Technical Memorandum

Co-Located Chemical Sampling Results at Historical Site Assessment Subarea 7 in Area IV

Santa Susana Field Laboratory
Ventura County, California

Prepared for:

Department of Energy
Energy Technology and Engineering Center
P.O. Box 10300
Canoga Park, California 91309

Prepared by:

CDM Federal Programs Corporation (CDM Smith)

Prepared under:

US Department of Energy
EM Consolidated Business Center
Contract DE-AM09-05SR22404
CDM Task Order DE-AT30-08CC60021/ET17

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I certify that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete.

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Acronyms and Abbreviations

%D	percent difference/percent drift
%R	percent recovery
mg/L	milligrams per liter
ng/L	nanograms per liter
pg/L	picograms per liter
µg/L	micrograms per liter
AOC	Administrative Order on Consent
ASTM	American Society for Testing and Materials
bgs	below ground surface
CDM	CDM Federal Programs Corporation
CoC	chain of custody
DOE	Department of Energy
DPT	direct push technology
DQI	data quality indicator
DQO	data quality objective
DTSC	Department of Toxic Substances Control
DUAR	data usability assessment review
EDL	estimated detection limit
EFH	extractable fuel hydrocarbon
EMAX	EMAX Laboratories, Inc.
EPA	U.S. Environmental Protection Agency
FTL	field team leader
GRO	gasoline range organics
HGL	HydroGeoLogic, Inc.
HSA	Historical Site Assessment
ICP	inductively coupled plasma
LCS	laboratory control sample
LCSD	laboratory control sample duplicate
LLI	Lancaster Laboratories, Inc.
MDL	method detection limit
mL	milliliters
MS	matrix spike
MSD	matrix spike duplicate
NDMA	n-Nitrosodimethylamine
ng/kg	nanogram per kilogram
PAH	polycyclic aromatic hydrocarbon
PARCCS	precision, accuracy, representativeness, comparability, completeness and sensitivity
PCB	polychlorinated biphenyl
PCT	polychlorinated triphenyl
PID	photoionization detector
QA	quality assurance
QAPP	quality assurance project plan
QC	quality control

RCRA	Resource Conservation and Recovery Act
RFI	RCRA Facility Investigation
RL	reporting limit
RPD	relative percent difference
SDG	sample delivery group
SIM	selective ion monitoring
SOW	statement of work
SSFL	Santa Susana Field Laboratory
SVOC	semi-volatile organic compound
TM	technical memorandum
TPH	total petroleum hydrocarbon
VOC	volatile organic compound
WP/FSAP	Work Plan/Field Sampling and Analysis Plan

Section 1
Introduction

This Technical Memorandum (TM) presents the results of chemical analyses of surface and subsurface soil, and soil from intermittent drainages collected under the *Master Work Plan/Field Sampling and Analysis Plan, Co-Located Chemical Sampling at Area IV, Santa Susana Field Laboratory, Ventura County, California* (CDM Federal Programs Corporation [CDM] 2011a) (WP/FSAP) and *Addendum No. 6 to Master Work Plan/Field Sampling and Analysis Plan, Co-Located Chemical Sampling at Area IV Santa Susana Field Laboratory* (WP/FSAP Addendum), *Ventura County, California, EPA Subareas 3, 5D South, 7 and 8 South Soil Sampling* (CDM 2011b).

This TM addresses sampling within U.S. Environmental Protection Agency (EPA) Historical Site Assessment (HSA) Subarea 7 of Area IV at Santa Susana Field Laboratory (SSFL) and provides a description of the sampling activities, the analytical results, and a discussion of the analytical data review findings. The TM does not provide an interpretation of the results. The data provided in this TM are intended to be combined with data collected under the prior Resource Conversation and Recovery Act (RCRA) Facility Investigation (RFI) efforts within the Area IV soil chemical database. A data gap analysis will be performed to assess the adequacy of Area IV data as a whole in defining the nature and extent of chemicals in soil for purposes of remedy determination.

1.1 Co-Located Soil Chemical Sampling Objectives

The radiological characterization study being performed by EPA includes collection of surface and subsurface soil, as well as drainage soil samples throughout Area IV of SSFL and the Northern Buffer Zone for analysis of radionuclides. The California Department of Toxic Substances Control (DTSC) and Department of Energy (DOE) agreed in the *Administrative Order on Consent for Remedial Action (AOC,* Docket Number HSA-CO 10/11-037) (DTSC 2010) that soil/sediment samples collected by EPA also be analyzed for chemical analytes. EPA's contractor, HydroGeoLogic, Inc. (HGL) was responsible for the collection of the EPA-proposed soil samples. DTSC and DOE agreed that the chemical analyses of the soil samples provided by EPA would be done by DOE's contractor, CDM. CDM was responsible for the management, shipment, and laboratory analyses of the samples collected for chemical analyses.

The AOC was signed by DTSC and DOE on December 6, 2010. The AOC is a legally binding order that requires and describes the characterization of Area IV and Northern Buffer Zone soils/sediments and further defines DOE's obligations in relation to radiologic and chemical cleanup of soils within these areas. It also stipulates that during Phase 1 of the chemical investigation activities, DOE is to analyze soil samples for chemical constituents at locations where EPA collects a sample for radiological analysis.

1.2 Basis for HSA Subarea 7 Soil Sampling

HGL's *Field Sampling Plan for Soil Sampling, Area IV Radiological Study, Santa Susana Field Laboratory, Ventura County, California* (HGL 2010) includes a description of the project objectives, the scope of work, laboratory analytical suites, sample collection and other standard field operation methods for EPA's radiological characterization study.

Subarea 7 FSP Addendum, Santa Susana Field Laboratory Site, Area IV Radiological Study (HGL 2011) was prepared by HGL to support the radiological soil sampling field implementation program specific to Subarea 7. This addendum provides the technical justification for location of the drainage, surface, and subsurface soil samples in Subarea 7. CDM obtained collocated soil samples for chemical analysis at each location where HGL collected soil samples for radionuclides analyses.

1.3 Geology

Subarea 7 is within the Chatsworth Formation that consists of fine to coarse grained sandstone interbedded with siltstone. The overlying native soils encountered consist of mostly sand and silts with minimal clay. The observed contact with bedrock occurs between 0.8 foot to 20 feet below ground surface (bgs). Non-native materials (gravel and asphalt) were observed in only trace quantities within this subarea.

Additional information regarding the geology in Area IV can be found in Volume I of *Group 7 – Northern Portion of Area IV RCRA Facility Investigation Report Santa Susana Field Laboratory, Ventura County, California* (MWH 2009).

1.4 Technical Memorandum Organization

This TM includes the following sections:

- **Section 1 - Introduction** – Summarizes the basis and objectives of the co-located soil sampling in Subarea 7
- **Section 2 - Field Sampling and Analytical Methods** – Provides details regarding field sampling procedures and laboratory analytical methods
- **Section 3 - Soil Sample Analytical Results** – Provides a summary of detected analytical results for each chemical; the appendices provide the overall results
- **Section 4 - Data Usability Assessment** – Discusses the results of the data review and validation processes
- **Section 5 - References**

Section 2
Field Sampling and Analytical Methods

Soil samples were collected from surface and drainage locations in Subarea 7 from September 13 through September 23, 2011. Subsurface sampling was performed from October 7 through November 4, 2011. The sample locations in the western portion of Subarea 7 are shown on Figure 2-1 and the locations in the eastern portion of Subarea 7 are shown on Figure 2-2.

Table 2-1 provides the rationale for sampling at each location, sample number, and date of collection for the soil samples; location description; description of any fill materials encountered; reasons for not sampling some of the locations proposed by EPA, and the required analyses.

All soil sampling equipment (described in Sections 2.1 and 2.2) that came into contact with sample materials was decontaminated prior to sample collection in accordance with the WP/FSAP.

2.1 Surface and Drainage Sampling

Surface soil and drainage samples in Subarea 7 were collected from the ground surface to 6 inches bgs. The surface of the sample area was prepared by HGL sampling personnel by removing leaves, grass, and any other surface debris. Surface samples to be analyzed for semivolatile organic compounds (SVOCs), polycyclic aromatic hydrocarbons (PAHs), and polychlorinated biphenyls (PCBs)/polychlorinated triphenyls (PCTs) were collected first using a slide hammer equipped with a 2-inch diameter and 6-inch long stainless steel sample liner. The sampler was pounded into the soil until its top was flush with the ground surface and then removed from the soil. The sample sleeve was removed from the sampler and both ends capped with a Teflon® liner and a plastic cap.

The soil sample for the remaining analytes was collected from a circular hole, approximately 12 inches in diameter to a depth of 6 inches bgs, using a stainless steel trowel and transferred to a stainless steel bowl and homogenized. Debris, wood, or other materials larger than 0.25 inch were removed prior to homogenization. After homogenization, the sample was placed into one or more 16-ounce glass jars. Adhesive sample labels, completed with all sampling information, were affixed to both the sample sleeves and jars. All sleeves and jars were placed into plastic baggies, and placed in a cooler with double bagged ice.

All surface and drainage samples were to be analyzed for the primary sample analytes (i.e., SVOCs, PAHs, metals [including mercury], hexavalent chromium, pH, fluoride, PCBs/PCTs, dioxins, and perchlorate) and pesticides and herbicides in Subarea 7. Selected surface and drainage samples in Subarea 7 were also to be analyzed for all of the secondary analytes (i.e., total petroleum hydrocarbons - extractable fuel hydrocarbons [TPH-EFH], TPH-gasoline range organics [TPH-GRO], nitrates, formaldehyde, n-Nitrosodimethylamine [NDMA], energetics, cyanide, terphenyls, glycols, and alcohols) or a subset of them as shown in Table 2-1.

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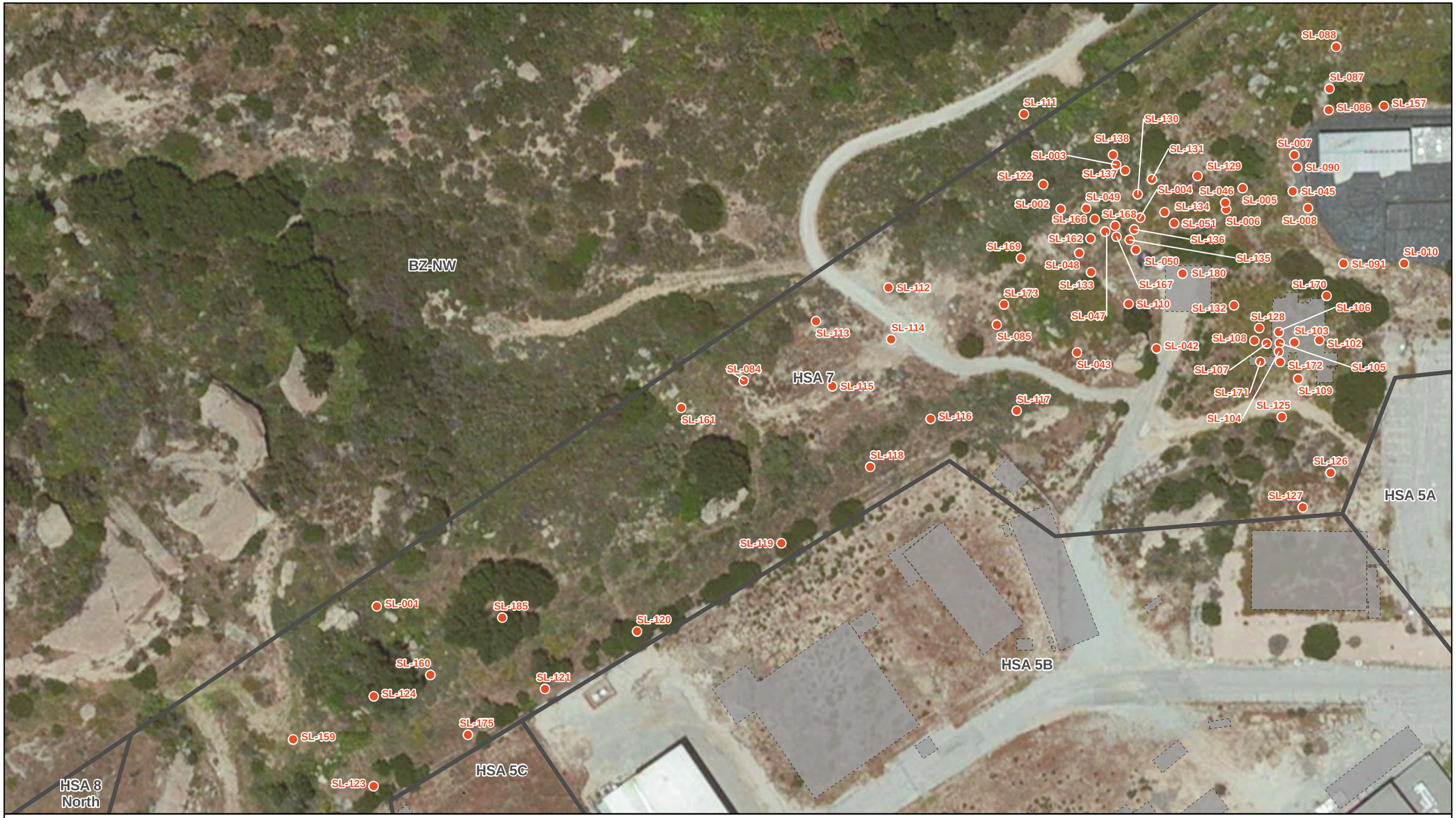

N

Legend

- Sample Location
- Area IV Subarea
- Removed Building

Aerial Source: Bing Maps, (c) 2010 Microsoft Corporation and its data suppliers

Subarea 7 Sample Locations West

Santa Susana Field Laboratory
Ventura County, California
Figure 2-1

0 17.5 35 70 105 140 Feet

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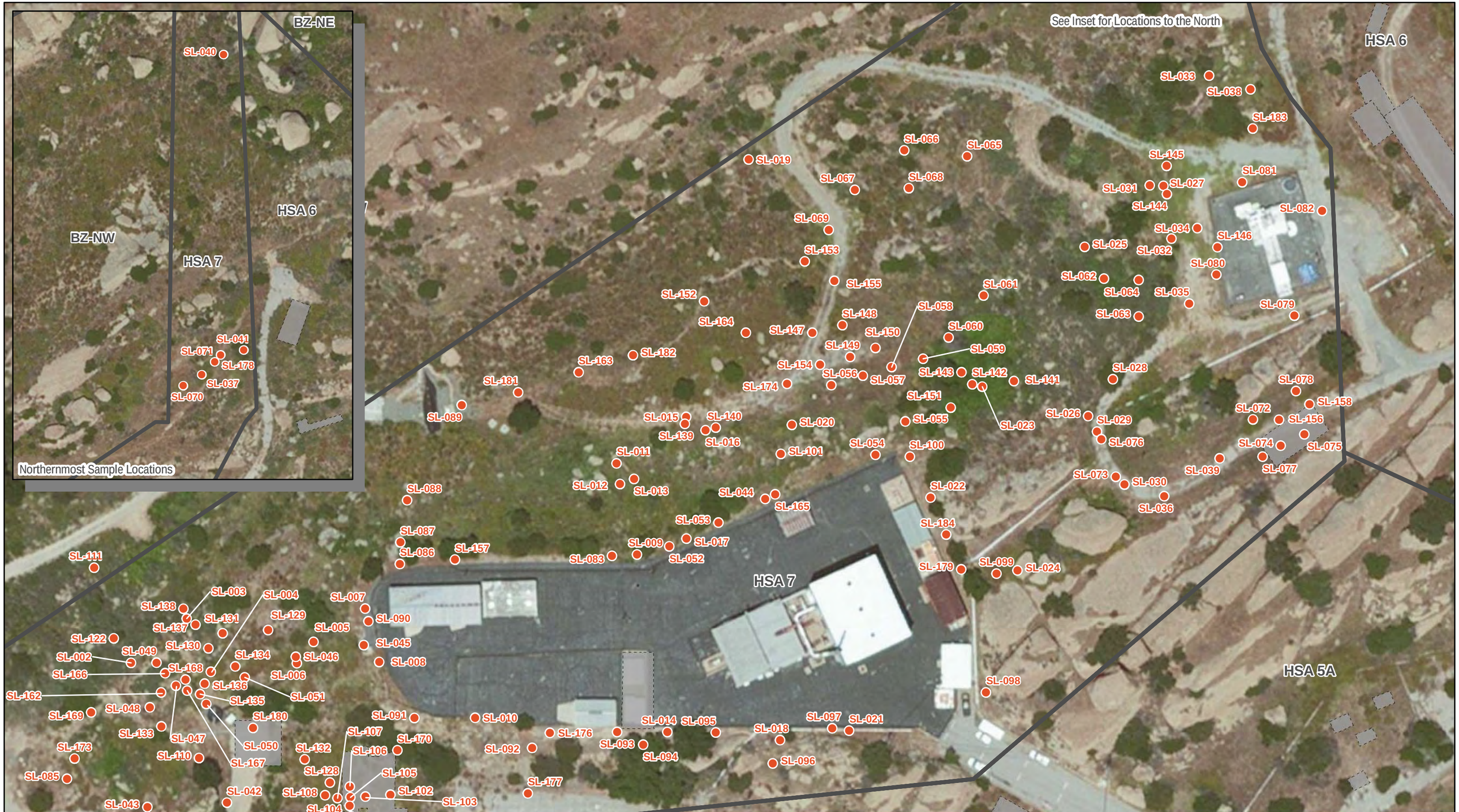

N

Legend

- Sample Location
- Area IV Subarea
- Removed Building

Aerial Source: Bing Maps, (c) 2010 Microsoft Corporation and its data suppliers

Subarea 7 Sample Locations East

Santa Susana Field Laboratory
Ventura County, California
Figure 2-2

0 17.5 35 70 105 140 Feet

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Sample Type	EPA Location ID	Location Description From EPA	EPA Technical Justification for Sample Collection	Boring Total Depth (ft bgs)	Description of Fill Encountered (from EPA Soil Boring Log)	Sample Date	Laboratory Analyses	Co-Located Chemical Sample Number
Surface	1	Southwest portion of Subarea 7. Northeast of the 56 Excavation.	Gamma scanning results show a potential gamma radiation anomaly - PGRAY 1	0.5	None indicated	9/21/2011	Primary	SL-001-SA7-SS-0.0-0.5
Subsurface	1	Southwest portion of Subarea 7. Northeast of the Building 56 Excavation.	Gamma scanning results show a potential gamma radiation anomaly - PGRAY 1	5.0	None indicated Refusal on sandstone	10/31/2011	Primary	SL-001-SA7-SB-4.0-5.0
Surface	2	Site 4614 - Northwest of Site 4614.	Gamma scanning results show a potential gamma radiation anomaly - PGRAY 2C	0.5	None indicated	9/19/2011	Primary & Secondary	SL-002-SA7-SS-0.0-0.5
Subsurface	2	Site 4614 - Northwest of Site 4614.	Gamma scanning results show a potential gamma radiation anomaly - PGRAY 2C	2.5	"10% sandstone rock fragments, trace asphalt" Refusal on sandstone	No subsurface sample collected due to refusal at < 2.5 ft bgs 10/10/2011	NA	NA
Surface	3	Site 4614 - North of Site 4614.	Gamma scanning results show a gamma radiation anomaly - GRAY 3	0.5	None indicated	9/19/2011	Primary & GATTC	SL-003-SA7-SS-0.0-0.5
Subsurface	3	Site 4614 - North of Site 4614.	Gamma scanning results show a gamma radiation anomaly - GRAY 4	3.0	None indicated Refusal on sandstone	No subsurface sample collected due to refusal at < 3.0 ft bgs (should have been sampled) 10/11/2011	NA	NA
Surface	4	Site 4614 - Northeast of Site 4614.	Gamma scanning results show a gamma radiation anomaly - GRAY 4C. Geophysical feature, "Conductivity".	0.5	None indicated	9/19/2011	Primary & Secondary	SL-004-SA7-SS-0.0-0.5
Subsurface	4	Site 4614 - Northeast of Site 4614.	Gamma scanning results show a gamma radiation anomaly - GRAY 4C. Geophysical feature, "Conductivity".	1.0	"15% sandstone rock fragments, concrete and asphalt fragments"	No subsurface sample collected due to refusal at < 2.5 ft bgs 10/10/2011	NA	NA
Surface	5	Site 4614 - East of Site 4614 and west of the RMHF.	Gamma scanning results show a gamma radiation anomaly - GRAY 5C	0.5	None indicated	9/20/2011	Primary & GATTC	SL-005-SA7-SS-0.0-0.5
Subsurface	5	Site 4614 - East of Site 4614 and west of the RMHF.	Gamma scanning results show a gamma radiation anomaly - GRAY 5C	1.8	None indicated Refusal on sandstone	No subsurface sample collected due to refusal at < 2.5 ft bgs 10/7/2011	NA	NA
Surface	6	Site 4614 - East of Site 4614 and west of the RMHF.	Gamma scanning results show a potential gamma radiation anomaly - PGRAY 6C	0.5	None indicated	9/20/2011	Primary & GATTC	SL-006-SA7-SS-0.0-0.5
Subsurface	6	Site 4614 - East of Site 4614 and west of the RMHF.	Gamma scanning results show a potential gamma radiation anomaly - PGRAY 6C	2.3	Fill "silty sand with gravel" from 0 to 2.3 ft "15% gravel angular to subangular" from 0 to 1.0 ft "10% gravel angular to subangular" from 1.0 2.3 ft	No subsurface sample collected due to refusal at < 2.5 ft bgs 10/7/2011	NA	NA
Surface	7	RMHF - West side of the RMHF, outside of the fence.	Gamma scanning results show a gamma radiation anomaly - GRAY 7C	0.5	"trace asphalt pieces found"	9/16/2011	Primary & GATTC	SL-007-SA7-SS-0.0-0.5
Subsurface	7	RMHF - West side of the RMHF, outside of the fence.	Gamma scanning results show a gamma radiation anomaly - GRAY 7C	2.5	None indicated Refusal on sandstone	No subsurface sample collected due to refusal at < 2.5 ft bgs 10/27/2011	NA	NA
Surface	8	RMHF - West side of the RMHF, outside of the fence.	Gamma scanning results show a gamma radiation anomaly - GRAY 8C	0.5	"1 iron bolt found"	9/15/2011	Primary & GATTC	SL-008-SA7-SS-0.0-0.5MS
Subsurface	8	RMHF - West side of the RMHF, outside of the fence.	Gamma scanning results show a gamma radiation anomaly - GRAY 8C	2.8	"trace gravel" from 0 to 2.8 ft	10/27/2011	Primary & GATTC	SL-008-SA7-SB-3.0 SL-008-SA7-SB-2.5-3.0
Surface	9	RMHF - North side, outside of the fence.	Gamma scanning results show a gamma radiation anomaly - GRAY 9C	0.5	None indicated	9/16/2011	Primary & GATTC	SL-009-SA7-SS-0.0-0.5

Table 2-1
Soil Samples Collected from HSA Subarea 7

Sample Type	EPA Location ID	Location Description From EPA	EPA Technical Justification for Sample Collection	Boring Total Depth (ft bgs)	Description of Fill Encountered (from EPA Soil Boring Log)	Sample Date	Laboratory Analyses	Co-Located Chemical Sample Number
Subsurface	9	RMHF - North side, outside of the fence.	Gamma scanning results show a gamma radiation anomaly - GRAY 9C	0.8	None indicated Refusal on sandstone	No subsurface sample collected due to refusal at < 2.5 ft bgs 10/26/2011	NA	NA
Surface	10	RMHF - South side of the RMHF, outside of the fence.	Gamma scanning results show a gamma radiation anomaly - GRAY 10C	0.5	None indicated	9/15/2011	Primary & GATTC	SL-010-SA7-SS-0.0-0.5
Subsurface	10	RMHF - South side of the RMHF, outside of the fence.	Gamma scanning results show a gamma radiation anomaly - GRAY 10C	2.3	None indicated Refusal on sandstone	No subsurface sample collected due to refusal at < 2.5 ft bgs 10/27/2011	NA	NA
Surface	11	North Drainage - North of the RMHF.	Gamma scanning results show a gamma radiation anomaly - GRAY 11C	0.5	"trace asphalt fragments"	9/22/2011	Primary	SL-011-SA7-SS-0.0-0.5
Subsurface	11	North Drainage - North of the RMHF.	Gamma scanning results show a gamma radiation anomaly - GRAY 11C	1.0	None indicated Refusal on sandstone	No subsurface sample collected due to refusal at < 2.5 ft bgs 10/17/2011	NA	NA
Surface	12	North Drainage - North of the RMHF.	Gamma scanning results show a gamma radiation anomaly - GRAY 12C	0.5	None indicated	9/22/2011	Primary & GATTC	SL-012-SA7-SS-0.0-0.5
Subsurface	12	North Drainage - North of the RMHF.	Gamma scanning results show a gamma radiation anomaly - GRAY 12C	1.5	None indicated Refusal on sandstone	No subsurface sample collected due to refusal at < 2.5 ft bgs 10/17/2011	NA	NA
Surface	13	North Drainage - North of the RMHF.	Gamma scanning results show a gamma radiation anomaly - GRAY 13C	0.5	None indicated	9/22/2011	Primary & GATTC	SL-013-SA7-SS-0.0-0.5
Subsurface	13	North Drainage - North of the RMHF.	Gamma scanning results show a gamma radiation anomaly - GRAY 13C	2.5	None indicated Refusal on sandstone	No subsurface sample collected due to refusal at < 2.5 ft bgs 10/17/2011	NA	NA
Surface	14	RMHF - South side of the RMHF, outside of the fence.	Gamma scanning results show a gamma radiation anomaly - GRAY 14C	0.5	None indicated	9/15/2011	Primary & GATTC	SL-014-SA7-SS-0.0-0.5
Subsurface	14	RMHF - South side of the RMHF, outside of the fence.	Gamma scanning results show a gamma radiation anomaly - GRAY 14C	1.8	None indicated Refusal on sandstone	No subsurface sample collected due to refusal at < 2.5 ft bgs 10/17/2011	NA	NA
Surface	15	North Drainage - North of the RMHF.	Gamma scanning results show a gamma radiation anomaly - GRAY 15C	0.5	None indicated	9/22/2011	Primary & GATTC	SL-015-SA7-SS-0.0-0.5MS
Subsurface	15	North Drainage - North of the RMHF.	Gamma scanning results show a gamma radiation anomaly - GRAY 15C	1.0	None indicated Refusal on sandstone	No subsurface sample collected due to refusal at < 2.5 ft bgs 9/20/2011	NA	NA
Surface	17	RMHF - Northeast side, outside of the fence.	Gamma scanning results show a gamma radiation anomaly - GRAY 17C	0.5	None indicated	9/16/2011	Primary & GATTC	SL-017-SA7-SS-0.0-0.5
Subsurface	17	RMHF - Northeast side, outside of fence.	Gamma scanning results show a gamma radiation anomaly - GRAY 17C	2.0	None indicated Refusal on sandstone	No subsurface sample collected due to refusal at < 2 ft bgs 10/26/2011	NA	NA
Surface	18	RMHF - South side of the RMHF, outside of the fence.	Gamma scanning results show a gamma radiation anomaly - GRAY 18C	0.5	"trace pieces of rubber & tar"	9/15/2011	Primary & GATTC	SL-018-SA7-SS-0.0-0.5
Subsurface	18	RMHF - South side of the RMHF, outside of the fence.	Gamma scanning results show a gamma radiation anomaly - GRAY 18C	1.5	None indicated	No subsurface sample collected due to refusal at < 2.5 ft bgs 10/12/2011	NA	NA
Surface	19	North Drainage - North of the RMHF, on the north side of the drainage.	Gamma scanning results show a potential gamma radiation anomaly - PGRAY 19T	0.5	None indicated	9/23/2011	Primary & GATTC	SL-019-SA7-SS-0.0-0.5

Sample Type	EPA Location ID	Location Description From EPA	EPA Technical Justification for Sample Collection	Boring Total Depth (ft bgs)	Description of Fill Encountered (from EPA Soil Boring Log)	Sample Date	Laboratory Analyses	Co-Located Chemical Sample Number
Subsurface	19	North Drainage - North of the RMHF, on the north side of the drainage.	Gamma scanning results show a potential gamma radiation anomaly - PGRAY 19T	2.5	None indicated Refusal on sandstone	No subsurface sample collected due to refusal at < 2.5 ft bgs 10/21/2011	NA	NA
Surface	20	North Drainage - North of the RMHF.	Gamma scanning results show a potential gamma radiation anomaly - PGRAY 20C	0.5	None indicated	9/22/2011	Primary & GATTC	SL-020-SA7-SS-0.0-0.5
Subsurface	20	North Drainage - North of the RMHF.	Gamma scanning results show a potential gamma radiation anomaly - PGRAY 20C	10.0	None indicated	10/18/2011	TPH-GRO Primary & GATTC TPH-GRO Primary & GATTC	SL-020-SA7-SB-4.5 SL-020-SA7-SB-4.0-5.0 SL-020-SA7-SB-9.5 SL-020-SA7-SB-9.0-10.0
Surface	21	RMHF - Southeast side, outside of the fence.	Gamma scanning results show a gamma radiation anomaly - GRAY 21C	0.5	"trace asphalt"	9/15/2011	Primary & GATTC	SL-021-SA7-SS-0.0-0.5
Subsurface	21	RMHF - Southeast side, outside of the fence.	Gamma scanning results show a gamma radiation anomaly - GRAY 21C	3.3	"presence of metal wire at ~1.0ft" Refusal on sandstone	No subsurface sample collected due to refusal at < 2.5 ft bgs 10/13/2011	NA	NA
Surface	22	RMHF - Northeast corner, outside of the fence.	Gamma scanning results show a gamma radiation anomaly - GRAY 22C	0.5	None indicated	9/16/2011	Primary & GATTC	SL-022-SA7-SS-0.0-0.5
Subsurface	22	RMHF - Northeast corner, outside of the fence.	Gamma scanning results show a gamma radiation anomaly - GRAY 22C	1.0	None indicated Refusal on sandstone	No subsurface sample collected due to refusal at < 2.5 ft bgs 10/25/2011	NA	NA
Surface	23	North Drainage - Northeast of the RMHF.	Gamma scanning results show a gamma radiation anomaly - GRAY 23C	0.5	None indicated	9/21/2011	Primary & GATTC	SL-023-SA7-SS-0.0-0.5
Subsurface	23	North Drainage - Northeast of the RMHF.	Gamma scanning results show a gamma radiation anomaly - GRAY 23C	4.1	None indicated Refusal on sandstone	10/20/2011	Primary & GATTC	SL-023-SA7-SB-2.5 SL-023-SA7-SB-2.0-3.0
Surface	24	RMHF - East side of the RMHF, outside of the fence.	Gamma scanning results show a gamma radiation anomaly - GRAY 24C	0.5	None indicated	9/14/2011	Primary & GATTC	SL-024-SA7-SS-0.0-0.5
Subsurface	24	RMHF - East side of the RMHF, outside of the fence.	Gamma scanning results show a gamma radiation anomaly - GRAY 24C	2.5	None indicated Refusal on sandstone	No subsurface sample collected due to refusal at < 2.5 ft bgs 10/25/2011	NA	NA
Surface	25	North Drainage - Northeast of the RMHF.	Gamma scanning results show a gamma radiation anomaly - GRAY 25C	0.5	None indicated	9/23/2011	Primary	SL-025-SA7-SS-0.0-0.5
Subsurface	25	North Drainage - Northeast of the RMHF.	Gamma scanning results show a gamma radiation anomaly - GRAY 25C	10.0	Fill from 0 to 10.0 ft: "silty sand" from 0 to 1.5 ft, "poorly graded sand with silt" from 1.5 to 8.5 ft, "sandstone cobble" from 8.5 to 9.8 ft	9/19/2011	Primary	SL-025-SA7-SB-4.0-5.0 SL-025-SA7-SB-9.0-10.0
Surface	26	Former Building 4654 - Northwest of former Building 4654 on the west side of the road.	Gamma scanning results show a gamma radiation anomaly - GREY 26C	0.5	"piece of styrofoam found"	9/14/2011	Primary	SL-026-SA7-SS-0.0-0.5
Subsurface	26	Former Building 4654 - Northwest of former Building 4654 on the west side of the road.	Gamma scanning results show a gamma radiation anomaly - GREY 26C	2.1	None indicated Refusal on sandstone	No subsurface sample collected due to refusal at < 2.5 ft bgs 10/24/2011	NA	NA
Surface	27	Former Building 4133 - Northwest of former Building 4133.	Gamma scanning results show a gamma radiation anomaly - GRAY 27C	0.5	"some fibrous cloth tape and insulation found"	9/23/2011	Primary	SL-027-SA7-SS-0.0-0.5
Subsurface	27	Former Building 4133 - Northwest of former Building 4133.	Gamma scanning results show a gamma radiation anomaly - GRAY 27C	1.7	None indicated Refusal on sandstone	No subsurface sample collected due to refusal at < 2.5 ft bgs 10/24/2011	NA	NA
Surface	28	Former Building 4654 - Northwest of former Building 4654. west side of the road.	Gamma scanning results show a potential gamma radiation anomaly - PGRAY 28C	0.5	"15% gravel fill rock asphalt and sandstone fragments"	9/14/2011	Primary	SL-028-SA7-SS-0.0-0.5
Subsurface	28	Former Building 4654 - Northwest of former Building 4654. west side of the road.	Gamma scanning results show a potential gamma radiation anomaly - PGRAY 28C	9.0	Fill "silty sand with gravel" into "silty sand" from 0 to 9.0 ft "10% fine subangular to subrounded gravel (fill rock and sandstone)" from 0 to 3.8 ft "5% fine (pea size) gravel" from 4.0 to 8.8 ft Refusal on sandstone	9/23/2011	Primary	SL-028-SA7-SB-4.0-5.0 SL-028-SA7-SB-8.0-9.0

Table 2-1
Soil Samples Collected from HSA Subarea 7

Sample Type	EPA Location ID	Location Description From EPA	EPA Technical Justification for Sample Collection	Boring Total Depth (ft bgs)	Description of Fill Encountered (from EPA Soil Boring Log)	Sample Date	Laboratory Analyses	Co-Located Chemical Sample Number
Surface	29	Former Building 4654 - Northwest of former Building 4654, west edge of the road.	Gamma scanning results show a gamma radiation anomaly - GRAY 29C	0.5	"20% fine to coarse gravel, asphalt, gravel fill rock, trace sandstone cobbles"	9/14/2011	Primary	SL-029-SA7-SS-0.0-0.5
Subsurface	29	Former Building 4654 - Northwest of former Building 4654, west edge of the road.	Gamma scanning results show a gamma radiation anomaly - GRAY 29C	2.5	Fill "silty sand" with 5 % fine subrounded gravel (fill rock) from 0 to 2.4 ft Refusal on sandstone	No subsurface sample collected due to refusal at < 2.5 ft bgs 9/23/2011	NA	NA
Surface	30	Former Building 4654 - Southwest of former Building 4654, west edge of the road.	Gamma scanning results show a gamma radiation anomaly - GRAY 30C	0.5	"10% gravel fill rock and asphalt"	9/13/2011	Primary	SL-030-SA7-SS-0.0-0.5
Subsurface	30	Former Building 4654 - Southwest of former Building 4654, west edge of the road.	Gamma scanning results show a gamma radiation anomaly - GRAY 30C	5.5	Fill "silty sand" with small sub-rounded granitic gravel (~10 mm) from 0 to 3.7 ft Refusal on sandstone	9/23/2011	Primary	SL-030-SA7-SB-4.0-5.0
Surface	32	Building 4133 - West of former Building 4133.	Gamma scanning results show a gamma radiation anomaly - GRAY 32C	0.5	"15% sandstone rock fragments, asphalt fragments and gravel fill rock"	9/14/2011	Primary & Secondary	SL-032-SA7-SS-0.0-0.5
Subsurface	32	Building 4133 - West of former Building 4133.	Gamma scanning results show a gamma radiation anomaly - GRAY 32C	10.0	Fill "silty sand" into "poorly graded sand" from 0 to 10.0 ft	9/19/2011	TPH-GRO Primary & Secondary TPH-GRO Primary & Secondary	SL-032-SA7-SB-4.5 SL-032-SA7-SB-4.0-5.0 SL-032-SA7-SB-9.5 SL-032-SA7-SB-9.0-10.0
Surface	33	Building 4133 - North of Building 4133.	Gamma scanning results show a gamma radiation anomaly - GRAY 33C	0.5	None indicated	9/14/2011	Primary	SL-033-SA7-SS-0.0-0.5
Subsurface	33	Building 4133 - North of Building 4133.	Gamma scanning results show a gamma radiation anomaly - GRAY 33C	9.8	None indicated Refusal on sandstone	10/24/2011	Primary	SL-033-SA7-SB-4.0-5.0 SL-033-SA7-SB-9.0-10.0
Surface	34	Building 4133 - West of former Building 4133.	Gamma scanning results show a gamma radiation anomaly - GRAY 34C	0.5	"1 iron nail found"	9/13/2011	Primary	SL-034-SA7-SS-0.0-0.5
Subsurface	34	Building 4133 - West of former Building 4133.	Gamma scanning results show a gamma radiation anomaly - GRAY 34C	10.0	Fill " silty sand" and "poorly graded sand" from 0 to 10.0 ft	9/16/2011	Primary	SL-034-SA7-SB-4.0-5.0 SL-034-SA7-SB-9.0-10.0
Surface	35	Building 4133 - Southwest of Building 4133.	Gamma scanning results show a gamma radiation anomaly - GRAY 35C	0.5	"30% gravel fill rock, concrete and sandstone rock fragments"	9/13/2011	Primary	SL-035-SA7-SS-0.0-0.5
Subsurface	35	Building 4133 - Southwest of Building 4133.	Gamma scanning results show a gamma radiation anomaly - GRAY 35C	8.0	Fill "silty sand" from 0 to 7.5 ft "sandstone medium gravel" from 3.1 to 3.3 ft	9/16/2011	Primary	SL-035-SA7-SB-4.0-5.0 SL-035-SA7-SB-9.0-10.0
Surface	36	Former Building 4654 - Southwest of former Building 4654.	Gamma scanning results show a gamma radiation anomaly - GRAY 36C	0.5	"15% gravel fill rock asphalt and sandstone fragments"	9/14/2011	Primary	SL-036-SA7-SS-0.0-0.5
Subsurface	36	Former Building 4654 - Southwest of former Building 4654.	Gamma scanning results show a gamma radiation anomaly - GRAY 36C	1.5	Fill "sandy silt" with "5% subangular fine gravel" from 0 to 1.3 ft Refusal on sandstone	No subsurface sample collected due to refusal at < 2.5 ft bgs 9/22/2011	NA	NA
Surface	37	Northeastern corner of Subarea 7.	Gamma scanning results show a gamma radiation anomaly - GRAY 37C	0.5	None indicated	9/13/2011	Primary & GATT	SL-037-SA7-SS-0.0-0.5
Subsurface	37	Northeastern corner of Subarea 7.	Gamma scanning results show a gamma radiation anomaly - GRAY 37C	5.0	None indicated Refusal on sandstone	9/15/2011	TPH-GRO Primary & GATTC	SL-037-SA7-SB-4.5 SL-037-SA7-SB-4.0-5.0
Surface	38	Building 4133 - North of Building 4133.	Gamma scanning results show a gamma radiation anomaly - GRAY 38C	0.5	"5% sandstone rock fragments and concrete fragments"	9/14/2011	Primary	SL-038-SA7-SS-0.0-0.5
Subsurface	38	Building 4133 - North of Building 4133.	Gamma scanning results show a gamma radiation anomaly - GRAY 38C	7.3	None indicated Refusal on sandstone	10/24/2011	Primary	SL-038-SA7-SB-4.0-5.0
Surface	39	Former Building 4654 - Southwest of former Building 4654.	Gamma scanning results show a gamma radiation anomaly - GRAY 39C	0.5	"15% sandstone fragments and gravel fill rock"	9/14/2011	Primary & GATT	SL-039-SA7-SS-0.0-0.5
Subsurface	39	Former Building 4654 - Southwest of former Building 4654.	Gamma scanning results show a gamma radiation anomaly - GRAY 39C	7.0	Fill "silty sandy" from 0 to 4.0 ft "5% pea size gravel" from 4.0 to 4.8 ft Refusal on sandstone	9/22/2011	TPH-GRO Primary & GATT	SL-039-SA7-SB-4.5 SL-039-SA7-SB-4.0-5.0
Surface	40	Northeastern corner of Subarea 7.	Gamma scanning results show a gamma radiation anomaly - GRAY 40C	0.5	None indicated	9/13/2011	Primary	SL-040-SA7-SS-0.0-0.5
Subsurface	40	Northeastern corner of Subarea 7.	Gamma scanning results show a gamma radiation anomaly - GRAY 40C	NA	NA	No sample collected-Archeology Site	NA	NA
Surface	41	Northeastern corner of Subarea 7.	Gamma scanning results show a gamma radiation anomaly - GRAY 41C	0.5	"trace carbon"	9/13/2011	Primary & GATT	SL-041-SA7-SS-0.0-0.5
Subsurface	41	Northeastern corner of Subarea 7.	Gamma scanning results show a gamma radiation anomaly - GRAY 41C	7.5	None indicated Refusal on sandstone	9/14/2011	TPH-GRO Primary & GATT	SL-041-SA7-SB-4.5 SL-041-SA7-SB-4.0-5.0
Surface	42	Former Building 4811 - South of former Building 4811.	Gamma scanning results show a potential gamma radiation anomaly - PGRAY 42C	0.5	"15% sandstone rock fragments and concrete fragments"	9/19/2011	Primary	SL-042-SA7-SS-0.0-0.5MS
Subsurface	42	Former Building 4811 - South of former Building 4811.	Gamma scanning results show a potential gamma radiation anomaly - PGRAY 42C	2.8	Fill "silty sand" from 0 to 2.6 ft Refusal on sandstone	No subsurface sample collected due to refusal at < 2.5 ft bgs 9/29/2011	NA	NA

Sample Type	EPA Location ID	Location Description From EPA	EPA Technical Justification for Sample Collection	Boring Total Depth (ft bgs)	Description of Fill Encountered (from EPA Soil Boring Log)	Sample Date	Laboratory Analyses	Co-Located Chemical Sample Number
Surface	43	Site 4614 - Southwest of the RMHF Holding Pond.	Aerial photo feature, "Debris Area".	0.5	None indicated	9/20/2011	Primary & GATT, formaldehyde, NDMA, nitrate, Dowanol	SL-043-SA7-SS-0.0-0.5
Subsurface	43	Site 4614 - Southwest of the RMHF Holding Pond.	Aerial photo feature, "Debris Area".	1.5	Fill "silty sand" from 0 to 0.5 ft Refusal on sandstone	No subsurface sample collected due to refusal at < 2.5 ft bgs 10/10/2011	NA	NA
Surface	45	RMHF - West side of the RMHF, outside of the fence.	Location of former drainage from RMHF to the former holding pond. Historical data show elevated levels of radionuclide's. Gamma scanning survey readings indicate elevated levels of cesium associated with GRAY 7C.	0.5	"15% sandstone rock fragments and asphalt fragments"	9/15/2011	Primary & Secondary	SL-045-SA7-SS-0.0-0.5
Subsurface	45	RMHF - West side of the RMHF, outside of the fence.	Location of former drainage from RMHF to the former holding pond. Historical data show elevated levels of radionuclide's. Gamma scanning survey readings indicate elevated levels of cesium associated with GRAY 7C.	0.9	None indicated Refusal on sandstone	No subsurface sample collected due to refusal at < 2.5 ft bgs 10/27/2011	NA	NA
Surface	46	Site 4614 - East of the former RMHF Holding Pond and west of the RMHF.	Potential residual contamination from the remediation of the former drainage way from RMHF to the former holding pond. Historical data show elevated reading of radionuclides.	0.5	None indicated	9/20/2011	Primary & Secondary	SL-046-SA7-SS-0.0-0.5
Subsurface	46	Site 4614 - East of the former RMHF Holding Pond and west of the RMHF.	Potential residual contamination from the remediation of the former drainage way from RMHF to the former holding pond. Historical data show elevated reading of radionuclides.	1.5	None indicated Refusal on sandstone	10/7/2011	TPH-GRO Primary & Secondary	SL-046-SA6-SB-3.0 SL-046-SA6-SB-2.5-3.5
Surface	47	Site 4614 - Center of the RMHF Holding Pond.	Characterize potential residual contamination within the former RMHF Holding Pond.	0.5	None indicated	9/20/2011	Primary & Secondary	SL-047-SA7-SS-0.0-0.5
Subsurface	47	Site 4614 - Center of the RMHF Holding Pond.	Characterize potential residual contamination within the former RMHF Holding Pond.	3.8	Fill "silty sand with gravel" from 0 to 3.8 ft "10% sandstone gravel angular-subangular" from 0 to 1.0 ft "10% sandstone & granite (1/6" to 1.5" diam)" from 1.0 to 3.8 ft Refusal on sandstone	No subsurface sample collected due to refusal at < 2.5 ft bgs 10/11/2011	NA	NA
Surface	48	Site 4614 - Southwest side of the former RMHF Holding Pond.	Characterize potential residual contamination surrounding the former RMHF Holding Pond.	0.5	"5% sandstone asphalt and cement fragments"	9/19/2011	Primary & Secondary	SL-048-SA7-SS-0.0-0.5
Subsurface	48	Site 4614 - Southwest side of the former RMHF Holding Pond.	Characterize potential residual contamination surrounding the former RMHF Holding Pond.	10.0	Fill " silty sand" with "trace artificial fill gravel" from 0 to 1.0 ft	11/2/2011	TPH-GRO Primary & Secondary TPH-GRO Primary & Secondary	SL-048-SA7-SB-4.5 SL-048-SA7-SB-4.0-5.0 SL-048-SA7-SB-9.5MS SL-048-SA7-SB-9.0-10.0MS
Surface	49	Site 4614 - Northeast side of the former holding pond.	Characterize potential residual contamination surrounding the former RMHF Holding Pond.	0.5	None indicated	9/20/2011	Primary & Secondary	SL-049-SA7-SS-0.0-0.5
Subsurface	49	Site 4614 - Northeast side of the former holding pond.	Characterize potential residual contamination surrounding the former RMHF Holding Pond.	5.0	"trace asphalt fragments"	10/11/2011	TPH Primary & Secondary	SL-049-SA7-SB-4.5 SL-049-SA7-SB-4.0-5.0
Surface	50	Site 4614 - Southeast side of the former RMHF Holding Pond.	Characterize potential residual contamination surrounding the former RMHF Holding Pond. Gamma survey readings indicate elevated levels of cesium associated with GRAY 4C.	0.5	"15% gravel fill rock, asphalt fragments"	9/20/2011	Primary & Secondary	SL-050-SA7-SS-0.0-0.5MS
Subsurface	50	Site 4614 - Southeast side of the former RMHF Holding Pond.	Characterize potential residual contamination surrounding the former RMHF Holding Pond. Gamma survey readings indicate elevated levels of cesium associated with GRAY 4C.	1.3	"trace gravel fill" Refusal on CONCRETE	No subsurface sample collected due to refusal at < 2.5 ft bgs 10/10/2011	NA	NA
Surface	51	Site 4614 - East of the former RMHF Holding Pond and west of the RMHF.	Location of former surface water drainage from RMHF to the former holding pond. Historical data show elevated concentrations of radionuclide's. Aerial photo feature, "Debris Area".	0.5	None indicated	9/20/2011	Primary & Secondary	SL-051-SA7-SS-0.0-0.5
Subsurface	51	Site 4614 - East of the former RMHF Holding Pond and west of the RMHF.	Location of former surface water drainage from RMHF to the former holding pond. Historical data show elevated concentrations of radionuclide's. Aerial photo feature, "Debris Area".	2.5	Fill "silty sand" and "sand with gravel" from 0 to 2.5 ft "small pieces of asphalt debris, 5 % gravel" from 0 to 0.5 ft Refusal on sandstone	No subsurface sample collected due to refusal at < 2.5 ft bgs 10/7/2011	NA	NA
Surface	52	RMHF - North side of the RMHF, in the asphalt drainage located just outside of the fence.	Gamma scanning survey readings indicate elevated levels of cesium associated with GRAY 17C.	0.5	None indicated	9/16/2011	Primary & GATTC	SL-052-SA7-SS-0.0-0.5
Subsurface	52	RMHF - North side of the RMHF, in the asphalt drainage located just outside of the fence.	Gamma scanning survey readings indicate elevated levels of cesium associated with GRAY 17C.	1.1	None indicated Refusal on sandstone	No subsurface sample collected due to refusal at < 2.5 ft bgs 10/26/2011	NA	NA

Table 2-1
Soil Samples Collected from HSA Subarea 7

Sample Type	EPA Location ID	Location Description From EPA	EPA Technical Justification for Sample Collection	Boring Total Depth (ft bgs)	Description of Fill Encountered (from EPA Soil Boring Log)	Sample Date	Laboratory Analyses	Co-Located Chemical Sample Number
Surface	53	RMHF - North side of the RMHF, in the asphalt drainage located just outside of the fence.	Gamma scanning survey readings indicate elevated readings of cesium associated with GRAY 17C.	0.5	None indicated	9/16/2011	Primary & GATTC	SL-053-SA7-SS-0.0-0.5
Subsurface	53	RMHF - North side of the RMHF, in the asphalt drainage located just outside of the fence.	Gamma scanning survey readings indicate elevated readings of cesium associated with GRAY 17C.	2.2	None indicated Refusal on sandstone	No subsurface sample collected due to refusal at < 2.5 ft bgs 10/26/2011	NA	NA
Surface	54	RMHF - Northeast side of the RMHF, in the drainage ditch located just outside of the fence.	Gamma scanning survey readings indicate elevated readings of cesium along the trough of the drainage ditch.	0.5	None indicated	9/16/2011	Primary & Secondary	SL-054-SA7-SS-0.0-0.5
Subsurface	54	RMHF - Northeast side of the RMHF, in the drainage ditch located just outside of the fence.	Gamma scanning survey readings indicate elevated readings of cesium along the trough of the drainage ditch.	1.5	None indicated Refusal on sandstone	No subsurface sample collected due to refusal at < 2.5 ft bgs 10/26/2011	NA	NA
Drainage	55	RMHF - Drainage on the northeast corner of the RMHF.	Characterize potential radiological contamination in drainage due to surface water run-off from the RMHF.	0.5	"barbed wire, wood plank, metal pieces, plastic found"	9/21/2011	Primary & Secondary	SL-055-SA7-SS-0.0-0.5
Subsurface	56	RMHF - Septic Leach Field. Approximately 75 feet north of the northeast portion of the RMHF.	Characterize potential residual contamination from the remediation of the RMHF Septic Leach Field. Geophysical feature, "Conductivity Anomaly". Historical data show elevated levels of radionuclides within the area.	5.0	Fill "silty sand" into "graded sand with silt" from 0 to 5.0 ft "sandstone cobble ~2" thick" at 4.2 ft "volcanic gravel (fine):" at 4.5 ft Refusal on sandstone	9/21/2011	TPH-GRO Primary & Secondary	SL-056-SA7-SB-4.5 SL-056-SA7-SB-4.0-5.0
Subsurface	57	RMHF - Septic Leach Field. Approximately 85 feet north of the northeastern portion of the RMHF.	Characterize potential residual contamination from the remediation of the RMHF Septic Leach Field. Geophysical feature, "Conductivity Anomaly". Historical data show elevated levels of radionuclides in the area.	4.0	Fill "silty sand" into "poorly graded sand" from 0 to 4.0 ft "clayey silt with sand" lense ~ 2 inch at 0.9 ft "sandstone cobble" ~3 inch at 1.8 ft "trace charcoal" at 2.9 ft Refusal on sandstone	9/21/2011	TPH-GRO Primary & Secondary	SL-057-SA7-SB-3.5 SL-057-SA7-SB-3.0-4.0
Subsurface	58	RMHF - Septic Leach Field. Approximately 65 feet north of the northeastern portion of the RMHF.	Characterize potential residual contamination from remediation of the RMHF Septic Leach Field. Geophysical feature, "Conductivity Anomaly". Historical data show elevated levels of radionuclides in the area.	1.5	None indicated Refusal on sandstone	9/20/2011	TPH-GRO Primary & Secondary	SL-058-SA7-SB-1.0 SL-058-SA7-SB-0.5-1.5
Subsurface	59	RMHF - Septic 75 feet north of the northeast corner of the RMHF.	Characterize potential residual contamination associated with the removal and remediation of the RMHF Septic Leach Field. Geophysical feature, "Conductivity Anomaly".	6.0	None indicated Refusal on sandstone	9/20/2011	TPH Primary & GATTC	SL-059-SA7-SB-5.5 SL-059-SA7-SB-5.0-6.0
Subsurface	60	RMHF - Septic Leach Field. Approximately 100 feet north of the northeast corner of the RMHF.	Characterize potential residual contamination from the removal and remediation of the RMHF Septic Leach Field. Geophysical feature, "Conductivity Anomaly"	3.6	None indicated Refusal on sandstone	10/20/2011	TPH Primary & GATTC	SL-060-SA6-SB-3.0 SL-060-SA6-SB-2.5-3.5
Surface	61	North Drainage - Approximately 150 feet north of the northeastern portion of the RMHF.	Aerial photo feature, "Debris Area". Characterize potential contamination from surface water run-off from Building 4133.	0.5	None indicated	9/21/2011	Primary & GATTC	SL-061-SA7-SS-0.0-0.5
Subsurface	61	North Drainage - Approximately 150 feet north of the northeastern portion of the RMHF.	Aerial photo feature, "Debris Area". Characterize potential contamination from surface water run-off from Building 4133.	2.5	None indicated Refusal on sandstone	No subsurface sample collected due to refusal at < 2.5 ft bgs 10/19/2011	NA	NA
Drainage	62	Building 4133 - Approximately 100 feet southwest of Building 4133.	Characterize potentially contaminated sediment in the drainage that may have originated from Building 4133. Geophysical feature, "Conductivity and Magnetometer Anomalies".	0.5	"15% sandstone fragments, asphalts and concrete fragments"	9/23/2011	Primary & Secondary	SL-062-SA7-SS-0.0-0.5
Subsurface	63	Building 4133 - Approximately 70 feet southwest of Building 4133.	Geophysical feature, "Conductivity and Magnetometer Anomalies".	0.7	None indicated Refusal on sandstone	No subsurface sample collected due to refusal at < 2.5 ft bgs 10/24/2011	NA	NA

Sample Type	EPA Location ID	Location Description From EPA	EPA Technical Justification for Sample Collection	Boring Total Depth (ft bgs)	Description of Fill Encountered (from EPA Soil Boring Log)	Sample Date	Laboratory Analyses	Co-Located Chemical Sample Number
Subsurface	64	Building 4133 - Approximately 70 feet southwest of Building 4133.	Geophysical features, "Conductivity and Magnetometer Anomalies".	0.8	None indicated Refusal on sandstone	No subsurface sample collected due to refusal at < 2.5 ft bgs 10/24/2011	NA	NA
Subsurface	65	Building 4133 - Approximately 220 feet northwest of Building 4133.	Aerial photo feature, "Debris Area". Geophysical features, "Conductivity and Magnetometer Anomalies".	3.0	Fill "sandy silt" from 0 to 2.0 ft "15% subangular gravel and concrete debris" from 0 to 1.0 ft "large coiled copper wire found at 1ft bgs fibrous white, stucco-like material also found @ 1.5 ft" Refusal on sandstone	10/21/2011	Primary & GATTC	SL-065-SA7-SB-2.0-3.0
Surface	66	Northern Drainage - Approximately 245 feet north of the northeastern portion of the RMHF.	Aerial photo feature, Debris Area. Gamma scanning survey indicate slightly elevated gamma readings.	0.5	"some charcoal/carbon from fire residue"	9/23/2011	Primary & GATTC	SL-066-SA7-SS-0.0-0.5
Subsurface	66	Northern Drainage - Approximately 245 feet north of the northeastern portion of the RMHF.	Aerial photo feature, Debris Area. Gamma scanning survey indicate slightly elevated gamma readings.	2.3	None indicated Refusal on sandstone	No subsurface sample collected due to refusal at < 2.5 ft bgs 10/21/2011	NA	NA
Surface	67	Northern Drainage - Approximately 225 feet north of the northeastern portion of the RMHF.	Aerial photo feature, "Debris Area". Gamma survey indicates slightly elevated gamma readings.	0.5	None indicated	9/23/2011	Primary & GATTC	SL-067-SA7-SS-0.0-0.5
Subsurface	67	Northern Drainage - Approximately 225 feet north of the northeastern portion of the RMHF.	Aerial photo feature, "Debris Area". Gamma survey indicates slightly elevated gamma readings.	0.8	None indicated Refusal on sandstone	No subsurface sample collected due to refusal at < 2.5 ft bgs 10/21/2011	NA	NA
Surface	68	Northern Drainage - Approximately 190 feet north of the northern portion of the RMHF.	Aerial photo feature, "Debris Area". Gamma scanning survey results indicate slightly elevated gamma readings in the area.	0.5	None indicated	9/23/2011	Primary & GATTC	SL-068-SA7-SS-0.0-0.5
Subsurface	68	Northern Drainage - Approximately 190 feet north of the northern portion of the RMHF.	Aerial photo feature, "Debris Area". Gamma scanning survey results indicate slightly elevated gamma readings in the area.	2.0	None indicated Refusal on sandstone	No subsurface sample collected due to refusal at < 2.5 ft bgs 10/21/2011	NA	NA
Surface	69	Northern Drainage - Approximately 190 feet north of the northeastern portion of the RMHF.	Aerial photo feature, "Debris Area". Gamma scanning survey results indicate slightly elevated gamma readings in the area.	0.5	"5% sandstone fragments and gravel fill rock"	9/23/2011	Primary & GATTC	SL-069-SA7-SS-0.0-0.5
Subsurface	69	Northern Drainage - Approximately 190 feet north of the northeastern portion of the RMHF.	Aerial photo feature, "Debris Area". Gamma scanning survey results indicate slightly elevated gamma readings in the area.	3.6	None indicated Refusal on sandstone	10/20/2011	TPH Primary & GATTC	SL-069-SA6-SB-3.0 SL-069-SA6-SB-2.5-3.5
Surface	70	Northeast portion of Subarea 7. Northwest of the SRE area.	Gamma survey readings indicate elevated levels of cesium associated with GRAY 37C. Aerial photo feature, "Cleared Area".	0.5	None indicated	9/13/2011	Primary & GATT	SL-070-SA7-SS-0.0-0.5
Subsurface	70	Northeast portion of Subarea 7. Northwest of the SRE area.	Gamma survey readings indicate elevated levels of cesium associated with GRAY 37C. Aerial photo feature, "Cleared Area".	4.5	Fill "silty sand" with 15% subangular to subrounded fine gravel (~3/4 in diameter), gravel is fill rock" from 0 to 2.3 ft Refusal on sandstone	9/15/2011	TPH Primary & GATTC	SL-070-SA7-SB-3.5 SL-070-SA7-SB-3.0-4.0
Surface	71	Northeast portion of Subarea 7. Northwest of the SRE area.	Gamma scanning survey readings indicate elevated levels of cesium associated with GRAY 37. Aerial photo feature, "Cleared Area".	0.5	"5% gravel fill rock"	9/13/2011	Primary & GATT	SL-071-SA7-SS-0.0-0.5
Subsurface	71	Northeast portion of Subarea 7. Northwest of the SRE area.	Gamma scanning survey readings indicate elevated levels of cesium associated with GRAY 37. Aerial photo feature, "Cleared Area".	7.3	None indicated Refusal on sandstone	9/14/2011	TPH-GRO Primary & GATTC	SL-071-SA7-SB-4.5 SL-071-SA7-SB-4.0-5.0
Subsurface	72	Former Building 4654 - Northwest corner of former Building 4654 foot print.	Historical records show elevated levels of radionuclide's in this area. Geophysical feature, "GPR". Aerial photo feature, "Open Storage".	8.5	Fill "sandy silt" into "silt" from 0 to 8.5 ft Refusal on sandstone	9/22/2011	TPH-GRO Primary & GATT TPH-GRO Primary & GATT	SL-072-SA7-SB-4.5 SL-072-SA7-SB-4.0-5.0 SL-072-SA7-SB-8.0 SL-072-SA7-SB-7.5-8.5
Surface	73	Former Building 4654 - West of former Building 4654 foot print, along the west side of the road.	Elevated gamma survey readings associated with GRAY 30.	0.5	"20% gravel fill rock, asphalt and sandstone rock fragments"	9/13/2011	Primary & GATT	SL-073-SA7-SS-0.0-0.5
Subsurface	73	Former Building 4654 - West of former Building 4654 foot print, along the west side of the road.	Elevated gamma survey readings associated with GRAY 30.	5.5	None indicated Refusal on sandstone	9/23/2011	TPH-GRO Primary & GATT	SL-073-SA7-SB-4.5 SL-073-SA7-SB-4.0-5.0
Subsurface	74	Former Building 4654 - Southwest corner of former Building 4654.	Former location of eight storage tubes used to store spent fuel rods. Aerial photo feature, "Open Storage". Geophysical feature, "GPR".	7.5	Fill "silty sand" from 0 to 7.5 ft "10% pea sized subangular gravel" from 0 to 1.0 ft "trace charcoal" at 2.3 ft "10% subangular gravel (fill rock)" from 5.0 to 6.9 ft Refusal on sandstone	9/22/2011	TPH-GRO Primary & GATT	SL-074-SA7-SB-4.5 SL-074-SA7-SB-4.0-5.0

Table 2-1
Soil Samples Collected from HSA Subarea 7

Sample Type	EPA Location ID	Location Description From EPA	EPA Technical Justification for Sample Collection	Boring Total Depth (ft bgs)	Description of Fill Encountered (from EPA Soil Boring Log)	Sample Date	Laboratory Analyses	Co-Located Chemical Sample Number
Subsurface	75	Former Building 4654 - South edge of former Building 4654 foot print.	Former location of storage tubes used to store spent fuel rods. Aerial photo feature, "Open Storage". Geophysical feature, "GPR".	10.0	Fill "silty sand" from 0 to 10.0 ft "trace fine sub-rounded gravel" from 0 to 3.8 ft "sandstone cobble (fill)" ~ 5 inches thick at 3.8 ft "10% angular sandstone gravel (fill)" from 4.3 to 7.7 ft "fractured concrete (fill)" from 7.7 to 8.9 ft "trace granitic gravel noted in driller shoe" at 8.9 ft "glass debris @ 10.0 ft"	9/22/2011	TPH-GRO Primary & GATT TPH-GRO Primary & GATT	SL-075-SA7-SB-4.5 SL-075-SA7-SB-4.0-5.0 SL-075-SA7-SB-9.5 SL-075-SA7-SB-9.0-10.0
Surface	76	Former Building 4654 - West of former Building 4654 foot print along the west side of the road.	Elevated gamma survey readings associated with GRAY 29.	0.5	"15% gravel fill rock, asphalt and sandstone fragments"	9/14/2011	Primary & GATT	SL-076-SA7-SS-0.0-0.5
Subsurface	76	Former Building 4654 - West of former Building 4654 foot print along the west side of the road.	Elevated gamma survey readings associated with GRAY 29.	3.5	Fill "silty sand" into "sandy silt" from 0 to 3.5 ft "5% fine subangular gravel" from 0 to 2.7 ft "magnetite gravel" at 2.6 ft Refusal on sandstone	9/23/2011	TPH-GRO Primary & GATT	SL-076-SA7-SB-3.0 SL-076-SA7-SB-2.5-3.5
Surface	77	Former Building 4654 - Southwest corner of former Building 4654 foot print.	Aerial photo feature, "Open Storage". Historical documents show levels of radionuclide's in this area.	0.5	"15% gravel fill rock"	9/14/2011	Primary & GATT	SL-077-SA7-SS-0.0-0.5
Subsurface	77	Former Building 4654 - Southwest corner of former Building 4654 foot print.	Aerial photo feature, "Open Storage". Historical documents show levels of radionuclide's in this area.	5.0	Fill "silty sand" from 0 to 4.7 ft "5% angular gravel" from 0 to 3.0 ft Refusal on sandstone	9/22/2011	TPH-GRO Primary & GATT	SL-077-SA7-SB-4.5 SL-077-SA7-SB-4.0-5.0
Surface	78	Former Building 4654 - Northeast corner of former Building 4654 foot print.	Aerial photo feature, "Open Storage". Historical documents show past contamination in this area.	0.5	None indicated	9/14/2011	Primary & GATT	SL-078-SA7-SS-0.0-0.5
Subsurface	78	Former Building 4654 - Northeast corner of former Building 4654 foot print.	Aerial photo feature, "Open Storage". Historical documents show past contamination in this area.	8.0	Fill "sandy silt" from 0 to 2.2 ft Refusal on sandstone	9/21/2011	TPH-GRO Primary & GATT TPH-GRO Primary & GATT	SL-078-SA7-SB-4.5 SL-078-SA7-SB-4.0-5.0 SL-078-SA7-SB-7.5 SL-078-SA7-SB-7.0-8.0
Subsurface	79	Building 4133 - South side of Building 4133, outside of the fence.	Characterize potential contamination resulting from activities conducted at Building 4133. Aerial photo feature, "Open Storage".	3.0	Fill "silty sand" from 0 to 1.3 ft Refusal on sandstone	9/16/2011	Primary	SL-079-SA7-SB-2.0-3.0
Subsurface	80	Building 4133 - Southwest side of Building 4133, outside of the fence.	Characterize potential contamination resulting from activities conducted at Building 4133. Aerial photo feature, "Open Storage".	10.0	Fill "silty sand" from 0 to 9.5 ft Refusal on sandstone	9/16/2011	Primary	SL-080-SA7-SB-4.0-5.0 SL-080-SA7-SB-9.0-10.0
Subsurface	81	Building 4133 - North side of Building 4133, outside of the fence.	Characterize potential contamination associated with activities conducted at Building 4133. Location of former temporary underground tank. Aerial photo feature, " Open Storage".	10.0	Fill "silty sand" from 0 to 7.5 ft "soil becomes moist" at 2.8 ft	9/15/2011	Primary	SL-081-SA7-SB-4.0-5.0 SL-081-SA7-SB-9.0-10.0
Subsurface	82	Building 4133 - East side of Building 4133, outside of the fence.	Characterize potential contamination associated with activities conducted at Building 4133. Aerial photo feature, "Open Storage".	6.0	"trace gravel" from 0 to 3.5 ft Refusal on sandstone	10/25/2011	Primary	SL-082-SA7-SB-4.0-5.0
Surface	83	RMHF - North side of the RMHF, outside of the fence.	Gamma scanning survey readings indicate elevated levels of cesium associated with GRAY 9C.	0.5	None indicated	9/16/2011	Primary & GATTC	SL-083-SA7-SS-0.0-0.5
Subsurface	83	RMHF - North side of the RMHF, outside of the fence.	Gamma scanning survey readings indicate elevated levels of cesium associated with GRAY 9C.	2.0	None indicated Refusal on sandstone	No subsurface sample collected due to refusal at < 2.5 ft bgs 10/26/2011	NA	NA
Subsurface	84	Southwest portion of Subarea 7.	Geophysical feature, "Conductivity Anomaly". Aerial photo feature, Ground Scar".	1.3	Fill "silty sand" from 0 to 0.3 ft Refusal on sandstone	9/30/2011	Primary	SL-084-SA7-SB-0.0-1.0
Surface	85	Site 4614 - West of the RMHF Holding Pond.	Aerial photo feature, "Debris Area".	0.5	None indicated	9/20/2011	Primary & GATT, formaldehyde, NDMA, nitrate, Dowanol	SL-085-SA7-SS-0.0-0.5
Subsurface	85	Site 4614 - West of the RMHF Holding Pond.	Aerial photo feature, "Debris Area".	1.7	None indicated Refusal on sandstone	No subsurface sample collected due to refusal at < 2 ft bgs 11/2/2011	NA	NA
Surface	86	RMHF - Northwest corner of the RMHF, outside of the fence.	Gamma scanning survey readings indicate elevated levels of cesium associated with GRAY 9C.	0.5	"25% asphalt fragments, sandstone fragments"	9/16/2011	Primary & GATTC	SL-086-SA7-SS-0.0-0.5
Subsurface	86	RMHF - Northwest corner of the RMHF, outside of the fence.	Gamma scanning survey readings indicate elevated levels of cesium associated with GRAY 9C.	4.0	None indicated Refusal on sandstone	10/26/2011	TPH-GRO Primary & GATTC	SL-086-SA7-SB-3.5 SL-086-SA7-SB-3.0-4.0
Surface	87	RMHF - Approximately 30 north of the northwest corner of the RMHF.	Aerial photo feature, "Debris Area". Potential contamination associated with GRAY 9C.	0.5	"35% concrete, asphalt, sandstone gravel fill and iron ore fragments"	9/16/2011	Primary & GATTC	SL-087-SA7-SS-0.0-0.5
Subsurface	87	RMHF - Approximately 30 north of the northwest corner of the RMHF.	Aerial photo feature, "Debris Area". Potential contamination associated with GRAY 9C.	2.0	Fill "silty sand" with "trace asphalt, concrete, metal (construction debris" from 0 to 2.0 ft Refusal material not noted	No subsurface sample collected due to refusal at < 2.5 ft bgs 10/27/2011	NA	NA
Surface	88	RMHF - Approximately 60 feet north of the western corner of the RMHF.	Aerial photo feature, "Debris Pile". Potential surface water run-off from the RMHF.	0.5	"5% sandstone rock fragments and concrete fragments"	9/22/2011	Primary & GATTC	SL-088-SA7-SS-0.0-0.5

Sample Type	EPA Location ID	Location Description From EPA	EPA Technical Justification for Sample Collection	Boring Total Depth (ft bgs)	Description of Fill Encountered (from EPA Soil Boring Log)	Sample Date	Laboratory Analyses	Co-Located Chemical Sample Number
Subsurface	88	RMHF - Approximately 60 feet north of the western corner of the RMHF.	Aerial photo feature, "Debris Pile". Potential surface water run-off from the RMHF.	2.3	Fill "silty sand" from 0 to 1.5 ft Refusal on sandstone	No subsurface sample collected due to refusal at < 2.5 ft bgs 10/14/2011	NA	NA
Surface	89	Northern Drainage - Up gradient (East) of Outfall 3, in pond area.	Characterize potential contamination in soil within ponded area. Geophysical feature, "Conductivity Anomaly"	0.5	"20% gravel fill rock and cobbles"	9/23/2011	Primary & Secondary	SL-089-SA7-SS-0.0-0.5
Subsurface	89	Northern Drainage - Up gradient (East) of Outfall 3, in pond area.	Characterize potential contamination in soil within ponded area. Geophysical feature, "Conductivity Anomaly".	4.5	Fill "sandy silt" with "trace iron oxide mottling" from 0 to 2.0 ft Refusal on sandstone	10/13/2011	TPH-GRO Primary & Secondary	SL-089-SA7-SB-4.0MS SL-089-SA7-SB-3.5-4.5MS
Surface	90	RMHF - West side of the RMHF, outside of the fence.	Gamma survey readings indicate elevated levels of cesium associated with GRAY 7C.	0.5	Fill " silty gravelly sand with 25% gravel fill rock, concrete and asphalt fragments" "3" bgs is concrete"	9/15/2011	Primary & GATTC	SL-090-SA7-SS-0.0-0.5
Subsurface	90	RMHF - West side of the RMHF, outside of the fence.	Gamma survey readings indicate elevated levels of cesium associated with GRAY 7C.	2.7	None indicated Refusal on sandstone	No subsurface sample collected due to refusal at < 2.5 ft bgs 10/27/2011	NA	NA
Surface	91	RMHF - Southwest corner of the RMHF, outside of the fence.	Gama scanning survey readings indicate elevated levels of cesium associated with GRAY 10C.	0.5	None indicated	9/15/2011	Primary & GATTC	SL-091-SA7-SS-0.0-0.5
Subsurface	91	RMHF - Southwest corner of the RMHF, outside of the fence.	Gama scanning survey readings indicate elevated levels of cesium associated with GRAY 10C.	3.5	None indicated Refusal on sandstone	10/27/2011	TPH-GRO Primary & GATTC	SL-091-SA7-SB-3.0 SL-091-SA7-SB-2.5-3.5
Surface	92	RMHF - Southside of the RMHF, outside of the fence.	Gamma survey readings indicate elevated levels of cesium associated with GRAY 10C.	0.5	None indicated	9/15/2011	Primary & GATTC	SL-092-SA7-SS-0.0-0.5
Subsurface	92	RMHF - Southside of the RMHF, outside of the fence.	Gamma survey readings indicate elevated levels of cesium associated with GRAY 10C.	1.8	None indicated Refusal on sandstone	No subsurface sample collected due to refusal at < 2.5 ft bgs 10/27/2011	NA	NA
Surface	96	RMHF - Southwest portion of the RMHF, outside of the fence.	Gamma scanning survey readings indicate elevated levels of cesium associated with GRAY 18C.	0.5	None indicated	9/15/2011	Primary & GATTC	SL-096-SA7-SS-0.0-0.5
Subsurface	96	RMHF - Southwest portion of the RMHF, outside of the fence.	Gamma scanning survey readings indicate elevated levels of cesium associated with GRAY 18C.	3.5	None indicated Refusal on sandstone	10/12/2011	TPH-GRO Primary & GATTC	SL-096-SA7-SB-2.5 SL-096-SA7-SB-2.0-3.0
Surface	97	RMHF - South central portion of the RMHF, outside of the fence.	Gamma scanning survey readings indicate elevated levels of cesium associated with GRAY 21C.	0.5	None indicated	9/15/2011	Primary & GATTC	SL-097-SA7-SS-0.0-0.5
Subsurface	97	RMHF - South central portion of the RMHF, outside of the fence.	Gamma scanning survey readings indicate elevated levels of cesium associated with GRAY 21C.	1.1	None indicated Refusal on sandstone	No subsurface sample collected due to refusal at < 2.5 ft bgs 10/12/2011	NA	NA
Surface	98	RMHF - Southeast side of the RMHF, outside of the fence.	Characterize potential contamination originating from sewer line that exits the RMHF at this location.	0.5	None indicated	9/16/2011	Primary & GATTC	SL-098-SA7-SS-0.0-0.5
Subsurface	98	RMHF - Southeast side of the RMHF, outside of the fence.	Characterize potential contamination originating from sewer line that exits the RMHF at this location.	2.3	None indicated Refusal on sandstone	No subsurface sample collected due to refusal at < 2.5 ft bgs 10/25/2011	NA	NA
Surface	99	RMHF - East side of the RMHF, outside of the fence.	Gamma scanning survey readings indicate elevated levels of cesium associated with GRAY 24C.	0.5	"Piece of copper wire found"	9/14/2011	Primary & GATT	SL-099-SA7-SS-0.0-0.5
Subsurface	99	RMHF - East side of the RMHF, outside of the fence.	Gamma scanning survey readings indicate elevated levels of cesium associated with GRAY 24C.	1.2	None indicated Refusal on sandstone	No subsurface sample collected due to refusal at < 2.5 ft bgs 10/25/2011	NA	NA
Surface	100	RMHF - Northeast corner of the RMHF, outside of the fence.	Gamma scanning readings indicate elevated levels of cesium associated with GRAY 22C.	0.5	"15% sandstone rock fragments and asphalt fragments"	9/16/2011	Primary & GATTC	SL-100-SA7-SS-0.0-0.5
Subsurface	100	RMHF - Northeast corner of the RMHF, outside of the fence.	Gamma scanning readings indicate elevated levels of cesium associated with GRAY 22C.	1.3	None indicated Refusal on sandstone	No subsurface sample collected due to refusal at < 2.5 ft bgs 10/25/2011	NA	NA
Surface	101	RMHF - North side of the RMHF, on north facing slope.	Process knowledge feature, "2 inch Discharge Pipe".	0.5	None indicated	9/22/2011	Primary	SL-101-SA7-SS-0.0-0.5

Table 2-1
Soil Samples Collected from HSA Subarea 7

Sample Type	EPA Location ID	Location Description From EPA	EPA Technical Justification for Sample Collection	Boring Total Depth (ft bgs)	Description of Fill Encountered (from EPA Soil Boring Log)	Sample Date	Laboratory Analyses	Co-Located Chemical Sample Number
Subsurface	101	RMHF - North side of the RMHF, on north facing slope.	Process knowledge feature, "2 inch Discharge Pipe".	1.1	None indicated Refusal on sandstone	No subsurface sample collected due to refusal at < 2.5 ft bgs 10/18/2011	NA	NA
Subsurface	102	Former Building 4028 - East side of former Building 4028 foot print.	Former location of Fuel Storage Vault.	10.0	None indicated	9/26/2011	TPH-GRO Primary, GATT, formaldehyde, NDMA, nitrate & Dowanol TPH-GRO Primary, GATT, formaldehyde, NDMA, nitrate & Dowanol	SL-102-SA7-SB-4.5MS SL-102-SA7-SB-4.0-5.0MS SL-102-SA7-SB-9.5 SL-102-SA7-SB-9.0-10.0
Subsurface	103	Former Building 4028 - South central portion of the former Building 4028 foot print.	Former location of the Reactor Pool (Drawing 301-018-P4).	19.0	Fill "silty sand" from 0 to 18.7 ft "Fill: sandy clay with silt" from 18.7 to 18.9 ft "5% gravel, some black plastic debris, trace asphalt fragments" from 0 to 4.8 ft "trace gravel granitic (~50mm diameter)" from 4.8 to 8.8 ft "10% angular to subangular fine gravel (fill rock)" from 11.0 to 18.5 ft "trace asphalt" from 17.5 to 18.7 ft Refusal on sandstone	9/27/2011 9/27/2011 9/27/2011 9/27/2011 9/28/2011 9/28/2011	TPH-GRO Primary, GATT, formaldehyde, NDMA, nitrate & Dowanol TPH-GRO Primary, GATT, formaldehyde, NDMA, nitrate & Dowanol TPH-GRO Primary, GATT, formaldehyde, NDMA, nitrate & Dowanol	SL-103-SA7-SB-4.5MS SL-103-SA7-SB-4.0-5.0MS SL-103-SA7-SB-9.5 SL-103-SA7-SB-9.0-10.0 SL-103-SA7-SB-18.5 SL-103-SA7-SB-18.0-19.0
Subsurface	104	Former Building 4028 - Southwest corner of the former Building 4028 foot print.	Former location of Reactor Pool (Drawing 301-018-P4).	20.0	Fill "silty sand" from 0 to 20.0 ft "trace fine subangular gravel mottled" from 0 to 4.6 ft "concrete debris" at 2.5 ft "sandstone cobble" at 3.8 ft "trace fine subangular gravel, mottled, trace asphalt" from 4.6 to 13.7 ft "trace concrete debris" at 12.1 ft "trace asphalt debris" at 13.7 ft "angular fine gravel (fill rock volcanic)" at 17.4 ft "subangular quartzite fine gravel" at 18.2 ft Refusal on sandstone	9/27/2011 9/27/2011 9/28/2011 9/28/2011 9/28/2011	Primary & GATT, formaldehyde, NDMA, nitrate, Dowanol Primary & GATT, formaldehyde, NDMA, nitrate, Dowanol VOCs, Dioxane, TPH-GRO TPH-GRO Primary & GATT, formaldehyde, NDMA, nitrate, Dowanol	SL-104-SA7-SB-4.0-5.0 SL-104-SA7-SB-9.0-10.0 SL-104-SA7-SB-15.5 SL-104-SA7-SB-19.5 SL-104-SA7-SB-19.0-20.0
Subsurface	105	Former Building 4028 - Southwest portion of former Building 4028.	Former location of the Reactor Pool (Drawing 301-018-P4).	5.0	Fill "silty sand" from 0 to 4.5 ft "5% subangular fine gravel, trace asphalt" from 0 to 4.5 ft "some asphalt debris" at 3.0 ft "trace subangular granitic gravel" at 4.5 ft Refusal on sandstone	9/27/2011	TPH-GRO Primary, GATT, formaldehyde, NDMA, nitrate & Dowanol	SL-105-SA7-SB-4.5 SL-105-SA7-SB-4.0-5.0
Subsurface	106	Former Building 4028 - Southwest portion of the former Building 4028 foot print.	Former location of the Reactor Pool (Drawing 301-018-P4)	17.5	Fill "silty sand" and "sandy silt" from 0 to 16.3 ft Fill "silty clay with sand" from 16.3 to 17.0 ft Fill "poorly graded sand" from 17.0 to 17.5 ft "10% angular to subangular gravel (fill gravel)" from 0 to 3.0 ft "10% subangular gravel (fill rock)" from 3.1 to 5.0 ft "asphalt debris" at 4.5 ft "trace asphalt debris" at 7.5 ft "white quartzite fine gravel" at 13.8 ft Refusal on sandstone	9/28/2011	TPH-GRO Primary, GATT, formaldehyde, NDMA, nitrate & Dowanol TPH-GRO Primary, GATT, formaldehyde, NDMA, nitrate & Dowanol TPH-GRO Primary, GATT, formaldehyde, NDMA, nitrate & Dowanol	SL-106-SA7-SB-4.5 SL-106-SA7-SB-4.0-5.0 SL-106-SA7-SB-9.5 SL-106-SA7-SB-9.0-10.0 SL-106-SA7-SB-17.0 SL-106-SA7-SB-16.5-17.5
Subsurface	107	Former Building 4028 - Western portion of former Building 4028.	Former location of the Test Vault and Cask Pit.	14.0	Fill "silty sand" from 0 to 14.0 ft "5% gravel debris material (AF), trace concrete debris and sandstone concretions" at 0 to 3.5 ft "trace artificial fill concrete and other debris material" from 3.5 to 7.0 ft "subrounded quartzite gravel (trace)" from 6.0 to 7.0 ft "trace sandstone concretions, trace fill gravel" from 7.0 to 10.0 ft "large concrete gravel and sandstone gravel" at 10.0 ft "5% rounded/subrounded sandstone gravel, trace fill concrete and asphalt debris" from 13.0 to 14.0 ft Refusal on debris/boulder	11/4/2011	TPH-GRO Primary, GATT, formaldehyde, NDMA, nitrate & Dowanol TPH-GRO Primary, GATT, formaldehyde, NDMA, nitrate & Dowanol TPH-GRO Primary, GATT, formaldehyde, NDMA, nitrate & Dowanol	SL-107-SA7-SB-4.5 SL-107-SA7-SB-4.0-5.0 SL-107-SA7-SB-9.5 SL-107-SA7-SB-9.0-10.0 SL-107-SA7-SB-13.5 SL-107-SA7-SB-13.0-14.0
Subsurface	108	Former Building 4028 - Western portion of the former Building 4028 foot print.	Former location of the Test Vault.	3.8	Fill "silty sand" from 0 to 3.8 ft "5% subrounded sandstone and fill gravel" from 0 to 2.0 ft "artificial debris, concrete pieces" from 2.0 to 3.8 ft Refusal on debris/boulder	11/3/2011	TPH-GRO Primary, GATT, formaldehyde, NDMA, nitrate & Dowanol	SL-108-SA7-SB-3.3 SL-108-SA7-SB-2.9-3.9
Subsurface	109	Former Building 4028 - South of the former Building 4028 foot print.	Geophysical feature, "Conductivity Anomaly".	10.0	Fill "silty sand" from 0 to 7.0 ft "10% gravel (sandstone and granitic), trace asphalt chunks (~5mm)"	9/26/2011	TPH-GRO Primary, GATT, formaldehyde, NDMA, nitrate & Dowanol TPH-GRO Primary, GATT, formaldehyde, NDMA, nitrate & Dowanol	SL-109-SA7-SB-4.5 SL-109-SA7-SB-4.0-5.0 SL-109-SA7-SB-9.5 SL-109-SA7-SB-9.0-10.0

Sample Type	EPA Location ID	Location Description From EPA	EPA Technical Justification for Sample Collection	Boring Total Depth (ft bgs)	Description of Fill Encountered (from EPA Soil Boring Log)	Sample Date	Laboratory Analyses	Co-Located Chemical Sample Number
Drainage	110	Site 4614 (RMHF Holding Pond). Approximately 60 feet south of the RMHF Holding Pond.	Characterize potential contamination in drainage from surface water run-off from former Buildings 4811 and 4028.	0.5	None indicated	9/19/2011	Primary & GATT, formaldehyde, NDMA, nitrate, Dowanol	SL-110-SA7-SS-0.0-0.5
Drainage	111	Site 4614 - Approximately 30 feet north of the RMHF former Holding Pond.	Characterize potential contamination in drainage that may have originated from the RMHF Holding Pond.	0.5	None indicated	9/19/2011	Primary	SL-111-SA7-SS-0.0-0.5
Subsurface	112	Site 4614 . Approximately 165 feet southwest of the RMHF Holding Pond.	Geophysical feature, "Conductivity". Aerial photo feature, "Disturbed Soil". Potential residual contamination from remediation of the RMHF Holding Pond.	1.0	Fill "silty sand" with "5% subangular fine gravel (pea gravel) from 0 to 0.7 ft Refusal on sandstone	10/10/2011	Primary	SL-112-SA7-SB-0.0-1.0
Subsurface	113	Southwest portion of Subarea 7. Approximately 230 feet to the southwest of the RMHF Holding Pond.	Geophysical feature, "Conductivity". Aerial photo feature, "Disturbed Soil".	1.3	Fill "silty sand" from 0 to 0.8 ft	9/30/2011	Primary	SL-113-SA7-SB-0.0-1.0
Subsurface	115	Approximately 240 feet southwest of the RMHF Holding Pond .	Geophysical feature, "Conductivity". Aerial photo feature, "Disturbed Soil".	1.5	Fill "silty sand with gravel" from 0 to 0.8 ft Refusal on sandstone	9/30/2011	Primary	SL-115-SA7-SB-0.5-1.5
Subsurface	116	Approximately 180 feet southwest of the RMHF Holding Pond.	Geophysical feature, "Conductivity". Aerial photo feature, "Disturbed Soil". Potential residual contamination from remediation activities conducted at the RMHF Holding Pond (Site 4614).	2.6	Fill "silty sand" with "15% subangular fine gravel (sandstone and fill rock up to 3/4 in diameter)" from 0 to 1.0 ft Refusal on sandstone	10/28/2011	Primary & GATTC	SL-116-SA7-SB-0.0-0.5
Subsurface	117	Approximately 135 feet southwest of the RMHF Holding Pond.	Geophysical feature, "Conductivity". Potential residual contamination from remediation activities conducted at the RMHF Holding Pond.	3.3	None indicated	10/28/2011	Primary	SL-117-SA7-SB-2.5-3.5
Subsurface	118	Southwest portion of Subarea 7.	Geophysical feature, "Conductivity". Aerial photo feature, "Disturbed Soil".	5.2	Fill "silty sand" into "silty sand with clay" from 0 to 5.2 ft "trace asphalt debris" at 2.3 ft Refusal on sandstone	10/28/2011	TPH-GRO Primary & GATTC	SL-118-SA7-SB-4.5 SL-118-SA7-SB-4.0-5.0
Surface	119	Southwest corner of Subarea 7. North of former Building 4013.	Characterize potential contamination as a result of surface water run-off from open storage areas associated with former Building 4013 and 4012.	0.5	"5% sandstone fragments and gravel fill rock"	9/21/2011	Primary & GATTC	SL-119-SA7-SS-0.0-0.5
Subsurface	119	Southwest corner of Subarea 7. North of former Building 4013.	Characterize potential contamination as a result of surface water run-off from open storage areas associated with former Building 4013 and 4012.	5.8	Fill "silty sand" into "silty sand with clay" from 0 to 5.8ft "5% subangular fine gravel, trace asphalt" from 0 to 4.0 ft "sandstone cobble" at 0.8 ft Refusal on sandstone	10/28/2011	TPH-GRO Primary & GATTC	SL-119-SA7-SB-4.5 SL-119-SA7-SB-4.0-5.0
Surface	120	Southwest corner of Subarea 7. North of Building 4019.	Characterize potential contamination resulting from surface water run-off from the Open Storage area associated with Building 4019 and former Building 4013.	0.5	"5% sandstone rock and asphalt fragments"	9/21/2011	Primary & GATTC	SL-120-SA7-SS-0.0-0.5MS
Subsurface	120	Southwest corner of Subarea 7. North of Building 4019.	Characterize potential contamination resulting from surface water run-off from the Open Storage area associated with Building 4019 and former Building 4013.	10.0	Fill "silty sand with clay" from 0 to 5.7 ft "15% subangular gravel" from 0 to 1.0 ft "5 % subangular gravel" from 1.0 to 2.5 ft	10/31/2011	VOCs/1,4-Dioxane/TPH-GRO Primary & Secondary VOCs/1,4-Dioxane/TPH-GRO Primary & Secondary	SL-120-SA7-SB-4.5 SL-120-SA7-SB-4.0-5.0 SL-120-SA7-SB-9.5MS SL-120-SA7-SB-9.0-10.0MS
Surface	121	Southwest corner of Subarea 7. North of Building 4019.	Characterize potential contamination resulting from surface water run-off from the Open Storage area associated with Building 4019 and former Building 4013.	0.5	"5% sandstone rock fragments, asphalt fragments"	9/21/2011	Primary & GATTC	SL-121-SA7-SS-0.0-0.5
Subsurface	121	Southwest corner of Subarea 7. North of Building 4019.	Characterize potential contamination resulting from surface water run-off from the Open Storage area associated with Building 4019 and former Building 4013.	10.0	Fill "silty sand" from 0 to 6.0 ft "10% subangular gravel" from 0 to 1.5 ft	10/31/2011	TPH-GRO Primary & GATTC TPH-GRO Primary & GATTC	SL-121-SA7-SB-4.5 SL-121-SA7-SB-4.0-5.0 SL-121-SA7-SB-9.5 SL-121-SA7-SB-9.0-10.0
Drainage	122	Site 4614 - Approximately 30 feet north of the Former RMHF Holding Pond.	Characterize potential contamination in drainage leading from the former RMHF Holding Pond. Aerial photo feature, "Disturbed Soil".	0.5	None indicated	9/19/2011	Primary & Secondary	SL-122-SA7-SS-0.0-0.5
Surface	123	Southwest corner of Subarea 7.	Characterize potential contamination as a result of surface water run-off from the SNAP. Aerial photo feature, "Debris".	0.5	None indicated	9/21/2011	Primary & GATTC	SL-123-SA7-SS-0.0-0.5
Subsurface	123	Southwest corner of Subarea 7.	Characterize potential contamination as a result of surface water run-off from the SNAP. Aerial photo feature, "Debris".	10.0	Fill "silty sand" from 0 to 3.3 ft "5% subangular gravel, gravel fill, and concrete debris" from 0 to 1.5 ft	11/1/2011	TPH-GRO Primary & GATTC TPH-GRO Primary & GATTC	SL-123-SA7-SB-4.5 SL-123-SA7-SB-4.0-5.0 SL-123-SA7-SB-9.5 SL-123-SA7-SB-9.0-10.0
Drainage	124	Southwest corner of Subarea 7.	Characterize potential contamination in the drainage that may have originated from debris up gradient and surface water run-off from the SNAP or Building 4019.	0.5	None indicated	9/21/2011	Primary	SL-124-SA7-SS-0.0-0.5
Surface	125	Former Building 4028 - South of former Building 4028.	Geophysical feature, "Conductivity Anomaly"	0.5	None indicated	9/20/2011	Primary	SL-125-SA7-SS-0.0-0.5
Subsurface	125	Former Building 4028 - South of former Building 4028.	Geophysical feature, "Conductivity Anomaly".	5.0	Fill "silty sand" with "5% subangular gravel & asphalt "from 0 to 5.0 ft "very angular asphalt pieces" from 2.4 to 2.7 ft Refusal on sandstone	9/26/2011	Primary	SL-125-SA7-SB-4.0-5.0MS
Subsurface	126	Former Building 4028 - South of former Building 4028.	Geophysical feature, "Magnetometer Anomaly".	7.0	Fill "silty sand" with "trace fine subangular gravel" from 0 to 3.5 ft Refusal on sandstone	9/29/2011	Primary	SL-126-SA7-SB-4.0-5.0

Table 2-1
Soil Samples Collected from HSA Subarea 7

Sample Type	EPA Location ID	Location Description From EPA	EPA Technical Justification for Sample Collection	Boring Total Depth (ft bgs)	Description of Fill Encountered (from EPA Soil Boring Log)	Sample Date	Laboratory Analyses	Co-Located Chemical Sample Number
Subsurface	127	Former Building 4028 - South of former Building 4028 and north of former Building 4025.	Geophysical feature, "Conductivity Anomaly".	7.5	Fill "silty sand" with "5% subangular fine gravel (granitic)" from 0 to 4.3 ft "trace granitic fine gravel" at 3.0 ft Refusal on sandstone	9/29/2011	Primary	SL-127-SA7-SB-4.0-5.0
Subsurface	128	Former Building 4028 - West side of former Building 4028 foot print.	Test Vault Access way.	10.0	Fill "silty sand" from 0 to 10.0 ft "trace subrounded gravel and fill debris" from 0 to 2.0 ft "trace sandstone concretions and artificial debris/gravel" from 4.3 to 5.0 ft "5% subangular gravel and artificial fill gravel" from 6.0 to 10.0 ft	11/3/2011	TPH-GRO Primary, GATT, formaldehyde, NDMA, nitrate & Dowanol TPH-GRO Primary, GATT, formaldehyde, NDMA, nitrate & Dowanol	SL-128-SA7-SB-4.5 SL-128-SA7-SB-4.0-5.0 SL-128-SA7-SB-9.5 SL-128-SA7-SB-9.0-10.0
Surface	129	RMHF - West of the RMHF and east of the former RMHF Holding Pond.	Location of former 4 inch cast iron pipe that exited from the RMHF. Potential drain that emptied into the former RMHF Holding Pond.	0.5	None indicated	9/20/2011	Primary & GATTC	SL-129-SA7-SS-0.0-0.5
Subsurface	129	RMHF - West of the RMHF and east of the former RMHF Holding Pond.	Location of former 4 inch cast iron pipe that exited from the RMHF. Potential drain that emptied into the former RMHF Holding Pond.	0.5	Fill "fine sand with gravel" Refusal on sandstone	No subsurface sample collected due to refusal at < 2.5 ft bgs 10/7/2011	NA	NA
Surface	130	Site 4614 - Approximately 40 feet northeast of the former RMHF Holding Pond.	Gamma survey readings indicate elevated levels of cesium associated with GRAY 4C. Geophysical feature, "Conductivity".	0.5	None indicated	9/19/2011	Primary & GATTC	SL-130-SA7-SS-0.0-0.5
Subsurface	130	Site 4614 - Approximately 40 feet northeast of the former RMHF Holding Pond.	Gamma survey readings indicate elevated levels of cesium associated with GRAY 4C. Geophysical feature, "Conductivity".	2.0	"trace gravel/concrete" from 0 to 2.0 ft Refusal on sandstone	No subsurface sample collected due to refusal at < 2.5 ft bgs 10/10/2011	NA	NA
Surface	131	Site 4614 - Approximately 60 feet northeast of the former RMHF Holding Pond.	Geophysical feature, "Conductivity". Potential residual contamination from remediation of RMHF Holding Pond.	0.5	None indicated	9/19/2011	Primary & GATTC	SL-131-SA7-SS-0.0-0.5
Subsurface	131	Site 4614 - Approximately 60 feet northeast of the former RMHF Holding Pond.	Geophysical feature, "Conductivity". Potential residual contamination from remediation of RMHF Holding Pond.	2.2	None indicated Refusal on sandstone	No subsurface sample collected due to refusal at < 2.5 ft bgs 10/10/2011	NA	NA
Subsurface	132	Former Building 4028 - Northwest corner of the former Test Vault Access way of former Building 4028.	Location of drainage sump within the former Test Vault access way.	9.5	Fill "silty sand with gravel" from 0 to 8.8 ft "trace fine subangular gravel" from 0 to 1.7 ft "10% fine subangular gravel (fill rock)" from 1.7 to 4.5 ft "granitic fine angular gravel" at 3.4 ft "concrete debris" from 6.5 to 6.9 ft and at 8.3 ft "trace asphalt debris" at 7.7 ft Refusal on sandstone	9/30/2011	TPH-GRO Primary, GATT, formaldehyde, NDMA, nitrate & Dowanol TPH-GRO Primary, GATT, formaldehyde, NDMA, nitrate & Dowanol	SL-132-SA7-SB-4.5 SL-132-SA7-SB-4.0-5.0 SL-132-SA7-SB-9.0 SL-132-SA7-SB-8.5-9.5
Subsurface	133	Site 4614 - Approximately 25 feet south of the RMHF Holding Pond.	Characterize potential residual contamination from remediation of RMHF Holding Pond. Potential contamination from surface water run-off from former Buildings 4811 and 4028. Geophysical feature, "Conductivity". Aerial photo feature' "Debris Area".	0.0	"Sample location is beneath concrete drainage. Attempts were made to breach concrete, but could not get through"	No subsurface sample collected due to refusal at < 2.5 ft bgs 10/10/2011	NA	NA
Drainage	133	Site 4614 - Approximately 25 feet south of the RMHF Holding Pond.	Characterize potential residual contamination from remediation of RMHF Holding Pond. Potential contamination from surface water run-off from former Buildings 4811 and 4028. Geophysical feature, "Conductivity". Aerial photo feature' "Debris Area".	0.5	None indicated	9/19/2011	Primary & Secondary	SL-133-SA7-SS-0.0-0.5
Surface	134	Site 4614 - Approximately 55 feet east of the RMHF Holding Pond.	Gamma survey reading indicate elevated levels of cesium associated with GRAY 4C.	0.5	None indicated	9/20/2011	Primary & Secondary	SL-134-SA7-SS-0.0-0.5
Subsurface	134	Site 4614 - Approximately 55 feet east of the RMHF Holding Pond.	Gamma survey reading indicate elevated levels of cesium associated with GRAY 4C.	1.3	Fill "silty sand with gravel" from 0 to 1.3 ft Refusal on sandstone	No subsurface sample collected due to refusal at < 2.5 ft bgs 10/7/2011	NA	NA
Surface	135	Site 4614 - Southeast corner of the former RMHF Holding Pond.	Gamma survey readings indicate elevated levels of cesium associated with GRAY 4C.	0.5	None indicated	9/20/2011	Primary & Secondary	SL-135-SA7-SS-0.0-0.5
Subsurface	135	Site 4614 - Southeast corner of the former RMHF Holding Pond.	Gamma survey readings indicate elevated levels of cesium associated with GRAY 4C.	1.8	None indicated Refusal on sandstone	No subsurface sample collected due to refusal at < 2.5 ft bgs 10/7/2011	NA	NA

Sample Type	EPA Location ID	Location Description From EPA	EPA Technical Justification for Sample Collection	Boring Total Depth (ft bgs)	Description of Fill Encountered (from EPA Soil Boring Log)	Sample Date	Laboratory Analyses	Co-Located Chemical Sample Number
Surface	136	Site 4614 - Southeast corner of the former RMHF Holding Pond.	Gamma survey readings indicate elevated levels of cesium associated with GRAY 4C. Geophysical feature, "Conductivity".	0.5	None indicated	9/20/2011	Primary & Secondary	SL-136-SA7-SS-0.0-0.5
Subsurface	136	Site 4614 - Southeast corner of the former RMHF Holding Pond.	Gamma survey readings indicate elevated levels of cesium associated with GRAY 4C. Geophysical feature, "Conductivity".	2.5	"trace concrete, asphalt" from 0 to 1.0 ft Refusal on sandstone	No subsurface sample collected due to refusal at < 2.5 ft bgs 10/7/2011	NA	NA
Surface	137	Northern Drainage - Approximately 55 feet northeast of the former RMHF Holding Pond.	Gamma survey readings indicate elevated levels of cesium associated with GRAY 3C.	0.5	None indicated	9/19/2011	Primary & GATTC	SL-137-SA7-SS-0.0-0.5
Subsurface	137	Northern Drainage - Approximately 55 feet northeast of the former RMHF Holding Pond.	Gamma survey readings indicate elevated levels of cesium associated with GRAY 3C.	1.1	None indicated Refusal on sandstone	10/7/2011	TPH-GRO Primary & GATTC	SL-137-SA7-SB-1.0 SL-137-SA7-SB-0.0-1.0
Surface	138	Site 4614 - North of the former RMHF Holding Pond.	Gamma survey readings indicate elevated levels of cesium associated with GRAY 3C.	0.5	None indicated	9/19/2011	Primary & GATTC	SL-138-SA7-SS-0.0-0.5
Subsurface	138	Site 4614 - North of the former RMHF Holding Pond.	Gamma survey readings indicate elevated levels of cesium associated with GRAY 3C.	2.7	None indicated Refusal on sandstone	10/7/2011	TPH-GRO Primary & GATTC	SL-138-SA7-SB-2.0 SL-138-SA7-SB-1.5-2.5
Surface	139	Northern Drainage - North of the RMHF.	Gamma scanning survey results indicate elevated levels of cesium associated with GRAY 16C.	0.5	None indicated	9/22/2011	Primary & GATTC	SL-139-SA7-SS-0.0-0.5
Subsurface	139	Northern Drainage - North of the RMHF.	Gamma scanning survey results indicate elevated levels of cesium associated with GRAY 16C.	3.5	"trace gravel" from 0 to 3.5 ft Refusal on sandstone	10/17/2011	TPH-GRO Primary & GATTC	SL-139-SA7-SB-2.5 SL-139-SA7-SB-2.0-3.0
Surface	140	Northern Drainage - North of the RMHF.	Gamma survey readings indicate elevated levels of cesium associated with GRAY 16C.	0.5	None indicated	9/22/2011	Primary & GATTC	SL-140-SA7-SS-0.0-0.5
Subsurface	140	Northern Drainage - North of the RMHF.	Gamma survey readings indicate elevated levels of cesium associated with GRAY 16C.	4.3	None indicated Refusal on sandstone	10/18/2011	TPH-GRO Primary & GATTC	SL-140-SA7-SB-3.5 SL-140-SA7-SB-3.0-4.0
Surface	141	Northern Drainage - Northeast of the northeastern portion of the RMHF.	Gamma scanning survey readings indicate elevated levels of cesium associated with GRAY 23C. Aerial photo feature, "Debris Area".	0.5	None indicated	9/21/2011	Primary & GATTC	SL-141-SA7-SS-0.0-0.5
Subsurface	141	Northern Drainage - Northeast of the northeastern portion of the RMHF.	Gamma scanning survey readings indicate elevated levels of cesium associated with GRAY 23C. Aerial photo feature, "Debris Area".	1.0	None indicated Refusal on sandstone	No subsurface sample collected due to refusal at < 2.5 ft bgs 10/20/2011	NA	NA
Surface	142	Northern Drainage - Northeast of the northeast portion of the RMHF.	Gamma scanning survey readings indicate elevated levels of cesium associated with GRAY 23C.	0.5	None indicated	9/21/2011	Primary & GATTC	SL-142-SA7-SS-0.0-0.5
Subsurface	142	Northern Drainage - Northeast of the northeast portion of the RMHF.	Gamma scanning survey readings indicate elevated levels of cesium associated with GRAY 23C.	8.0	None indicated Refusal on sandstone	10/19/2011	TPH-GRO Primary & GATT TPH-GRO Primary & GATT	SL-142-SA7-SB-2.5 SL-142-SA7-SB-2.0-3.0 SL-142-SA7-SB-5.5 SL-142-SA7-SB-7.0-8.0
Surface	143	Northern Drainage - Northeast of the northeastern portion of the RMHF.	Gamma scanning survey readings indicate elevated levels of cesium associated with GRAY 23C.	0.5	None indicated	9/21/2011	Primary & GATTC	SL-143-SA7-SS-0.0-0.5
Subsurface	143	Northern Drainage - Northeast of the northeastern portion of the RMHF.	Gamma scanning survey readings indicate elevated levels of cesium associated with GRAY 23C.	10.0	None indicated	10/19/2011	VOCs/1,4-Dioxane/TPH-GRO Primary & Secondary VOCs/1,4-Dioxane/TPH-GRO Primary & Secondary	SL-143-SA7-SB-5.5 SL-143-SA7-SB-5.0-6.0 SL-143-SA7-SB-9.5 SL-143-SA7-SB-9.0-10.0
Surface	144	Building 4133 - Northwest of Building 4133.	Gamma scanning survey readings indicate elevated levels of cesium associated with GRAY 31C.	0.5	None indicated	9/14/2011	Primary	SL-144-SA7-SS-0.0-0.5
Subsurface	144	Building 4133 - Northwest of Building 4133.	Gamma scanning survey readings indicate elevated levels of cesium associated with GRAY 31C.	10.0	Fill "poorly graded sand with silt" into "silty sand" from 0 to 10.0 ft "trace angular sandstone gravel" at 3.2 ft, 6.3 ft, and 6.6 ft "sandstone cobble ~3 in thick fine grained sandstone" at 8.8 ft	9/19/2011	Primary	SL-144-SA7-SB-4.0-5.0 SL-144-SA7-SB-9.0-10.0
Surface	145	Building 4133 - Northwest of Building 4133.	Gamma scanning survey readings indicate elevated levels of cesium associated with GRAY 31C.	0.5	"piece of re-solidified melted metal found"	9/14/2011	Primary	SL-145-SA7-SS-0.0-0.5
Subsurface	145	Building 4133 - Northwest of Building 4133.	Gamma scanning survey readings indicate elevated levels of cesium associated with GRAY 31C.	10.0	Fill "poorly graded sand with silt" into "silty sand" from 0 to 10.0 ft "trace angular sandstone gravel" at 3.2 ft, 6.3 ft, and 6.6 ft "sandstone cobble ~3 in thick fine grained sandstone" at 8.8 ft	9/19/2011	Primary	SL-145-SA7-SB-4.0-5.0 SL-145-SA7-SB-9.0-10.0
Surface	146	Building 4133 - West side of Building 4133 .	Gamma scanning survey readings indicate elevated reading of cesium associated with GRAY 34C.	0.5	"15% gravel fill rock and asphalt, trace glass"	9/13/2011	Primary	SL-146-SA7-SS-0.0-0.5
Subsurface	146	Building 4133 - West side of Building 4133 .	Gamma scanning survey readings indicate elevated reading of cesium associated with GRAY 34C.	10.0	Fill "poorly graded sand with silt" into "silty sand" from 0 to 10.0 ft "trace charcoal" at 4.5 ft "poorly graded sand with silt" from 7.8 to 8.6 ft	9/16/2011	Primary	SL-146-SA7-SB-4.0-5.0 SL-146-SA7-SB-9.0-10.0

Table 2-1
Soil Samples Collected from HSA Subarea 7

Sample Type	EPA Location ID	Location Description From EPA	EPA Technical Justification for Sample Collection	Boring Total Depth (ft bgs)	Description of Fill Encountered (from EPA Soil Boring Log)	Sample Date	Laboratory Analyses	Co-Located Chemical Sample Number
Subsurface	147	RMHF - North of the RMHF Septic Leach Field.	Characterize potential residual contamination from remediation activities.	2.3	Fill "silty sand with gravel" with "10% fine volcanic angular gravel" from 0 to 0.7 ft Refusal on sandstone	10/11/2011	TPH-GRO Primary & GATTC	SL-147-SA7-SB-1.5 SL-147-SA7-SB-1.0-2.0
Subsurface	148	RMHF - North of the RMHF Septic Leach Field.	Potential residual contamination from remediation activities.	1.3	None indicated Refusal on sandstone	10/20/2011	Primary & GATTC	SL-148-SA7-SB-0.0-1.0
Subsurface	149	RMHF - North of the RMHF Septic Leach Field.	Potential residual contamination from remediation activities.	1.0	None indicated Refusal on sandstone	9/20/2011	TPH-GRO Primary & GATTC	SL-149-SA7-SB-0.5 SL-149-SA7-SB-0.0-1.0
Subsurface	150	RMHF - North edge of the RMHF Septic Leach Field.	Potential residual contamination from remediation activities.	1.0	None indicated Refusal on sandstone	9/20/2011	TPH-GRO Primary & GATTC	SL-150-SA7-SB-0.5 SL-150-SA7-SB-0.0-1.0
Surface	151	RMHF - East side of the RMHF.	Aerial photo feature, "Debris Area".	0.5	None indicated	9/22/2011	Primary & GATTC	SL-151-SA7-SS-0.0-0.5
Subsurface	151	RMHF - East side of the RMHF.	Aerial photo feature, "Debris Area".	1.0	None indicated Refusal on sandstone	No subsurface sample collected due to refusal at < 2.5 ft bgs 10/19/2011	NA	NA
Drainage	152	Northern Drainage - North of the RMHF,	Potential contamination in the drainage that may have originated from the RMHF Septic Leach Field.	0.5	"trace gravel fill"	9/23/2011	Primary & Secondary	SL-152-SA7-SS-0.0-0.5
Drainage	153	Northern Drainage - North of the RMHF Septic Leach Field.	Potential contamination in drainage fro RMHF Septic Leach Field.	0.3	"15% gravel fill rock and asphalt fragments"	9/23/2011	Primary & Secondary	SL-153-SA7-SS-0.0-0.5
Subsurface	154	RMHF - Septic Leach Field. West end of the RMHF Septic Leach Field.	Potential residual contamination from remediation activities.	1.5	None indicated Refusal on sandstone	9/20/2011	TPH-GRO Primary & GATTC	SL-154-SA7-SB-0.5 SL-154-SA7-SB-0.0-1.0
Subsurface	155	RMHF - Septic Leach Field. North of the RMHF Septic Leach Field in the road lead to the north.	Potential residual contamination on road used during the remediation of the leach Field.	2.5	Fill "sandy silt" into "sand with silt" from 0 to 2.1 ft Refusal on sandstone	10/11/2011	TPH-GRO Primary & GATTC	SL-155-SA7-SB-2.0 SL-155-SA7-SB-1.5-2.5
Subsurface	156	Former Building 4654 - Center of former Building 4654 foot print.	Potential contamination from storage activities conducted at former Building 4654. Geophysical feature, "GPR".	8.5	Fill "sandy silt" into "silty sand" from 0 to 8.0 ft "trace fine sandstone" from 0 to 5.5 ft "sandstone cobble" at 4.3 ft Refusal on sandstone	9/21/2011	TPH-GRO Primary & GATT TPH-GRO Primary & GATT	SL-156-SA7-SB-4.5 SL-156-SA7-SB-4.0-5.0 SL-156-SA7-SB-8.0 SL-156-SA7-SB-7.5-8.5
Surface	157	Northwest portion of the RMHF, outside of the fence.	Gamma scanning results show a gamma radiation anomaly associated with GRAY 9.	0.5	"15% sandstone rock fragments, iron-rock and gravel rock fragments"	9/16/2011	Primary & GATTC	SL-157-SA7-SS-0.0-0.5
Subsurface	157	Northwest portion of the RMHF, outside of the fence.	Gamma scanning results show a gamma radiation anomaly associated with GRAY 9.	3.8	None indicated Refusal on sandstone	10/26/2011	Primary & GATTC	SL-157-SA7-SB-2.5-3.5
Subsurface	158	Former Building 4654 - Eastern edge of former Building 4654 foot print.	Geophysical feature, "GPR". Aerial photo feature, "Open Storage".	5.0	Fill "silty sand" from 0 to 4.8 ft "10% fine subangular gravel" from 0 to 0.3 ft Refusal on sandstone	9/21/2011	TPH-GRO Primary & GATTC	SL-158-SA7-SB-4.5 SL-158-SA7-SB-4.0-5.0
Subsurface	159	Southwest corner of Subarea 7.	Aerial photo feature, "Debris Area".	4.0	Fill "sandy silt" from 0 to 3.5 ft Refusal on siltstone	10/10/2011	Primary	SL-159-SA7-SB-3.0-4.0
Subsurface	160	Southwest corner of Subarea 7.	Aerial photo feature, "Debris Area".	1.1	None indicated Refusal on sandstone	11/1/2011	Primary	SL-160-SA7-SB-0.0-1.0
Subsurface	161	Southwest portion of Subarea 7.	Geophysical feature, "Conductivity Anomaly". Aerial photo feature, "Ground Scar".	6.5	"piece of possible artificial fill (concrete debris) at 3.5 ft Refusal on sandstone	11/2/2011	Primary	SL-161-SA7-SB-4.0-5.0
Subsurface	162	Site 4614 - Center of the former RMHF Holding Pond.	Potential residual contamination from remediation activities.	1.0	None indicated Refusal on sandstone	10/11/2011	Primary & Secondary	SL-162-SA7-SB-0.0-1.0
Subsurface	163	Northern Drainage - Up gradient (East) of Outfall 3.	Geophysical feature, "Conductivity Anomaly".	1.1	Fill "sandy silty with gravel" with "5% subangular igneous gravel, artificial fill gravel" from 0 to 1.1 ft Refusal on sandstone	No subsurface sample collected due to refusal at < 2.5 ft bgs 10/14/2011	NA	NA
Subsurface	164	Northern Drainage - Northwest of the RMHF Septic Leach Field.	Gamma scanning survey readings indicate elevated levels of cesium associated with GRAY 17C.	1.6	None indicated Refusal on sandstone	10/14/2011	Primary & Secondary	SL-164-SA7-SB-0.5-1.5
Surface	165	RMHF - North side of the RMHF, outside of the fence.	Gamma scanning survey readings indicate elevated levels of cesium associated with GRAY 17C. Location of septic tank.	0.5	None indicated Refusal on sandstone	9/16/2011	Primary & GATTC	SL-165-SA7-SS-0.0-0.5
Subsurface	165	RMHF - North side of the RMHF, outside of the fence.	Gamma scanning survey readings indicate elevated levels of cesium associated with GRAY 17C. Location of septic tank.	2.5	None indicated Refusal on sandstone	No subsurface sample collected due to refusal at < 2.5 ft bgs 10/25/2011	NA	NA
Subsurface	166	Site 4614 - Center of the former RMHF Holding Pond.	Potential residual contamination from remediation activities.	2.2	"trace asphalt"	10/11/2011	TPH-GRO Primary & GATTC	SL-166-SA7-SB-1.5 SL-166-SA7-SB-1.0-2.0
Subsurface	167	Site 4614 - Center of the former RMHF Holding Pond.	Potential residual contamination from remediation activities.	1.5	"trace concrete and asphalt fragments" from 0 to 1.5 ft	10/11/2011	TPH-GRO Primary & GATTC	SL-167-SA7-SB-1.0 SL-167-SA7-SB-0.5-1.5
Subsurface	168	Site 4614 - Center of the former RMHF Holding Pond.	Potential residual contamination from remediation activities.	2.7	None indicated Refusal on sandstone	10/11/2011	TPH-GRO Primary & GATTC	SL-168-SA7-SB-1.0 SL-168-SA7-SB-0.5-1.5
Subsurface	169	Site 4614 - West of the RMHF Holding Pond.	Potential residual contamination from remediation activities.	4.0	Fill "silty sand with trace angular siltstone gravel" from 0 to 2.4 ft "sandstone cobbles" from 2.4 to 2.8 ft Refusal on sandstone	10/10/2011	TPH-GRO Primary, GATT, formaldehyde, NDMA, nitrate & Dowanol	SL-169-SA7-SB-3.5 SL-169-SA7-SB-3.0-4.0

Sample Type	EPA Location ID	Location Description From EPA	EPA Technical Justification for Sample Collection	Boring Total Depth (ft bgs)	Description of Fill Encountered (from EPA Soil Boring Log)	Sample Date	Laboratory Analyses	Co-Located Chemical Sample Number
Subsurface	170	Former Building 4028 - Southwest of the southwest corner of the RMHF.	Potential contamination from surface water run-off from the RMHF. Down gradient from cesium levels associated with GRAY 10C.	10.0	Fill "silty sand" with "trace asphalt chucks (5mm)" from 0 to 2.7 ft	9/26/2011	TPH-GRO Primary, GATT, formaldehyde, NDMA, nitrate & Dowanol TPH-GRO Primary, GATT, formaldehyde, NDMA, nitrate & Dowanol	SL-170-SA7-SB-4.5 SL-170-SA7-SB-4.0-5.0 SL-170-SA7-SB-9.5 SL-170-SA7-SB-9.0-10.0
Subsurface	171	Former Building 4028 - South of former Building 4028 foot print.	Potential contamination within the former cooling unit piping trench.	10.0	Fill "silty sand" from 0 to 10.0 ft "5% subangular artificial fill and sandstone gravel" from 0 to 2.0 ft "concrete debris located" at 2.5 ft "trace artificial fill debris" from 2.5 to 3.5 ft "trace sand stone gravel, artificial debris gravel" from 3.5 to 5.0 ft "trace asphalt piece and debris material " from 7.0 to 10.0 ft	11/3/2011	TPH-GRO Primary, GATT, formaldehyde, NDMA, nitrate & Dowanol TPH-GRO Primary, GATT, formaldehyde, NDMA, nitrate & Dowanol	SL-171-SA7-SB-4.5 SL-171-SA7-SB-4.0-5.0 SL-171-SA7-SB-9.5 SL-171-SA7-SB-9.0-10.0
Subsurface	172	Former Building 4028 - South of former Building 4028 foot print.	Potential contamination within the former cooling unit piping trench and pit.	10.0	Fill "silty sand" from 0 to 10.0 ft "5% granitic angular + subangular gravel, trace charcoal fragments ~2mm, small chunks of high grade concrete" from 0 to 10.0 ft	9/27/2011	TPH-GRO Primary, GATT, formaldehyde, NDMA, nitrate & Dowanol TPH-GRO Primary, GATT, formaldehyde, NDMA, nitrate & Dowanol	SL-172-SA7-SB-4.5 SL-172-SA7-SB-4.0-5.0 SL-172-SA7-SB-9.5 SL-172-SA7-SB-9.0-10.0
Surface	173	Site 4614 - West of the former RMHF Holding Pond.	Potential contamination within soil pile associated with remedial activity at the holding pond.	0.5	None indicated	9/20/2011	Primary & GATT, formaldehyde, NDMA, nitrate, Dowanol	SL-173-SA7-SS-0.0-0.5
Subsurface	173	Site 4614 - West of the former RMHF Holding Pond.	Potential contamination within soil pile associated with remedial activity at the holding pond.	2.0	None indicated Refusal on sandstone	No subsurface sample collected due to refusal at < 2.5 ft bgs 10/10/2011	NA	NA
Subsurface	174	RMHF Septic Leach Field - West of the former RMHF Leach Field.	Down gradient of the former RMHF Leach Field.	2.0	None indicated Refusal on sandstone	9/20/2011	TPH-GRO Primary & GATTC	SL-174-SA7-SB-1.5 SL-174-SA7-SB-1.0-2.0
Surface	175	Southwest corner of Subarea 7.	Potential contamination from surface water run-off from the SNAP area.	0.5	"trace sandstone and gravel fill"	9/21/2011	Primary & GATTC	SL-175-SA7-SS-0.0-0.5
Subsurface	175	Southwest corner of Subarea 7.	Potential contamination from surface water run-off from the SNAP area.	10.0	Fill "silty sand" from 0 to 1.5 ft	11/1/2011	TPH-GRO Primary & GATT TPH-GRO Primary & GATT	SL-175-SA7-SB-4.5 SL-175-SA7-SB-4.0-5.0 SL-175-SA7-SB-9.5 SL-175-SA7-SB-9.0-10.0
Subsurface	177	RMHF - South of the RMHF, in the parking lot of north of Building 4024.	Potential contamination from surface water run-off from the RMHF. Down gradient of GRAY 10C.	4.0	Fill "silty sand" and "sandy silt" from 0 to 4.0 ft "5% subangular fine gravel (fill rock)" from 0 to 2.1 ft Refusal on sandstone	9/29/2011	TPH-GRO Primary & GATTC	SL-177-SA7-SB-3.5 SL-177-SA7-SB-3.0-4.0
Surface	179	East side of the RMHF.	Surface water run-off from the RMHF.	0.5	None indicated	9/16/2011	Primary & GATTC	SL-179-SA7-SS-0.0-0.5
Subsurface	179	East side of the RMHF.	Surface water run-off from the RMHF.	1.2	None indicated Refusal on sandstone	No subsurface sample collected due to refusal at < 2.5 ft bgs 10/25/2011	NA	NA
Subsurface	180	Southeast of the RMHF holding pond and northwest of former Building 4028.	Characterize potential contamination from waste lines from former Building 4028 to the RMHF Holding Pond.	4.0	Fill "poorly graded sand with silt" from 0 to 1.1 ft Fill "silty sand" with "5% subangular gravel" from 1.1 to 4.0 ft Refusal on sandstone	9/30/2011	TPH-GRO Primary, GATT, formaldehyde, NDMA, nitrate & Dowanol	SL-180-SA7-SB-2.5 SL-180-SA7-SB-2.0-3.0
Surface	181	Northern Drainage - Up gradient from Outfall 3. North of the RMHF.	Geophysical feature, "Conductivity". Potential contamination from surface water run-off in surface and subsurface soil within the drainage area.	0.5	"15% gravel fill rock"	9/23/2011	Primary & Secondary	SL-181-SA7-SS-0.0-0.5
Subsurface	181	Northern Drainage - Up gradient from Outfall 3. North of the RMHF.	Geophysical feature, "Conductivity". Potential contamination from surface water run-off in surface and subsurface soil within the drainage area.	1.6	Fill "sandy silt" from 0 to 0.5 ft Refusal on sandstone	No subsurface sample collected due to refusal at < 2.5 ft bgs 10/13/2011	NA	NA
Subsurface	182	Northern Drainage - Up gradient of Outfall 3. North of the RMHF.	Geophysical feature, "Conductivity". Potential contamination in the subsurface soil within the drainage area.	3.0	Fill "sandy silt" from 0 to 1.4 ft Refusal on sandstone	No subsurface sample collected due to refusal at < 2.5 ft bgs 10/14/2011	NA	NA
Surface	183	North of Building 4133.	Geophysical feature, "Magnetometer Anomaly"	0.5	"5% gravel fill rock"	9/14/2011	Primary	SL-183-SA7-SS-0.0-0.5
Subsurface	183	North of Building 4133.	Geophysical feature, "Magnetometer Anomaly".	10.0	Fill "silty sand" and "silt" from 0 to 10.0 ft "thick charcoal section with ~20% silt, all black" at 4.7 ft Refusal on sandstone	9/15/2011	Primary Primary	SL-183-SA7-SB-4.0-5.0 SL-183-SA7-SB-9.0-10.0

Table 2-1
Soil Samples Collected from HSA Subarea 7

Sample Type	EPA Location ID	Location Description From EPA	EPA Technical Justification for Sample Collection	Boring Total Depth (ft bgs)	Description of Fill Encountered (from EPA Soil Boring Log)	Sample Date	Laboratory Analyses	Co-Located Chemical Sample Number
Surface	184	East side of the RMHF outside of the fence.	Possible open storage of drums. Potential contamination from surface water run-off from the RMHF.	0.5	"piece of iron metal found"	9/16/2011	Primary & GATTC	SL-184-SA7-SS-0.0-0.5
Subsurface	184	East side of the RMHF outside of the fence.	Possible open storage of drums. Potential contamination from surface water run-off from the RMHF.	1.2	None indicated Refusal on sandstone	No subsurface sample collected due to refusal at < 2.5 ft bgs 10/25/2011	NA	NA
Subsurface	185	Southwest portion of Subarea 7.	Areal photo feature, "Debris Area".	4.0	"piece of quartzite recovered, possible artificial fill" at 3.5 ft	11/1/2011	Primary	SL-185-SA7-SB-3.0-4.0

Notes & Abbreviations:
EPA Location ID is highlighted in yellow for subsurface locations that were sampled using a hand auger
Surface samples at SL-11 and SL-101 were sampled for Primary analytes only. These locations should also have been sampled for GATTC.
Subsurface sample at SL-37 should have been sampled only for Primary and GATT but was also sampled for cyanide.
Surface sample at SL-99 was sampled for Primary analytes and GATT, but should have also been sampled for cyanide.
Primary analyses include: SVOCs, Metals, Chromium VI, Fluoride, Perchlorate, PCBs/PCTs, Dioxins/Furans, pH, in all samples and pesticides/herbicides in surface/drainage samples only.
Secondary analyses include: Alcohols, terphenyls, glycols, TPH-extractable fuel hydrocarbons, Formaldehyde, n-Nitrosodimethylamine, Energetics, Nitrate, Cyanide
bgs = below ground surface
dioxane = 1,4-dioxane
ft = feet
GATT = glycols, alcohols, terphenyls and TPH-extractable fuel hydrocarbons
GATTC = glycols, alcohols, terphenyls, TPH-extractable fuel hydrocarbons, and cyanide
GPR = ground penetrating radar
GRAY = gamma ray anomaly
GRO = gasoline range organics
NA = not applicable
NDMA = n-Nitrosodimethylamine
PCB/PCTs = polychlorinated biphenyls/polychlorinated triphenyls
PGRAY = potential gamma ray anomaly
RMHF = Radioactive Material Handling Facility
SVOCs = semivolatile organic compounds
SRE = Sodium Reactor Experiment
TPH = total petroleum hydrocarbons
VOCs = volatile organic compounds

2.2 Subsurface Sampling

Most of the subsurface soil sampling was performed by a California-licensed direct push technology (DPT) subcontractor under HGL oversight. The majority of the DPT borings in Subarea 7 were advanced to a targeted depth of between approximately 5 and 10 feet bgs. Table 2-1 provides the actual depths achieved at each location.

Soil cores were collected using the Geoprobe® dual-tube sampling method, which consisted of a 2-inch outer steel drive casing and an inner 1-3/4-inch diameter acetate soil sampling sleeve. After the acetate liner was retracted from the core barrel, it was opened lengthwise with a cutting tool. The core was screened for radioactivity using Micro R (for gamma radiation) and Pancake (for alpha and beta radiation) probes, followed by screening with a photoionization detector (PID). Based on the instrument readings and/or visual evidence of possible contamination, the sample depths were determined. If no elevated radiation or PID readings were indicated, samples were collected from the acetate sleeve by the CDM sampler at the default depths of 4 to 5 feet bgs and 9 to 10 feet bgs.

Soil for VOCs, 1,4-dioxane, and TPH-GRO analyses was collected from the acetate sleeve using EnCore® samplers. Subsurface soil for SVOC, PAH, and PCB/PCT analyses was removed from the acetate sleeve in a manner causing minimal soil disturbance and placed into 16-ounce glass jars. Soil for all other analyses was also placed into 16-ounce glass jars. Adhesive sample labels were completed with all sampling information and affixed to each sample jar, and then placed into plastic baggies. The EnCore® samplers were placed in one of the bags in which they were received, and the sample label affixed to the outside of the bag. All jars and EnCore® samplers were placed in a cooler with double bagged ice.

Several subsurface locations were not accessible by the Geoprobe® rig, therefore, these borings were advanced using a hand auger. Each location was augered to the target depth of 5 feet bgs, where possible, and each foot of augered soil was retrieved to the surface, placed in plastic bags and screened using the Micro R, Pancake, and PID. All borings in Subarea 7 were sampled by CDM for chemical analyses at approximately 4 to 5 feet bgs, or in some cases at a shallower depth (see Table 2-1), using a slide hammer with stainless steel sleeves. The EnCore® samplers were filled from one end of the sleeve and the sleeve was capped and submitted for the SVOC, PAH, and PCB/PCT analyses. Jars were then filled with sample material collected using the hand auger for the remaining analyses. This process was repeated at those locations where a deeper sample (i.e., target depth of 9 to 10 feet bgs) could also be collected. Because sampling using a hand auger was not addressed in the WP/FSAP or in the FSAP Addendum for Subarea 7, this sampling method constitutes a variance from the FSAP (see Section 2.8). However, sample collection from hand augered holes was revised effective August 2, 2011 and approved by DTSC, such that when conditions permitted, a 6-inch sleeve was collected using a slide hammer for the SVOC, PAH, and PCB/PCT analyses, and any EnCore® samples were collected from the bottom of the sleeve.

After all samples were collected from each boring and hand augered hole, the soil cuttings were used to backfill the hole and the hole was topped off with a bentonite chip seal. At locations in asphalt, asphalt patch material was applied on top of the bentonite.

2.3 Sample Handling

All soil samples collected by HGL for chemical analyses were relinquished by the field sampler to CDM's Field Team Leader (FTL). The FTL ensured that the sample labels were completed legibly and

accurately. Any discrepancies were discussed with the field samplers and corrections to the sample labels were made as needed. All sample labels were covered with clear tape, the sleeves and jars placed back into their plastic baggie, and refrigerated.

All sampling information was recorded onto one or more chain-of-custody (CoC) forms. Each sampler reviewed the CoC and any discrepancies were corrected by the FTL. Each completed CoC was signed by the sampler and the FTL as the individual responsible for release of the samples to the courier. All samples were packed into coolers in accordance with Section 6.4 of the *Master Work Plan/Field Sampling and Analysis Plan, Co-Located Chemical Sampling at Area IV, Santa Susana Field Laboratory, Ventura County, California* (CDM 2011a).

2.4 Field Quality Control Procedures

Quality control (QC) samples collected in the field included field duplicates, matrix spike (MS)/matrix spike duplicate (MSD) samples, equipment rinsate blanks, and field blanks. Trip blanks filled with laboratory analyte-free water were sent to the site from the laboratory and were submitted unopened with any samples to be analyzed for VOCs/1,4-dioxane, and/or TPH-GRO.

2.4.1 Field Duplicates and MS/MSD Samples

Both the field duplicates and MS/MSD samples were to be collected at a frequency of one per 20 parent soil samples collected. The field duplicate and MS/MSD samples were collected from the same location. The duplicate samples were submitted to the laboratory as separate (and blind) from the parent samples. The MS/MSD samples are additional volume of the parent samples collected in triple volume for the DPT subsurface samples; a double volume of soil was sufficient for the surface and hand-augered MS/MSD samples.

For Subarea 7, five surface MS/MSD/duplicate samples were collected from Subarea 7 and analyzed for the primary analytes and pesticides/herbicides. One of these samples was also analyzed for all the secondary analytes, and three others were analyzed for TPH-GRO, TPH-EFH, terphenyls, glycols, alcohols, and cyanide. For the subsurface samples, six MS/MSD/duplicate samples were collected and analyzed for the primary analytes. Two of these samples were also analyzed for all secondary analytes, two other samples were analyzed for TPH-GRO, TPH-EFH, terphenyls, glycols, alcohols, NDMA, nitrates, and formaldehyde, and one sample was analyzed for TPH-GRO, TPH-EFH, terphenyls, glycols, alcohols, and cyanide.

2.4.2 Equipment Rinsate Blank Samples

As stated in the Master WP/FSAP, equipment rinsate blanks were to be prepared and submitted for chemical analysis at a minimum frequency of one per 20 parent soil samples collected for each sampling technique and whenever there were changes in the sample collection procedures, sampling decontamination procedures, or sampling equipment. As sampling was being conducted in Subarea 5D North during the week of June 20, 2011, the frequency of collection of equipment blanks was changed (to align with frequency of collection of equipment blanks performed under the RFI program) to weekly for both surface/drainage and subsurface samples regardless of the number of soil samples collected.

Other subareas were concurrently sampled during the Subarea 7 sampling period. Therefore, since equipment blanks were labeled with specific subareas in the sample identification numbers, they were in some instances also related to samples collected from other subareas. Equipment blanks that are associated with Subarea 7 soil samples are listed below.

Equipment Blank Number	Equipment Blank Date	Equipment Blank Analyses	Soil Sample Type
EB-SA7-SS-091411	9/14/11	Primary, secondary, pesticide/herbicides	Surface
EB-SA7-SB-091511	9/15/11	Primary, secondary, VOCs & dioxane	Subsurface
EB-SA7-SS-092111	9/21/11	Primary, secondary, pesticide/herbicides	Surface
EB-SA7-SB-092211	9/22/11	Primary, secondary, VOCs & dioxane	Subsurface
EB-SA7-SB-092711	9/27/11	Primary, secondary, VOCs & dioxane	Subsurface
EB-SA6-SB-100511	10/5/11	Primary, secondary, VOCs & dioxane	Subsurface
EB-SA6-SB-100611	10/6/11	Primary, secondary, VOCs & dioxane, pesticides/herbicides	Subsurface
EB-SA3-SB-101211	10/12/11	Primary, secondary	Subsurface
EB-SA7-SB-101311	10/13/11	Primary, secondary	Subsurface
EB-SA5DS-SB-101811	10/18/11	Primary, secondary, VOCs & dioxane	Subsurface
EB-SA7-SB-101911	10/19/11	Primary, secondary, VOCs & dioxane	Subsurface
EB-SA7-SB-102611	10/26/11	Primary	Subsurface
EB-SA7-SB-102711	10/27/11	Secondary	Subsurface
EB-SA7-SB-110311	11/3/11	Primary, secondary	Subsurface

During the Subarea 7 sampling period, several equipment blanks (consisting of HGL's American Society for Testing and Materials [ASTM] Type II water) were also collected for NDMA only. Collection of equipment blanks for NDMA analysis began after review of equipment blank data indicated that NDMA was being detected in equipment blanks collected in association with soil samples from other subareas of Area IV. The field team was instructed by the project manager to begin collecting equipment blanks using HGL's ASTM Type II water and submitting soil (i.e., baked sand prepared by Lancaster Laboratories, Inc. [LLI]) and water trip blanks in an effort to determine a possible source of the NDMA other than onsite. Results of all NDMA equipment and trip blank analyses will be discussed in a separate report.

2.4.3 Field Blank Samples

Field blanks were to be collected once for each lot number of ASTM Type II water that HGL used for decontamination. Two field blanks were collected during sampling in Subarea 7: one field blank was collected of the bottled drinking water and one of the ASTM Type II water used by HGL for decontamination of the sampling equipment. The drinking water field blank was analyzed by LLI for all primary and secondary analytes, pesticides and herbicides, and VOCs/1,4-dioxane. The ASTM Type II water field blank was analyzed by EMAX Laboratories, Inc. [EMAX] located in Torrance, CA for the primary analytes, VOCs/1,4-dioxane and TPH-GRO, TPH-EFH, nitrates, energetics, cyanide, glycols, and alcohols.

2.4.4 Decontamination of Sampling Equipment

All drilling equipment was cleaned by HGL and their DPT subcontractor before and after completing each boring. This included the sampling device and drill rods. The external surfaces of the equipment were washed with potable water and Alconox, or equivalent laboratory-grade detergent. Equipment was scrubbed until all visible dirt, grime, grease, oil, loose paint, rust flakes, etc., was removed. The equipment was then rinsed with potable water.

Hand sampling equipment used to collect the surface and drainage samples, including shovels, hand trowels, and mixing bowls, were decontaminated as follows:

- Washed with a solution of potable water and Liquinox, or equivalent laboratory-grade detergent
- Rinsed thoroughly with potable water
- Given a final rinse with ASTM Type II water

If the sampling device was not used immediately after being decontaminated, it was wrapped in oil-free aluminum foil, or placed in a closed plastic, stainless steel, glass, or Teflon® container.

2.5 Analytical Laboratory Methods and Procedures

2.5.1 Analytical Methods

The analytical methods for the co-located chemical soil samples were divided into two suites of analyses. The primary suite performed on all samples includes:

- Metals using EPA Methods 6010B/6020, 7471A (mercury), and 7199 (chromium VI)
- Soil pH using EPA Method 9045M
- Fluoride using EPA Method 300.0
- SVOCs using EPA Method 8270C and PAHs using Method 8270C selective ion monitoring (SIM)
- PCBs and PCTs using EPA Method 8082
- Dioxins and furans using EPA Method 1613B
- Perchlorate using EPA Method 314.0 (and EPA Method 6850 for verification of non-detects at a rate of 10 percent of the samples submitted)

Surface soil samples only were also to be analyzed for:

- Pesticides using EPA Method 8081A
- Herbicides using EPA Method 8151A

Locations selected for sampling for the secondary suite of analyses were based on several factors including locations with a process history of the specific chemical usage, sample sites with elevated instrument readings, soil fill, waste, or visually contaminated materials. The secondary list of analyses includes:

- Nitrates using EPA Method 300.0
- Formaldehyde using EPA Method 8315A
- TPH-GRO/TPH-EFH/glycols using EPA Method 8015M
- NDMA using EPA Method 1625C
- Energetics using EPA Method 8330A
- Cyanide using EPA Method 9012B

- Alcohols and terphenyls using EPA Method 8015B

Through July 22, 2011, all shallow (i.e., target depth of 4 to 5 feet bgs) subsurface soil samples and any deeper subsurface soil samples at locations where both the primary and secondary suites were to be sampled, were also analyzed for:

- EPA Method 8260B for VOCs and
- EPA Method 8260B SIM for 1,4-dioxane

These analyses were also to be performed on samples collected from deeper target depths at locations that were originally proposed for primary analyses only but exhibited elevated instrument readings, soil fill, waste, or visually contaminated materials.

After July 22, 2011, shallow subsurface soil samples were to be analyzed for VOCs and 1,4-dioxane only at locations that where:

- Field instruments indicated the presence of VOCs above background
- Staining or exhibiting organic odors were detected
- A feature such as a sump or tank was known or suspected to have contained VOCs
- RFI data indicate the potential for VOCs to be at the subsurface soil/bedrock interface
- RFI data indicate potential for VOCs to be harbored in clay soil

2.5.2 Analytical Method Modifications

The analytical laboratory used for the Subarea 7 co-located soil sampling effort was LLI of Lancaster, Pennsylvania. LLI was selected by competitive procurement based on their proposed method detection limits (MDLs). Selection of LLI as the co-located soil analytical laboratory was discussed with the community on October 10, 2010. A second laboratory (EMAX) was subcontracted and samples collected in Subarea 7 were shipped to EMAX on November 1, 2, and 3 and December 1, 2011. EMAX performed all analyses with the exception of samples collected for dioxin/furans, formaldehyde and terphenyls. Although the methods performed by EMAX are not identical to the methods performed by LLI in some cases, the methods are equivalent.

The analytical methods identified for the co-located soil sampling were selected to be consistent with the methods used for the RFI. These analytical methods are presented in the *Quality Assurance Project Plan, Santa Susana Field Laboratory RCRA Facility Investigation, Surficial Media Operable Unit* (MECx 2009) (RFI Quality Assurance Project Plan [QAPP]) and are listed in Table 2-2.

For Subarea 7 sampling, CDM also evaluated the RFI QAPP detection limits relative to risk-based soil criteria. There were several instances where risk-based soil values were lower than the RFI QAPP limits. To determine whether the analytical MDL could be lowered, method modifications were discussed with DTSC and LLI chemists at the time of implementation. The ability of the laboratory to achieve project reporting limits (RLs) and QC criteria using these method modifications remains under evaluation by the project chemists. Table 2-2 also identifies methods that have been modified in an effort to lower respective MDLs and RLs.

Table 2-2 Analytical Methods and Method Modifications for Soil

Parameter Group	Analytical Method	Method Modified?
Volatile Organic Compounds	EPA 8260B	No
1,4-Dioxane	EPA 8260B SIM	No
Primary Analytes		
Select SVOCs	EPA 8270C SIM	No
SVOCs	EPA 8270C	No
Metals (including Mercury)	EPA 6010B/6020/7471A	No
Chromium VI	EPA 7199	No
Fluoride	EPA 300.0	No
Perchlorate[1]	EPA 6850	No
Perchlorate	EPA 314.0	No
PCBs/PCTs	EPA 8082	Yes
Pesticides	EPA 8081A	Yes
Herbicides	EPA 8151A	Yes
Dioxins/Furans	EPA 1613B	No
Secondary Analytes		
Alcohols	EPA 8015B	Yes
Terphenyls	EPA 8015B	Yes
Glycols	EPA 8015M	Yes
TPH (GRO and EFH)	EPA 8015M	Yes
Formaldehyde	EPA 8315A	Yes
n-Nitrosodimethylamine[2]	EPA 1625C	No
Energetics	EPA 8330A	Yes
Nitrate	EPA 300.0	No
Cyanide	EPA 9012B	No
pH	EPA 9045M	No

[1] Perchlorate by Method EPA 6850 was analyzed on 10 percent of samples analyzed by Method EPA 314.0

[2] n-Nitrosodimethylamine was analyzed by both Methods 8270C and 8270C SIM in addition to 1625C

The method modifications primarily involved increasing the prescribed sample volume (soil mass extracted) and concentrating the resulting extract to a smaller final volume, as follows:

- Method 8082 (PCBs and PCTs) – 60 grams of sample prepared and concentrated 5 fold to a final volume of 2 milliliters (mL)
- Method 8081A (Pesticides) – 60 grams of sample prepared and taken to a final volume of 4 mL (due to extract cleanup techniques)
- Method 8151A (Herbicides) – 60 grams of sample prepared and taken to a final volume of 2 mL
- Method 8330A (Energetics) – 5 grams of sample prepared in 10 mL of solvent
- Method 8315A (Formaldehyde) – 20 grams of sample used to prepare the leachate
- Method 8015M (TPH-EFH) – 60 grams of sample prepared and taken to a final volume of 1 mL
- Method 8015B (Alcohols) – 10 grams of sample prepared and taken to a final volume of 5 mL
- Method 8015M (Glycols) – 10 grams of sample prepared and taken to a final volume of 5 mL
- Method 8015B (Terphenyls) – 60 grams of sample prepared and extract concentrated to a final volume of 5 mL instead of 10 mL

For samples analyzed for glycols, an additional method modification was used. The standard method prescribes water extraction of the soils followed by concentration and then analysis by direct injection of the extract. The extraction procedure was altered by using acetone as the extraction solvent followed by concentration and then direct injection into the gas chromatograph. This modification was developed as a response to observed continuing calibration exceedances that could not be corrected using the standard procedure. These exceedances were due to the analytical column experiencing rapid degradation as a result of injecting water.

2.6 Data Review Processes

Analytical data produced by LLI were subject to multiple review steps to coincide with the start of distinct tasks. These steps were performed in a timely manner to ensure appropriate feedback and correction of errors. These steps included:

- Cross-reference check of sample CoC documents against the laboratory acknowledgement of sample receipt form. The laboratory acknowledgement of sample receipt was typically transmitted to the data manager via e-mail two to three days after sample receipt and login and includes a summary of the requested analyses to be performed per sample. Sample log-in errors were identified and corrected at this step.

- Tracking of sample collection, receipt, and laboratory sample delivery group (SDG) numbers on a sample tracking spreadsheet. This spreadsheet also includes field QC sample information, sample location coordinates, and required laboratory deliverables including reports, electronic data deliverables, raw data, and the status of validation.

Upon receipt of the laboratory report (delivered via e-mail), a preliminary review of the data was performed. This review consisted of:

- Reconciliation of the reported analyses against the analyses that were requested on the CoCs.

- Review of the laboratory case narratives. The case narrative identifies and explains quality issues encountered during the analysis of the samples. Quality issues may include (but are not limited to) missed holding times, poor spike recoveries in matrix or batch-specific QC samples, instrument calibration exceedances, and blank contamination. The laboratory consults with the project chemists on these issues and receives instruction on how to proceed before reporting the sample results.

- Review of the laboratory-specific QC data. These data are provided by the laboratory in summary form. Any unanticipated deviations from the project or method-specific criteria are reconciled with the laboratory at this stage.

2.7 Increased Field and Laboratory Quality Control Measures

Further evaluation of additional quality control items such as the frequency of equipment blank collection (Section 2.4.2) and evaluation of low level RLs were identified and implemented during the field sampling and laboratory analytical program. In addition, a second analytical laboratory (EMAX) was contracted to provide analytical services at the SSFL site. These additional measures of quality control were developed in order to address and monitor these items throughout the sampling program.

As discussed above, collection of additional equipment blanks consisting of HGL's ASTM Type II water was initiated when review of equipment blank data indicated that NDMA was being detected in equipment blanks collected from other subareas (e.g., Subarea 5C) of Area IV. During sampling in Subarea 7, several equipment blanks consisting of HGL's ASTM Type II water were collected for NDMA only.

CDM further evaluated the modified RLs at the request of DTSC chemists to verify that LLI was achieving the lower RL. LLI was requested in September 2011 to analyze additional soil QC samples spiked near the RL to verify their RLs and to evaluate precision and accuracy of the results. The QC samples consisted of MS and laboratory control samples (LCS) that were spiked at the MRL. The LCS consists of an aliquot of blank matrix (sand) to which known quantities of the method analyte and all preservation compounds are added. The LCS is prepared and analyzed in a similar manner as the sample. Evaluation of these additional QC sample results is on-going.

2.8 Deviations from the WP/FSAP

During the field sampling and analytical programs, modifications from the procedures detailed in the WP/FSAP (CDM 2011a) were required. These deviations and associated resolutions were discussed with the FTL, the project manager, and in some cases with the DTSC representative prior to implementation. These deviations are described below.

2.8.1 Field Sampling

A total of 185 locations in Subarea 7 (Table 2-1) were to be sampled at one or more depths. No subsurface samples were collected at 65 locations as noted in Table 2-1 due to shallow refusal at less than 2.5 feet bgs. Samples were not collected at SL-40 due to archeological concerns.

Subsurface sampling using a hand auger was not originally planned in the Master WP/FSAP or the FSAP Addendum for Subarea 7. Twenty-nine locations in Subarea 7 were hand augered as noted in Table 2-1. All hand augered locations were sampled using a slide hammer for collection of soil submitted for SVOC, PAH, and PCB/PCT analyses and all required Encore® samplers for VOCs/1,4-dioxane or TPH-GRO analyses were collected from one end of the sleeves.

Review of the data is ongoing to ascertain whether VOC and SVOC results should be qualified based on changes to the planned sampling procedure. The results of this review will be reported in a future revision of this document.

The surface samples at SL-11 and SL-101 were to be sampled for the primary analytes and for glycols, alcohols, terphenyls, TPH, and cyanide. However, these locations were sampled for the primary analytes only. The subsurface sample at SL-37 and the surface sample at SL-99 should have been sampled for the primary analytes and glycols, alcohols, terphenyls, and TPH, but both locations were also sampled for cyanide.

2.8.2 Analytical

As noted in Section 2.5.2, some analytical methods have been modified for this project. All modifications were discussed with DTSC representatives prior to their implementation. Review of the analytical methods and sample results indicates that the objectives for the project were addressed for all non-modified analyses. All modified analyses are undergoing further studies evaluating the effect of the modifications on precision and accuracy. The RL-LCS and RL-MS QC samples analyzed by LLI are a prime part of these studies. An independent study evaluating the precision and accuracy of the

modified herbicide method has been completed. Review of these herbicide results indicate that the method modifications did not achieve precision and accuracy goals at this lower reporting limit for some of the analytes. Data are currently under further review and it is likely that reporting limits may be elevated for some analytes.

Section 3

Area IV Subareas 7 Soil Sampling Results

Because this TM only provides a presentation of the analytical results, data in this section are presented in a summary fashion. Table 3-1 provides a summary of the Subarea 7 surface and drainage soil data. The table details the chemicals analyzed, their associated frequency of detection, the minimum and maximum detected concentrations, the range of observed detection limits and RLs, and the sample location where the maximum concentration of each analyte was detected. Table 3-2 provides the same information for Subarea 7 subsurface soil data. This table also indicates depths at which maximum concentrations were observed. For the subsurface soil data, samples were sent to both EMAX and LLI laboratories. A column has been added to the tables to indicate which laboratory the maximum concentration came from. Table 3-3 provides a summary of the Subarea 7 combined surface and subsurface datasets.

When screening criteria are developed to assess the presence/absence of contamination (i.e., above/below the applicable criteria) the Subarea 7 data will be combined with RFI data to better define the nature and extent of surface soil contamination throughout Subarea 7.

Appendix A provides tables for all validated data by analytical method and sample location. Data validation qualifier codes and their definitions are presented in these tables. Appendix B provides the summary analytical data reports as received from LLI. Appendix C presents the data usability and assessment report (DUAR), which details specific qualifications of sample results along with all validation reports. Appendix D is the master database of all sample results including the data validation "flags" (qualifiers).

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Table 3-1
Summary of Analytical Results for Chemicals - Validated Data
Surface Soils - HSA - 7

Group	Chemical	CAS No	Detection Frequency	Minimum Concentration	Maximum Concentration	Range of Method Detection Limit	Range of Method Reporting Limit	Unit	Location of Maximum Concentration	Lab of Maximum Concentration	Method of Maximum Concentration	Depth of Maximum Concentration
Inorganic	Nitrate	14797-55-8	24 / 26	0.97 J Z	26.3	0.80 - 0.85	1.5 - 1.6	mg/kg	SL-181-SA7	LL	300.0	0 - 0.5
Inorganic	Fluoride	16984-48-8	41 / 117	0.91 J Z	10.7	0.097 - 0.96	0.12 - 1.2	mg/kg	SL-054-SA7	LL	300.0	0 - 0.5
Inorganic	Cyanide	57-12-5	5 / 80	0.19 J Z	1.5	0.17 - 0.36	0.47 - 1.0	mg/kg	SL-055-SA7	LL	9012B	0 - 0.5
Inorganic	Aluminum	7429-90-5	117 / 117	7760	22200	5.81 - 7.21	19.2 - 23.8	mg/kg	SL-122-SA7	LL	6010B	0 - 0.5
Inorganic	Iron	7439-89-6	117 / 117	12900	204000	2.51 - 26.5	19.2 - 203	mg/kg	SL-086-SA7	LL	6010B	0 - 0.5
Inorganic	Lead	7439-92-1	117 / 117	3.93	30200 J Q	0.0099 - 12.8	0.194 - 252	mg/kg	SL-013-SA7	LL	6020	0 - 0.5
Inorganic	Lithium	7439-93-2	117 / 117	9.5	35.5	0.60 - 0.74	1.9 - 2.4	mg/kg	SL-122-SA7	LL	6010B	0 - 0.5
Inorganic	Magnesium	7439-95-4	111 / 117	2500	7150	0.423 - 0.524	9.61 - 11.9	mg/kg	SL-122-SA7	LL	6010B	0 - 0.5
Inorganic	Manganese	7439-96-5	117 / 117	178 J E	1130	0.0346 - 0.184	0.480 - 2.56	mg/kg	SL-020-SA7	LL	6010B	0 - 0.5
Inorganic	Mercury	7439-97-6	48 / 117	0.0071 J FD, Z	0.984	0.0066 - 0.0332	0.0934 - 0.472	mg/kg	SL-146-SA7	LL	7471A	0 - 0.5
Inorganic	Molybdenum	7439-98-7	117 / 117	0.284 J E	7.99 J Q	0.0484 - 0.0596	0.0969 - 0.119	mg/kg	SL-146-SA7	LL	6020	0 - 0.5
Inorganic	Nickel	7440-02-0	117 / 117	5.41 J E, Q	163 J Q	0.0969 - 0.119	0.387 - 0.477	mg/kg	SL-146-SA7	LL	6020	0 - 0.5
Inorganic	Potassium	7440-09-7	117 / 117	2310	5290	10.9 - 13.5	48.0 - 59.6	mg/kg	SL-122-SA7	LL	6010B	0 - 0.5
Inorganic	Silver	7440-22-4	115 / 117	0.0161 J Q, Z	4.78 J Q	0.0138 - 0.0169	0.0969 - 0.119	mg/kg	SL-157-SA7	LL	6020	0 - 0.5
Inorganic	Sodium	7440-23-5	117 / 117	49.8 J Z	974	5.72 - 7.09	96.1 - 119	mg/kg	SL-116-SA7	LL	6010B	0 - 0.5
Inorganic	Strontium	7440-24-6	117 / 117	7.77	54.0	0.0240 - 0.0298	0.480 - 0.596	mg/kg	SL-039-SA7	LL	6010B	0 - 0.5
Inorganic	Thallium	7440-28-0	117 / 117	0.148	0.570 J Q	0.0291 - 0.299	0.0969 - 0.998	mg/kg	SL-122-SA7	LL	6020	0 - 0.5
Inorganic	Tin	7440-31-5	1 / 117	9.65 J Z	9.65 J Z	0.307 - 0.381	9.61 - 11.9	mg/kg	SL-086-SA7	LL	6010B	0 - 0.5
Inorganic	Titanium	7440-32-6	117 / 117	779	1560	0.0686 - 0.0854	0.966 - 1.20	mg/kg	SL-122-SA7	LL	6010B	0 - 0.5
Inorganic	Antimony	7440-36-0	94 / 117	0.076 J Q, E, Z	1010 J Q	0.0717 - 3.69	0.194 - 9.98	mg/kg	SL-013-SA7	LL	6020	0 - 0.5
Inorganic	Arsenic	7440-38-2	117 / 117	2.67	428 J E, Q	0.0775 - 0.399	0.387 - 2.00	mg/kg	SL-013-SA7	LL	6020	0 - 0.5
Inorganic	Beryllium	7440-41-7	117 / 117	0.313 J Q	1.00 J Q	0.0155 - 0.0401	0.0969 - 0.251	mg/kg	SL-122-SA7	LL	6020	0 - 0.5
Inorganic	Barium	7440-39-3	117 / 117	60.2	193	0.103 - 0.521	0.387 - 1.97	mg/kg	SL-122-SA7	LL	6020	0 - 0.5
Inorganic	Boron	7440-42-8	49 / 117	0.695 J Z	12.6	0.346 - 1.83	4.80 - 25.4	mg/kg	SL-067-SA7	LL	6010B	0 - 0.5
Inorganic	Cadmium	7440-43-9	117 / 117	0.0883 J Q, Z	5.01	0.0426 - 0.0524	0.0969 - 0.119	mg/kg	SL-101-SA7	LL	6020	0 - 0.5
Inorganic	Chromium	7440-47-3	117 / 117	9.40 J E, Q	184 J Q	0.116 - 0.300	0.387 - 1.00	mg/kg	SL-146-SA7	LL	6020	0 - 0.5
Inorganic	Cobalt	7440-48-4	117 / 117	3.25 J E	18.9 J Q, A	0.0194 - 0.0238	0.0969 - 0.119	mg/kg	SL-086-SA7	LL	6020	0 - 0.5
Inorganic	Copper	7440-50-8	117 / 117	5.14 J E, Q	378 J E	0.0775 - 0.398	0.387 - 1.99	mg/kg	SL-086-SA7	LL	6020	0 - 0.5
Inorganic	Vanadium	7440-62-2	117 / 117	18.8 J E, Q	598 J A	0.0213 - 0.109	0.0969 - 0.497	mg/kg	SL-086-SA7	LL	6020	0 - 0.5
Inorganic	Zinc	7440-66-6	117 / 117	46.9	1500 J E, A	0.542 - 13.9	2.91 - 74.4	mg/kg	SL-097-SA7	LL	6020	0 - 0.5
Inorganic	Zirconium	7440-67-7	71 / 117	1.93 J Z	11.5	0.442 - 2.33	4.80 - 25.4	mg/kg	SL-035-SA7	LL	6010B	0 - 0.5
Inorganic	Calcium	7440-70-2	117 / 117	1660 J E	24100	2.40 - 2.98	19.2 - 23.8	mg/kg	SL-086-SA7	LL	6010B	0 - 0.5
Inorganic	Phosphorus	7723-14-0	117 / 117	231	3010	0.336 - 1.77	9.61 - 50.7	mg/kg	SL-086-SA7	LL	6010B	0 - 0.5
Inorganic	Selenium	7782-49-2	117 / 117	0.0668 J Z	0.546 J Q	0.0562 - 0.0691	0.387 - 0.477	mg/kg	SL-122-SA7	LL	6020	0 - 0.5
Inorganic	Chromium VI	18540-29-9	62 / 117	0.2 J Z	9.2	0.19 - 0.25	0.96 - 1.2	mg/kg	SL-007-SA7	LL	7199	0 - 0.5
Inorganic	Perchlorate (314.0)	14797-73-0	0 / 117	-	-	9.0 - 11.0	30.0 - 36.8	ug/kg				-
Inorganic	Perchlorate (6850)	14797-73-0	2 / 23	2.5 J Z	3.6 J Z	2.1 - 2.2	5.0 - 5.2	ug/kg	SL-146-SA7	LL	6850	0 - 0.5
Inorganic	Percent Moisture	MOIST	113 / 117	0.51	18.5	0.50 - 0.50	0.50 - 0.50	%	SL-138-SA7	LL	160.3M	0 - 0.5
Inorganic	pH	pH	117 / 117	5.87	8.49	0.0100 - 0.0100	0.0100 - 0.0100	pH unit	SL-116-SA7	LL	9045M	0 - 0.5
Misc. Organics	Ethanol	64-17-5	1 / 94	170 J Z	170 J Z	100 - 210	500 - 1100	ug/kg	SL-153-SA7	LL	8015B	0 - 0.5
Misc. Organics	Methanol	67-56-1	22 / 94	110 J Z	440 J Z	100 - 210	500 - 1100	ug/kg	SL-019-SA7	LL	8015B	0 - 0.5
									SL-136-SA7	LL	8015B	0 - 0.5
Misc. Organics	2-Propanol	67-63-0	7 / 94	100 J Z, #	280 J Z	100 - 210	500 - 1100	ug/kg	SL-051-SA7	LL	8015B	0 - 0.5
Misc. Organics	Ethylene Glycol	107-21-1	0 / 94	-	-	5.0 - 6.1	10 - 12	mg/kg				-
Misc. Organics	Diethylene Glycol	111-46-6	0 / 94	-	-	5.0 - 6.1	10 - 12	mg/kg				-
Misc. Organics	Propylene glycol	57-55-6	0 / 94	-	-	5.0 - 6.1	10 - 12	mg/kg				-
Misc. Organics	o-Terphenyl	84-15-1	2 / 94	2.8 J S, Z	3.4 J S, Z	1.5 - 1.8	3.5 - 4.3	mg/kg	SL-007-SA7	LL	8015B	0 - 0.5
Misc. Organics	m-Terphenyl	92-06-8	0 / 94	-	-	1.5 - 1.8	3.5 - 4.3	mg/kg				-
Misc. Organics	p-Terphenyl	92-94-4	1 / 94	2.4 J S, Z	2.4 J S, Z	1.5 - 1.8	3.5 - 4.3	mg/kg	SL-007-SA7	LL	8015B	0 - 0.5
Misc. Organics	Formaldehyde	50-00-0	7 / 26	690 J Z	1100 J Z	600 - 1200	1500 - 3100	ug/kg	SL-153-SA7	LL	8315A	0 - 0.5
Misc. Organics	2,6-Dinitrotoluene	606-20-2	0 / 22	-	-	40 - 42	120 - 130	ug/kg				-
Misc. Organics	2,4,6-Trinitrotoluene	118-96-7	0 / 22	-	-	40 - 42	120 - 130	ug/kg				-
Misc. Organics	RDX	121-82-4	0 / 22	-	-	50 - 53	120 - 130	ug/kg				-
Misc. Organics	4-Amino-2,6-Dinitrotoluene	19406-51-0	0 / 22	-	-	60 - 63	120 - 130	ug/kg				-
Misc. Organics	HMX	2691-41-0	0 / 22	-	-	100 - 110	300 - 320	ug/kg				-
Misc. Organics	2-Amino-4,6-Dinitrotoluene	35572-78-2	0 / 22	-	-	40 - 42	120 - 130	ug/kg				-
Misc. Organics	Tetryl	479-45-8	0 / 22	-	-	62 - 64	120 - 130	ug/kg				-
Misc. Organics	Nitroglycerin	55-63-0	0 / 22	-	-	810 - 840	2400 - 2500	ug/kg				-

Table 3-1
Summary of Analytical Results for Chemicals - Validated Data
Surface Soils - HSA - 7

Group	Chemical	CAS No	Detection Frequency	Minimum Concentration	Maximum Concentration	Range of Method Detection Limit	Range of Method Reporting Limit	Unit	Location of Maximum Concentration	Lab of Maximum Concentration	Method of Maximum Concentration	Depth of Maximum Concentration
Misc. Organics	2,6-Diamino-4-nitrotoluene	59229-75-3	0 / 22	-	-	81 - 84	240 - 250	ug/kg				-
Misc. Organics	2,4-Diamino-6-nitrotoluene	6629-29-4	0 / 22	-	-	81 - 84	240 - 250	ug/kg				-
Misc. Organics	PETN	78-11-5	0 / 22	-	-	810 - 840	2400 - 2500	ug/kg				-
Misc. Organics	2-Nitrotoluene	88-72-2	0 / 22	-	-	81 - 84	120 - 130	ug/kg				-
Misc. Organics	3-Nitrotoluene	99-08-1	0 / 22	-	-	100 - 110	120 - 130	ug/kg				-
Misc. Organics	1,3,5-Trinitrobenzene	99-35-4	0 / 22	-	-	40 - 42	120 - 130	ug/kg				-
Misc. Organics	4-Nitrotoluene	99-99-0	0 / 22	-	-	81 - 84	120 - 130	ug/kg				-
Misc. Organics	2,4-Dinitrotoluene	121-14-2	0 / 22	-	-	40 - 42	120 - 130	ug/kg				-
Misc. Organics	Nitrobenzene	98-95-3	0 / 22	-	-	40 - 42	120 - 130	ug/kg				-
Misc. Organics	m-Dinitrobenzene	99-65-0	0 / 22	-	-	40 - 42	120 - 130	ug/kg				-
PCBs and Dioxins	2,3,7,8-TCDD	1746-01-6	65 / 117	0.0366 J Z	2.68	0.0135 - 0.313	0.961 - 1.21	ng/kg	SL-014-SA7	LL	1613B	0 - 0.5
PCBs and Dioxins	1,2,3,7,8,9-HxCDD	19408-74-3	116 / 117	0.08 J Z	60	0.0253 - 0.340	4.81 - 6.07	ng/kg	SL-003-SA7	LL	1613B	0 - 0.5
PCBs and Dioxins	OCDD	3268-87-9	117 / 117	18.6	39300 J #	0.0246 - 0.648	9.61 - 12.1	ng/kg	SL-032-SA7	LL	1613B	0 - 0.5
PCBs and Dioxins	1,2,3,4,6,7,8-HpCDD	35822-46-9	117 / 117	1.97 J Z	2630 J #	0.0263 - 0.624	4.81 - 6.07	ng/kg	SL-032-SA7	LL	1613B	0 - 0.5
PCBs and Dioxins	OCDF	39001-02-0	116 / 117	1.24 J Z	704	0.0227 - 0.250	9.61 - 12.1	ng/kg	SL-014-SA7	LL	1613B	0 - 0.5
PCBs and Dioxins	1,2,3,4,7,8-HxCDD	39227-28-6	114 / 117	0.0778 J Z	29.5	0.0266 - 0.393	4.81 - 6.07	ng/kg	SL-003-SA7	LL	1613B	0 - 0.5
PCBs and Dioxins	1,2,3,7,8-PeCDD	40321-76-4	102 / 117	0.0483 J Z	14.5	0.0179 - 0.351	4.81 - 6.07	ng/kg	SL-003-SA7	LL	1613B	0 - 0.5
PCBs and Dioxins	2,3,7,8-TCDF	51207-31-9	98 / 117	0.0308 J Z	4.82	0.0266 - 0.376	0.961 - 1.21	ng/kg	SL-014-SA7	LL	1613B	0 - 0.5
PCBs and Dioxins	1,2,3,4,7,8,9-HpCDF	55673-89-7	107 / 117	0.0541 J Z	31.1	0.0224 - 0.281	4.81 - 6.07	ng/kg	SL-003-SA7	LL	1613B	0 - 0.5
PCBs and Dioxins	2,3,4,7,8-PeCDF	57117-31-4	92 / 117	0.16 J Z	11.7	0.0147 - 0.336	4.81 - 6.07	ng/kg	SL-014-SA7	LL	1613B	0 - 0.5
PCBs and Dioxins	1,2,3,7,8-PeCDF	57117-41-6	104 / 117	0.0592 J Z	14	0.0164 - 0.400	4.81 - 6.07	ng/kg	SL-184-SA7	LL	1613B	0 - 0.5
PCBs and Dioxins	1,2,3,6,7,8-HxCDF	57117-44-9	111 / 117	0.0758 J Z	15	0.0163 - 0.308	4.81 - 6.07	ng/kg	SL-003-SA7	LL	1613B	0 - 0.5
PCBs and Dioxins	1,2,3,6,7,8-HxCDD	57653-85-7	116 / 117	0.207 J Z	114	0.0264 - 0.366	4.81 - 6.07	ng/kg	SL-003-SA7	LL	1613B	0 - 0.5
PCBs and Dioxins	2,3,4,6,7,8-HxCDF	60851-34-5	100 / 117	0.11 J Z	28.2	0.0157 - 0.295	4.81 - 6.07	ng/kg	SL-003-SA7	LL	1613B	0 - 0.5
PCBs and Dioxins	1,2,3,4,6,7,8-HpCDF	67562-39-4	115 / 117	0.919 J Z	329	0.0144 - 0.213	4.81 - 6.07	ng/kg	SL-003-SA7	LL	1613B	0 - 0.5
PCBs and Dioxins	1,2,3,4,7,8-HxCDF	70648-26-9	112 / 117	0.065 J Z	23.5	0.0168 - 0.321	4.81 - 6.07	ng/kg	SL-014-SA7	LL	1613B	0 - 0.5
PCBs and Dioxins	1,2,3,7,8,9-HxCDF	72918-21-9	78 / 117	0.032 J Z	11.3	0.0172 - 0.324	4.81 - 6.07	ng/kg	SL-097-SA7	LL	1613B	0 - 0.5
PCBs and Dioxins	Aroclor 1260	11096-82-5	100 / 117	0.52 J Z	1300	0.39 - 40	1.7 - 170	ug/kg	SL-014-SA7	LL	8082	0 - 0.5
PCBs and Dioxins	Aroclor 1254	11097-69-1	101 / 117	0.39 J Z	970	0.33 - 33	1.7 - 170	ug/kg	SL-146-SA7	LL	8082	0 - 0.5
PCBs and Dioxins	Aroclor 1268	11100-14-4	0 / 117	-	-	0.33 - 33	1.7 - 170	ug/kg				-
PCBs and Dioxins	Aroclor 1221	11104-28-2	0 / 117	-	-	0.33 - 33	1.7 - 170	ug/kg				-
PCBs and Dioxins	Aroclor 5460	11126-42-4	96 / 117	1.4 J Z	910	1.0 - 100	3.3 - 330	ug/kg	SL-146-SA7	LL	8082	0 - 0.5
PCBs and Dioxins	Aroclor 1232	11141-16-5	0 / 117	-	-	0.33 - 33	1.7 - 170	ug/kg				-
PCBs and Dioxins	Aroclor 5442	12642-23-8	0 / 117	-	-	1.0 - 100	3.3 - 330	ug/kg				-
PCBs and Dioxins	Aroclor 1248	12672-29-6	10 / 117	0.56 J Z, #	8.7	0.33 - 33	1.7 - 170	ug/kg	SL-061-SA7	LL	8082	0 - 0.5
PCBs and Dioxins	Aroclor 1016	12674-11-2	0 / 117	-	-	0.33 - 33	1.7 - 170	ug/kg				-
PCBs and Dioxins	Aroclor 1262	37324-23-5	0 / 117	-	-	0.33 - 33	1.7 - 170	ug/kg				-
PCBs and Dioxins	Aroclor 1242	53469-21-9	3 / 117	0.7 J Z	4.2 J Z	0.33 - 33	1.7 - 170	ug/kg	SL-025-SA7	LL	8082	0 - 0.5
PCBs and Dioxins	Aroclor 5432	63496-31-1	0 / 117	-	-	1.0 - 100	3.3 - 330	ug/kg				-
Pesticides	Dichlorprop	120-36-5	2 / 115	1.4 J Z	4.8	0.79 - 20	1.7 - 43	ug/kg	SL-098-SA7	LL	8151A	0 - 0.5
Pesticides	Dicamba	1918-00-9	18 / 115	0.41 J Z	0.86 J Z	0.40 - 10	1.2 - 30	ug/kg	SL-014-SA7	LL	8151A	0 - 0.5
Pesticides	2,2-Dichlor-Propionic Acid	75-99-0	0 / 115	-	-	4.4 - 110	8.9 - 230	ug/kg				-
Pesticides	Dinitrobutyl Phenol	88-85-7	0 / 115	-	-	0.79 - 20	2.4 - 60	ug/kg				-
Pesticides	MCPP	93-65-2	2 / 115	110 J Z, #	120 J Z	74 - 5300	250 - 6300	ug/kg	SL-083-SA7	LL	8151A	0 - 0.5
Pesticides	2,4,5-TP	93-72-1	8 / 115	0.087 J FD, Q, Z	1.1	0.074 - 1.9	0.17 - 4.3	ug/kg	SL-089-SA7	LL	8151A	0 - 0.5
Pesticides	2,4,5-T	93-76-5	27 / 115	0.087 J Z	1.9	0.081 - 3.0	0.17 - 4.3	ug/kg	SL-001-SA7	LL	8151A	0 - 0.5
Pesticides	MCPA	94-74-6	7 / 115	150 J FD, Z, #	2300	75 - 1900	250 - 6300	ug/kg	SL-071-SA7	LL	8151A	0 - 0.5
Pesticides	2,4-D	94-75-7	5 / 115	1.8 J Z	9.6	1.2 - 30	3.6 - 91	ug/kg	SL-088-SA7	LL	8151A	0 - 0.5
Pesticides	2,4 DB	94-82-6	44 / 115	1 J Z	82	0.61 - 44	1.7 - 44	ug/kg	SL-010-SA7	LL	8151A	0 - 0.5
Pesticides	Toxaphene	8001-35-2	7 / 115	2.5 J Z	21 J Z	2.2 - 460	6.6 - 460	ug/kg	SL-025-SA7	LL	8081A	0 - 0.5
Pesticides	Heptachlor Epoxide	1024-57-3	4 / 115	0.047 J Z	0.57	0.034 - 4.5	0.17 - 4.5	ug/kg	SL-130-SA7	LL	8081A	0 - 0.5
Pesticides	Endosulfan Sulfate	1031-07-8	2 / 115	0.18 J Z	0.36 J S	0.066 - 4.6	0.34 - 6.9	ug/kg	SL-165-SA7	LL	8081A	0 - 0.5
Pesticides	Mirex	2385-85-5	4 / 115	0.24 J Z, #	0.77	0.066 - 6.6	0.34 - 6.9	ug/kg	SL-076-SA7	LL	8081A	0 - 0.5
Pesticides	Aldrin	309-00-2	1 / 115	0.12 J S, Z	0.12 J S, Z	0.066 - 1.3	0.17 - 3.3	ug/kg	SL-023-SA7	LL	8081A	0 - 0.5
Pesticides	Alpha-BHC	319-84-6	10 / 115	0.035 J S, Z	1.2	0.034 - 0.69	0.17 - 3.3	ug/kg	SL-067-SA7	LL	8081A	0 - 0.5
Pesticides	Beta-BHC	319-85-7	6 / 115	0.067 J S, Z	1.3 J S	0.060 - 1.2	0.17 - 3.3	ug/kg	SL-053-SA7	LL	8081A	0 - 0.5
Pesticides	Delta-BHC	319-86-8	18 / 115	0.04 J Z J S, Z	0.32 J Z	0.036 - 0.73	0.17 - 3.3	ug/kg	SL-007-SA7	LL	8081A	0 - 0.5

Table 3-1
Summary of Analytical Results for Chemicals - Validated Data
Surface Soils - HSA - 7

Group	Chemical	CAS No	Detection Frequency	Minimum Concentration	Maximum Concentration	Range of Method Detection Limit	Range of Method Reporting Limit	Unit	Location of Maximum Concentration	Lab of Maximum Concentration	Method of Maximum Concentration	Depth of Maximum Concentration
Pesticides	Endosulfan II	33213-65-9	3 / 115	0.15 J Z, C, # J Z	1.5 J S	0.066 - 3.7	0.34 - 6.9	ug/kg	SL-101-SA7	LL	8081A	0 - 0.5
Pesticides	4,4'-DDT	50-29-3	72 / 115	0.072 J Z	46	0.066 - 49	0.34 - 49	ug/kg	SL-146-SA7 SL-179-SA7	LL LL	8081A 8081A	0 - 0.5 0 - 0.5
Pesticides	Endrin Ketone	53494-70-5	3 / 115	0.23 J S, Z	0.36	0.066 - 1.9	0.34 - 6.9	ug/kg	SL-012-SA7	LL	8081A	0 - 0.5
Pesticides	Chlordane	57-74-9	65 / 115	1.1 J Z, # J Z	96	0.80 - 22	3.4 - 69	ug/kg	SL-048-SA7	LL	8081A	0 - 0.5
Pesticides	Gamma-BHC (Lindane)	58-89-9	10 / 115	0.041 J FD, Z	0.23 J S	0.034 - 0.69	0.17 - 3.3	ug/kg	SL-048-SA7	LL	8081A	0 - 0.5
Pesticides	Dieldrin	60-57-1	2 / 115	0.38	1.1 J S, C	0.066 - 13	0.34 - 13	ug/kg	SL-135-SA7	LL	8081A	0 - 0.5
Pesticides	Endrin	72-20-8	2 / 115	0.11 J Z	0.17 J S, Z	0.066 - 4.1	0.34 - 6.9	ug/kg	SL-122-SA7	LL	8081A	0 - 0.5
Pesticides	Methoxychlor	72-43-5	2 / 115	0.53 J Z	1.1 J Z	0.34 - 49	1.7 - 49	ug/kg	SL-068-SA7	LL	8081A	0 - 0.5
Pesticides	4,4'-DDD	72-54-8	2 / 115	0.15 J Z	7.7	0.066 - 5.3	0.34 - 6.9	ug/kg	SL-048-SA7	LL	8081A	0 - 0.5
Pesticides	4,4'-DDE	72-55-9	61 / 115	0.093 J Z	22	0.066 - 3.9	0.34 - 6.9	ug/kg	SL-146-SA7	LL	8081A	0 - 0.5
Pesticides	Endrin Aldehyde	7421-93-4	6 / 115	0.18 J Z	0.66 J S, C	0.066 - 20	0.34 - 20	ug/kg	SL-035-SA7	LL	8081A	0 - 0.5
Pesticides	Heptachlor	76-44-8	10 / 115	0.064 J S, Z	0.14 J Z	0.060 - 1.2	0.17 - 3.3	ug/kg	SL-067-SA7	LL	8081A	0 - 0.5
Pesticides	Endosulfan I	959-98-8	3 / 115	0.053 J Z	1.1 J S, C	0.044 - 0.89	0.17 - 3.3	ug/kg	SL-134-SA7	LL	8081A	0 - 0.5
Semivolatiles	N-Nitrosodimethylamine	62-75-9	0 / 26	-	-	16.6 - 173	33.2 - 346	ng/kg				-
Semivolatiles	N-Nitrosodimethylamine	62-75-9	1 / 117	110	110	0.66 - 34	1.7 - 84	ug/kg	SL-038-SA7	LL	8270C SIM	0 - 0.5
Semivolatiles	2,4-Dinitrotoluene	121-14-2	0 / 117	-	-	33 - 850	170 - 4300	ug/kg				-
Semivolatiles	Nitrobenzene	98-95-3	0 / 117	-	-	17 - 430	170 - 4300	ug/kg				-
Semivolatiles	1,4-Dichlorobenzene	106-46-7	0 / 117	-	-	17 - 430	170 - 4300	ug/kg				-
Semivolatiles	1,2,4-Trichlorobenzene	120-82-1	0 / 117	-	-	17 - 430	170 - 4300	ug/kg				-
Semivolatiles	1,3-Dichlorobenzene	541-73-1	0 / 117	-	-	17 - 430	170 - 4300	ug/kg				-
Semivolatiles	Hexachlorobutadiene	87-68-3	0 / 117	-	-	66 - 1700	170 - 4300	ug/kg				-
Semivolatiles	1,2-Dichlorobenzene	95-50-1	0 / 117	-	-	17 - 430	170 - 4300	ug/kg				-
Semivolatiles	4-Nitroaniline	100-01-6	0 / 117	-	-	66 - 1700	170 - 4300	ug/kg				-
Semivolatiles	4-Nitrophenol	100-02-7	0 / 117	-	-	170 - 4300	500 - 13000	ug/kg				-
Semivolatiles	4-Bromophenyl Phenyl Ether	101-55-3	0 / 117	-	-	17 - 430	170 - 4300	ug/kg				-
Semivolatiles	2,4-Dimethylphenol	105-67-9	0 / 117	-	-	33 - 850	170 - 4300	ug/kg				-
Semivolatiles	4-Methylphenol	106-44-5	0 / 117	-	-	33 - 850	170 - 4300	ug/kg				-
Semivolatiles	4-Chloroaniline	106-47-8	0 / 117	-	-	66 - 1700	170 - 4300	ug/kg				-
Semivolatiles	3,5-Dimethylphenol	108-68-9	0 / 117	-	-	33 - 850	170 - 4300	ug/kg				-
Semivolatiles	Phenol	108-95-2	2 / 117	19 J Z	19 J Z	17 - 430	170 - 4300	ug/kg	SL-001-SA7 SL-124-SA7	LL LL	8270C 8270C	0 - 0.5 0 - 0.5
Semivolatiles	Bis(2-Chloroethyl) ether	111-44-4	0 / 117	-	-	17 - 430	170 - 4300	ug/kg				-
Semivolatiles	Bis(2-Chloroethoxy) methane	111-91-1	0 / 117	-	-	17 - 430	170 - 4300	ug/kg				-
Semivolatiles	Bis(2-Ethylhexyl) phthalate	117-81-7	97 / 117	6.7 J Z	15000	5.9 - 420	18 - 8300	ug/kg	SL-157-SA7	LL	8270C	0 - 0.5
Semivolatiles	Di-N-Octyl Phthalate	117-84-0	21 / 117	7.4 J Z	3200	5.9 - 120	18 - 850	ug/kg	SL-184-SA7	LL	8270C SIM	0 - 0.5
Semivolatiles	Hexachlorobenzene	118-74-1	0 / 117	-	-	17 - 430	170 - 4300	ug/kg				-
Semivolatiles	Anthracene	120-12-7	61 / 117	0.35 J Z	4100	0.33 - 87	1.7 - 870	ug/kg	SL-090-SA7	LL	8270C SIM	0 - 0.5
Semivolatiles	2,4-Dichlorophenol	120-83-2	0 / 117	-	-	17 - 430	170 - 4300	ug/kg				-
Semivolatiles	1,2-Diphenylhydrazine	122-66-7	0 / 117	-	-	17 - 430	170 - 4300	ug/kg				-
Semivolatiles	Pyrene	129-00-0	101 / 117	0.71 J Z	23000	0.66 - 130	1.7 - 870	ug/kg	SL-017-SA7	LL	8270C SIM	0 - 0.5
Semivolatiles	Dimethylphthalate	131-11-3	0 / 117	-	-	5.9 - 120	18 - 850	ug/kg				-
Semivolatiles	Dibenzofuran	132-64-9	7 / 117	57 J Z	340 J Z	17 - 430	170 - 4300	ug/kg	SL-017-SA7	LL	8270C	0 - 0.5
Semivolatiles	Benzo(g,h,i)perylene	191-24-2	83 / 117	0.69 J Z	4600	0.66 - 87	1.7 - 870	ug/kg	SL-017-SA7	LL	8270C	0 - 0.5
Semivolatiles	Indeno(1,2,3-Cd)Pyrene	193-39-5	72 / 117	0.69 J Z	4400	0.66 - 87	1.7 - 870	ug/kg	SL-017-SA7	LL	8270C	0 - 0.5
Semivolatiles	Benzo(b)fluoranthene	205-99-2	112 / 117	0.75 J Z	14000	0.66 - 130	1.7 - 870	ug/kg	SL-017-SA7	LL	8270C SIM	0 - 0.5
Semivolatiles	Fluoranthene	206-44-0	104 / 117	0.7 J Z	29000	0.66 - 130	1.7 - 870	ug/kg	SL-017-SA7	LL	8270C SIM	0 - 0.5
Semivolatiles	Benzo(k)fluoranthene	207-08-9	85 / 117	0.77 J Z	6500	0.66 - 130	1.7 - 870	ug/kg	SL-017-SA7	LL	8270C SIM	0 - 0.5
Semivolatiles	Acenaphthylene	208-96-8	27 / 117	0.36 J Z	78	0.33 - 17	1.7 - 170	ug/kg	SL-017-SA7	LL	8270C SIM	0 - 0.5
Semivolatiles	Chrysene	218-01-9	110 / 117	0.45 J Z	12000	0.33 - 87	1.7 - 870	ug/kg	SL-017-SA7	LL	8270C SIM	0 - 0.5
Semivolatiles	bis(2-Chloroisopropyl) ether	39638-32-9	0 / 117	-	-	17 - 430	170 - 4300	ug/kg				-
Semivolatiles	Benzo(a)pyrene	50-32-8	89 / 117	0.67 J Z	8800	0.66 - 130	1.7 - 870	ug/kg	SL-017-SA7	LL	8270C SIM	0 - 0.5
Semivolatiles	2,4-Dinitrophenol	51-28-5	0 / 117	-	-	330 - 8500	990 - 26000	ug/kg				-
Semivolatiles	4,6-Dinitro-2-Methylphenol	534-52-1	0 / 117	-	-	170 - 4300	500 - 13000	ug/kg				-
Semivolatiles	Dibenzo(a,h)anthracene	53-70-3	41 / 117	0.73 J Z	1100	0.66 - 84	1.7 - 840	ug/kg	SL-017-SA7	LL	8270C	0 - 0.5
Semivolatiles	Benzo(a)anthracene	56-55-3	81 / 117	0.75 J Z	9200	0.66 - 130	1.7 - 870	ug/kg	SL-017-SA7	LL	8270C SIM	0 - 0.5

Table 3-1
Summary of Analytical Results for Chemicals - Validated Data
Surface Soils - HSA - 7

Group	Chemical	CAS No	Detection Frequency	Minimum Concentration	Maximum Concentration	Range of Method Detection Limit	Range of Method Reporting Limit	Unit	Location of Maximum Concentration	Lab of Maximum Concentration	Method of Maximum Concentration	Depth of Maximum Concentration
Semivolatiles	4-Chloro-3-Methylphenol	59-50-7	0 / 117	-	-	33 - 850	170 - 4300	ug/kg				-
Semivolatiles	N-Nitroso-Di-N-Propylamine	621-64-7	0 / 117	-	-	17 - 430	170 - 4300	ug/kg				-
Semivolatiles	Aniline	62-53-3	0 / 117	-	-	170 - 4300	500 - 13000	ug/kg				-
Semivolatiles	Benzoic Acid	65-85-0	3 / 117	190 J Z	1100	170 - 4300	500 - 13000	ug/kg	SL-138-SA7	LL	8270C	0 - 0.5
Semivolatiles	Hexachloroethane	67-72-1	0 / 117	-	-	17 - 430	170 - 4300	ug/kg				-
Semivolatiles	4-Chlorophenyl Phenylether	7005-72-3	0 / 117	-	-	33 - 850	170 - 4300	ug/kg				-
Semivolatiles	Hexachlorocyclopentadiene	77-47-4	0 / 117	-	-	170 - 4300	500 - 13000	ug/kg				-
Semivolatiles	Isophorone	78-59-1	0 / 117	-	-	17 - 430	170 - 4300	ug/kg				-
Semivolatiles	Acenaphthene	83-32-9	31 / 117	0.71 J Z	2100	0.66 - 67	1.7 - 170	ug/kg	SL-090-SA7	LL	8270C SIM	0 - 0.5
Semivolatiles	Diethylphthalate	84-66-2	0 / 117	-	-	5.9 - 120	18 - 850	ug/kg				-
Semivolatiles	Di-n-Butylphthalate	84-74-2	23 / 117	11 J Z	830	5.9 - 120	18 - 850	ug/kg	SL-184-SA7	LL	8270C	0 - 0.5
Semivolatiles	Phenanthrene	85-01-8	90 / 117	0.84 J Z	18000	0.66 - 130	1.7 - 870	ug/kg	SL-017-SA7	LL	8270C SIM	0 - 0.5
Semivolatiles	Butylbenzylphthalate	85-68-7	29 / 117	6.1 J Z	190	5.9 - 120	18 - 870	ug/kg	SL-184-SA7	LL	8270C SIM	0 - 0.5
Semivolatiles	N-Nitrosodiphenylamine	86-30-6	0 / 117	-	-	17 - 430	170 - 4300	ug/kg				-
Semivolatiles	Fluorene	86-73-7	31 / 117	0.73 J Z	1800	0.66 - 84	1.7 - 840	ug/kg	SL-090-SA7	LL	8270C SIM	0 - 0.5
Semivolatiles	Carbazole	86-74-8	18 / 117	22 J Z	2000	17 - 430	170 - 4300	ug/kg	SL-017-SA7	LL	8270C	0 - 0.5
Semivolatiles	Pentachlorophenol	87-86-5	1 / 117	220 J Z	220 J Z	170 - 4300	500 - 13000	ug/kg	SL-138-SA7	LL	8270C	0 - 0.5
Semivolatiles	2,4,6-Trichlorophenol	88-06-2	0 / 117	-	-	33 - 850	170 - 4300	ug/kg				-
Semivolatiles	2-Nitroaniline	88-74-4	0 / 117	-	-	17 - 430	170 - 4300	ug/kg				-
Semivolatiles	2-Nitrophenol	88-75-5	0 / 117	-	-	17 - 430	170 - 4300	ug/kg				-
Semivolatiles	1-Methylnaphthalene	90-12-0	20 / 117	0.7 J Z	630	0.66 - 34	1.7 - 84	ug/kg	SL-090-SA7	LL	8270C SIM	0 - 0.5
Semivolatiles	Naphthalene	91-20-3	41 / 117	0.68 J Z	1600	0.66 - 84	1.7 - 840	ug/kg	SL-090-SA7	LL	8270C SIM	0 - 0.5
Semivolatiles	2-Methylnaphthalene	91-57-6	21 / 117	0.89 J Z	680	0.66 - 34	1.7 - 84	ug/kg	SL-090-SA7	LL	8270C SIM	0 - 0.5
Semivolatiles	2-Chloronaphthalene	91-58-7	0 / 117	-	-	17 - 430	170 - 4300	ug/kg				-
Semivolatiles	3,3`-Dichlorobenzidine	91-94-1	0 / 117	-	-	99 - 2600	330 - 8500	ug/kg				-
Semivolatiles	Benzidine	92-87-5	0 / 117	-	-	1200 - 30000	3300 - 85000	ug/kg				-
Semivolatiles	2-Methylphenol	95-48-7	0 / 117	-	-	33 - 850	170 - 4300	ug/kg				-
Semivolatiles	2-Chlorophenol	95-57-8	0 / 117	-	-	17 - 430	170 - 4300	ug/kg				-
Semivolatiles	2,4,5-Trichlorophenol	95-95-4	0 / 117	-	-	33 - 850	170 - 4300	ug/kg				-
Semivolatiles	3-Nitroaniline	99-09-2	0 / 117	-	-	33 - 850	170 - 4300	ug/kg				-
Semivolatiles	Benzyl Alcohol	100-51-6	0 / 117	-	-	170 - 4300	500 - 13000	ug/kg				-
Semivolatiles	2,6-Dinitrotoluene	606-20-2	0 / 117	-	-	17 - 430	170 - 4300	ug/kg				-
Semivolatiles	2-butoxy-Ethanol	111-76-2	0 / 1	-	-	1700 - 1700	1700 - 1700	ug/kg				-
Semivolatiles	2-phenoxy-Ethanol	122-99-6	0 / 1	-	-	1700 - 1700	1700 - 1700	ug/kg				-
Semivolatiles	Tetralin	119-64-2	0 / 117	-	-	170 - 4300	170 - 4300	ug/kg				-
Volatiles	EFH (C12-C14)	PHCC12C14	0 / 94	-	-	0.40 - 100	1.2 - 310	mg/kg				-
Volatiles	EFH (C15-C20)	PHCC15C20	66 / 94	0.48 J Z	60 J Z	0.40 - 100	1.2 - 310	mg/kg	SL-135-SA7	LL	8015M	0 - 0.5
Volatiles	EFH (C21-C30)	PHCC21C30	94 / 94	2.3 J S	1200	0.40 - 100	1.2 - 310	mg/kg	SL-120-SA7	LL	8015M	0 - 0.5
Volatiles	EFH (C30-C40)	PHCC30C40	94 / 94	6.8 J S	3700	0.40 - 100	1.2 - 310	mg/kg	SL-120-SA7	LL	8015M	0 - 0.5
Volatiles	EFH (C8-C11)	PHCC8C11	8 / 94	0.51 J Z	11	0.40 - 100	1.2 - 310	mg/kg	SL-061-SA7	LL	8015M	0 - 0.5

ug/kg- microgram per kilogram
mg/kg - milligram per kilogram
ng/kg - nanogram per kilogram
J - Result is an estimated value
H - Holding times exceeded
S - Surrogates outside of criteria
C - Calibration recoveries outside of criteria
R - Calibration relative response factors outside of criteria
B - Method blank contamination
L - Laboratory control sample recoveries outside of criteria
Q - Matrix spike recoveries outside of criteria
E - Laboratory control sample and or matrix spike relative percent differences outside of criteria
I - Internal standards outside of criteria
A - Serial dilution results outside of criteria
F - Field blank contamination
Z - Analytes reported below the reporting limits and above the method detection limi

Table 3-2
Summary of Analytical Results for Chemicals - Validated Data
Subsurface Soils - HSA - 7

Group	Chemical	CAS No	Detection Frequency	Minimum Concentration	Maximum Concentration	Range of Method Detection Limit	Range of Method Reporting Limit	Unit	Location of Maximum Concentration	Lab of Maximum Concentration	Method of Maximum Concentration	Depth of Maximum Concentration
Inorganic	Nitrate	14797-55-8	55 / 59	0.92 J Z	13.6	0.776 - 0.94	1.5 - 1.8	mg/kg	SL-109-SA7	LL	300.0	9 - 10
Inorganic	Fluoride	16984-48-8	123 / 140	0.679 J Z	13.5 J Q	0.517 - 0.94	1.0 - 1.2	mg/kg	SL-070-SA7	LL	300.0	3 - 4
Inorganic	Cyanide	57-12-5	0 / 53	-	-	0.17 - 0.298	0.47 - 0.595	mg/kg				-
Inorganic	Aluminum	7429-90-5	140 / 140	8550	31600	5.91 - 134	19.5 - 268	mg/kg	SL-072-SA7	LL	6010B	4 - 5
Inorganic	Iron	7439-89-6	140 / 140	12200	49400	2.55 - 112	19.5 - 223	mg/kg	SL-113-SA7	LL	6010B	0 - 1
Inorganic	Lead	7439-92-1	140 / 140	2.85 J Q, A	18.7 J A	0.0101 - 0.113	0.197 - 0.234	mg/kg	SL-113-SA7	LL	6020	0 - 1
Inorganic	Lithium	7439-93-2	140 / 140	14.7	52.2	0.61 - 1.13	1.97 - 2.4	mg/kg	SL-113-SA7	LL	6010B	0 - 1
Inorganic	Magnesium	7439-95-4	140 / 140	2770	11300	0.430 - 55.8	9.77 - 112	mg/kg	SL-113-SA7	LL	6010B	0 - 1
Inorganic	Manganese	7439-96-5	140 / 140	106	530	0.0352 - 2.79	0.488 - 5.58	mg/kg	SL-001-SA7	EMAX	6020	4 - 5
Inorganic	Mercury	7439-97-6	32 / 140	0.007 J Z	0.067 J Z	0.0067 - 0.0592	0.0956 - 0.118	mg/kg	SL-113-SA7	LL	7471A	0 - 1
Inorganic	Molybdenum	7439-98-7	139 / 140	0.16 J Q	4.43 J Q	0.0493 - 0.0584	0.0986 - 0.117	mg/kg	SL-106-SA7	LL	6020	19 - 20
Inorganic	Nickel	7440-02-0	140 / 140	5.05 J E, Q	58.3 J A	0.0986 - 2.23	0.394 - 4.46	mg/kg	SL-113-SA7	LL	6020	0 - 1
Inorganic	Potassium	7440-09-7	140 / 140	945 J Q	4180	11.0 - 33.9	48.8 - 67.8	mg/kg	SL-102-SA7	LL	6010B	9 - 10
Inorganic	Silver	7440-22-4	111 / 140	0.015 J Z	1.04	0.0140 - 0.0565	0.0986 - 0.117	mg/kg	SL-113-SA7	LL	6020	0 - 1
Inorganic	Sodium	7440-23-5	137 / 140	58.6 J Q, Z	834	5.81 - 56.5	97.7 - 119	mg/kg	SL-113-SA7	LL	6010B	0 - 1
Inorganic	Strontium	7440-24-6	140 / 140	4.66	43.5 J E	0.0244 - 0.282	0.488 - 0.593	mg/kg	SL-172-SA7	LL	6010B	4 - 5
Inorganic	Thallium	7440-28-0	127 / 140	0.159	0.535	0.0296 - 0.0565	0.0986 - 0.117	mg/kg	SL-159-SA7	LL	6020	3 - 4
Inorganic	Tin	7440-31-5	0 / 140	-	-	0.313 - 5.65	9.77 - 11.9	mg/kg				-
Inorganic	Titanium	7440-32-6	140 / 140	614	1610	0.0694 - 5.65	0.977 - 11.3	mg/kg	SL-102-SA7	LL	6010B	9 - 10
Inorganic	Antimony	7440-36-0	91 / 140	0.076 J E, Q, Z	0.422 J Q	0.0730 - 0.113	0.197 - 0.234	mg/kg	SL-112-SA7	LL	6020	0 - 1
Inorganic	Arsenic	7440-38-2	140 / 140	2.30	24.6 J Q, E	0.0789 - 0.226	0.394 - 0.467	mg/kg	SL-020-SA7	LL	6020	9 - 10
Inorganic	Beryllium	7440-41-7	140 / 140	0.336	1.64 J Q	0.0158 - 0.0565	0.0986 - 0.276	mg/kg	SL-113-SA7	LL	6020	0 - 1
Inorganic	Barium	7440-39-3	140 / 140	29.1	298 J A	0.105 - 0.293	0.394 - 1.10	mg/kg	SL-113-SA7	LL	6020	0 - 1
Inorganic	Boron	7440-42-8	67 / 140	0.556 J Z	25.6 J Z	0.352 - 2.82	4.88 - 26.2	mg/kg	SL-076-SA7	LL	6010B	2.5 - 3.5
Inorganic	Cadmium	7440-43-9	123 / 140	0.054 J Q, Z	0.452	0.0434 - 0.0565	0.0986 - 0.117	mg/kg	SL-121-SA7	EMAX	6020	9 - 10
Inorganic	Chromium	7440-47-3	140 / 140	9.98 J Q	53.2 J Q, A	0.118 - 2.23	0.394 - 4.46	mg/kg	SL-113-SA7	LL	6020	0 - 1
Inorganic	Cobalt	7440-48-4	140 / 140	2.57 J E	20.1 J A	0.0197 - 0.558	0.0986 - 1.12	mg/kg	SL-113-SA7	LL	6020	0 - 1
Inorganic	Copper	7440-50-8	140 / 140	3.43 J E, Q	399 J Q	0.0780 - 2.23	0.390 - 4.46	mg/kg	SL-128-SA7	EMAX	6020	4 - 5
Inorganic	Vanadium	7440-62-2	140 / 140	19.8	80.4 J A	0.0217 - 0.558	0.0986 - 1.12	mg/kg	SL-113-SA7	LL	6020	0 - 1
Inorganic	Zinc	7440-66-6	140 / 140	27.1	117 J E	0.552 - 1.69	2.96 - 3.50	mg/kg	SL-138-SA7	LL	6020	1.5 - 2.5
Inorganic	Zirconium	7440-67-7	94 / 140	0.552 J Z	4.98 J Z	0.449 - 2.82	4.88 - 5.93	mg/kg	SL-102-SA7	LL	6010B	9 - 10
Inorganic	Calcium	7440-70-2	139 / 140	243	20600	2.44 - 112	19.5 - 223	mg/kg	SL-120-SA7	EMAX	6020	9 - 10
Inorganic	Phosphorus	7723-14-0	140 / 140	84.5 J Q	914	0.342 - 6.78	9.77 - 13.6	mg/kg	SL-113-SA7	LL	6010B	0 - 1
Inorganic	Selenium	7782-49-2	118 / 140	0.06 J Z	1.72	0.0572 - 0.226	0.394 - 0.467	mg/kg	SL-113-SA7	LL	6020	0 - 1
Inorganic	Chromium VI	18540-29-9	78 / 159	0.22 J Z	8.5 J Z	0.20 - 22.1	0.98 - 110	mg/kg	SL-106-SA7	LL	7199	16.5 - 17.5
Inorganic	Perchlorate (314.0)	14797-73-0	0 / 140	-	-	9.2 - 11.9	20.7 - 35.6	ug/kg				-
Inorganic	Perchlorate (6850)	14797-73-0	0 / 12	-	-	2.2 - 2.66	5.2 - 5.6	ug/kg				-
Inorganic	Percent Moisture	MOIST	141 / 141	2.0	15.7	0.50 - 0.50	0.50 - 0.50	%	SL-138-SA7	LL	160.3M	1.5 - 2.5
Inorganic	pH	pH	140 / 140	5.12	8.71	0.0100 - 0.1	0.0100 - 0.1	pH unit	SL-107-SA7	LL	9045M	9 - 10
Misc. Organics	Ethanol	64-17-5	0 / 100	-	-	100 - 300	510 - 600	ug/kg				-
Misc. Organics	Methanol	67-56-1	1 / 100	140 J Z	140 J Z	100 - 300	510 - 600	ug/kg	SL-072-SA7	LL	8015B	7.5 - 8.5
Misc. Organics	2-Propanol	67-63-0	0 / 100	-	-	100 - 300	510 - 600	ug/kg				-
Misc. Organics	Ethylene Glycol	107-21-1	0 / 100	-	-	5.1 - 6.0	10 - 12	mg/kg				-
Misc. Organics	Diethylene Glycol	111-46-6	0 / 100	-	-	5.1 - 8.9	10 - 18	mg/kg				-
Misc. Organics	Propylene glycol	57-55-6	0 / 100	-	-	5.1 - 6.0	10 - 12	mg/kg				-
Misc. Organics	o-Terphenyl	84-15-1	0 / 100	-	-	1.5 - 1.8	3.6 - 4.2	mg/kg				-
Misc. Organics	m-Terphenyl	92-06-8	0 / 100	-	-	1.5 - 1.8	3.6 - 4.2	mg/kg				-
Misc. Organics	p-Terphenyl	92-94-4	0 / 100	-	-	1.5 - 1.8	3.6 - 4.2	mg/kg				-
Misc. Organics	Formaldehyde	50-00-0	1 / 55	1200 J Z	1200 J Z	610 - 1200	1500 - 3100	ug/kg	SL-106-SA7	LL	8315A	19 - 20
Misc. Organics	2,6-Dinitrotoluene	606-20-2	0 / 25	-	-	39 - 50	99 - 140	ug/kg				-
Misc. Organics	2,4,6-Trinitrotoluene	118-96-7	0 / 25	-	-	39 - 50	99 - 140	ug/kg				-
Misc. Organics	RDX	121-82-4	0 / 25	-	-	49 - 57	99 - 140	ug/kg				-
Misc. Organics	4-Amino-2,6-Dinitrotoluene	19406-51-0	0 / 25	-	-	50 - 68	99 - 140	ug/kg				-
Misc. Organics	HMX	2691-41-0	0 / 25	-	-	50 - 110	99 - 340	ug/kg				-

Table 3-2
Summary of Analytical Results for Chemicals - Validated Data
Subsurface Soils - HSA - 7

Group	Chemical	CAS No	Detection Frequency	Minimum Concentration	Maximum Concentration	Range of Method Detection Limit	Range of Method Reporting Limit	Unit	Location of Maximum Concentration	Lab of Maximum Concentration	Method of Maximum Concentration	Depth of Maximum Concentration
Misc. Organics	2-Amino-4,6-Dinitrotoluene	35572-78-2	0 / 25	-	-	39 - 50	99 - 140	ug/kg				-
Misc. Organics	Tetryl	479-45-8	0 / 25	-	-	50 - 69	99 - 140	ug/kg				-
Misc. Organics	Nitroglycerin	55-63-0	0 / 25	-	-	490 - 910	990 - 2700	ug/kg				-
Misc. Organics	2,6-Diamino-4-nitrotoluene	59229-75-3	0 / 25	-	-	79 - 100	200 - 270	ug/kg				-
Misc. Organics	2,4-Diamino-6-nitrotoluene	6629-29-4	0 / 25	-	-	79 - 100	200 - 270	ug/kg				-
Misc. Organics	PETN	78-11-5	0 / 25	-	-	490 - 910	990 - 2700	ug/kg				-
Misc. Organics	2-Nitrotoluene	88-72-2	0 / 25	-	-	50 - 91	99 - 140	ug/kg				-
Misc. Organics	3-Nitrotoluene	99-08-1	0 / 25	-	-	50 - 110	99 - 140	ug/kg				-
Misc. Organics	1,3,5-Trinitrobenzene	99-35-4	0 / 25	-	-	39 - 50	99 - 140	ug/kg				-
Misc. Organics	4-Nitrotoluene	99-99-0	0 / 25	-	-	50 - 91	99 - 140	ug/kg				-
Misc. Organics	2,4-Dinitrotoluene	121-14-2	0 / 25	-	-	39 - 50	99 - 140	ug/kg				-
Misc. Organics	Nitrobenzene	98-95-3	0 / 25	-	-	39 - 50	99 - 140	ug/kg				-
Misc. Organics	m-Dinitrobenzene	99-65-0	0 / 25	-	-	39 - 50	99 - 140	ug/kg				-
PCBs and Dioxins	2,3,7,8-TCDD	1746-01-6	35 / 140	0.027 J Z	0.241 J Z	0.0143 - 0.120	0.994 - 1.18	ng/kg	SL-137-SA7	LL	1613B	0 - 1
PCBs and Dioxins	1,2,3,7,8,9-HxCDD	19408-74-3	76 / 140	0.032 J Z	9.2	0.0141 - 0.0828	4.97 - 5.91	ng/kg	SL-166-SA7	LL	1613B	1 - 2
PCBs and Dioxins	OCDD	3268-87-9	100 / 140	1.79 J Z	4110	0.0149 - 0.207	9.94 - 11.8	ng/kg	SL-166-SA7	LL	1613B	1 - 2
PCBs and Dioxins	1,2,3,4,6,7,8-HpCDD	35822-46-9	69 / 140	1.13 J Z	479	0.0175 - 0.186	4.97 - 5.91	ng/kg	SL-166-SA7	LL	1613B	1 - 2
PCBs and Dioxins	OCDF	39001-02-0	59 / 140	0.415 J Z	137	0.0192 - 0.130	9.94 - 11.8	ng/kg	SL-166-SA7	LL	1613B	1 - 2
PCBs and Dioxins	1,2,3,4,7,8-HxCDD	39227-28-6	66 / 140	0.022 J Z	4.14 J Z	0.0140 - 0.0796	4.97 - 5.91	ng/kg	SL-166-SA7	LL	1613B	1 - 2
PCBs and Dioxins	1,2,3,7,8-PeCDD	40321-76-4	51 / 140	0.031 J Z	1.94 J Z	0.0158 - 0.0942	4.97 - 5.91	ng/kg	SL-137-SA7	LL	1613B	0 - 1
PCBs and Dioxins	2,3,7,8-TCDF	51207-31-9	63 / 140	0.015 J Z	0.519 J Z	0.0127 - 0.0982	0.994 - 1.18	ng/kg	SL-112-SA7	LL	1613B	0 - 1
PCBs and Dioxins	1,2,3,4,7,8,9-HpCDF	55673-89-7	24 / 140	0.034 J Z	5.59	0.0105 - 0.0907	4.97 - 5.91	ng/kg	SL-166-SA7	LL	1613B	1 - 2
PCBs and Dioxins	2,3,4,7,8-PeCDF	57117-31-4	20 / 140	0.167 J Z	1.19 J Z	0.00902 - 0.0456	4.97 - 5.91	ng/kg	SL-075-SA7	LL	1613B	9 - 10
PCBs and Dioxins	1,2,3,7,8-PeCDF	57117-41-6	53 / 140	0.028 J Z	1.63 J Z	0.00891 - 0.0460	4.97 - 5.91	ng/kg	SL-091-SA7	LL	1613B	2.5 - 3.5
PCBs and Dioxins	1,2,3,6,7,8-HxCDF	57117-44-9	39 / 140	0.021 J Z	2.41 J Z	0.00901 - 0.0537	4.97 - 5.91	ng/kg	SL-166-SA7	LL	1613B	1 - 2
PCBs and Dioxins	1,2,3,6,7,8-HxCDD	57653-85-7	85 / 140	0.024 J Z	18.3	0.0145 - 0.0821	4.97 - 5.91	ng/kg	SL-166-SA7	LL	1613B	1 - 2
PCBs and Dioxins	2,3,4,6,7,8-HxCDF	60851-34-5	29 / 140	0.029 J Z	4.65 J Z	0.00848 - 0.0570	4.97 - 5.91	ng/kg	SL-166-SA7	LL	1613B	1 - 2
PCBs and Dioxins	1,2,3,4,6,7,8-HpCDF	67562-39-4	41 / 140	0.445 J Z	56.7	0.00731 - 0.0522	4.97 - 5.91	ng/kg	SL-166-SA7	LL	1613B	1 - 2
PCBs and Dioxins	1,2,3,4,7,8-HxCDF	70648-26-9	43 / 140	0.031 J Z	3.01 J Z	0.0104 - 0.0642	4.97 - 5.91	ng/kg	SL-075-SA7	LL	1613B	9 - 10
PCBs and Dioxins	1,2,3,7,8,9-HxCDF	72918-21-9	43 / 140	0.035 J FD, Z	0.742 J Z	0.0107 - 0.0841	4.97 - 5.91	ng/kg	SL-121-SA7	LL	1613B	9 - 10
PCBs and Dioxins	Aroclor 1260	11096-82-5	35 / 140	0.46 J Z	15 J L	0.40 - 8.3	1.7 - 36	ug/kg	SL-091-SA7	LL	8082	2.5 - 3.5
PCBs and Dioxins	Aroclor 1254	11097-69-1	25 / 140	0.35 J Z	11	0.34 - 7.0	1.7 - 36	ug/kg	SL-142-SA7	LL	8082	2 - 3
PCBs and Dioxins	Aroclor 1268	11100-14-4	0 / 140	-	-	0.34 - 7.0	1.7 - 36	ug/kg				-
PCBs and Dioxins	Aroclor 1221	11104-28-2	0 / 140	-	-	0.34 - 7.0	1.7 - 36	ug/kg				-
PCBs and Dioxins	Aroclor 5460	11126-42-4	18 / 140	1.3 J Z	120	1.0 - 21	3.4 - 70	ug/kg	SL-076-SA7	LL	8082	2.5 - 3.5
PCBs and Dioxins	Aroclor 1232	11141-16-5	0 / 140	-	-	0.34 - 7.0	1.7 - 36	ug/kg				-
PCBs and Dioxins	Aroclor 5442	12642-23-8	0 / 140	-	-	1.0 - 21	3.4 - 70	ug/kg				-
PCBs and Dioxins	Aroclor 1248	12672-29-6	3 / 140	0.48 J Z	2.5	0.34 - 7.0	1.7 - 36	ug/kg	SL-128-SA7	EMAX	8082	4 - 5
PCBs and Dioxins	Aroclor 1016	12674-11-2	0 / 140	-	-	0.34 - 7.0	1.7 - 36	ug/kg				-
PCBs and Dioxins	Aroclor 1262	37324-23-5	0 / 140	-	-	0.34 - 7.0	1.7 - 36	ug/kg				-
PCBs and Dioxins	Aroclor 1242	53469-21-9	1 / 140	0.74 J Z	0.74 J Z	0.34 - 7.0	1.7 - 36	ug/kg	SL-075-SA7	LL	8082	9 - 10
PCBs and Dioxins	Aroclor 5432	63496-31-1	0 / 140	-	-	1.0 - 21	3.4 - 70	ug/kg				-
Semivolatiles	N-Nitrosodimethylamine	62-75-9	3 / 55	20.1 J S, Z	23.2 J S, Z	16.8 - 184	33.6 - 367	ng/kg	SL-046-SA7	LL	1625C	2.5 - 3.5
Semivolatiles	N-Nitrosodimethylamine	62-75-9	0 / 140	-	-	0.68 - 6.8	1.7 - 17	ug/kg				-
Semivolatiles	2,4-Dinitrotoluene	121-14-2	0 / 140	-	-	33 - 340	170 - 1700	ug/kg				-
Semivolatiles	Nitrobenzene	98-95-3	0 / 140	-	-	17 - 170	170 - 1700	ug/kg				-
Semivolatiles	1,4-Dichlorobenzene	106-46-7	0 / 140	-	-	17 - 170	170 - 1700	ug/kg				-
Semivolatiles	1,2,4-Trichlorobenzene	120-82-1	0 / 140	-	-	17 - 170	170 - 1700	ug/kg				-
Semivolatiles	1,3-Dichlorobenzene	541-73-1	0 / 140	-	-	17 - 170	170 - 1700	ug/kg				-
Semivolatiles	Hexachlorobutadiene	87-68-3	0 / 140	-	-	67 - 690	170 - 1700	ug/kg				-
Semivolatiles	1,2-Dichlorobenzene	95-50-1	0 / 140	-	-	17 - 170	170 - 1700	ug/kg				-
Semivolatiles	4-Nitroaniline	100-01-6	0 / 140	-	-	67 - 690	170 - 1700	ug/kg				-
Semivolatiles	4-Nitrophenol	100-02-7	0 / 140	-	-	170 - 1700	340 - 5200	ug/kg				-
Semivolatiles	4-Bromophenyl Phenyl Ether	101-55-3	0 / 140	-	-	17 - 170	170 - 1700	ug/kg				-

Table 3-2
Summary of Analytical Results for Chemicals - Validated Data
Subsurface Soils - HSA - 7

Group	Chemical	CAS No	Detection Frequency	Minimum Concentration	Maximum Concentration	Range of Method Detection Limit	Range of Method Reporting Limit	Unit	Location of Maximum Concentration	Lab of Maximum Concentration	Method of Maximum Concentration	Depth of Maximum Concentration
Semivolatiles	2,4-Dimethylphenol	105-67-9	0 / 140	-	-	33 - 340	170 - 1700	ug/kg				-
Semivolatiles	4-Methylphenol	106-44-5	0 / 140	-	-	33 - 340	170 - 1700	ug/kg				-
Semivolatiles	4-Chloroaniline	106-47-8	0 / 140	-	-	67 - 690	170 - 1700	ug/kg				-
Semivolatiles	3,5-Dimethylphenol	108-68-9	0 / 140	-	-	33 - 340	170 - 1700	ug/kg				-
Semivolatiles	Phenol	108-95-2	3 / 140	17 J Z	19 J Z	17 - 170	170 - 1700	ug/kg	SL-167-SA7	LL	8270C	0.5 - 1.5
Semivolatiles	Bis(2-Chloroethyl) ether	111-44-4	0 / 140	-	-	17 - 170	170 - 1700	ug/kg				-
Semivolatiles	Bis(2-Chloroethoxy) methane	111-91-1	0 / 140	-	-	17 - 170	170 - 1700	ug/kg				-
Semivolatiles	Bis(2-Ethylhexyl) phthalate	117-81-7	51 / 159	6.3 J Z	220 J Z	6.1 - 170	17 - 3400	ug/kg	SL-034-SA7	LL	8270C	9 - 10
Semivolatiles	Di-N-Octyl Phthalate	117-84-0	11 / 159	7.5 J Z	140 J Z	6.1 - 170	17 - 1700	ug/kg	SL-035-SA7 SL-146-SA7 SL-146-SA7	LL LL LL	8270C 8270C 8270C	9 - 10 4 - 5 9 - 10
Semivolatiles	Hexachlorobenzene	118-74-1	0 / 140	-	-	17 - 170	170 - 1700	ug/kg				-
Semivolatiles	Anthracene	120-12-7	13 / 159	0.4 J Z	200	0.34 - 100	1.7 - 200	ug/kg	SL-167-SA7	LL	8270C	0.5 - 1.5
Semivolatiles	2,4-Dichlorophenol	120-83-2	0 / 140	-	-	17 - 170	170 - 1700	ug/kg				-
Semivolatiles	1,2-Diphenylhydrazine	122-66-7	0 / 140	-	-	17 - 170	170 - 1700	ug/kg				-
Semivolatiles	Pyrene	129-00-0	33 / 159	0.72 J Z	2100	0.68 - 100	1.7 - 200	ug/kg	SL-167-SA7	LL	8270C	0.5 - 1.5
Semivolatiles	Dimethylphthalate	131-11-3	0 / 159	-	-	6.1 - 170	17 - 1700	ug/kg				-
Semivolatiles	Dibenzofuran	132-64-9	1 / 140	53 J Z	53 J Z	17 - 170	170 - 1700	ug/kg	SL-167-SA7	LL	8270C	0.5 - 1.5
Semivolatiles	Benzo(g,h,i)perylene	191-24-2	28 / 159	0.7 J Z	710	0.68 - 100	1.7 - 200	ug/kg	SL-167-SA7	LL	8270C	0.5 - 1.5
Semivolatiles	Indeno(1,2,3-Cd)Pyrene	193-39-5	18 / 159	0.72 J Z	670	0.68 - 100	1.7 - 200	ug/kg	SL-167-SA7	LL	8270C	0.5 - 1.5
Semivolatiles	Benzo(b)fluoranthene	205-99-2	52 / 159	0.72 J Z	1200	0.68 - 100	1.7 - 200	ug/kg	SL-167-SA7	LL	8270C	0.5 - 1.5
Semivolatiles	Fluoranthene	206-44-0	28 / 159	0.86 J Z	2700	0.68 - 100	1.7 - 200	ug/kg	SL-167-SA7	LL	8270C	0.5 - 1.5
Semivolatiles	Benzo(k)fluoranthene	207-08-9	25 / 159	0.73 J Z	490	0.68 - 100	1.7 - 200	ug/kg	SL-167-SA7	LL	8270C	0.5 - 1.5
Semivolatiles	Acenaphthylene	208-96-8	3 / 159	0.58 J Z	1.2 J FD, Z	0.34 - 100	1.7 - 200	ug/kg	SL-102-SA7	LL	8270C SIM	4 - 5
Semivolatiles	Chrysene	218-01-9	50 / 159	0.38 J Z	1200	0.34 - 100	1.7 - 200	ug/kg	SL-167-SA7	LL	8270C	0.5 - 1.5
Semivolatiles	bis(2-Chloroisopropyl) ether	39638-32-9	0 / 140	-	-	17 - 170	170 - 1700	ug/kg				-
Semivolatiles	Benzo(a)pyrene	50-32-8	30 / 159	0.75 J Z	920	0.68 - 100	1.7 - 200	ug/kg	SL-167-SA7	LL	8270C	0.5 - 1.5
Semivolatiles	2,4-Dinitrophenol	51-28-5	0 / 140	-	-	170 - 3400	340 - 10000	ug/kg				-
Semivolatiles	4,6-Dinitro-2-Methylphenol	534-52-1	0 / 140	-	-	170 - 1700	340 - 5200	ug/kg				-
Semivolatiles	Dibenzo(a,h)anthracene	53-70-3	10 / 159	0.72 J Z	190	0.68 - 100	1.7 - 200	ug/kg	SL-167-SA7	LL	8270C	0.5 - 1.5
Semivolatiles	Benzo(a)anthracene	56-55-3	23 / 159	0.72 J Z	970	0.68 - 100	1.7 - 200	ug/kg	SL-167-SA7	LL	8270C	0.5 - 1.5
Semivolatiles	4-Chloro-3-Methylphenol	59-50-7	0 / 140	-	-	33 - 340	170 - 1700	ug/kg				-
Semivolatiles	N-Nitroso-Di-N-Propylamine	621-64-7	0 / 140	-	-	17 - 170	170 - 1700	ug/kg				-
Semivolatiles	Aniline	62-53-3	0 / 140	-	-	170 - 1700	340 - 5200	ug/kg				-
Semivolatiles	Benzoic Acid	65-85-0	2 / 140	180 J Z	840	170 - 1700	500 - 5200	ug/kg	SL-140-SA7	LL	8270C	3 - 4
Semivolatiles	Hexachloroethane	67-72-1	0 / 140	-	-	17 - 170	170 - 1700	ug/kg				-
Semivolatiles	4-Chlorophenyl Phenylether	7005-72-3	0 / 140	-	-	33 - 340	170 - 1700	ug/kg				-
Semivolatiles	Hexachlorocyclopentadiene	77-47-4	0 / 140	-	-	170 - 1700	500 - 5200	ug/kg				-
Semivolatiles	Isophorone	78-59-1	0 / 140	-	-	17 - 170	170 - 1700	ug/kg				-
Semivolatiles	Acenaphthene	83-32-9	7 / 159	1.1 J Z	57 J Z	0.68 - 100	1.7 - 200	ug/kg	SL-167-SA7	LL	8270C	0.5 - 1.5
Semivolatiles	Diethylphthalate	84-66-2	0 / 159	-	-	6.1 - 170	17 - 1700	ug/kg				-
Semivolatiles	Di-n-Butylphthalate	84-74-2	8 / 159	6.4 J Z	64 J Z	6.1 - 170	17 - 1700	ug/kg	SL-137-SA7	LL	8270C	0 - 1
Semivolatiles	Phenanthrene	85-01-8	27 / 159	0.72 J Z	1500	0.68 - 100	1.7 - 200	ug/kg	SL-167-SA7	LL	8270C	0.5 - 1.5
Semivolatiles	Butylbenzylphthalate	85-68-7	7 / 159	6.8 J Z	58 J Z	6.1 - 170	17 - 1700	ug/kg	SL-162-SA7	LL	8270C SIM	0 - 1
Semivolatiles	N-Nitrosodiphenylamine	86-30-6	0 / 140	-	-	17 - 170	170 - 1700	ug/kg				-
Semivolatiles	Fluorene	86-73-7	7 / 159	0.71 J Z	58 J Z	0.68 - 100	1.7 - 200	ug/kg	SL-167-SA7	LL	8270C	0.5 - 1.5
Semivolatiles	Carbazole	86-74-8	1 / 140	250	250	17 - 170	170 - 1700	ug/kg	SL-167-SA7	LL	8270C	0.5 - 1.5
Semivolatiles	Pentachlorophenol	87-86-5	0 / 140	-	-	170 - 1700	340 - 5200	ug/kg				-
Semivolatiles	2,4,6-Trichlorophenol	88-06-2	0 / 140	-	-	33 - 340	170 - 1700	ug/kg				-
Semivolatiles	2-Nitroaniline	88-74-4	0 / 140	-	-	17 - 170	170 - 1700	ug/kg				-
Semivolatiles	2-Nitrophenol	88-75-5	0 / 140	-	-	17 - 170	170 - 1700	ug/kg				-
Semivolatiles	1-Methylnaphthalene	90-12-0	2 / 159	0.86 J Z	1.2 J Z	0.68 - 100	1.7 - 200	ug/kg	SL-074-SA7	LL	8270C SIM	4 - 5
Semivolatiles	Naphthalene	91-20-3	13 / 160	0.7 J Z	3.4	0.68 - 170	1.7 - 1700	ug/kg	SL-074-SA7	LL	8270C SIM	4 - 5
Semivolatiles	2-Methylnaphthalene	91-57-6	6 / 159	0.82 J Z	2.6	0.68 - 100	1.7 - 200	ug/kg	SL-074-SA7	LL	8270C SIM	4 - 5

Table 3-2
Summary of Analytical Results for Chemicals - Validated Data
Subsurface Soils - HSA - 7

Group	Chemical	CAS No	Detection Frequency	Minimum Concentration	Maximum Concentration	Range of Method Detection Limit	Range of Method Reporting Limit	Unit	Location of Maximum Concentration	Lab of Maximum Concentration	Method of Maximum Concentration	Depth of Maximum Concentration
Semivolatiles	2-Chloronaphthalene	91-58-7	1 / 140	25 J Z	25 J Z	17 - 170	170 - 1700	ug/kg	SL-139-SA7	LL	8270C	2 - 3
Semivolatiles	3,3`-Dichlorobenzidine	91-94-1	0 / 140	-	-	87 - 1000	170 - 3400	ug/kg				-
Semivolatiles	Benzidine	92-87-5	0 / 140	-	-	520 - 12000	1000 - 34000	ug/kg				-
Semivolatiles	2-Methylphenol	95-48-7	0 / 140	-	-	33 - 340	170 - 1700	ug/kg				-
Semivolatiles	2-Chlorophenol	95-57-8	0 / 140	-	-	17 - 170	170 - 1700	ug/kg				-
Semivolatiles	2,4,5-Trichlorophenol	95-95-4	0 / 140	-	-	33 - 340	170 - 1700	ug/kg				-
Semivolatiles	3-Nitroaniline	99-09-2	0 / 140	-	-	33 - 340	170 - 1700	ug/kg				-
Semivolatiles	Benzyl Alcohol	100-51-6	0 / 140	-	-	87 - 1700	170 - 5200	ug/kg				-
Semivolatiles	2,6-Dinitrotoluene	606-20-2	0 / 140	-	-	17 - 170	170 - 1700	ug/kg				-
Semivolatiles	2-butoxy-Ethanol	111-76-2	0 / 47	-	-	170 - 1900	170 - 1900	ug/kg				-
Semivolatiles	2-phenoxy-Ethanol	122-99-6	0 / 47	-	-	170 - 1900	170 - 1900	ug/kg				-
Semivolatiles	Tetralin	119-64-2	0 / 140	-	-	170 - 1700	170 - 1700	ug/kg				-
Volatiles	GRO (C5-C12)	GROC5C12	9 / 95	0.2 J Z	0.9 J Z	0.2 - 2.4	0.9 - 12	mg/kg	SL-167-SA7	LL	8015M	0.5 - 1.5
Volatiles	EFH (C12-C14)	PHCC12C14	6 / 100	0.43 J Z	1.3	0.41 - 8.3	1.0 - 25	mg/kg	SL-139-SA7	LL	8015M	2 - 3
Volatiles	EFH (C15-C20)	PHCC15C20	35 / 100	0.43 J Z	3.7 J Z	0.41 - 8.3	1.0 - 25	mg/kg	SL-137-SA7	LL	8015M	0 - 1
Volatiles	EFH (C21-C30)	PHCC21C30	79 / 100	0.83 J Z	71	0.41 - 8.3	1.0 - 25	mg/kg	SL-166-SA7	LL	8015M	1 - 2
Volatiles	EFH (C30-C40)	PHCC30C40	88 / 100	0.78 J Z	250	0.41 - 8.3	1.0 - 25	mg/kg	SL-166-SA7	LL	8015M	1 - 2
Volatiles	EFH (C8-C11)	PHCC8C11	16 / 100	0.44 J Z	1.6	0.41 - 8.3	1.0 - 25	mg/kg	SL-164-SA7	LL	8015M	0.5 - 1.5
Volatiles	1,4-Dichlorobenzene	106-46-7	0 / 5	-	-	0.17 - 1.3	4.2 - 6.4	ug/kg				-
Volatiles	1,2,4-Trichlorobenzene	120-82-1	0 / 5	-	-	0.19 - 2.5	4.2 - 6.4	ug/kg				-
Volatiles	1,3-Dichlorobenzene	541-73-1	0 / 5	-	-	0.13 - 1.3	4.2 - 6.4	ug/kg				-
Volatiles	Hexachlorobutadiene	87-68-3	0 / 5	-	-	0.15 - 2.5	4.2 - 6.4	ug/kg				-
Volatiles	1,2-Dichlorobenzene	95-50-1	0 / 5	-	-	0.09 - 1.3	4.2 - 6.4	ug/kg				-
Volatiles	Isopropyltoluene	99-87-6	0 / 5	-	-	0.11 - 1.3	4.2 - 6.4	ug/kg				-
Volatiles	Ethylbenzene	100-41-4	1 / 5	0.08 J Z	0.08 J Z	0.06 - 1.3	4.2 - 6.4	ug/kg	SL-106-SA7	LL	8260B	15.5 - 15.5
Volatiles	Styrene	100-42-5	0 / 5	-	-	0.10 - 1.3	4.2 - 6.4	ug/kg				-
Volatiles	cis-1,3-Dichloropropene	10061-01-5	0 / 5	-	-	0.17 - 1.3	4.2 - 6.4	ug/kg				-
Volatiles	trans-1,3-Dichloropropene	10061-02-6	0 / 5	-	-	0.18 - 1.3	4.2 - 6.4	ug/kg				-
Volatiles	N-Propylbenzene	103-65-1	0 / 5	-	-	0.07 - 1.3	4.2 - 6.4	ug/kg				-
Volatiles	N-Butylbenzene	104-51-8	0 / 5	-	-	0.13 - 1.3	4.2 - 6.4	ug/kg				-
Volatiles	4-Chlorotoluene	106-43-4	0 / 5	-	-	0.15 - 1.3	4.2 - 6.4	ug/kg				-
Volatiles	1,2-Dibromoethane	106-93-4	0 / 5	-	-	0.18 - 1.3	4.2 - 6.4	ug/kg				-
Volatiles	1,2-Dichloroethane	107-06-2	0 / 5	-	-	0.16 - 1.3	4.2 - 6.4	ug/kg				-
Volatiles	4-Methyl-2-Pentanone	108-10-1	0 / 5	-	-	0.41 - 6.4	8.3 - 13	ug/kg				-
Volatiles	1,3,5-Trimethylbenzene	108-67-8	0 / 5	-	-	0.10 - 1.3	4.2 - 6.4	ug/kg				-
Volatiles	Bromobenzene	108-86-1	0 / 5	-	-	0.14 - 1.3	4.2 - 6.4	ug/kg				-
Volatiles	Toluene	108-88-3	3 / 5	0.21 J Z	0.42 J Z	0.08 - 1.3	4.2 - 6.4	ug/kg	SL-106-SA7	LL	8260B	15.5 - 15.5
Volatiles	Chlorobenzene	108-90-7	0 / 5	-	-	0.11 - 1.3	4.2 - 6.4	ug/kg				-
Volatiles	2-Chloroethyl Vinyl Ether	110-75-8	0 / 5	-	-	0.31 - 2.5	4.2 - 6.4	ug/kg				-
Volatiles	1,4-Dioxane	123-91-1	0 / 5	-	-	5.3 - 6.5	12 - 20	ug/kg				-
Volatiles	Dibromochloromethane	124-48-1	0 / 5	-	-	0.21 - 1.3	4.2 - 6.4	ug/kg				-
Volatiles	Tetrachloroethene	127-18-4	0 / 5	-	-	0.21 - 1.3	4.2 - 6.4	ug/kg				-
Volatiles	sec-Butylbenzene	135-98-8	0 / 5	-	-	0.06 - 1.3	4.2 - 6.4	ug/kg				-
Volatiles	1,3-Dichloropropane	142-28-9	0 / 5	-	-	0.08 - 1.3	4.2 - 6.4	ug/kg				-
Volatiles	cis-1,2-Dichloroethene	156-59-2	0 / 5	-	-	0.20 - 1.3	4.2 - 6.4	ug/kg				-
Volatiles	trans-1,2-Dichloroethene	156-60-5	0 / 5	-	-	0.13 - 1.3	4.2 - 6.4	ug/kg				-
Volatiles	Methyl tert-Butyl Ether	1634-04-4	0 / 5	-	-	0.22 - 1.3	4.2 - 6.4	ug/kg				-
Volatiles	m,p-Xylene	179601-23-1	1 / 5	0.32 J Z	0.32 J Z	0.18 - 2.5	4.2 - 6.4	ug/kg	SL-106-SA7	LL	8260B	15.5 - 15.5
Volatiles	Carbon tetrachloride	56-23-5	0 / 5	-	-	0.15 - 1.3	4.2 - 6.4	ug/kg				-
Volatiles	1,1-Dichloropropene	563-58-6	0 / 5	-	-	0.14 - 1.3	4.2 - 6.4	ug/kg				-
Volatiles	2-Hexanone	591-78-6	0 / 5	-	-	1.7 - 6.4	8.3 - 13	ug/kg				-
Volatiles	2,2-Dichloropropane	594-20-7	0 / 5	-	-	0.18 - 2.5	4.2 - 6.4	ug/kg				-
Volatiles	1,1,1,2-Tetrachloroethane	630-20-6	0 / 5	-	-	0.11 - 1.3	4.2 - 6.4	ug/kg				-
Volatiles	Acetone	67-64-1	1 / 5	11	11	6.2 - 7.7	8.3 - 13	ug/kg	SL-106-SA7	LL	8260B	15.5 - 15.5

Group	Chemical	CAS No	Detection Frequency	Minimum Concentration	Maximum Concentration	Range of Method Detection Limit	Range of Method Reporting Limit	Unit	Location of Maximum Concentration	Lab of Maximum Concentration	Method of Maximum Concentration	Depth of Maximum Concentration
Volatiles	Chloroform	67-66-3	0 / 5	-	-	0.13 - 1.3	4.2 - 6.4	ug/kg				-
Volatiles	Benzene	71-43-2	0 / 5	-	-	0.10 - 1.3	4.2 - 6.4	ug/kg				-
Volatiles	1,1,1-Trichloroethane	71-55-6	0 / 5	-	-	0.21 - 1.3	4.2 - 6.4	ug/kg				-
Volatiles	Bromomethane	74-83-9	0 / 5	-	-	0.26 - 2.5	4.2 - 6.4	ug/kg				-
Volatiles	Chloromethane	74-87-3	0 / 5	-	-	0.34 - 2.5	4.2 - 6.4	ug/kg				-
Volatiles	Dibromomethane	74-95-3	0 / 5	-	-	0.25 - 1.3	4.2 - 6.4	ug/kg				-
Volatiles	Bromochloromethane	74-97-5	0 / 5	-	-	0.34 - 1.3	4.2 - 6.4	ug/kg				-
Volatiles	Chloroethane	75-00-3	0 / 5	-	-	0.14 - 2.5	4.2 - 6.4	ug/kg				-
Volatiles	Vinyl Chloride	75-01-4	0 / 5	-	-	0.21 - 2.5	4.2 - 6.4	ug/kg				-
Volatiles	Methylene chloride	75-09-2	0 / 5	-	-	0.25 - 2.5	4.2 - 6.4	ug/kg				-
Volatiles	Bromoform	75-25-2	0 / 5	-	-	0.42 - 2.5	4.2 - 6.4	ug/kg				-
Volatiles	Bromodichloromethane	75-27-4	0 / 5	-	-	0.08 - 1.3	4.2 - 6.4	ug/kg				-
Volatiles	1,1-Dichloroethane	75-34-3	0 / 5	-	-	0.10 - 1.3	4.2 - 6.4	ug/kg				-
Volatiles	1,1-Dichloroethene	75-35-4	0 / 5	-	-	0.41 - 1.3	4.2 - 6.4	ug/kg				-
Volatiles	Trichlorofluoromethane	75-69-4	0 / 5	-	-	0.30 - 2.5	4.2 - 6.4	ug/kg				-
Volatiles	Dichlorodifluoromethane	75-71-8	0 / 5	-	-	0.13 - 2.5	4.2 - 6.4	ug/kg				-
Volatiles	Freon 113a	75-88-7	0 / 5	-	-	0.52 - 2.5	5.2 - 6.4	ug/kg				-
Volatiles	Freon 113	76-13-1	0 / 5	-	-	0.11 - 2.5	4.2 - 6.4	ug/kg				-
Volatiles	1,2-Dichloropropane	78-87-5	0 / 5	-	-	0.18 - 1.3	4.2 - 6.4	ug/kg				-
Volatiles	2-Butanone	78-93-3	1 / 5	2.9 J Z	2.9 J Z	1.3 - 6.4	8.3 - 13	ug/kg	SL-106-SA7	LL	8260B	15.5 - 15.5
Volatiles	1,1,2-Trichloroethane	79-00-5	0 / 5	-	-	0.28 - 1.3	4.2 - 6.4	ug/kg				-
Volatiles	Trichloroethene	79-01-6	0 / 5	-	-	0.16 - 1.3	4.2 - 6.4	ug/kg				-
Volatiles	1,1,2,2-Tetrachloroethane	79-34-5	0 / 5	-	-	0.24 - 1.3	4.2 - 6.4	ug/kg				-
Volatiles	Chlorotrifluoroethene	79-38-9	0 / 5	-	-	0.52 - 2.5	5.2 - 6.4	ug/kg				-
Volatiles	1,2,3-Trichlorobenzene	87-61-6	0 / 5	-	-	0.15 - 2.5	4.2 - 6.4	ug/kg				-
Volatiles	o-Xylene	95-47-6	0 / 5	-	-	0.18 - 1.3	4.2 - 6.4	ug/kg				-
Volatiles	2-Chlorotoluene	95-49-8	0 / 5	-	-	0.15 - 1.3	4.2 - 6.4	ug/kg				-
Volatiles	1,2,4-Trimethylbenzene	95-63-6	0 / 5	-	-	0.42 - 1.3	4.2 - 6.4	ug/kg				-
Volatiles	1,2-Dibromo-3-chloropropane	96-12-8	0 / 5	-	-	0.73 - 2.5	4.2 - 6.4	ug/kg				-
Volatiles	1,2,3-Trichloropropane	96-18-4	0 / 5	-	-	0.34 - 2.5	4.2 - 6.4	ug/kg				-
Volatiles	tert-Butylbenzene	98-06-6	0 / 5	-	-	0.17 - 1.3	4.2 - 6.4	ug/kg				-
Volatiles	Isopropylbenzene	98-82-8	0 / 5	-	-	0.06 - 1.3	4.2 - 6.4	ug/kg				-

ug/kg- microgram per kilogram
mg/kg - milligram per kilogram
ng/kg - nanogram per kilogram
J - Result is an estimated value
H - Holding times exceeded
S - Surrogates outside of criteria
C - Calibration recoveries outside of criteria
R - Calibration relative response factors outside of criteria
B - Method blank contamination
L - Laboratory control sample recoveries outside of criteria
Q - Matrix spike recoveries outside of criteria
E - Laboratory control sample and or matrix spike relative percent differences outside of criteria
I - Internal standards outside of criteria
A - Serial dilution results outside of criteria
F - Field blank contamination
Z - Analytes reported below the reporting limits and above the method detection limit

Table 3-3
Summary of Analytical Results for Chemicals - Validated Data
Combined Soils - HSA - 7

Group	Chemical	CAS No	Detection Frequency	Minimum Concentration	Maximum Concentration	Range of Method Detection Limit	Range of Method Reporting Limit	Unit	Location of Maximum Concentration	Lab of Maximum Concentration	Method of Maximum Concentration	Depth of Maximum Concentration
Inorganic	Nitrate	14797-55-8	79 / 85	0.92 J Z	26.3	0.776 - 0.94	1.5 - 1.8	mg/kg	SL-181-SA7	LL	300.0	0 - 0.5
Inorganic	Fluoride	16984-48-8	164 / 257	0.679 J Z	13.5 J Q	0.097 - 0.96	0.12 - 1.2	mg/kg	SL-070-SA7	LL	300.0	3 - 4
Inorganic	Cyanide	57-12-5	5 / 133	0.19 J Z	1.5	0.17 - 0.36	0.47 - 1.0	mg/kg	SL-055-SA7	LL	9012B	0 - 0.5
Inorganic	Aluminum	7429-90-5	257 / 257	7760	31600	5.81 - 134	19.2 - 268	mg/kg	SL-072-SA7	LL	6010B	4 - 5
Inorganic	Iron	7439-89-6	257 / 257	12200	204000	2.51 - 112	19.2 - 223	mg/kg	SL-086-SA7	LL	6010B	0 - 0.5
Inorganic	Lead	7439-92-1	257 / 257	2.85 J Q, A	30200 J Q	0.0099 - 12.8	0.194 - 252	mg/kg	SL-013-SA7	LL	6020	0 - 0.5
Inorganic	Lithium	7439-93-2	257 / 257	9.5	52.2	0.60 - 1.13	1.9 - 2.4	mg/kg	SL-113-SA7	LL	6010B	0 - 1
Inorganic	Magnesium	7439-95-4	251 / 257	2500	11300	0.423 - 55.8	9.61 - 112	mg/kg	SL-113-SA7	LL	6010B	0 - 1
Inorganic	Manganese	7439-96-5	257 / 257	106	1130	0.0346 - 2.79	0.480 - 5.58	mg/kg	SL-020-SA7	LL	6010B	0 - 0.5
Inorganic	Mercury	7439-97-6	80 / 257	0.007 J FD, Z	0.984	0.0066 - 0.0592	0.0934 - 0.472	mg/kg	SL-146-SA7	LL	7471A	0 - 0.5
Inorganic	Molybdenum	7439-98-7	256 / 257	0.16 J Q	7.99 J Q	0.0484 - 0.0596	0.0969 - 0.119	mg/kg	SL-146-SA7	LL	6020	0 - 0.5
Inorganic	Nickel	7440-02-0	257 / 257	5.05 J E, Q	163 J Q	0.0969 - 2.23	0.387 - 4.46	mg/kg	SL-146-SA7	LL	6020	0 - 0.5
Inorganic	Potassium	7440-09-7	257 / 257	945 J Q	5290	10.9 - 33.9	48.0 - 67.8	mg/kg	SL-122-SA7	LL	6010B	0 - 0.5
Inorganic	Silver	7440-22-4	226 / 257	0.015 J Z	4.78 J Q	0.0138 - 0.0565	0.0969 - 0.119	mg/kg	SL-157-SA7	LL	6020	0 - 0.5
Inorganic	Sodium	7440-23-5	254 / 257	49.8 J Z	974	5.72 - 56.5	96.1 - 119	mg/kg	SL-116-SA7	LL	6010B	0 - 0.5
Inorganic	Strontium	7440-24-6	257 / 257	4.66	54.0	0.0240 - 0.282	0.480 - 0.596	mg/kg	SL-039-SA7	LL	6010B	0 - 0.5
Inorganic	Thallium	7440-28-0	244 / 257	0.148	0.57 J Q	0.0291 - 0.299	0.0969 - 0.998	mg/kg	SL-122-SA7	LL	6020	0 - 0.5
Inorganic	Tin	7440-31-5	1 / 257	9.65 J Z	9.65 J Z	0.307 - 5.65	9.61 - 11.9	mg/kg	SL-086-SA7	LL	6010B	0 - 0.5
Inorganic	Titanium	7440-32-6	257 / 257	614	1610	0.0686 - 5.65	0.966 - 11.3	mg/kg	SL-102-SA7	LL	6010B	9 - 10
Inorganic	Antimony	7440-36-0	185 / 257	0.076 J Q, E, Z	1010 J Q	0.0717 - 3.69	0.194 - 9.98	mg/kg	SL-013-SA7	LL	6020	0 - 0.5
Inorganic	Arsenic	7440-38-2	257 / 257	2.30	428 J E, Q	0.0775 - 0.399	0.387 - 2.00	mg/kg	SL-013-SA7	LL	6020	0 - 0.5
Inorganic	Beryllium	7440-41-7	257 / 257	0.313 J Q	1.64 J Q	0.0155 - 0.0565	0.0969 - 0.276	mg/kg	SL-113-SA7	LL	6020	0 - 1
Inorganic	Barium	7440-39-3	257 / 257	29.1	298 J A	0.103 - 0.521	0.387 - 1.97	mg/kg	SL-113-SA7	LL	6020	0 - 1
Inorganic	Boron	7440-42-8	116 / 257	0.556 J Z	25.6 J Z	0.346 - 2.82	4.80 - 26.2	mg/kg	SL-076-SA7	LL	6010B	2.5 - 3.5
Inorganic	Cadmium	7440-43-9	240 / 257	0.054 J Q, Z	5.01	0.0426 - 0.0565	0.0969 - 0.119	mg/kg	SL-101-SA7	LL	6020	0 - 0.5
Inorganic	Chromium	7440-47-3	257 / 257	9.40 J E, Q	184 J Q	0.116 - 2.23	0.387 - 4.46	mg/kg	SL-146-SA7	LL	6020	0 - 0.5
Inorganic	Cobalt	7440-48-4	257 / 257	2.57 J E	20.1 J A	0.0194 - 0.558	0.0969 - 1.12	mg/kg	SL-113-SA7	LL	6020	0 - 1
Inorganic	Copper	7440-50-8	257 / 257	3.43 J E, Q	399 J Q	0.0775 - 2.23	0.387 - 4.46	mg/kg	SL-128-SA7	EMAX	6020	4 - 5
Inorganic	Vanadium	7440-62-2	257 / 257	18.8 J E, Q	598 J A	0.0213 - 0.558	0.0969 - 1.12	mg/kg	SL-086-SA7	LL	6020	0 - 0.5
Inorganic	Zinc	7440-66-6	257 / 257	27.1	1500 J E, A	0.542 - 13.9	2.91 - 74.4	mg/kg	SL-097-SA7	LL	6020	0 - 0.5
Inorganic	Zirconium	7440-67-7	165 / 257	0.552 J Z	11.5	0.442 - 2.82	4.80 - 25.4	mg/kg	SL-035-SA7	LL	6010B	0 - 0.5
Inorganic	Calcium	7440-70-2	256 / 257	243	24100	2.40 - 112	19.2 - 223	mg/kg	SL-086-SA7	LL	6010B	0 - 0.5
Inorganic	Phosphorus	7723-14-0	257 / 257	84.5 J Q	3010	0.336 - 6.78	9.61 - 50.7	mg/kg	SL-086-SA7	LL	6010B	0 - 0.5
Inorganic	Selenium	7782-49-2	235 / 257	0.06 J Z	1.72	0.0562 - 0.226	0.387 - 0.477	mg/kg	SL-113-SA7	LL	6020	0 - 1
Inorganic	Chromium VI	18540-29-9	140 / 276	0.2 J Z	9.2	0.19 - 22.1	0.96 - 110	mg/kg	SL-007-SA7	LL	7199	0 - 0.5
Inorganic	Perchlorate (314.0)	14797-73-0	0 / 257	-	-	9.0 - 11.9	20.7 - 36.8	ug/kg				-
Inorganic	Perchlorate (6850)	14797-73-0	2 / 35	2.5 J Z	3.6 J Z	2.1 - 2.66	5.0 - 5.6	ug/kg	SL-146-SA7	LL	6850	0 - 0.5
Inorganic	Percent Moisture	MOIST	254 / 258	0.51	18.5	0.50 - 0.50	0.50 - 0.50	%	SL-138-SA7	LL	160.3M	0 - 0.5
Inorganic	pH	pH	257 / 257	5.12	8.71	0.0100 - 0.1	0.0100 - 0.1	pH unit	SL-107-SA7	LL	9045M	9 - 10
Misc. Organics	Ethanol	64-17-5	1 / 194	170 J Z	170 J Z	100 - 300	500 - 1100	ug/kg	SL-153-SA7	LL	8015B	0 - 0.5
Misc. Organics	Methanol	67-56-1	23 / 194	110 J Z	440 J Z	100 - 300	500 - 1100	ug/kg	SL-019-SA7	LL	8015B	0 - 0.5
					J Z				SL-136-SA7	LL	8015B	0 - 0.5
Misc. Organics	2-Propanol	67-63-0	7 / 194	100 J Z, #	280 J Z	100 - 300	500 - 1100	ug/kg	SL-051-SA7	LL	8015B	0 - 0.5
Misc. Organics	Ethylene Glycol	107-21-1	0 / 194	-	-	5.0 - 6.1	10 - 12	mg/kg				-
Misc. Organics	Diethylene Glycol	111-46-6	0 / 194	-	-	5.0 - 8.9	10 - 18	mg/kg				-
Misc. Organics	Propylene glycol	57-55-6	0 / 194	-	-	5.0 - 6.1	10 - 12	mg/kg				-
Misc. Organics	o-Terphenyl	84-15-1	2 / 194	2.8 J S, Z	3.4 J S, Z	1.5 - 1.8	3.5 - 4.3	mg/kg	SL-007-SA7	LL	8015B	0 - 0.5
Misc. Organics	m-Terphenyl	92-06-8	0 / 194	-	-	1.5 - 1.8	3.5 - 4.3	mg/kg				-
Misc. Organics	p-Terphenyl	92-94-4	1 / 194	2.4 J S, Z	2.4 J S, Z	1.5 - 1.8	3.5 - 4.3	mg/kg	SL-007-SA7	LL	8015B	0 - 0.5
Misc. Organics	Formaldehyde	50-00-0	8 / 81	690 J Z	1200 J Z	600 - 1200	1500 - 3100	ug/kg	SL-106-SA7	LL	8315A	19 - 20
Misc. Organics	2,6-Dinitrotoluene	606-20-2	0 / 47	-	-	39 - 50	99 - 140	ug/kg				-
Misc. Organics	2,4,6-Trinitrotoluene	118-96-7	0 / 47	-	-	39 - 50	99 - 140	ug/kg				-
Misc. Organics	RDX	121-82-4	0 / 47	-	-	49 - 57	99 - 140	ug/kg				-
Misc. Organics	4-Amino-2,6-Dinitrotoluene	19406-51-0	0 / 47	-	-	50 - 68	99 - 140	ug/kg				-
Misc. Organics	HMX	2691-41-0	0 / 47	-	-	50 - 110	99 - 340	ug/kg				-

Table 3-3
Summary of Analytical Results for Chemicals - Validated Data
Combined Soils - HSA - 7

Group	Chemical	CAS No	Detection Frequency	Minimum Concentration	Maximum Concentration	Range of Method Detection Limit	Range of Method Reporting Limit	Unit	Location of Maximum Concentration	Lab of Maximum Concentration	Method of Maximum Concentration	Depth of Maximum Concentration
Misc. Organics	2-Amino-4,6-Dinitrotoluene	35572-78-2	0 / 47	-	-	39 - 50	99 - 140	ug/kg				-
Misc. Organics	Tetryl	479-45-8	0 / 47	-	-	50 - 69	99 - 140	ug/kg				-
Misc. Organics	Nitroglycerin	55-63-0	0 / 47	-	-	490 - 910	990 - 2700	ug/kg				-
Misc. Organics	2,6-Diamino-4-nitrotoluene	59229-75-3	0 / 47	-	-	79 - 100	200 - 270	ug/kg				-
Misc. Organics	2,4-Diamino-6-nitrotoluene	6629-29-4	0 / 47	-	-	79 - 100	200 - 270	ug/kg				-
Misc. Organics	PETN	78-11-5	0 / 47	-	-	490 - 910	990 - 2700	ug/kg				-
Misc. Organics	2-Nitrotoluene	88-72-2	0 / 47	-	-	50 - 91	99 - 140	ug/kg				-
Misc. Organics	3-Nitrotoluene	99-08-1	0 / 47	-	-	50 - 110	99 - 140	ug/kg				-
Misc. Organics	1,3,5-Trinitrobenzene	99-35-4	0 / 47	-	-	39 - 50	99 - 140	ug/kg				-
Misc. Organics	4-Nitrotoluene	99-99-0	0 / 47	-	-	50 - 91	99 - 140	ug/kg				-
Misc. Organics	2,4-Dinitrotoluene	121-14-2	0 / 47	-	-	39 - 50	99 - 140	ug/kg				-
Misc. Organics	Nitrobenzene	98-95-3	0 / 47	-	-	39 - 50	99 - 140	ug/kg				-
Misc. Organics	m-Dinitrobenzene	99-65-0	0 / 47	-	-	39 - 50	99 - 140	ug/kg				-
PCBs and Dioxins	2,3,7,8-TCDD	1746-01-6	100 / 257	0.027 J Z	2.68	0.0135 - 0.313	0.961 - 1.21	ng/kg	SL-014-SA7	LL	1613B	0 - 0.5
PCBs and Dioxins	1,2,3,7,8,9-HxCDD	19408-74-3	192 / 257	0.032 J Z	60	0.0141 - 0.340	4.81 - 6.07	ng/kg	SL-003-SA7	LL	1613B	0 - 0.5
PCBs and Dioxins	OCDD	3268-87-9	217 / 257	1.79 J Z	39300 J #	0.0149 - 0.648	9.61 - 12.1	ng/kg	SL-032-SA7	LL	1613B	0 - 0.5
PCBs and Dioxins	1,2,3,4,6,7,8-HpCDD	35822-46-9	186 / 257	1.13 J Z	2630 J #	0.0175 - 0.624	4.81 - 6.07	ng/kg	SL-032-SA7	LL	1613B	0 - 0.5
PCBs and Dioxins	OCDF	39001-02-0	175 / 257	0.415 J Z	704	0.0192 - 0.250	9.61 - 12.1	ng/kg	SL-014-SA7	LL	1613B	0 - 0.5
PCBs and Dioxins	1,2,3,4,7,8-HxCDD	39227-28-6	180 / 257	0.022 J Z	29.5	0.0140 - 0.393	4.81 - 6.07	ng/kg	SL-003-SA7	LL	1613B	0 - 0.5
PCBs and Dioxins	1,2,3,7,8-PeCDD	40321-76-4	153 / 257	0.031 J Z	14.5	0.0158 - 0.351	4.81 - 6.07	ng/kg	SL-003-SA7	LL	1613B	0 - 0.5
PCBs and Dioxins	2,3,7,8-TCDF	51207-31-9	161 / 257	0.015 J Z	4.82	0.0127 - 0.376	0.961 - 1.21	ng/kg	SL-014-SA7	LL	1613B	0 - 0.5
PCBs and Dioxins	1,2,3,4,7,8,9-HpCDF	55673-89-7	131 / 257	0.034 J Z	31.1	0.0105 - 0.281	4.81 - 6.07	ng/kg	SL-003-SA7	LL	1613B	0 - 0.5
PCBs and Dioxins	2,3,4,7,8-PeCDF	57117-31-4	112 / 257	0.16 J Z	11.7	0.00902 - 0.336	4.81 - 6.07	ng/kg	SL-014-SA7	LL	1613B	0 - 0.5
PCBs and Dioxins	1,2,3,7,8-PeCDF	57117-41-6	157 / 257	0.028 J Z	14	0.00891 - 0.400	4.81 - 6.07	ng/kg	SL-184-SA7	LL	1613B	0 - 0.5
PCBs and Dioxins	1,2,3,6,7,8-HxCDF	57117-44-9	150 / 257	0.021 J Z	15	0.00901 - 0.308	4.81 - 6.07	ng/kg	SL-003-SA7	LL	1613B	0 - 0.5
PCBs and Dioxins	1,2,3,6,7,8-HxCDD	57653-85-7	201 / 257	0.024 J Z	114	0.0145 - 0.366	4.81 - 6.07	ng/kg	SL-003-SA7	LL	1613B	0 - 0.5
PCBs and Dioxins	2,3,4,6,7,8-HxCDF	60851-34-5	129 / 257	0.029 J Z	28.2	0.00848 - 0.295	4.81 - 6.07	ng/kg	SL-003-SA7	LL	1613B	0 - 0.5
PCBs and Dioxins	1,2,3,4,6,7,8-HpCDF	67562-39-4	156 / 257	0.445 J Z	329	0.00731 - 0.213	4.81 - 6.07	ng/kg	SL-003-SA7	LL	1613B	0 - 0.5
PCBs and Dioxins	1,2,3,4,7,8-HxCDF	70648-26-9	155 / 257	0.031 J Z	23.5	0.0104 - 0.321	4.81 - 6.07	ng/kg	SL-014-SA7	LL	1613B	0 - 0.5
PCBs and Dioxins	1,2,3,7,8,9-HxCDF	72918-21-9	121 / 257	0.032 J Z	11.3	0.0107 - 0.324	4.81 - 6.07	ng/kg	SL-097-SA7	LL	1613B	0 - 0.5
PCBs and Dioxins	Aroclor 1260	11096-82-5	135 / 257	0.46 J Z	1300	0.39 - 40	1.7 - 170	ug/kg	SL-014-SA7	LL	8082	0 - 0.5
PCBs and Dioxins	Aroclor 1254	11097-69-1	126 / 257	0.35 J Z	970	0.33 - 33	1.7 - 170	ug/kg	SL-146-SA7	LL	8082	0 - 0.5
PCBs and Dioxins	Aroclor 1268	11100-14-4	0 / 257	-	-	0.33 - 33	1.7 - 170	ug/kg				-
PCBs and Dioxins	Aroclor 1221	11104-28-2	0 / 257	-	-	0.33 - 33	1.7 - 170	ug/kg				-
PCBs and Dioxins	Aroclor 5460	11126-42-4	114 / 257	1.3 J Z	910	1.0 - 100	3.3 - 330	ug/kg	SL-146-SA7	LL	8082	0 - 0.5
PCBs and Dioxins	Aroclor 1232	11141-16-5	0 / 257	-	-	0.33 - 33	1.7 - 170	ug/kg				-
PCBs and Dioxins	Aroclor 5442	12642-23-8	0 / 257	-	-	1.0 - 100	3.3 - 330	ug/kg				-
PCBs and Dioxins	Aroclor 1248	12672-29-6	13 / 257	0.48 J Z	8.7	0.33 - 33	1.7 - 170	ug/kg	SL-061-SA7	LL	8082	0 - 0.5
PCBs and Dioxins	Aroclor 1016	12674-11-2	0 / 257	-	-	0.33 - 33	1.7 - 170	ug/kg				-
PCBs and Dioxins	Aroclor 1262	37324-23-5	0 / 257	-	-	0.33 - 33	1.7 - 170	ug/kg				-
PCBs and Dioxins	Aroclor 1242	53469-21-9	4 / 257	0.7 J Z	4.2 J Z	0.33 - 33	1.7 - 170	ug/kg	SL-025-SA7	LL	8082	0 - 0.5
PCBs and Dioxins	Aroclor 5432	63496-31-1	0 / 257	-	-	1.0 - 100	3.3 - 330	ug/kg				-
Pesticides	Dichlorprop	120-36-5	2 / 115	1.4 J Z	4.8	0.79 - 20	1.7 - 43	ug/kg	SL-098-SA7	LL	8151A	0 - 0.5
Pesticides	Dicamba	1918-00-9	18 / 115	0.41 J Z	0.86 J Z	0.40 - 10	1.2 - 30	ug/kg	SL-014-SA7	LL	8151A	0 - 0.5
Pesticides	2,2-Dichlor-Propionic Acid	75-99-0	0 / 115	-	-	4.4 - 110	8.9 - 230	ug/kg				-
Pesticides	Dinitrobutyl Phenol	88-85-7	0 / 115	-	-	0.79 - 20	2.4 - 60	ug/kg				-
Pesticides	MCPP	93-65-2	2 / 115	110 J Z, #	120 J Z	74 - 5300	250 - 6300	ug/kg	SL-083-SA7	LL	8151A	0 - 0.5
Pesticides	2,4,5-TP	93-72-1	8 / 115	0.087 J FD, Q, Z	1.1	0.074 - 1.9	0.17 - 4.3	ug/kg	SL-089-SA7	LL	8151A	0 - 0.5
Pesticides	2,4,5-T	93-76-5	27 / 115	0.087 J Z	1.9	0.081 - 3.0	0.17 - 4.3	ug/kg	SL-001-SA7	LL	8151A	0 - 0.5
Pesticides	MCPA	94-74-6	7 / 115	150 J FD, Z, #	2300	75 - 1900	250 - 6300	ug/kg	SL-071-SA7	LL	8151A	0 - 0.5
Pesticides	2,4-D	94-75-7	5 / 115	1.8 J Z	9.6	1.2 - 30	3.6 - 91	ug/kg	SL-088-SA7	LL	8151A	0 - 0.5
Pesticides	2,4 DB	94-82-6	44 / 115	1 J Z	82	0.61 - 44	1.7 - 44	ug/kg	SL-010-SA7	LL	8151A	0 - 0.5
Pesticides	Toxaphene	8001-35-2	7 / 115	2.5 J Z	21 J Z	2.2 - 460	6.6 - 460	ug/kg	SL-025-SA7	LL	8081A	0 - 0.5
Pesticides	Heptachlor Epoxide	1024-57-3	4 / 115	0.047 J Z	0.57	0.034 - 4.5	0.17 - 4.5	ug/kg	SL-130-SA7	LL	8081A	0 - 0.5
Pesticides	Endosulfan Sulfate	1031-07-8	2 / 115	0.18 J Z	0.36 J S	0.066 - 4.6	0.34 - 6.9	ug/kg	SL-165-SA7	LL	8081A	0 - 0.5

Table 3-3
Summary of Analytical Results for Chemicals - Validated Data
Combined Soils - HSA - 7

Group	Chemical	CAS No	Detection Frequency	Minimum Concentration	Maximum Concentration	Range of Method Detection Limit	Range of Method Reporting Limit	Unit	Location of Maximum Concentration	Lab of Maximum Concentration	Method of Maximum Concentration	Depth of Maximum Concentration
Pesticides	Mirex	2385-85-5	4 / 115	0.24 J Z, #	0.77	0.066 - 6.6	0.34 - 6.9	ug/kg	SL-076-SA7	LL	8081A	0 - 0.5
Pesticides	Aldrin	309-00-2	1 / 115	0.12 J S, Z	0.12 J S, Z	0.066 - 1.3	0.17 - 3.3	ug/kg	SL-023-SA7	LL	8081A	0 - 0.5
Pesticides	Alpha-BHC	319-84-6	10 / 115	0.035 J S, Z	1.2	0.034 - 0.69	0.17 - 3.3	ug/kg	SL-067-SA7	LL	8081A	0 - 0.5
Pesticides	Beta-BHC	319-85-7	6 / 115	0.067 J S, Z	1.3 J S	0.060 - 1.2	0.17 - 3.3	ug/kg	SL-053-SA7	LL	8081A	0 - 0.5
Pesticides	Delta-BHC	319-86-8	18 / 115	0.04 J Z J S, Z	0.32 J Z	0.036 - 0.73	0.17 - 3.3	ug/kg	SL-007-SA7	LL	8081A	0 - 0.5
Pesticides	Endosulfan II	33213-65-9	3 / 115	0.15 J Z, C, # J Z	1.5 J S	0.066 - 3.7	0.34 - 6.9	ug/kg	SL-101-SA7	LL	8081A	0 - 0.5
Pesticides	4,4'-DDT	50-29-3	72 / 115	0.072 J Z	46	0.066 - 49	0.34 - 49	ug/kg	SL-146-SA7 SL-179-SA7	LL LL	8081A 8081A	0 - 0.5 0 - 0.5
Pesticides	Endrin Ketone	53494-70-5	3 / 115	0.23 J S, Z	0.36	0.066 - 1.9	0.34 - 6.9	ug/kg	SL-012-SA7	LL	8081A	0 - 0.5
Pesticides	Chlordane	57-74-9	65 / 115	1.1 J Z J Z, #	96	0.80 - 22	3.4 - 69	ug/kg	SL-048-SA7	LL	8081A	0 - 0.5
Pesticides	Gamma-BHC (Lindane)	58-89-9	10 / 115	0.041 J FD, Z	0.23 J S	0.034 - 0.69	0.17 - 3.3	ug/kg	SL-048-SA7	LL	8081A	0 - 0.5
Pesticides	Dieldrin	60-57-1	2 / 115	0.38	1.1 J S, C	0.066 - 13	0.34 - 13	ug/kg	SL-135-SA7	LL	8081A	0 - 0.5
Pesticides	Endrin	72-20-8	2 / 115	0.11 J Z	0.17 J S, Z	0.066 - 4.1	0.34 - 6.9	ug/kg	SL-122-SA7	LL	8081A	0 - 0.5
Pesticides	Methoxychlor	72-43-5	2 / 115	0.53 J Z	1.1 J Z	0.34 - 49	1.7 - 49	ug/kg	SL-068-SA7	LL	8081A	0 - 0.5
Pesticides	4,4'-DDD	72-54-8	2 / 115	0.15 J Z	7.7	0.066 - 5.3	0.34 - 6.9	ug/kg	SL-048-SA7	LL	8081A	0 - 0.5
Pesticides	4,4'-DDE	72-55-9	61 / 115	0.093 J Z	22	0.066 - 3.9	0.34 - 6.9	ug/kg	SL-146-SA7	LL	8081A	0 - 0.5
Pesticides	Endrin Aldehyde	7421-93-4	6 / 115	0.18 J Z	0.66 J S, C	0.066 - 20	0.34 - 20	ug/kg	SL-035-SA7	LL	8081A	0 - 0.5
Pesticides	Heptachlor	76-44-8	10 / 115	0.064 J S, Z	0.14 J Z	0.060 - 1.2	0.17 - 3.3	ug/kg	SL-067-SA7	LL	8081A	0 - 0.5
Pesticides	Endosulfan I	959-98-8	3 / 115	0.053 J Z	1.1 J S, C	0.044 - 0.89	0.17 - 3.3	ug/kg	SL-134-SA7	LL	8081A	0 - 0.5
Semivolatiles	N-Nitrosodimethylamine	62-75-9	3 / 81	20.1 J S, Z	23.2 J S, Z	16.6 - 184	33.2 - 367	ng/kg	SL-046-SA7	LL	1625C	2.5 - 3.5
Semivolatiles	N-Nitrosodimethylamine	62-75-9	1 / 257	110	110	0.66 - 34	1.7 - 84	ug/kg	SL-038-SA7	LL	8270C SIM	0 - 0.5
Semivolatiles	2,4-Dinitrotoluene	121-14-2	0 / 257	-	-	33 - 850	170 - 4300	ug/kg				-
Semivolatiles	Nitrobenzene	98-95-3	0 / 257	-	-	17 - 430	170 - 4300	ug/kg				-
Semivolatiles	1,4-Dichlorobenzene	106-46-7	0 / 257	-	-	17 - 430	170 - 4300	ug/kg				-
Semivolatiles	1,2,4-Trichlorobenzene	120-82-1	0 / 257	-	-	17 - 430	170 - 4300	ug/kg				-
Semivolatiles	1,3-Dichlorobenzene	541-73-1	0 / 257	-	-	17 - 430	170 - 4300	ug/kg				-
Semivolatiles	Hexachlorobutadiene	87-68-3	0 / 257	-	-	66 - 1700	170 - 4300	ug/kg				-
Semivolatiles	1,2-Dichlorobenzene	95-50-1	0 / 257	-	-	17 - 430	170 - 4300	ug/kg				-
Semivolatiles	4-Nitroaniline	100-01-6	0 / 257	-	-	66 - 1700	170 - 4300	ug/kg				-
Semivolatiles	4-Nitrophenol	100-02-7	0 / 257	-	-	170 - 4300	340 - 13000	ug/kg				-
Semivolatiles	4-Bromophenyl Phenyl Ether	101-55-3	0 / 257	-	-	17 - 430	170 - 4300	ug/kg				-
Semivolatiles	2,4-Dimethylphenol	105-67-9	0 / 257	-	-	33 - 850	170 - 4300	ug/kg				-
Semivolatiles	4-Methylphenol	106-44-5	0 / 257	-	-	33 - 850	170 - 4300	ug/kg				-
Semivolatiles	4-Chloroaniline	106-47-8	0 / 257	-	-	66 - 1700	170 - 4300	ug/kg				-
Semivolatiles	3,5-Dimethylphenol	108-68-9	0 / 257	-	-	33 - 850	170 - 4300	ug/kg				-
Semivolatiles	Phenol	108-95-2	5 / 257	17 J Z	19 J Z	17 - 430	170 - 4300	ug/kg	SL-167-SA7 SL-001-SA7 SL-124-SA7	LL LL LL	8270C 8270C 8270C	0.5 - 1.5 0 - 0.5 0 - 0.5
Semivolatiles	Bis(2-Chloroethyl) ether	111-44-4	0 / 257	-	-	17 - 430	170 - 4300	ug/kg				-
Semivolatiles	Bis(2-Chloroethoxy) methane	111-91-1	0 / 257	-	-	17 - 430	170 - 4300	ug/kg				-
Semivolatiles	Bis(2-Ethylhexyl) phthalate	117-81-7	148 / 276	6.3 J Z	15000	5.9 - 420	17 - 8300	ug/kg	SL-157-SA7	LL	8270C	0 - 0.5
Semivolatiles	Di-N-Octyl Phthalate	117-84-0	32 / 276	7.4 J Z	3200	5.9 - 170	17 - 1700	ug/kg	SL-184-SA7	LL	8270C SIM	0 - 0.5
Semivolatiles	Hexachlorobenzene	118-74-1	0 / 257	-	-	17 - 430	170 - 4300	ug/kg				-
Semivolatiles	Anthracene	120-12-7	74 / 276	0.35 J Z	4100	0.33 - 100	1.7 - 870	ug/kg	SL-090-SA7	LL	8270C SIM	0 - 0.5
Semivolatiles	2,4-Dichlorophenol	120-83-2	0 / 257	-	-	17 - 430	170 - 4300	ug/kg				-
Semivolatiles	1,2-Diphenylhydrazine	122-66-7	0 / 257	-	-	17 - 430	170 - 4300	ug/kg				-
Semivolatiles	Pyrene	129-00-0	134 / 276	0.71 J Z	23000	0.66 - 130	1.7 - 870	ug/kg	SL-017-SA7	LL	8270C SIM	0 - 0.5
Semivolatiles	Dimethylphthalate	131-11-3	0 / 276	-	-	5.9 - 170	17 - 1700	ug/kg				-
Semivolatiles	Dibenzofuran	132-64-9	8 / 257	53 J Z	340 J Z	17 - 430	170 - 4300	ug/kg	SL-017-SA7	LL	8270C	0 - 0.5
Semivolatiles	Benzo(g,h,i)perylene	191-24-2	111 / 276	0.69 J Z	4600	0.66 - 100	1.7 - 870	ug/kg	SL-017-SA7	LL	8270C	0 - 0.5
Semivolatiles	Indeno(1,2,3-Cd)Pyrene	193-39-5	90 / 276	0.69 J Z	4400	0.66 - 100	1.7 - 870	ug/kg	SL-017-SA7	LL	8270C	0 - 0.5
Semivolatiles	Benzo(b)fluoranthene	205-99-2	164 / 276	0.72 J Z	14000	0.66 - 130	1.7 - 870	ug/kg	SL-017-SA7	LL	8270C SIM	0 - 0.5

Table 3-3
Summary of Analytical Results for Chemicals - Validated Data
Combined Soils - HSA - 7

Group	Chemical	CAS No	Detection Frequency	Minimum Concentration	Maximum Concentration	Range of Method Detection Limit	Range of Method Reporting Limit	Unit	Location of Maximum Concentration	Lab of Maximum Concentration	Method of Maximum Concentration	Depth of Maximum Concentration
Semivolatiles	Fluoranthene	206-44-0	132 / 276	0.7 J Z	29000	0.66 - 130	1.7 - 870	ug/kg	SL-017-SA7	LL	8270C SIM	0 - 0.5
Semivolatiles	Benzo(k)fluoranthene	207-08-9	110 / 276	0.73 J Z	6500	0.66 - 130	1.7 - 870	ug/kg	SL-017-SA7	LL	8270C SIM	0 - 0.5
Semivolatiles	Acenaphthylene	208-96-8	30 / 276	0.36 J Z	78	0.33 - 100	1.7 - 200	ug/kg	SL-017-SA7	LL	8270C SIM	0 - 0.5
Semivolatiles	Chrysene	218-01-9	160 / 276	0.38 J Z	12000	0.33 - 100	1.7 - 870	ug/kg	SL-017-SA7	LL	8270C SIM	0 - 0.5
Semivolatiles	bis(2-Chloroisopropyl) ether	39638-32-9	0 / 257	-	-	17 - 430	170 - 4300	ug/kg				-
Semivolatiles	Benzo(a)pyrene	50-32-8	119 / 276	0.67 J Z	8800	0.66 - 130	1.7 - 870	ug/kg	SL-017-SA7	LL	8270C SIM	0 - 0.5
Semivolatiles	2,4-Dinitrophenol	51-28-5	0 / 257	-	-	170 - 8500	340 - 26000	ug/kg				-
Semivolatiles	4,6-Dinitro-2-Methylphenol	534-52-1	0 / 257	-	-	170 - 4300	340 - 13000	ug/kg				-
Semivolatiles	Dibenzo(a,h)anthracene	53-70-3	51 / 276	0.72 J Z	1100	0.66 - 100	1.7 - 840	ug/kg	SL-017-SA7	LL	8270C	0 - 0.5
Semivolatiles	Benzo(a)anthracene	56-55-3	104 / 276	0.72 J Z	9200	0.66 - 130	1.7 - 870	ug/kg	SL-017-SA7	LL	8270C SIM	0 - 0.5
Semivolatiles	4-Chloro-3-Methylphenol	59-50-7	0 / 257	-	-	33 - 850	170 - 4300	ug/kg				-
Semivolatiles	N-Nitroso-Di-N-Propylamine	621-64-7	0 / 257	-	-	17 - 430	170 - 4300	ug/kg				-
Semivolatiles	Aniline	62-53-3	0 / 257	-	-	170 - 4300	340 - 13000	ug/kg				-
Semivolatiles	Benzoic Acid	65-85-0	5 / 257	180 J Z	1100	170 - 4300	500 - 13000	ug/kg	SL-138-SA7	LL	8270C	0 - 0.5
Semivolatiles	Hexachloroethane	67-72-1	0 / 257	-	-	17 - 430	170 - 4300	ug/kg				-
Semivolatiles	4-Chlorophenyl Phenylether	7005-72-3	0 / 257	-	-	33 - 850	170 - 4300	ug/kg				-
Semivolatiles	Hexachlorocyclopentadiene	77-47-4	0 / 257	-	-	170 - 4300	500 - 13000	ug/kg				-
Semivolatiles	Isophorone	78-59-1	0 / 257	-	-	17 - 430	170 - 4300	ug/kg				-
Semivolatiles	Acenaphthene	83-32-9	38 / 276	0.71 J Z	2100	0.66 - 100	1.7 - 200	ug/kg	SL-090-SA7	LL	8270C SIM	0 - 0.5
Semivolatiles	Diethylphthalate	84-66-2	0 / 276	-	-	5.9 - 170	17 - 1700	ug/kg				-
Semivolatiles	Di-n-Butylphthalate	84-74-2	31 / 276	6.4 J Z	830	5.9 - 170	17 - 1700	ug/kg	SL-184-SA7	LL	8270C	0 - 0.5
Semivolatiles	Phenanthrene	85-01-8	117 / 276	0.72 J Z	18000	0.66 - 130	1.7 - 870	ug/kg	SL-017-SA7	LL	8270C SIM	0 - 0.5
Semivolatiles	Butylbenzylphthalate	85-68-7	36 / 276	6.1 J Z	190	5.9 - 170	17 - 1700	ug/kg	SL-184-SA7	LL	8270C SIM	0 - 0.5
Semivolatiles	N-Nitrosodiphenylamine	86-30-6	0 / 257	-	-	17 - 430	170 - 4300	ug/kg				-
Semivolatiles	Fluorene	86-73-7	38 / 276	0.71 J Z	1800	0.66 - 100	1.7 - 840	ug/kg	SL-090-SA7	LL	8270C SIM	0 - 0.5
Semivolatiles	Carbazole	86-74-8	19 / 257	22 J Z	2000	17 - 430	170 - 4300	ug/kg	SL-017-SA7	LL	8270C	0 - 0.5
Semivolatiles	Pentachlorophenol	87-86-5	1 / 257	220 J Z	220 J Z	170 - 4300	340 - 13000	ug/kg	SL-138-SA7	LL	8270C	0 - 0.5
Semivolatiles	2,4,6-Trichlorophenol	88-06-2	0 / 257	-	-	33 - 850	170 - 4300	ug/kg				-
Semivolatiles	2-Nitroaniline	88-74-4	0 / 257	-	-	17 - 430	170 - 4300	ug/kg				-
Semivolatiles	2-Nitrophenol	88-75-5	0 / 257	-	-	17 - 430	170 - 4300	ug/kg				-
Semivolatiles	1-Methylnaphthalene	90-12-0	22 / 276	0.7 J Z	630	0.66 - 100	1.7 - 200	ug/kg	SL-090-SA7	LL	8270C SIM	0 - 0.5
Semivolatiles	Naphthalene	91-20-3	54 / 277	0.68 J Z	1600	0.66 - 170	1.7 - 1700	ug/kg	SL-090-SA7	LL	8270C SIM	0 - 0.5
Semivolatiles	2-Methylnaphthalene	91-57-6	27 / 276	0.82 J Z	680	0.66 - 100	1.7 - 200	ug/kg	SL-090-SA7	LL	8270C SIM	0 - 0.5
Semivolatiles	2-Chloronaphthalene	91-58-7	1 / 257	25 J Z	25 J Z	17 - 430	170 - 4300	ug/kg	SL-139-SA7	LL	8270C	2 - 3
Semivolatiles	3,3`-Dichlorobenzidine	91-94-1	0 / 257	-	-	87 - 2600	170 - 8500	ug/kg				-
Semivolatiles	Benzidine	92-87-5	0 / 257	-	-	520 - 30000	1000 - 85000	ug/kg				-
Semivolatiles	2-Methylphenol	95-48-7	0 / 257	-	-	33 - 850	170 - 4300	ug/kg				-
Semivolatiles	2-Chlorophenol	95-57-8	0 / 257	-	-	17 - 430	170 - 4300	ug/kg				-
Semivolatiles	2,4,5-Trichlorophenol	95-95-4	0 / 257	-	-	33 - 850	170 - 4300	ug/kg				-
Semivolatiles	3-Nitroaniline	99-09-2	0 / 257	-	-	33 - 850	170 - 4300	ug/kg				-
Semivolatiles	Benzyl Alcohol	100-51-6	0 / 257	-	-	87 - 4300	170 - 13000	ug/kg				-
Semivolatiles	2,6-Dinitrotoluene	606-20-2	0 / 257	-	-	17 - 430	170 - 4300	ug/kg				-
Semivolatiles	2-butoxy-Ethanol	111-76-2	0 / 48	-	-	170 - 1900	170 - 1900	ug/kg				-
Semivolatiles	2-phenoxy-Ethanol	122-99-6	0 / 48	-	-	170 - 1900	170 - 1900	ug/kg				-
Semivolatiles	Tetralin	119-64-2	0 / 257	-	-	170 - 4300	170 - 4300	ug/kg				-
Volatiles	GRO (C5-C12)	GROC5C12	9 / 95	0.2 J Z	0.9 J Z	0.2 - 2.4	0.9 - 12	mg/kg	SL-167-SA7	LL	8015M	0.5 - 1.5
Volatiles	EFH (C12-C14)	PHCC12C14	6 / 194	0.43 J Z	1.3	0.40 - 100	1.0 - 310	mg/kg	SL-139-SA7	LL	8015M	2 - 3
Volatiles	EFH (C15-C20)	PHCC15C20	101 / 194	0.43 J Z	60 J Z	0.40 - 100	1.0 - 310	mg/kg	SL-135-SA7	LL	8015M	0 - 0.5
Volatiles	EFH (C21-C30)	PHCC21C30	173 / 194	0.83 J Z	1200	0.40 - 100	1.0 - 310	mg/kg	SL-120-SA7	LL	8015M	0 - 0.5
Volatiles	EFH (C30-C40)	PHCC30C40	182 / 194	0.78 J Z	3700	0.40 - 100	1.0 - 310	mg/kg	SL-120-SA7	LL	8015M	0 - 0.5
Volatiles	EFH (C8-C11)	PHCC8C11	24 / 194	0.44 J Z	11	0.40 - 100	1.0 - 310	mg/kg	SL-061-SA7	LL	8015M	0 - 0.5
Volatiles	1,4-Dichlorobenzene	106-46-7	0 / 5	-	-	0.17 - 1.3	4.2 - 6.4	ug/kg				-
Volatiles	1,2,4-Trichlorobenzene	120-82-1	0 / 5	-	-	0.19 - 2.5	4.2 - 6.4	ug/kg				-
Volatiles	1,3-Dichlorobenzene	541-73-1	0 / 5	-	-	0.13 - 1.3	4.2 - 6.4	ug/kg				-
Volatiles	Hexachlorobutadiene	87-68-3	0 / 5	-	-	0.15 - 2.5	4.2 - 6.4	ug/kg				-

Table 3-3
Summary of Analytical Results for Chemicals - Validated Data
Combined Soils - HSA - 7

Group	Chemical	CAS No	Detection Frequency	Minimum Concentration	Maximum Concentration	Range of Method Detection Limit	Range of Method Reporting Limit	Unit	Location of Maximum Concentration	Lab of Maximum Concentration	Method of Maximum Concentration	Depth of Maximum Concentration
Volatiles	1,2-Dichlorobenzene	95-50-1	0 / 5	-	-	0.09 - 1.3	4.2 - 6.4	ug/kg				-
Volatiles	Isopropyltoluene	99-87-6	0 / 5	-	-	0.11 - 1.3	4.2 - 6.4	ug/kg				-
Volatiles	Ethylbenzene	100-41-4	1 / 5	0.08 J Z	0.08 J Z	0.06 - 1.3	4.2 - 6.4	ug/kg	SL-106-SA7	LL	8260B	15.5 - 15.5
Volatiles	Styrene	100-42-5	0 / 5	-	-	0.10 - 1.3	4.2 - 6.4	ug/kg				-
Volatiles	cis-1,3-Dichloropropene	10061-01-5	0 / 5	-	-	0.17 - 1.3	4.2 - 6.4	ug/kg				-
Volatiles	trans-1,3-Dichloropropene	10061-02-6	0 / 5	-	-	0.18 - 1.3	4.2 - 6.4	ug/kg				-
Volatiles	N-Propylbenzene	103-65-1	0 / 5	-	-	0.07 - 1.3	4.2 - 6.4	ug/kg				-
Volatiles	N-Butylbenzene	104-51-8	0 / 5	-	-	0.13 - 1.3	4.2 - 6.4	ug/kg				-
Volatiles	4-Chlorotoluene	106-43-4	0 / 5	-	-	0.15 - 1.3	4.2 - 6.4	ug/kg				-
Volatiles	1,2-Dibromoethane	106-93-4	0 / 5	-	-	0.18 - 1.3	4.2 - 6.4	ug/kg				-
Volatiles	1,2-Dichloroethane	107-06-2	0 / 5	-	-	0.16 - 1.3	4.2 - 6.4	ug/kg				-
Volatiles	4-Methyl-2-Pentanone	108-10-1	0 / 5	-	-	0.41 - 6.4	8.3 - 13	ug/kg				-
Volatiles	1,3,5-Trimethylbenzene	108-67-8	0 / 5	-	-	0.10 - 1.3	4.2 - 6.4	ug/kg				-
Volatiles	Bromobenzene	108-86-1	0 / 5	-	-	0.14 - 1.3	4.2 - 6.4	ug/kg				-
Volatiles	Toluene	108-88-3	3 / 5	0.21 J Z	0.42 J Z	0.08 - 1.3	4.2 - 6.4	ug/kg	SL-106-SA7	LL	8260B	15.5 - 15.5
Volatiles	Chlorobenzene	108-90-7	0 / 5	-	-	0.11 - 1.3	4.2 - 6.4	ug/kg				-
Volatiles	2-Chloroethyl Vinyl Ether	110-75-8	0 / 5	-	-	0.31 - 2.5	4.2 - 6.4	ug/kg				-
Volatiles	1,4-Dioxane	123-91-1	0 / 5	-	-	5.3 - 6.5	12 - 20	ug/kg				-
Volatiles	Dibromochloromethane	124-48-1	0 / 5	-	-	0.21 - 1.3	4.2 - 6.4	ug/kg				-
Volatiles	Tetrachloroethene	127-18-4	0 / 5	-	-	0.21 - 1.3	4.2 - 6.4	ug/kg				-
Volatiles	sec-Butylbenzene	135-98-8	0 / 5	-	-	0.06 - 1.3	4.2 - 6.4	ug/kg				-
Volatiles	1,3-Dichloropropane	142-28-9	0 / 5	-	-	0.08 - 1.3	4.2 - 6.4	ug/kg				-
Volatiles	cis-1,2-Dichloroethene	156-59-2	0 / 5	-	-	0.20 - 1.3	4.2 - 6.4	ug/kg				-
Volatiles	trans-1,2-Dichloroethene	156-60-5	0 / 5	-	-	0.13 - 1.3	4.2 - 6.4	ug/kg				-
Volatiles	Methyl tert-Butyl Ether	1634-04-4	0 / 5	-	-	0.22 - 1.3	4.2 - 6.4	ug/kg				-
Volatiles	m,p-Xylene	179601-23-1	1 / 5	0.32 J Z	0.32 J Z	0.18 - 2.5	4.2 - 6.4	ug/kg	SL-106-SA7	LL	8260B	15.5 - 15.5
Volatiles	Carbon tetrachloride	56-23-5	0 / 5	-	-	0.15 - 1.3	4.2 - 6.4	ug/kg				-
Volatiles	1,1-Dichloropropene	563-58-6	0 / 5	-	-	0.14 - 1.3	4.2 - 6.4	ug/kg				-
Volatiles	2-Hexanone	591-78-6	0 / 5	-	-	1.7 - 6.4	8.3 - 13	ug/kg				-
Volatiles	2,2-Dichloropropane	594-20-7	0 / 5	-	-	0.18 - 2.5	4.2 - 6.4	ug/kg				-
Volatiles	1,1,1,2-Tetrachloroethane	630-20-6	0 / 5	-	-	0.11 - 1.3	4.2 - 6.4	ug/kg				-
Volatiles	Acetone	67-64-1	1 / 5	11	11	6.2 - 7.7	8.3 - 13	ug/kg	SL-106-SA7	LL	8260B	15.5 - 15.5
Volatiles	Chloroform	67-66-3	0 / 5	-	-	0.13 - 1.3	4.2 - 6.4	ug/kg				-
Volatiles	Benzene	71-43-2	0 / 5	-	-	0.10 - 1.3	4.2 - 6.4	ug/kg				-
Volatiles	1,1,1-Trichloroethane	71-55-6	0 / 5	-	-	0.21 - 1.3	4.2 - 6.4	ug/kg				-
Volatiles	Bromomethane	74-83-9	0 / 5	-	-	0.26 - 2.5	4.2 - 6.4	ug/kg				-
Volatiles	Chloromethane	74-87-3	0 / 5	-	-	0.34 - 2.5	4.2 - 6.4	ug/kg				-
Volatiles	Dibromomethane	74-95-3	0 / 5	-	-	0.25 - 1.3	4.2 - 6.4	ug/kg				-
Volatiles	Bromochloromethane	74-97-5	0 / 5	-	-	0.34 - 1.3	4.2 - 6.4	ug/kg				-
Volatiles	Chloroethane	75-00-3	0 / 5	-	-	0.14 - 2.5	4.2 - 6.4	ug/kg				-
Volatiles	Vinyl Chloride	75-01-4	0 / 5	-	-	0.21 - 2.5	4.2 - 6.4	ug/kg				-
Volatiles	Methylene chloride	75-09-2	0 / 5	-	-	0.25 - 2.5	4.2 - 6.4	ug/kg				-
Volatiles	Bromoform	75-25-2	0 / 5	-	-	0.42 - 2.5	4.2 - 6.4	ug/kg				-
Volatiles	Bromodichloromethane	75-27-4	0 / 5	-	-	0.08 - 1.3	4.2 - 6.4	ug/kg				-
Volatiles	1,1-Dichloroethane	75-34-3	0 / 5	-	-	0.10 - 1.3	4.2 - 6.4	ug/kg				-
Volatiles	1,1-Dichloroethene	75-35-4	0 / 5	-	-	0.41 - 1.3	4.2 - 6.4	ug/kg				-
Volatiles	Trichlorofluoromethane	75-69-4	0 / 5	-	-	0.30 - 2.5	4.2 - 6.4	ug/kg				-
Volatiles	Dichlorodifluoromethane	75-71-8	0 / 5	-	-	0.13 - 2.5	4.2 - 6.4	ug/kg				-
Volatiles	Freon 113a	75-88-7	0 / 5	-	-	0.52 - 2.5	5.2 - 6.4	ug/kg				-
Volatiles	Freon 113	76-13-1	0 / 5	-	-	0.11 - 2.5	4.2 - 6.4	ug/kg				-
Volatiles	1,2-Dichloropropane	78-87-5	0 / 5	-	-	0.18 - 1.3	4.2 - 6.4	ug/kg				-
Volatiles	2-Butanone	78-93-3	1 / 5	2.9 J Z	2.9 J Z	1.3 - 6.4	8.3 - 13	ug/kg	SL-106-SA7	LL	8260B	15.5 - 15.5
Volatiles	1,1,2-Trichloroethane	79-00-5	0 / 5	-	-	0.28 - 1.3	4.2 - 6.4	ug/kg				-
Volatiles	Trichloroethene	79-01-6	0 / 5	-	-	0.16 - 1.3	4.2 - 6.4	ug/kg				-
Volatiles	1,1,2,2-Tetrachloroethane	79-34-5	0 / 5	-	-	0.24 - 1.3	4.2 - 6.4	ug/kg				-

Table 3-3
Summary of Analytical Results for Chemicals - Validated Data
Combined Soils - HSA - 7

Group	Chemical	CAS No	Detection Frequency	Minimum Concentration	Maximum Concentration	Range of Method Detection Limit	Range of Method Reporting Limit	Unit	Location of Maximum Concentration	Lab of Maximum Concentration	Method of Maximum Concentration	Depth of Maximum Concentration
Volatiles	Chlorotrifluoroethene	79-38-9	0 / 5	-	-	0.52 - 2.5	5.2 - 6.4	ug/kg				-
Volatiles	1,2,3-Trichlorobenzene	87-61-6	0 / 5	-	-	0.15 - 2.5	4.2 - 6.4	ug/kg				-
Volatiles	o-Xylene	95-47-6	0 / 5	-	-	0.18 - 1.3	4.2 - 6.4	ug/kg				-
Volatiles	2-Chlorotoluene	95-49-8	0 / 5	-	-	0.15 - 1.3	4.2 - 6.4	ug/kg				-
Volatiles	1,2,4-Trimethylbenzene	95-63-6	0 / 5	-	-	0.42 - 1.3	4.2 - 6.4	ug/kg				-
Volatiles	1,2-Dibromo-3-chloropropane	96-12-8	0 / 5	-	-	0.73 - 2.5	4.2 - 6.4	ug/kg				-
Volatiles	1,2,3-Trichloropropane	96-18-4	0 / 5	-	-	0.34 - 2.5	4.2 - 6.4	ug/kg				-
Volatiles	tert-Butylbenzene	98-06-6	0 / 5	-	-	0.17 - 1.3	4.2 - 6.4	ug/kg				-
Volatiles	Isopropylbenzene	98-82-8	0 / 5	-	-	0.06 - 1.3	4.2 - 6.4	ug/kg				-

ug/kg- microgram per kilogram
mg/kg - milligram per kilogram
ng/kg - nanogram per kilogram
J - Result is an estimated value
H - Holding times exceeded
S - Surrogates outside of criteria
C - Calibration recoveries outside of criteria
R - Calibration relative response factors outside of criteria
B - Method blank contamination
L - Laboratory control sample recoveries outside of criteria
Q - Matrix spike recoveries outside of criteria
E - Laboratory control sample and or matrix spike relative percent differences outside of criteria
I - Internal standards outside of criteria
A - Serial dilution results outside of criteria
F - Field blank contamination
Z - Analytes reported below the reporting limits and above the method detection limit

Section 4

Data Usability Assessment

The purposes of the DUAR provided in Appendix C and summarized here are to: (1) describe the data validation processes performed on the data sets and (2) determine whether the sample results meet the data quality objectives (DQOs) outlined in the *Master Work Plan/Field Sampling and Analysis Plan Co-Located Chemical Sampling at Area IV, Santa Susana Field Laboratory, Ventura County, California* (CDM 2011a).

4.1 Usability Summary

For the Subarea 7 data usability assessment, 58 data sets, or SDGs were reviewed. A SDG consists of 20 or fewer samples grouped together by analytical method for analyses depending on the time and date the samples were received by the laboratory. The analyses performed are discussed in Sections 2.5.1 and 2.5.2.

Samples were collected and analyzed in accordance with the WP/FSAP (CDM 2011a), and WP/FSAP Addendum for Subarea 7 with the exception of deviations during the field investigation as stated in Section 2.8.

The data generated for the Subarea 7 samples, together with the added data validation qualifiers are usable as reported, with the exception of three antimony results, three diethylene glycol results, three EFH (C12-C14) results, two EFH (C15-C20) results, four EFH (C18-C11), 34 pesticide results, 88 herbicide results, 27 SVOC results, 2 SVOC SIM results, and one cyanide result (0.38 percent of all analytes) that were rejected for Subarea 7 data. These rejected data do not impact project objectives and goals. Specific details are provided in the validation reports in Appendix C and Section 4.7.

4.2 Data Validation Procedures

Data were validated by the independent data validation firm Laboratory Data Consultants, Inc. All data validation was conducted in accordance with *EPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review* (EPA 2004), *EPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review* (EPA 2008), and *EPA Contract Laboratory Program National Functional Guidelines for Chlorinated Dioxin/Furan Data Review* (EPA 2005).

The data validation strategy was to validate 10 percent of the data according to EPA Level IV protocols (all QC parameters and raw data) and the remaining 90 percent according to EPA Level III protocols (all QC parameters except calibrations and raw data).

Table 4-1 shows all SDGs that include Subarea 7 soil samples and those SDGs that were validated as Level III or Level IV. Some SDGs contain samples from other subareas, but all samples in an SDG were validated together. An index of samples associated with each SDG is presented at the beginning of Appendix C.

Table 4-1 Sample Delivery Groups and Validation Levels for Subarea 7

Sample Delivery Group	Level of Validation Performed	CDM Review
8 North		
DE242	Level IV	
DE243	Level III	
DE245	Level III	
DE246	Level III	
DE247	Level III	
DE248	Level III	Yes
DE249	Level III	
DE250	Level III	
DE251	Level III	
DE252	Level III	
DE253	Level III	
DE254	Level III	
DE255	Level III	
DE256	Level III	
DE257	Level III	
DE258	Level III	
DE259	Level III	Yes
DE264	Level III	
DE265	Level III	
DE266	Level III	
DE267	Level III	
DE268	Level III	
DE269	Level III	
DE270	Level III	
DE271	Level III	
DE272	Level IV	Yes
DE273	Level III	
DE274	Level III	
DE275	Level III	
DE276	Level III	
DE277	Level III	
DE278	Level III	
DE279	Level III	
DE280	Level III	
DX133	Level III	
DX134	Level III	
DX135	Level III	
DX136	Level III	
DX137	Level III	
DX138	Level III	
DX139	Level III	
DX140	Level III	Yes
DX141	Level III	
DX142	Level III	
DX143	Level IV	
DX144	Level III	
DX145	Level III	
DX146	Level III	
DX147	Level IV	
DX148	Level III	
DX149	Level III	
DX150	Level III	

Table 4-1 Sample Delivery Groups and Validation Levels for Subarea 7

Sample Delivery Group	Level of Validation Performed	CDM Review
DX151	Level III	
DX152	Level III	
DX153	Level III	
DX154	Level III	
11K007	Level IV	Yes

Note: Some SDGs contain samples from other subareas, but all samples in an SDG were validated together.

In order to evaluate the quality of the laboratory and the validation firm, CDM chemists reviewed 10 percent of the Subarea 7 soil sample SDGs. The purpose of the review was to identify any QC issues with the laboratory not identified by the validation firm or any discrepancies in validation procedures by the validation firm. No additional qualifiers were applied to the data based on CDM's review. The results of this review are provided in Section 4.8.

4.3 Quality Assurance Objectives

Quality assurance (QA) objectives for measurement data are expressed in terms of precision, accuracy, representativeness, comparability, completeness, and sensitivity (PARCCS). The QA objectives provide a mechanism for evaluating and measuring data quality.

A review of the collected data is necessary to determine if DQOs established in the WP/FSAP (CDM 2011a) have been met. The following data measurement tasks were evaluated:

- Specification and adherence to analytical method and reporting detection limit requirements
- Identification of the appropriate laboratory analytical QC requirements and verification of whether these QC requirements were met
- Verification that measurement performance criteria (representativeness and completeness) for the data were met
- Verification that field procedures were followed, deviations were documented, and determination of impact on data quality as a result of these deviations

The data validation review determines if the collected data are of sufficient quality (except for the rejected results) to support their intended use.

4.4 Summary of Field and Laboratory QA Activities

CDM completed sampling activities in Subarea 7 in accordance with the approved WP/FSAP (CDM 2011a) and Addendum to the WP/FSAP (CDM 2011b). A total of 257 samples were collected and analyzed from 116 drainage and surface locations and 102 soil boring locations. Table 2-1 provides a summary of the samples collected and the laboratory analyses requested.

4.5 Field Quality QA/QC

The field QC samples were collected at a frequency of 1 per 20 samples (5 percent) for MS/MSDs and field duplicates. MS/MSD and field duplicate samples were collected by CDM at 11 sample locations in Subarea 7 and analyzed by LLI and EMAX. MS/MSD and field duplicate samples met the frequency requirements detailed in the WP/FSAP (CDM 2011a).

As discussed in Section 2.4.2, nine equipment rinsate blank samples were collected weekly during the time samples were collected in Subarea 7. Two field blank samples were collected during sampling in Subarea 7. Results for the equipment rinsate blank and field blank samples labeled in association with Subarea 7 are presented in Appendix C and a summary of the detected results is presented in Tables 4-2 and 4-3.

Table 4-2 Equipment Blanks for Subarea 7 Samples – Detected Results Only

EB-SA7-091411 EB-SA7 09/14/2011			
Analyte	**Units**	**Concentration/RL**	**Final Qualifier**
1,2,3,4,7,8,9-HpCDF	pg/L	0.429/9.48	J
4-Amino-2,6-Dinitrotoluene	µg/L	0.8/0.6	
Diethylphthalate	µg/L	0.31/1.0	J
Di-N-Butylphthalate	µg/L	0.94/1.0	J
N-Nitrosodimethylamine	ng/L	2.99/1.01	
RDX	µg/L	2.5/0.6	
EB-SA7-SB-091511 EB-SA7 09/15/2011			
Analyte	**Units**	**Concentration/RL**	**Final Qualifier**
1,2,3,4,7,8,9-HpCDF	pg/L	0.284/10.1	J
1,2,3,7,8-PeCDD	pg/L	0.503/10.1	J
4-Amino-2,6-Dinitrotoluene	µg/L	0.75/0.6	
Acetone	µg/L	30/20	
Diethylphthalate	µg/L	0.27/1.1	J
Di-N-Butylphthalate	µg/L	0.83/1.1	J
GRO (C5-C12)	µg/L	26/50	J
Methylene Chloride	µg/L	5/5	
N-Nitrosodimethylamine	ng/L	4.34/2.17	J
RDX	µg/L	2.9/0.6	
EB-SA7-SS-092111 EB-SA7 09/21/2011			
Analyte	**Units**	**Concentration/RL**	**Final Qualifier**
1,2,3,7,8,9-HxCDF	pg/L	0.333/9.72	J
1,2,3,7,8-PeCDD	pg/L	0.324/9.72	J
4-Amino-2,6-Dinitrotoluene	µg/L	0.82/0.6	
Diethylphthalate	µg/L	0.35/1.1	J
Di-N-Butylphthalate	µg/L	0.83/1.1	J
Lead	mg/L	0.00021/0.001	J
Napthalene	µg/L	0.057/0.056	
RDX	µg/L	3.2/0.6	

Table 4-2 Equipment Blanks for Subarea 7 Samples – Detected Results Only

EB-SA7-SB-092211 EB-SA7 09/22/2011			
Analyte	**Units**	**Concentration/RL**	**Final Qualifier**
1,2,3,7,8-PeCDD	pg/L	0.380/10.9	J
4-Amino-2,6-Dinitrotoluene	µg/L	0.77/0.6	
Acetone	µg/L	22/20	
Boron	µg/L	0.0033/0.05	J
Diethylphthalate	µg/L	0.34/1.1	J
Di-N-Butylphthalate	µg/L	0.82/1.0	J
Lead	mg/L	0.00042/0.001	J
Methylene Chloride	µg/L	3/5	J
Napthalene	µg/L	0.06/0.051	
RDX	µg/L	3.0/0.6	
EB-SA7-SB-092711 EB-SA7 09/27/2011			
Analyte	**Units**	**Concentration/RL**	**Final Qualifier**
Acetone	µg/L	26/20	
Bis(2-Ethylhexyl) phthalate	µg/L	0.13/1.1	J
Boron	µg/L	0.0039/0.05	J
Diethylphthalate	µg/L	0.36/1.1	J
Di-N-Butylphthalate	µg/L	0.79/1.1	J
Di-N-Octylphthalate	µg/L	0.11/1.1	J
Methylene Chloride	µg/L	3/5	J
Napthalene	µg/L	0.091/0.055	
RDX	µg/L	3.4/0.6	
EB-SA7-SB-100711 EB-SA7 10/07/2011			
Analyte	**Units**	**Concentration/RL**	**Final Qualifier**
N-Nitrosodimethylamine	ng/L	0.589/0.951	J
EB-SA7-SB-101311 EB-SA7 10/13/2011			
Analyte	**Units**	**Concentration/RL**	**Final Qualifier**
1,2,3,4,7,8-HxCDD	pg/L	0.265/9.99	J
Diethylphthalate	µg/L	0.11/0.98	J
Di-N-Butylphthalate	µg/L	0.19/0.98	J
Lead	mg/L	0.000089/0.001	J
Napthalene	µg/L	0.06/0.049	
RDX	µg/L	1.7/0.6	
Strontium	mg/L	0.00051/0.005	J
Zinc	mg/L	0.0056/0.015	J
EB-SA7-SB-101811 EB-SA7 10/18/2011			
Analyte	**Units**	**Concentration/RL**	**Final Qualifier**
N-Nitrosodimethylamine	ng/L	3.72/1.09	J

Table 4-2 Equipment Blanks for Subarea 7 Samples – Detected Results Only

EB-SA7-SB-101911 EB-SA7 10/19/2011			
Analyte	**Units**	**Concentration/RL**	**Final Qualifier**
Bis(2-Ethylhexyl) phthalate	µg/L	0.16/1.1	J
Diethylphthalate	µg/L	0.19/0.075	J
Di-N-Butylphthalate	µg/L	0.27/1.1	J
Lead	mg/L	0.00012/0.001	J
Methylene Chloride	µg/L	5/5	J
Napthalene	µg/L	0.039/0.053	J
Phosphorous	mg/L	0.0055/0.1	J
RDX	µg/L	0.99/0.6	NJ
EB-SA7-SB-102611 EB-SA7 10/26/2011			
Analyte	**Units**	**Concentration/RL**	**Final Qualifier**
1,2,3,6,7,8-HxCDF	pg/L	0.961/10.6	J
Diethylphthalate	µg/L	0.075/1.0	J
Di-N-Butylphthalate	µg/L	0.28/1.0	J
Iron	mg/L	0.0424/0.20	J
Manganese	mg/L	0.00052/0.005	J
Napthalene	µg/L	0.037/0.05	J
EB-SA7-SB-102711 EB-SA7 10/27/2011			
Analyte	**Units**	**Concentration/RL**	**Final Qualifier**
4-Amino-2,6-Dinitrotoluene	µg/L	0.71/0.6	
N-Nitrosodimethylamine	ng/L	2.02/0.987	
RDX	µg/L	2.1/0.6	
EB-SA7-SB-103111 EB-SA7 10/31/2011			
Analyte	**Units**	**Concentration/RL**	**Final Qualifier**
N-Nitrosodimethylamine	ng/L	1.69/1.08	J
EB-SA7-SB-110311S EB-SA7 11/03/2011			
Analyte	**Units**	**Concentration/RL**	**Final Qualifier**
Copper	mg/L	0.000561/0.001	J
Methyl tert-Butyl Ether	µg/L	0.4/1.0	J
Methylene Chloride	µg/L	2.8/1.0	
EB-SA7-SB-110311 EB-SA7 11/03/2011			
		Concentration/RL	**Final Qualifier**
1,2,3,6,7,8-HxCDF	pg/L	0.262/9.84	J
N-Nitrosodimethylamine	ng/L	1.59/1.0	J

Table 4-2 Equipment Blanks for Subarea 7 Samples – Detected Results Only

EB-SA7-NDMA-110311 EB-SA7 11/03/2011			
Analyte	**Units**	**Concentration/RL**	**Final Qualifier**
N-Nitrosodimethylamine	ng/L	1.53/1.0	J
EB-SA7-NDMA-110411 EB-SA7 11/04/2011			
Analyte	**Units**	**Concentration/RL**	**Final Qualifier**
N-Nitrosodimethylamine	ng/L	1.66/1.01	J

Notes:
Blank result greater than RL
GRO = gasoline range organics
HpCDF = heptachlorodibenzofuran
HxCDD = hexachlorodibenzo-p-dioxin
HxCDF = hexachlorodibenzofuran
PeCDD = pentachlorodibenzo-p-dioxin
RL = Reporting Limit
µg/L = microgram per liter
mg/L = milligram per liter
pg/L =- picogram per liter
ng/L = nanogram per liter
RDX = 1,3,5-Trinitroperhydro-1,3,5-triazine

Table 4-3 Field Blanks for Subarea 7 Soil Samples – Detected Results Only

FB-SA7-102611 FB-SA7 10/26/2011			
Analyte	**Units**	**Concentration/RL**	**Final Qualifier**
1,2,3,7,8,9-HxCDF	pg/L	0.251/10.5	J
1,2,3,6,7,8-HxCDF	pg/L	0.219/10.4	J
Boron	mg/L	0.148/0.05	
Calcium	mg/L	9.89/0.2	
Di-N-Octylphthalate	µg/L	0.083/0.98	J
Magnesium	mg/L	1.22/0.1	
Sodium	mg/L	8.3/1.0	
Strontium	mg/L	0.0018/0.005	J
Titanium	mg/L	0.0006/0.01	J
FB-SA7-110111 FB-SA7 11/01/2011			
Analyte	**Units**	**Concentration/RL**	**Final Qualifier**
Chloroform	µg/L	2.7/1.0	
Ethylbenzene	µg/L	1.4/1.0	
m, p-Xylene	µg/L	5.7/2.0	
o-Xylene	µg/L	2.6/1.0	
Toluene	µg/L	5.5/1.0	

Notes:
Blank result greater than RL
HxCDF = hexachlorodibenzofuran
RL = Reporting Limit
µg/L = microgram per liter
mg/L = milligram per liter
pg/L = picogram per liter

Thirty-five trip blank samples were shipped with the Subarea 7soil samples. The results for these samples are presented in Appendix C and a summary of the detected results is presented in Table 4-4. Data qualifications based on blank detections and impacts to the data due to contaminants detected in the blanks are discussed in Section 4.7.3 and in the Appendix C validation reports.

Table 4-4 Trip Blanks for Subarea 7 Soil Samples – Detected Results Only

TB-092911 09/29/2011			
Analyte	**Units**	**Concentration/RL**	**Final Qualifier**
N-Nitrosodimethylamine	ng/L	4.12/0.991	
TB-101711 10/17/2011			
Analyte	**Units**	**Concentration/RL**	**Final Qualifier**
N-Nitrosodimethylamine	ng/kg	105/33.2	
TB-110111S 11/01/2011			
Analyte	**Units**	**Concentration/RL**	**Final Qualifier**
GRO (C5-C12)	µg/L	21/50	J
TB-110211 11/02/2011			
Analyte	**Units**	**Concentration/RL**	**Final Qualifier**
GRO (C5-C12)	µg/L	18/50	J
TB-110311S 11/03/2011			
Analyte	**Units**	**Concentration/RL**	**Final Qualifier**
GRO (C5-C12)	µg/L	26/50	J

Notes:
Blank result greater than RL
GRO = gasoline range organics
RL = Reporting Limit
µg/L = microgram per liter
ng/L = nanogram per liter
ng/kg = nanogram per kilogram

Temperature blanks were to be included with each shipment of samples. Based on validation results, all temperature blanks for Subarea 7 met criteria. Field QA/QC objectives were attained through the use of appropriate sampling techniques and collection of the required number and frequency of QC samples.

4.6 Laboratory Quality QA/QC

Analytical QA/QC was assessed by laboratory QC checks, method blanks, sample custody tracking, sample preservation, adherence to holding times, LCSs, MSs, calibration recoveries, surrogates, tuning criteria, second column confirmations, internal standards, serial dilutions, laboratory duplicates, and interference check standards. The majority of the laboratory QC sample criteria met project requirements as indicated in the data validation reports in Appendix C with the appropriate qualifiers applied. Three antimony results, three diethylene glycol results, three EFH (C12-C14) results, three EFH (C15-C20) results, four EFH (C18-C11) results, 34 pesticide results, 88 herbicide results, 27 SVOC

results, 2 SVOC SIM results, and one cyanide result (0.38 percent of all analytes) were rejected for Subarea 7 as discussed in Section 4.7 and in Appendix C.

4.7 Data Quality Indicators

This section summarizes the validation performed. Individual SDG validation reports with specific sample detail are provided in Appendix C.

Achievement of the DQOs was determined in part by the use of data quality indicators (DQIs) described in the DUAR in Appendix C. These DQIs for measurement data are expressed in terms of PARCCS. The DQIs provide a mechanism for ongoing control to evaluate and measure data quality throughout the project. These criteria are defined in the sections below.

4.7.1 Precision

Precision is the measurement of the ability to obtain the same value on re-analysis of a sample through the entire analytical process. The closer the measurement results, the greater the precision. Precision has nothing to do with accuracy or true values of the sample. Instead, it is focused on random errors inherent in the analysis that stem from the measurement process and are compounded by the non-homogeneous nature of some samples. Precision is measured by analyzing two portions of the sample (sample and duplicate) and then comparing the results. This comparison can be expressed in terms of relative percent difference (RPD). RPD is calculated as the absolute difference between the two measurements divided by the average of the two measurements.

$$RPD = \frac{[(A-B)/[A+B]}{2} \times 100$$

The problem with this formula is that it depends on the average of the two measurements and the magnitude of the calculated RPD is intimately linked to the magnitude of the results. When sample results are close to the RL, the RPD is greater but does not necessarily indicate that the precision is out of control limits, just that the sample concentrations are low.

RPD as a measure of precision works very well in those cases where the same level of analyte is present in all samples; however, it does not work well as a quantitative tool when varying levels are present. Analysis of sample duplicates is valuable as a quantitative measure of precision but is not useful as a quantitative measure in environmental sample analyses. Another option that is used for evaluating the differences between sample results that are close to the RL is calculating the absolute difference between the results. In this situation, the difference between the sample results is compared to the RL (2 times the RL for soils) and if the difference is greater, the sample results are qualified as estimated "J."

Because of these problems, precision is normally calculated on spike samples, either on MS and MSD or on a LCS and laboratory control sample duplicate (LCSD). In this case, a known concentration of analyte has been created in each sample and long and short term evaluations of RPD can be made that are applicable to the reality of the measurement. The drawback is that the precision measurement is only applicable to the particular spike level used.

For the Subarea 7soil data set, precision was evaluated by reviewing RPD results for MS/MSDs, LCS/LCSDs, laboratory duplicates, and field duplicates.

Laboratory RPD control limits are presented in the WP/FSAP (CDM 2011a) or are laboratory specific. For laboratory duplicates, if one or both of the sample results were less than 2 times the RL, a control limit of the absolute difference value equal to the RL was used for comparison.

The field duplicate RPD criterion is 50 percent. Field duplicates for this project were validated as follows: If one result is non-detect and the other result is above the RL, the RPD result is reported at 200 percent and the field duplicate sample and parent sample results are qualified as estimated "J" for a detect value or "UJ" for a non-detect value. If the field duplicate RPD is above the 50 percent criterion (and both sample results are above the RL) the field duplicate and parent sample results for that analyte are qualified as estimated "J."

Qualifiers were applied to applicable sample analyte results during the validation process based on laboratory and field duplicate precision results. Details of the validation and the number of analytes qualified are provided in the DUAR and laboratory validation reports in Appendix C.

The following Subarea 7 individual analyte results were qualified as estimated "J/UJ" based on precision criteria:

- Some of the fluoride/nitrate, metals and PCBs/PCTs analyte results due to laboratory precision criteria
- Some of the dioxins, alcohols and terphenyls, TPH and glycols, PCB/PCTs and herbicide analyte results as RPD results between the two columns were outside of criteria

The following individual analyte results were rejected "R" based on precision criteria:

- Three antimony results based on MSs

Some dioxin results, various metal results, hexavalent chromium results, mercury results, alcohol and terphenyls, TPH and glycol results, pesticides, PCB/PCT results, herbicide results, SVOC results, SVOC SIM results and cyanide results for Subarea 7 samples were qualified as estimated “J/UJ” based on field duplicate precision criteria. No results were rejected based on field duplicate precision criteria. All field duplicate RPD results are presented in Appendix C.

There is no discernable pattern or reason for the laboratory and field duplicate sample RPD exceedances identified. No field sampling issues were identified that would cause the RPD results that were outside of criteria. These exceedances are reasonable for this type of sampling activity. Sample results that have been qualified as estimated "J/UJ" due to precision criteria are usable for project decisions with a degree of caution.

4.7.2 Accuracy

Accuracy is a concept from quantitative analysis that attempts to address the question of how close the analytical result is to the true value of the analyte in the sample. Accuracy is determined through a spike procedure, where a known amount of the target analyte is added to a portion of the sample then the sample and the spiked sample are analyzed. The quantitative measure of accuracy is percent recovery (%R) calculated as follows:

$$\textbf{Percent Recovery} = \frac{\textbf{(Total Analyte Found – Analyte Originally Present)}}{\textbf{Analyte Added}} \times 100$$

Each measurement performed on a sample is subject to random and systematic error. Accuracy is related to the systematic error. Attempts to assess systematic error are always complicated by the inherent random error of the measurement.

Analytical accuracy for the entire data collection activity is difficult to assess because several sources of error exist. Errors can be introduced by any of the following:

- Sampling procedure
- Field contamination
- Sample preservation and handling
- Sample matrix
- Sample preparation
- Analytical techniques

Accuracy is maintained to the extent possible by adhering to the EPA method and approved field and analytical standard operating procedures.

The following QC samples are used to assess laboratory accuracy:

Matrix Spikes: MSs are samples with a known amount of a target analyte added to them. Analysis of the sample that has been spiked and comparison with the results from the unspiked sample (background) gives information about the ability of the test procedure to generate a correct result from the sample.

Reporting Limit Matrix Spikes: RL-MSs are samples to which a known amount of a target analyte has been added to the sample at the reporting limit concentration. Analysis of the sample that has been spiked and comparison with the results from the unspiked sample (background) gives information about the ability of the test procedure to generate a correct result from the sample. The RL-MS is designed to verify the laboratory methods ability to accurately quantitate the spiked compound at the RL in the site matrix. The RL-MS is an extra QC sample used for the modified methods identified in Table 2-2.

Post Digestion Spikes: Post digestion spikes are performed after the sample has been prepared and are ready for analysis. These are also termed "analytical spikes." The technique is used in conjunction with a MS to provide data that can separate interferences produced as part of the sample preparation from interferences that are innate qualities of the sample.

Laboratory Control Samples: LCSs consist of a portion of analyte-free water or solid phase sample that is spiked with target analytes at a known concentration.

Reporting Limit Laboratory Control Samples: RL-LCSs consist of a portion of analyte-free water or solid phase sample that is spiked at the reporting limit with target analytes at a known concentration. The RL-LCS is designed to verify the laboratory methods ability to accurately quantitate the spiked compound at the RL. The RL-LCS is an extra QC sample used for the modified methods identified in Table 2-2.

Surrogates: Surrogate recovery is a QC measure limited to use in organics analysis. Surrogates are compounds added to every sample at the beginning of the sample preparation to monitor the success of the sample preparation and analytical procedures on an individual sample

basis. Individual compounds used as surrogates are selected based on their ability to mimic the behavior of specific target analytes held to be particularly sensitive to the sample preparation manipulations.

Interference Check Samples: Interference check sample analysis is a QC measure unique to metals analysis using inductively coupled plasma atomic emission spectrometry. This QC sample verifies the analytical instrument's ability to overcome interferences typical of those found in samples.

Calibrations: Method requirements for satisfactory instrument calibration are established to ensure that the instrument is capable of producing acceptable quantitative data for metals. Initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of the analytical run. Continuing calibrations demonstrate that the initial calibration is still valid by checking the performance of the instrument on a continuing basis.

Internal Standards: Internal standards measure the gas chromatograph/mass spectrometer sensitivity and response stablility during each analysis.

Serial Dilution: Serial dilutions are performed on at least one sample from every batch of analyses for metals to determine if physical or chemical interferences exist in the analyte determinations.

For the Subarea 7 soil data sets, accuracy was evaluated by reviewing the %R values of initial and continuing calibration (percent difference or percent drift [%D] for organic analyses), internal standards, surrogate spikes (organic analyses only), MS/MSD, LCS/LCSD, inductively coupled plasma (ICP) interference standards, serial dilution results, and reviewing method blanks, calibration blanks, equipment rinsate blanks, and trip blank results. These QC results assist in identifying the type and magnitude of effects that may have contributed to system error introduced from field and/or laboratory procedures.

Qualifiers were applied to applicable sample results during the validation process based on laboratory accuracy results. Details of the validation and the number of analytes qualified are discussed in detail in the DUAR and laboratory validation reports in Appendix C. No qualifiers were applied to applicable sample results based on the accuracy results of the RL-LCS and RL-MS samples. These QC samples are intended to evaluate the effects of the method modifications on the RLs program-wide. A statistically robust population of RL-LCS and RL-MS samples has not yet been achieved. When enough data has been collected, decisions regarding the accuracy and precision of these RLs will be addressed by all parties including possible changes to the RLs.

The following Subarea 7 individual analyte results were qualified as estimated "J/UJ" based on accuracy criteria:

- Some of the dioxin results, fluoride/nitrate results, metals, TPH and glycols, pesticide results, PCB/PCTs, herbicides, SVOC results, SVOC SIM results, and cyanide results due to MSs
- Some of the pesticides, PCB/PCT results, herbicide results and SVOC results due to LCSs
- Some of the NDMA results, alcohol and terphenyl results, TPH and glycols, pesticides and PCB/PCT results due to surrogates

- Some of the alcohol and terphenyl results, pesticides, PCB/PCT results, VOC results and energetic results due to calibrations
- Some of the metal analyte results due to serial dilutions

The following individual analyte results were rejected "R" based on accuracy criteria:

- Three antimony results based on MSs (these results were previously rejected due to precision criteria as well)
- Three diethylene glycol results, three EFH (C12-C14) results, two EFH (C15-C20) results and four EFH (C8-C11) results based on MSs and surrogates
- Thirty-four pesticide results based on MSs and surrogates
- Eighty-eight herbicide results based on LCSs and MSs
- Twenty-seven SVOC results based on MSs and LCSs
- Two SVOC SIM results (Di-n-octylphthalate and benzo(k) fluoranthene) based on internal standards and MSs
- One cyanide result based on MS

Sample preservation, handling, and holding times are additional measures of accuracy of the data. Holding times are defined as the amount of time that elapses between collection of the sample in the field to the start of the analysis. Preservation is defined as techniques used to maintain the target analytes at concentrations representative of the source sampled. Published holding times are viewed as valid as long as the associated preservation and container requirements have been met. All holding times, sample preservation and handling criteria were met except for ten TPH and glycol results. These are discussed in detail in the DUAR and laboratory validation reports in Appendix C.

Sample results that have been qualified as estimated "J/UJ" due to accuracy criteria are usable for project decisions. Results that have been rejected are not usable.

4.7.3 Blank Contamination

Blanks are used to determine the level of laboratory and field contamination introduced into the samples, independent of the level of target analytes found in the sample source. Sources of sample contamination can include the containers and equipment used to collect the sample, preservatives added to the sample, other samples in transport coolers and laboratory sample storage refrigerators, standards and solutions used to calibrate instruments, glassware and reagents used to process samples, airborne contamination in the laboratory preparation area and the analytical instrument sample introduction equipment. Each analyte group has its own particular suite of common laboratory contaminants. Active measures must be performed to continually measure the ambient contamination level and steps taken to discover the source of the contamination to eliminate or minimize the levels. Random spot contamination can also occur from analytes that are not common laboratory problems but that can arise as a problem for a specific project or over a short period of time. Sample equipment decontamination practices are discussed in Section 2.4.4. Field blanks, equipment blanks, trip blanks and laboratory method blanks are analyzed to identify possible sources of contamination. The DUAR and laboratory validation reports in Appendix C discuss the results that were qualified based on field and laboratory blank contamination.

In summary, for Subarea 7 samples, some dioxins, metals, mercury, TPH and glycols, VOCs, and SVOC SIM results were qualified as non-detect due to laboratory blank contamination criteria. Some results for metals, hexavalent chromium, mercury and VOC analytes were also qualified based on field blank contamination. The percentage of results qualified as non-detect based on laboratory blank contamination was less than 5 percent, as discussed in Appendix C, for all analyses except the following: 28 percent of the dioxins; and 23 percent of the mercury results. These results were qualified as non-detect "U" due to laboratory blank contamination.

For the dioxins, estimated detection limits (EDLs) are calculated for each sample. The EDLs for this analysis are very low, reported in nanograms per kilogram (ng/kg) or parts per trillion, resulting in numerous results qualified as estimated "J" values because they are below the RL. Many of these estimated values have been subsequently qualified as non-detect "U" because the compound was detected in related laboratory blanks. The laboratory blank results correlate to the sample EDLs and low level detections of dioxin analytes are somewhat inevitable because of the nature and universal extent of the compounds. The dioxin levels found in the blanks are well below site-related action levels. Therefore, the resulting qualification of associated sample results as not detected or "U" qualified data do not falsely diminish identification of site-related contaminants.

The other reported analytes that had blank qualifications greater than 5 percent do not indicate a laboratory blank contamination problem as the overall sample counts for those analytes were low. For example, there were only 257 mercury samples analyzed and out of those samples 57 mercury results were qualified due to blank contamination.

Tables 4-2 through 4-4 provide a summary of analytes observed in equipment, field, and trip blank samples, respectively. Most of the detected compounds in these blanks were below the RLs but above the MDLs. Compounds detected above the RL in equipment, trip, and field blanks are highlighted yellow in the associated tables. The field blanks had detections of analytes as shown in Table 4-3. ASTM Type II water is not typically certified “clean” to the low RLs established for the low level methods used for the co-located sampling program.

A review of the ASTM Type II field blanks for all Phase 1 sampling showed one detect of heptachlor, three detects of naphthalene, and one detect of RDX above their respective RL. One field blank had detects above the RLs for four metal analytes and one field blank had detects above the RLs for a variety of VOC analytes. ASTM Type II water field blanks will continue to be reviewed to monitor for detected concentrations of analytes throughout the sampling program. The associated sample results were qualified accordingly during the validation process.

A review of all Phase 1 equipment blanks was also performed. In general, a variety of analytes were detected above their respective RLs. The most frequently detected analytes were naphthalene, NDMA and RDX. Naphthalene was detected in 28 percent of the equipment blanks, NDMA in 27 percent of the equipment blanks, and RDX in 26 percent of the equipment blanks. Other analytes were detected in the equipment blanks with methylene chloride being detected in eight percent of the equipment blanks. All other analytes were detected in less than five percent of the equipment blank samples.

Further review of the equipment blanks is being conducted and all Phase 3 equipment blanks collected to-date are being evaluated to determine if these low level detections are consistent indicating a possible deficiency in decontamination procedures and/or source water impacts that need to be addressed and corrected. Associated sample results were qualified accordingly during the validation process regarding field blank contamination. No sample results were rejected due to detected concentrations in any field, trip, equipment or laboratory blanks.

4.7.4 Representativeness, Comparability, and Sensitivity

Representativeness, comparability, and sensitivity are achieved by using EPA-approved sampling procedures and analytical methodologies. By following the procedures described in the WP/FSAP for this sampling event and future sampling events, sample analysis should yield results representative of environmental conditions at the time of sampling. Similarly, reasonable comparability of analytical results for this and future sampling events can be achieved if approved EPA analytical methods and standardized reporting units are employed.

4.7.4.1 Representativeness

Representativeness is a qualitative term that expresses the degree to which the sample data accurately and precisely represent the environmental conditions corresponding to the location and depth interval of sample collection. Requirements and procedures for sample collection are designed to maximize sample representativeness.

Representativeness also can be monitored by reviewing field documentation and/or performing field audits. For this report, a detailed review was performed on the CoC forms, laboratory sample confirmation logs, and data validation packages. Laboratory QA/QC requirements were included in the WP/FSAP (CDM 2011a) and laboratory statements of work (SOWs) to ensure that the laboratory analytical results were representative of true field conditions.

The most significant measure of representativeness is the accuracy of the sampling network and selection of appropriate locations and depths, etc. Field sampling accuracy was attained through adherence to the approved WP/FSAP for sample location and collection and by using approved standard operating procedures for field data collection. Therefore the data should represent, as near as possible, the actual field conditions at the time of sampling.

Representativeness has been achieved by the performed field work and laboratory analyses. The analytical data generated that have not been rejected are viewed to be a representative characterization of the project area.

4.7.4.2 Comparability

Comparability is a qualitative term that expresses the confidence with which a data set can be compared with another. Strict adherence to standard sample collection procedures, analytical detection limits, reporting units and analytical methods assures that data from like samples and sample conditions are comparable. This comparability is independent of laboratory personnel, data reviewers, or sampling personnel. Comparability criteria are met for the project if, based on data review, the sample collection and analytical procedures are determined to have been followed, or defined to show that variations did not affect the values reported.

To ensure comparability of data generated for the site, standard sample collection procedures and DTSC-reviewed analytical methods were utilized by CDM. The sample analyses were performed by LLI and EMAX. Utilizing such procedures and methods enables the current data to be comparable with previous and future data sets generated using similar methods.

4.7.4.3 Sensitivity

Sensitivity is related to the ability to compare analytical results with project-specific levels of interest, such as risk-based screening levels or action levels. Analytical detection limits for the various sample analytes should be below the level of interest to allow an effective comparison.

Detection Limits

The MDL study attempts to answer the question, "What is the lowest level of analyte in a sample that will result in a signal different than zero"? The study is based upon repetitive analysis of an interference-free sample spiked with a known amount of the target analyte. The MDL is a measure of the ability of the test procedure to generate a positive response for the target analyte in the absence of any other interferences from the sample.

The RL is generally defined as the lowest concentration at which an analyte can be detected in a sample and its concentration reported with a reasonable degree of accuracy and precision. For samples that do not pose a particular matrix problem, the RL is typically about three to five times higher than the MDL.

Laboratory results are reported according to rules that provide established certainty of detection and RLs. An analyte result is flagged with a "U" if that analyte was not detected, or qualified with a "J" flag if associated QC results fall outside the appropriate tolerance limits. Also, if an analyte is present at a concentration between the MDL and the RL, the analytical result is flagged with a "J," indicating an estimated quantity. Qualifying the result as an estimated concentration reflects increased uncertainty in the reported value.

RLs for the modified methods identified in Table 2-2 are evaluated through the analysis of RL-LCS and RL-MS samples created by LLI. The evaluation of these QC samples is ongoing throughout all subareas of Area IV and recommendations regarding program-wide sample qualification based on the RL-LCS and RL-MS QC results have not been finalized. Qualification of individual sample results for Subarea 7 was not performed based on the current RL-LCS and RL-MS QC results.

Qualifiers were applied to applicable sample results by the laboratory and identified during the validation process based on sample results being reported as detected below the RL/MDL. Details of the validation and the number of results qualified are discussed in detail in the DUAR and laboratory validation reports in Appendix C.

In summary, for all Subarea 7 samples analyzed, results for some of the analytes were qualified as estimated due to RL criteria for all analytical methods except for VOC SIM results and energetic results. The VOC SIM and energetic results required no qualification based on RL criteria.

In general, for the data validated in this TM, RLs for the sample results were low enough to compare to the RLs stated in the WP/FSAP (CDM 2011a). The RLs for this project are lower than "normal" environmental data analyses for some classes of compounds. Some analytical laboratory methods were modified in order to achieve the lowest practicable RLs in an attempt to comply with the AOC. All modified analyses are undergoing further studies to evaluate the effect of the modifications on precision and accuracy. An independent study evaluating the precision and accuracy of the modified herbicide method has been completed. Review of the herbicide results indicate that the method modifications did not achieve precision and accuracy goals at this lower reporting limit for some of the analytes. Data are currently under further review and it is likely that reporting limits may be elevated for some analytes. These results are still considered usable for project decisions.

4.8 Review of Selected Validation Reports

CDM performed a review of the validation reports identified in Table 4-1. This review involved comparing the validation report results against the laboratory data packages as well as the validation

guidance documents. All validation report results were verified against the laboratory data packages and validation guidance documents were followed as required.

4.9 Data Completeness

Completeness of the data collection program is defined as the percentage of samples planned for collection as listed in the WP/FSAP (CDM 2011a) versus the actual number of samples collected during the field program (see equation A).

Completeness for acceptable data is defined as the percentage of acceptable data obtained judged to be valid versus the total quantity of data generated (see equation B). Acceptable data include both data that pass all the QC criteria (unqualified data) and data that may not pass all the QC criteria but had appropriate corrective actions taken (qualified but usable data).

Equation A.

$$\%\text{Completeness} = C \times \frac{100}{n}$$

Where:

C = actual number of samples collected
n = total number of samples planned

Equation B.

$$\%\text{Completeness} = V \times \frac{100}{n'}$$

Where:

V = number of measurements judged valid
n' = total number of measurements made

The overall completeness goal, as defined in the WP/FSAP (CDM 2011a), for this sampling event is 90 percent for each analytical test for all project data.

A total of 266 Subarea 7 soil samples including field duplicates were collected and analyzed. As discussed in Section 2.8, 185 locations were to be sampled in Subarea 7. Some locations required only a subsurface sample while other locations required both a surface and subsurface sample. The number of subsurface samples to be collected at each location is not pre-determined because the total depth of each boring varies depending on the local geology. Of the locations to be sampled in Subarea 7, subsurface samples were not collected at 65 locations due to shallow refusal at less than 2.5 feet and one location was not sampled due to archeological concerns.

As discussed in Section 2.8, the sampling deviations do not impact completeness objectives for this sampling program. Ninety-nine percent of the sample locations identified in the WP/FSAP Addendum for Subarea 7 were sampled; this meets the completeness goal for the number of locations sampled versus number of locations planned to be sampled.

The completeness goal achieved for acceptable data was 99.6 percent of the number of measurements judged to be valid versus the total number of measurements made for all Subarea 7samples analyzed. Table 4-6 summarizes all results that were estimated or rejected.

The following Subarea 7 individual analyte results were rejected per analyses:

- Method 6020
  - Three out of 4,378 antimony results (0.068 percent)

- Method 8015M
  - Twelve out of 1,557 individual TPH and glycol results (0.77 percent)
- Method 8081A
  - Thirty-four out of 2,415 individual pesticide results (1.4 percent)
- Method 8151A
  - Eight-eight out of 1,150 individual herbicide results (7.6 percent)
- Method 8270C
  - Twenty-seven out of 13,501 individual SVOC results (0.199 percent)
- Method 8270C SIM
  - Two out of 5,832 individual SVOC SIM results (0.034 percent)
- Method 9012B
  - One out of 133 cyanide results (0.75 percent)

Table 4-6 Summary of Data Completeness Following Data Validation – Subarea 7

	Number of Analyte Detections Without Qualifiers	Number of Estimated Results	Number of Rejected Results	Number of Nondetect Results	Number of Estimated Nondetect Results	Total Analytes Detect and Nondetect	Percent of Analyte Results Judged Valid Versus Total Analyte Results Collected
Dioxins	666	2010		1667	26	4269	100
NDMA		3		78		81	100
Formaldehyde		8		73		81	100
Cyanide	2	3	1	127		133	99.25
Fluoride, Nitrate	106	137		37	62	342	100
Hexavalent Chromium	20	120		133	3	276	100
Mercury	2	78		173	4	257	100
Metals – 6010B	2317	566		446	3	3332	100
Metals – 6020	1109	3063	3	114	89	4378	99.93
Perchlorate-314				257		257	100
Perchlorate-6850		2		33		35	100
Alcohols, terphenyls	26	51		1145	17	1239	100
Energetics				844	2	846	100
Total Petroleum Hydrocarbons, glycols	330	121	12	1057	37	1557	99.23
PCBs/PCTs	220	172		2605	87	3084	100
Pesticides	117	176	34	1870	218	2415	98.6
Herbicides	62	51	88	944	5	1150	92.4
Semivolatiles	97	303	27	13017	69	13501	99.8
Semivolatiles SIM	841	621	2	4312	44	5832	99.96
Volatiles	1	6		188	6	201	100
Volatiles SIM				3		3	100
Completeness Total for All Subarea 7 Samples Collected and Judged Valid							**99.62**

The completeness goals for both the locations sampled and the number of measurements judged to be valid were met.

Sampling deviations from procedures described in the WP/FSAP (CDM 2011a) are discussed in Section 2.8 of this TM. Deviations did not impact DQOs for this sampling event. The data reported and not rejected are suitable for their intended use for characterization of Area IV of SSFL. The DQIs identified in the WP/FSAP (CDM 2011a) met appropriate criteria. The achievement of the completeness goals for the data indicates a sufficient amount of usable data has been generated on which to base project decisions.

As discussed in Section 2.7, the EMAX split samples were also validated. Sample results were qualified based on blank results, field duplicate results, MSs, ICP serial dilution results and reporting limits. Validation qualifiers applied to the EMAX analyzed samples are similar to the qualifiers applied to LLI analyzed samples. A separate memorandum discusses the details of the precision and accuracy of the EMAX sample results compared to the LLI sample results. The results generally indicate acceptable performance by EMAX.

4.10 Assessment of Data Usability and Reconciliation with WP/FSAP Goals

Over 99 percent of the data validated for Subarea 7 and reported in this TM are suitable for their intended use for site characterization. Sample results that were rejected are not suitable for project use. The rejected analyte results do not impact achievement of the overall project objectives. The RLs reported generally met the expected limits proposed by the analytical laboratory in their contract agreement with CDM.

Sample results that were qualified as estimated are usable for project decisions. Numerous dioxin results were qualified as estimated and/or non-detect due to the low detection limits. This data is considered usable.

Field duplicate precision also met criteria a majority of the time. RPDs were outside criteria predominantly when the sample results were close to the RL and/or below the project required action limits. Decisions based on results close to the RL should be made with a degree of caution. The achievement of the completeness goals for number of samples collected, and the number of sample results acceptable for use provides sufficient quality data to support project decisions.

Section 5
References

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N

Legend

- Sample Location
- Area IV Subarea
- Removed Building

Aerial Source: Bing Maps, (c) 2010 Microsoft Corporation and its data suppliers

Subarea 7 Sample Locations

0 54 108 216 324 Feet

Santa Susana Field Laboratory
Ventura County, California
Exhibit 1

CDM Smith

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