Technical Memorandum

Co-Located Chemical Sampling Results at Historical Site Assessment Subarea 5C in Area IV

Santa Susana Field Laboratory Ventura County, California

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Acronyms and Abbreviations

%D	percent difference/percent drift
%R	percent recovery
AOC	Administrative Order on Consent
ASTM	American Society for Testing of 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
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
IDL	instrument detection limit
LCS	laboratory control sample
LCSD	laboratory control sample duplicate
LLI	Lancaster Laboratory, Inc.
MDL	method detection limit
MS	matrix spike
MSD	matrix spike duplicate
PAH	polycyclic aromatic hydrocarbon
PARCCS	precision, accuracy, representativeness, comparability, completeness and sensitivity
PCB	polychlorinated biphenyl
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

Section 1
Introduction

This technical memorandum (TM) presents the results of chemical analysis of soil, drainage, and sediment samples collected under the *Work Plan/ Field Sampling and Analysis Plan, Co-Located Chemical Sampling at Area IV, Santa Susana Field Laboratory* (CDM Federal Programs Corporation [CDM] 2010). The TM addresses sampling within U.S. Environmental Protection Agency (EPA) Historical Site Assessment (HSA) Subarea 5C of Area IV.

This TM does not provide detailed interpretation of the results. It is primarily a presentation of field activities, analytical results, and data quality review. Data interpretation will require combining these results with prior Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI) results and comparison of the combined results with screening criteria. The screening criteria will be used to identify where contamination exists and where additional sampling may be warranted. At the time of development of this TM, California Department of Toxic Substances Control (DTSC) and community-accepted screening criteria had not been approved by DTSC for data interpretation purposes. Once the screening criteria are approved, this TM will be revised to provide the interpretations of the results and the recommendations for additional sampling under Phase 3 (step out sampling).

1.1 Co-Located Soil Chemical Sampling Objectives

The radiological characterization study being performed by EPA includes collection of surface and subsurface soil samples throughout Area IV of the Santa Susana Field Laboratory (SSFL) and the Northern Buffer Zone for analysis of radionuclides. As part of the process of developing the Administrative Order on Consent (AOC[1]), DTSC and Department of Energy (DOE) agreed that soil samples collected by EPA will also be analyzed for chemical constituents. DTSC and DOE agreed that the chemical sampling would be done by DOEs contractor, CDM.

EPA's contractor, HydroGeoLogic, Inc. (HGL) completed an HSA for the 5C study area of Area IV of SSFL. The HSA findings coupled with surface gamma emissions and geophysical surveys were used by HGL in developing a sampling strategy for radionuclide characterization. The sample locations and rationale presented in this report are based on EPAs recommendations. For HSA 5C, co-located samples for chemical analysis were planned for collection at all EPA proposed sample locations. Because EPA did not collect samples at all proposed locations, some samples were not

[1] The *Administrative Order on Consent for Remedial Action* Docket Number HSA-CO 10/11-037 between DTSC and DOE was not signed until December 6, 2010. However, DOE and DTSC agreed to implement the co-located sampling portion of the order in October 2010 given EPAs start of sampling on October 18.

collected (see Section 2.7 for a discussion of the deviations from the proposed sampling work).

The objectives of the co-located sampling program are to take advantage of EPAs evaluation of sampling needs for Area IV of SSFL and EPAs soil sampling field work, and not duplicate efforts for obtaining the required chemical data. EPA provided the equipment and personnel already engaged in soil sampling to collect the samples for chemical analyses. In addition, sampling for chemicals and radionuclides at the same location would help determine where chemical and radionuclide contamination coincide.

HGL started surface soil sampling in HSA Subarea 5C on October 18, 2010, with a CDM sampling team present to receive the soil samples for chemical analysis. This report only presents the chemical results for the co-located sampling effort. The radionuclide results will be presented by EPA in a separate report.

1.2 Basis for the HSA Subarea 5C Sampling

HGLs *Field Sampling Plan for Soil Sampling, Area IV Radiological Study, Santa Susana Field Laboratory* (HGL 2010a) describes their overall project goals, data quality objectives (DQOs), sampling strategy, laboratory analytical suites for radionuclides, sample depth interval selection, data quality control, and data evaluation. *Subarea 5C Addendum to Field Sampling Plan for Soil Sampling, Area IV Radiological Study, Santa Susana Field Laboratory* (HGL 2010b) was prepared by HGL to support the field implementation of their overall soil sampling program in Subarea 5C. The addendum provides the technical justification for locating the drainage, surface, and subsurface soil samples in Subarea 5C.

1.3 Geology

HSA Subarea 5C of Area IV is within the Chatsworth Formation, which is composed predominantly of sandstone interbedded with siltstone and shale. The native soils encountered in HSA Subarea 5C range from predominantly silty sands to sandy silts at shallow depths with increasing clay content to 10 feet below ground surface (bgs). Disturbed areas in HSA Subarea 5C comprise fill soils of unknown origin and debris such as concrete, asphalt, and wood. The contact with lithified Chatsworth Formation at many soil boring locations occurs between 2 and 9 feet bgs. Additional information regarding the geology in Area IV can be found in Volume I of *Group 5 – Central Portion of Areas III and IV RCRA Facility Investigation Report, Santa Susana Field Laboratory, Ventura County, California* (CH2M Hill 2008).

1.4 Report Organization

This report includes the following sections:

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

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Section 2
Field Sampling and Analytical Methods

Soil sampling at surface and drainage locations in HSA Subarea 5C was initiated on October 18, 2010. Samples were collected from 13 drainage locations and 69 surface locations. Subsurface sampling was started on November 1, 2010 and samples were collected from 110 soil boring locations. Figures 2-1 and 2-2 illustrate the locations of the soil sampling points for HSA Subarea 5C.

Table 2-1 provides the rationale for sampling and a description of what was observed in each soil boring. The table was prepared using HGLs HSA Subarea 5C Addendum table "Summary of Soil Sample Locations in Subarea 5C" and annotated by CDM to add information regarding sampling (sample date and numbers and analytes sampled for) and description of any fill materials encountered. Reasons for not sampling some locations are also included in the table.

2.1 Surface and Drainage Sampling

Surface soil and drainage samples were collected from the surface to 6-inch bgs interval. The drainage samples were collected from drainages internal to Area IV. The surface of the sample area was prepared by HGLs sampler by removing leaves, grass, and any other surface debris. Surface samples to be analyzed for semivolatile organic compounds (SVOCs) and polycyclic aromatic hydrocarbons (PAHs) in HSA Subarea 5C were collected first using a slide hammer equipped with a 2-inch diameter and 6-inch long stainless steel or brass sampling liner. The sampler was pounded into the soil until its top was flush with the 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 for the remaining surface sample analytes was collected from a circular hole approximately 12 inches in diameter to a depth of 6 inches bgs. The removed soil was placed in a stainless steel bowl and homogenized and debris, wood, or other materials larger than 0.25 inches were removed. 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.

Drainage samples were collected from 13 locations on October 19, 20, and 27, 2010 and surface soil samples were collected from 69 locations during October 18 through October 27, on November 15 and 19, 2010, and January 4, 2011. All surface and drainage samples were analyzed for primary analytes only (i.e., SVOCs, PAHs, metals, hexavalent chromium, fluoride, polychlorinated biphenyls (PCBs), dioxins, perchlorate, pesticides, and herbicides). Volatile organic compounds (VOCs), including 1,4-dioxane, were not sampled for at any of these locations.

Ten storm drain access locations were also planned by HGL to be sampled; however, it was determined that there was an insufficient amount of sediment to be sampled from any of the storm drains and no samples were collected. However, a surface sample was collected adjacent to the storm drain at SL-114.

2.2 Subsurface Sampling

Subsurface soil sampling was performed by a California-licensed direct push technology (DPT) subcontractor under HGL oversight. Most of the DPT borings in HSA Subarea 5C 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 consists of a 2-inch outer steel drive casing and an inner 1-¾-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 (i.e., 4 to 5 feet bgs and 9 to 10 feet bgs).

Soil for VOCs, 1,4-dioxane, and total petroleum hydrocarbons gasoline range organics (TPH-GRO) analyses were collected from the sleeve using EnCore® Samplers. Subsurface soil for SVOC, PAH, and PCB analyses were 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, completed with all sampling information, were affixed to each sample jar, and the jars placed into plastic baggies. The Encore® samplers were placed into 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.

Three subsurface locations (SL-038, SL-124, and SL-137) were not accessible by the Geoprobe rig and these borings were advanced using a hand auger. Each location was augered to the target depth of 5 feet bgs. Each 1-foot of soil augered was retrieved to the surface, placed in plastic bags, and screened using the Micro R, Pancake, and PID. All three borings were sampled by CDM for chemical analyses at approximately 4 to 5 feet bgs (see Table 2-1). The EnCore® Samplers were filled first from the soil placed in the plastic bag; the jars were then filled using a decontaminated stainless steel trowel.

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

Table 2-1
Soil Samples Collected from HSA Subarea 5C

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	Northeast of Building 4059	Possible open storage area; Underground contaminated gas suspect tank.			10/26/2010	Primary	SL-001-SA5C-SS-0.0-0.5
Subsurface	1	Northeast of Building 4059	Possible open storage area; Underground contaminated gas suspect tank.	9.5	"Some staining from 5.5 - 7.3 ft, trace gravel fill throughout"	12/13/2010	VOCs/Dioxane/GRO Primary & Secondary VOCs/Dioxane/GRO Primary & Secondary	SL-001-SA5C-SB-4.5 SL-001-SA5C-SB-4.0-5.0 SL-001-SA5C-SB-9.5 SL-001-SA5C-SB-9.0-10.0
Surface	2	North of Building 4059	Possible open storage; Verticle tank noted in airphoto; radiological waste/gasoline hold tank footprint.			10/26/2010	Primary	SL-002-SA5C-SS-0.0-0.5
Subsurface	2	North of Building 4059	Possible open storage; Verticle tank noted in airphoto; radiological waste/gasoline hold tank footprint.	10.0	"Staining from 5.5 - 6.5 ft" "Staining also occurs from 8-8.5 ft and 9-10 ft"	12/14/2010	VOCs/Dioxane/GRO Primary & Secondary VOCs/Dioxane/GRO Primary & Secondary	SL-002-SA5C-SB-4.5 SL-002-SA5C-SB-4.0-5.0 SL-002-SA5C-SB-9.5 SL-002-SA5C-SB-9.0-10.0
Subsurface	3	Northeast of Building 4059	Soil excavated during demolition of Building 4059 was used as backfill.	7.0	"light staining (1.5")" at 6.6 ft	12/13/2010	VOCs/Dioxane/GRO Primary & Secondary	SL-003-SA5C-SB-4.5 SL-003-SA5C-SB-4.0-5.0
Surface	4	North-northwest of Building 4059	Soil excavated during D&D of Building 4059 was used as backfill; Proximity to Building 4059.			10/26/2010	Primary	SL-004-SA5C-SS-0.0-0.5
Subsurface	4	North-northwest of Building 4059	Soil excavated during D&D of Building 4059 was used as backfill; Proximity to Building 4059.	10.0	"some staining 5-5.5 ft" "staining from 7-7.5 & 9-10 ft"	12/14/2010	VOCs/Dioxane/GRO Primary & Secondary VOCs/Dioxane/GRO Primary & Secondary	SL-004-SA5C-SB-4.5 SL-004-SA5C-SB-4.0-5.0 SL-004-SA5C-SB-9.5 SL-004-SA5C-SB-9.0-10.0
Subsurface	5	Northwest of Building 4059	Tank footprint of underground tank.	10.0	"concrete debris" @ 6'3"	12/10/2010	VOCs/Dioxane/GRO Primary & Secondary VOCs/Dioxane/GRO Primary & Secondary	SL-005-SA5C-SB-4.5 SL-005-SA5C-SB-4.0-5.0 SL-005-SA5C-SB-9.5 SL-005-SA5C-SB-9.0-10.0
Subsurface	6	North side of Building 4059	Proximity to Building 4059 french drain; Two ASTs; soil excavated during Building 4059 D&D used as backfill.	10.0	light staining from 8'9" - 8'10"	12/13/2010	VOCs/Dioxane/GRO Primary & Secondary VOCs/Dioxane/GRO Primary & Secondary	SL-006-SA5C-SB-4.5MS SL-006-SA5C-SB-4.0-5.0MS SL-006-SA5C-SB-9.5 SL-006-SA5C-SB-9.0-10.0
Subsurface	7	North side of Building 4059	French drain; Two ASTs; Building 4059 excavated soil used as backfill, past soil data shows radiological concentration greater than the preliminary remediation goals.	10.0	at end of log: TD=10 ft bgs No GW encountered Fill material	12/13/2010	VOCs/Dioxane/GRO Primary & Secondary VOCs/Dioxane/GRO Primary & Secondary	SL-007-SA5C-SB-4.5MS SL-007-SA5C-SB-4.0-5.0MS SL-007-SA5C-SB-9.5 SL-007-SA5C-SB-9.0-10.0
Surface	8	Northwest of Building 4059	Elevated radionuclide concentrations measured in past soil verification samples.			10/26/2010	Primary	SL-008-SA5C-SS-0.0-0.5
Subsurface	8	Northwest of Building 4059	Elevated radionuclide concentrations measured in past soil verification samples.	9.0	"5 ft - black rubber piece"	12/10/2010	VOCs/Dioxane Primary Primary	SL-008-SA5C-SB-4.5 SL-008-SA5C-SB-4.0-5.0 SL-008-SA5C-SB-8.0-9.0
Subsurface	9	North portion of Building 4059, inside footprint	Soil from Bldg 4059 D&D excavation used to backfill.	10.0	None indicated	12/10/2010	VOCs/Dioxane/GRO Primary & Secondary VOCs/Dioxane/GRO Primary & Secondary	SL-009-SA5C-SB-4.5 SL-009-SA5C-SB-4.0-5.0 SL-009-SA5C-SB-9.5 SL-009-SA5C-SB-9.0-10.0
Subsurface	10	West side of former Building 4059; NE of the french drain holding tank	Location of former French drain and holding tank, Geophysical Anomaly.	10.0	"staining @ 9'2" to 9'-6"	12/10/2010	VOCs/Dioxane/GRO Primary & Secondary VOCs/Dioxane/GRO Primary & Secondary	SL-010-SA5C-SB-4.5 SL-010-SA5C-SB-4.0-5.0 SL-010-SA5C-SB-9.5 SL-010-SA5C-SB-9.0-10.0
Subsurface	11	West portion of Building 4059, inside footprint	Soil from excavation used to backfill, Geophysical Anomaly.	10.0	"wood" @ 6'6"-6'8" "trace gravel - subangular & concrete debris" @ 8'3" - 8'9" "greenish gray staining" @ 9'2"	12/10/2010	VOCs/Dioxane/GRO Primary & Secondary VOCs/Dioxane/GRO Primary & Secondary	SL-011-SA5C-SB-4.5 SL-011-SA5C-SB-4.0-5.0 SL-011-SA5C-SB-9.5 SL-011-SA5C-SB-9.0-10.0
Surface	12	South central portion of Building 4059, inside footprint	Soil excavated during D&D of Building 4059 was used as backfill.			10/26/2010	Primary	SL-012-SA5C-SS-0.0-0.5
Subsurface	12	South central portion of Building 4059, inside footprint	Soil from excavation used to backfill.	10.0	None indicated	12/9/2010	VOCs/Dioxane/GRO Primary & Secondary VOCs/Dioxane/GRO Primary & Secondary	SL-012-SA5C-SB-4.5 SL-012-SA5C-SB-4.0-5.0 SL-012-SA5C-SB-9.5 SL-012-SA5C-SB-9.0-10.0

Table 2-1
Soil Samples Collected from HSA Subarea 5C

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	13	East side of Building 4059	Footprint of a former underground contaminated waste hold up tank, Geophysical Anomaly.	10.0	"pieces of asphalt, pieces of fiber material" @ 1'9" - 2'3"	12/9/2010	VOCs/Dioxane/GRO Primary & Secondary VOCs/Dioxane/GRO Primary & Secondary	SL-013-SA5C-SB-4.5 SL-013-SA5C-SB-4.0-5.0 SL-013-SA5C-SB-9.5 SL-013-SA5C-SB-9.0-10.0
Subsurface	14	West of Building 4059	Soil from excavation used to backfill; Possible open storage.	10.0	"Artificial fill" noted above 0.5 ft "fill" noted at 3.0 ft "fill material" noted at 4.0 ft "large red brick ~ 1" in thickness" noted at 5.0 ft "Fill material same as above" noted @ 6 ft "Piece of black solid tar" at 8.0 ft	12/7/2010	VOCs/Dioxane/GRO Primary & Secondary VOCs/Dioxane/GRO Primary & Secondary	SL-014-SA5C-SB-4.5 SL-014-SA5C-SB-4.0-5.0 SL-014-SA5C-SB-9.5 SL-014-SA5C-SB-9.0-10.0
Subsurface	15	Southwest portion of Building 4059, inside footprint	Soil from excavation used to backfill, Geophysical Anomaly.	10.0	"Pieces of concrete debris" @ 8'6" & 9.0 ft	12/8/2010	VOCs/Dioxane/GRO Primary & Secondary VOCs/Dioxane/GRO Primary & Secondary	SL-015-SA5C-SB-4.5 SL-015-SA5C-SB-4.0-5.0 SL-015-SA5C-SB-9.5 SL-015-SA5C-SB-9.0-10.0
Subsurface	16	South central portion of Building 4059, inside footprint	Elevated radionuclide concentrations measured in past soil verification samples, Geophysical Anomaly.	10.0	None indicated	12/8/2010	VOCs/Dioxane/GRO Primary & Secondary VOCs/Dioxane/GRO Primary & Secondary	SL-016-SA5C-SB-4.5 SL-016-SA5C-SB-4.0-5.0 SL-016-SA5C-SB-9.5 SL-016-SA5C-SB-9.0-10.0
Subsurface	17	Southeast corner of Building 4059 footprint	French drains; Soil excavated during Building 4059 D&D used as backfill, Geophysical Anomaly.	10.0	None indicated	12/9/2010	VOCs/Dioxane/GRO Primary & Secondary VOCs/Dioxane/GRO Primary & Secondary	SL-017-SA5C-SB-4.5 SL-017-SA5C-SB-4.0-5.0 SL-017-SA5C-SB-9.5 SL-017-SA5C-SB-9.0-10.0
Surface	18	West portion of Group 1	Elevated radionuclide concentrations measured in past soil samples; Stained area; open storage area; Possible pit.			10/26/2010	Primary	SL-018-SA5C-SS-0.0-0.5
Subsurface	18	West portion of Group 1	Elevated radionuclide concentrations measured in past soil samples; Stained area; open storage area; Possible pit.	5.0	None indicated	12/6/2010	VOCs/Dioxane/GRO Primary & Secondary	SL-018-SA5C-SB-4.5 SL-018-SA5C-SB-4.0-5.0
Subsurface	19	Southwest of Building 4059	Two former ASTs; Soil excavated during demolition of Building 4059 was used as backfill.	9.5	Fill indicated at surface to 9.5 ft	12/7/2010	VOCs/Dioxane/GRO Primary & Secondary VOCs/Dioxane/GRO Primary & Secondary	SL-019SA5C-SB-4.5 SL-019-SA5C-SB-4.0-5.0 SL-019-SA5C-SB-9.0 SL-019-SA5C-SB-8.5-9.5
Surface	20	South of Building 4059	If storm drain received radiological material residual contamination may remain.			10/26/2010	Primary	SL-020-SA5C-SS-0.0-0.5
Subsurface	20	South of Building 4059	If storm drain received contaminated drainage, residual radiological contamination may remain .	8.5	"stained with tar ~ dime size" (around 6 ft)	12/8/2010	VOCs/Dioxane/GRO Primary & Secondary VOCs/Dioxane/GRO Primary & Secondary	SL-020-SA5C-SB-4.5 SL-020-SA5C-SB-4.0-5.0 SL-020-SA5C-SB-8.0 SL-020-SA5C-SB-7.5-8.5
Subsurface	21	South side of Building 4059	French drains; Soil excavated during demolition of Building 4059 was used as backfill.	10.0	"pieces of concreted debris (2 dime size pieces)" at around 8 ft	12/8/2010	VOCs/Dioxane/GRO Primary & Secondary VOCs/Dioxane/GRO Primary & Secondary	SL-021-SA5C-SB-4.5 SL-021-SA5C-SB-4.0-5.0 SL-021-SA5C-SB-9.5 SL-021-SA5C-SB-9.0-10.0
Subsurface	22	Southeast corner of Building 4059 footprint	French drains; Soil excavated during Building 4059 D&D was used as backfill, Geophysical Anomaly.	10.0	None indicated	12/9/2010	VOCs/Dioxane/GRO Primary & Secondary VOCs/Dioxane/GRO Primary & Secondary	SL-022-SA5C-SB-4.5 SL-022-SA5C-SB-4.0-5.0 SL-022-SA5C-SB-9.5 SL-022-SA5C-SB-9.0-10.0
Surface	24	West side of Group 1	Open storage area.			10/26/2010	Primary	
Subsurface	24	West side of Group 1	Open storage area.	10.0	None indicated	12/6/2010	VOCs/Dioxane Primary Primary	SL-024-SA5C-SB-4.5 SL-024-SA5C-SB-4.0-5.0 SL-024-SA5C-SB-9.0-10.0

Table 2-1
Soil Samples Collected from HSA Subarea 5C

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	25	West of Building 4059	Soil from excavation used to backfill; open storage.	10.0	None indicated	12/6/2010	VOCs/Dioxane/GRO Primary & Secondary VOCs/Dioxane/GRO Primary & Secondary	SL-025-SA5C-SB-4.5 SL-025-SA5C-SB-4.0-5.0 SL-025-SA5C-SB-9.5 SL-025-SA5C-SB-9.0-10.0
Surface	26	South of Building former 4059	Recommended sample around Building 4059 - HSA.			10/25/2010	Primary	SL-026-SA5C-SS-0.0-0.5
Subsurface	26	South of Building former 4059	Recommended sample around Building 4059 - HSA.	9.5	"Artificial fill at 0.5 ft; hydroseed mat"	12/7/2010	VOCs/Dioxane/GRO Primary & Secondary VOCs/Dioxane/GRO Primary & Secondary	SL-026-SA5C-SB-4.5 SL-026-SA5C-SB-4.0-5.0 SL-026-SA5C-SB-9.5 SL-026-SA5C-SB-9.0-10.0
Surface	27	South of Building 4059	Elevated radionuclide concentrations measured in past soil verification samples.			10/25/2010	Primary	SL-027-SA5C-SS-0.0-0.5
Subsurface	27	South of Building 4059	Elevated radionuclide concentrations measured in past soil verification samples.	10.0	Artificial fill at 0.5 ft	12/7/2010	VOCs/Dioxane/GRO Primary & Secondary VOCs/Dioxane/GRO Primary & Secondary	SL-027-SA5C-SB-3.0 SL-027-SA5C-SB-2.5-3.5 SL-027-SA5C-SB-9.5 SL-027-SA5C-SB-9.0-10.0
Subsurface	28	West of Building former 4059	Soil from excavation used to backfill; Possible open storage.	7.0	"Fill/disturbed to 7.0 ft"	12/6/2010	VOCs/Dioxane/GRO Primary & Secondary	SL-028-SA5C-SB-4.5MS SL-028-SA5C-SB-4.0-5.0MS
Subsurface	30	South of Building 4057	Location of dry well.	10.0	"Fill" at 0.5 ft	12/3/2010	VOCs/Dioxane/GRO Primary & Secondary VOCs/Dioxane/GRO Primary & Secondary	SL-030-SA5C-SB-4.5 SL-030-SA5C-SB-4.0-5.0 SL-030-SA5C-SB-9.5 SL-030-SA5C-SB-9.0-10.0
Subsurface	31	South of Building 4057	South of drywall location.	10.0	"Fill" at 0.5 ft	12/3/2010	VOCs/Dioxane/GRO Primary & Secondary VOCs/Dioxane/GRO Primary & Secondary	SL-031-SA5C-SB-4.5 SL-031-SA5C-SB-4.0-5.0 SL-031-SA5C-SB-9.5 SL-031-SA5C-SB-9.0-10.0
Surface	32	Footprint of Building 4626	Possible open storage, chemical use area/debris field.			10/25/2010	Primary	SL-032-SA5C-SS-0.0-0.5
Subsurface	32	Footprint of Building 4626	Possible open storage, chemical use area/debris field.	5.0	"Fill" at top	12/3/2010	VOCs/Dioxane/GRO Primary & Secondary	SL-032-SA5C-SB-4.5MS SL-032-SA5C-SB-4.0-5.0MS
Surface	33	West of former Building 4626	On prior access road - interview line, Gamma anomaly.			10/26/2010	Primary	SL-033-SA5C-SS-0.0-0.5
Subsurface	33	West of former Building 4626	On prior access road - interview line, Gamma anomaly.	2.5	None indicated	No subsurface samples collected due to refusal at 2.5 ft bgs;. collected surface sample instead		
Surface	36	West of Building 4038	Open storage, containers.			1/4/2011	Primary	SL-036-SA5C-SS-0.0-0.5
Subsurface	36	West of Building 4038	Open storage, containers.	6.0	None indicated	12/2/2010	VOCs/Dioxane Primary	SL-036-SA5C-SB-4.5 SL-036-SA5C-SB-4.0-5.0
Subsurface	37	Northwest of former Building 4062	Near Underground tank.	4.5	Asphalt to 3" with "pea gravel (granite and asphalt)", sand, and silt directly beneath	12/2/2010	VOCs/Dioxane/GRO Primary & Secondary	SL-037-SA5C-SB-4.0MS SL-037-SA5C-SB-3.5-4.5MS
Surface	38	Northwest of Building 4463	Debris field.			10/25/2010	Primary	SL-038-SA5C-SS-0.0-0.5
Subsurface	38	Northwest of Building 4463	Debris field. (HAND AUGERED)	5.5	None indicated	1/5/2011	VOCs/Dioxane Primary	SL-038-SA5C-SB-4.5 SL-038-SA5C-SB-4.0-5.0
Surface	39	Southwest of Building 4038	Probable vertical tank, probable stain, open storage, containers.			1/4/2011	Primary	SL-039-SA5C-SS-0.0-0.5
Subsurface	39	Southwest of Building 4038	Probable vertical tank, probable stain, open storage, containers.	5.0	None indicated	12/2/2010	VOCs/Dioxane/GRO Primary & Secondary	SL-039-SA5C-SB-4.5 SL-039-SA5C-SB-4.0-5.0
Subsurface	40	In parking lot between Building 4038 and former Building 4065	Unknown.	10.0	None indicated	12/2/2010	VOCs/Dioxane Primary Primary	SL-040-SA5C-SB-4.5 SL-040-SA5C-SB-4.0-5.0 SL-040-SA5C-SB-9.0-10.0
Surface	41	Footprint of Building 4062	Possible vertical tank, ground scar.			10/25/2010	Primary	SL-041-SA5C-SS-0.0-0.5MS

Table 2-1
Soil Samples Collected from HSA Subarea 5C

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	41	Footprint of Building 4062	Possible vertical tank, ground scar.	5.0	None indicated	2/4/2011	VOCs/Dioxane Primary	SL-041-SA5C-SB-4.5 SL-041-SA5C-SB-4.0-5.0
Surface	42	Northwest of Building 4463	Geophysical anomaly.			11/19/2010	Primary	SL-042-SA5C-SS-0.0-0.5
Subsurface	42	Northwest of Building 4463	Geophysical anomaly.			No subsurface sample collected due to refusal at 1 ft bgs		
Surface	43	West of former Building 4065	Open storage area.			10/25/2010	Primary	SL-043-SA5C-SS-0.0-0.5
Subsurface	43	West of former Building 4065	Open storage area.	3.0	None indicated	11/30/2010	VOCs/Dioxane Primary	SL-043-SA5C-SB-2.5 SL-043-SA5C-SB-2.0-3.0
Subsurface	44	East of former Building 4065	Unidentified tank.	10.0	"Fill material" indicated just below grass	12/1/2010	VOCs/Dioxane/GRO Primary & Secondary Primary & Secondary	SL-044-SA5C-SB-4.5 SL-044-SA5C-SB-4.0-5.0 SL-044-SA5C-SB-9.0-10.0
Surface	45	East of former Building 4065	Ground scar.			10/25/2010	Primary	SL-045-SA5C-SS-0.0-0.5
Subsurface	45	East of former Building 4065	Ground scar.	9.0	"Fill material" indicated just below grass	12/1/2010	VOCs/Dioxane Primary Primary	SL-045-SA5C-SB-4.5 SL-045-SA5C-SB-4.0-5.0 SL-045-SA5C-SB-8.0-9.0
Subsurface	46	South of former Building 4065	Ground scar, former metals clarifier.	10.0	None indicated	12/1/2010	VOCs/Dioxane/GRO Primary & Secondary Primary & Secondary	SL-046-SA5C-SB-4.5 SL-046-SA5C-SB-4.0-5.0 SL-046-SA5C-SB-9.0-10.0
Surface	47	Footprint of Building 4066	Ground scar.			10/25/2010	Primary	SL-047-SA5C-SS-0.0-0.5
Subsurface	47	Footprint of Building 4066	Ground scar.	7.0	"Fill material" indicated just below grass	12/1/2010	VOCs/Dioxane Primary	SL-047-SA5C-SB-4.5 SL-047-SA5C-SB-4.0-5.0
Surface	49	North section of open area between 22nd and 23rd street	Open storage area.			10/22/2010	Primary	SL-049-SA5C-SS-0.0-0.5
Subsurface	49	North section of open area between 22nd and 23rd street	Open storage area.	2.0	None indicated	No samples collected due to refusal at 2 ft bgs		
Surface	50	Northeast of Building 4100	Disturbed ground, chemical use area/debris field.			10/22/2010	Primary	SL-050-SA5C-SS-0.0-0.5
Subsurface	50	Northeast of Building 4100	Disturbed ground, chemical use area/debris field.	10.0	None indicated	11/22/2010	VOCs/Dioxane/GRO Primary & Secondary Primary & Secondary	SL-050-SA5C-SB-4.5 SL-050-SA5C-SB-4.0-5.0 SL-050-SA5C-SB-9.0-10.0
Surface	51	North section of open area between	Open storage area, crates.			10/21/2010	Primary	SL-051-SA5C-SS-0.0-0.5MS
Subsurface	51	North section of open area between 22nd and 23rd street	Open storage area, crates.	4.0	"Gravel is fill" (sandy gravels with silt & fine sand)	11/19/2010	VOCs/Dioxane Primary	SL-051-SA5C-SB-4.0 SL-051-SA5C-SB-3.0-4.0
Surface	52	Area between 23rd street and 24th street	Geophysical anomaly, crates, open storage area, previous remedial excavation area.			10/21/2010	Primary	SL-052-SA5C-SS-0.0-0.5
Subsurface	52	Area between 23rd street and 24th street	Geophysical anomaly, crates, open storage area, previous remedial excavation area.	3.0	None indicated	11/19/2010	VOCs/Dioxane/GRO Primary & Secondary	SL-052-SA5C-SB-3.0 SL-052-SA5C-SB-2.5-3.0
Surface	53	East of Building 4100	Ground scar, open storage area, MTMM, chemical use area/debris field .			10/22/2010	Primary	SL-053-SA5C-SS-0.0-0.5
Subsurface	53	East of Building 4100	Ground scar, open storage area, MMTM, chemical use area/debris field .	4.0	Fill indicated 0.5 ft	11/22/2010	VOCs/Dioxane/GRO Primary & Secondary	SL-053-SA5C-SB-3.5 SL-053-SA5C-SB-3.0-4.0
Surface	54	Open area between 22nd and 23rd street	Open storage area, possible debris field, waste disposal area, previous remedial excavation area .			10/21/2010	Primary	SL-054-SA5C-SS-0.0-0.5
Subsurface	54	Open area between 22nd and 23rd street	Open storage area, possible debris field, waste disposal area, previous remedial excavation area .	4.0	None indicated	11/18/2010	VOCs/Dioxane/GRO Primary & Secondary	SL-054-SA5C-SB-4.0 SL-054-SA5C-SB-3.0-4.0
Subsurface	55	Along 23rd street, south of F street	Gamma anomaly.			No samples collected due to refusal at 1.8 ft bgs		
Surface	56	North of Building 4100	Recommended in HSA document.			10/22/2010	Primary	SL-056-SA5C-SS-0.0-0.5
Subsurface	56	North of Building 4100	Recommended in HSA document.	10.0	None indicated	1/4/2011	VOCs/Dioxane Primary	SL-056-SA5C-SB-4.5 SL-056-SA5C-SB-4.0-5.0 SL-056-SA5C-SB-9.0-10.0
Surface	57	North of Building 4100	Gamma anomaly.			10/22/2010	Primary	SL-057-SA5C-SS-0.0-0.5
Subsurface	57	North of Building 4100	Gamma anomaly.	8.0	"5% cm-sized rounded pea gravel" surface to 1.5 ft	11/30/2010	VOCs/Dioxane Primary Primary	SL-057-SA5C-SB-4.5 SL-057-SA5C-SB-4.0-5.0 SL-057-SA5C-SB-7.0-8.0
Subsurface	58	North of Building 4100	Recommended in HSA document.	4.0	"Fill material" indicated just below surface asphalt	11/29/2010	VOCs/Dioxane Primary	SL-058-SA5C-SB-3.5 SL-058-SA5C-SB-3.0-4.0
Subsurface	59	East of Building 4100	Recommended in HSA document.	10.0	Fill material from below asphalt surface to 3.0 ft	11/29/2010	VOCs/Dioxane/GRO Primary & Secondary VOCs/Dioxane/GRO Primary & Secondary	SL-059-SA5C-SB-1.5 SL-059-SA5C-SB-1.0-2.0 SL-059-SA5C-SB-9.5 SL-059-SA5C-SB-9.0-10.0

Table 2-1
Soil Samples Collected from HSA Subarea 5C

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	60	East of Building 4100 on hold up tank	Open storage area, hold up tank.			10/22/2010	Primary	SL-060-SA5C-SS-0.0-0.5
Subsurface	60	East of Building 4100 on hold up tank	open storage area, hold up tank. Boring was deepened on 12/14	11.0	Fill material from 0.5 to 10 ft	11/23/2010 12/14/2010	VOCs/Dioxane/GRO Primary & Secondary VOCs/Dioxane/GRO Primary & Secondary	SL-060-SA5C-SB-4.5 SL-060-SA5C-SB-4.0-5.0 SL-060-SA5C-SB-9.0-10.0 SL-060-SA5C-SB-10.5 SL-060-SA5C-SB-10.0-11.0
Surface	61	East of Building 4100	Open storage area, hold up tank.			10/22/2010	Primary	SL-061-SA5C-SS-0.0-0.5
Subsurface	61	East of Building 4100	Open storage area, hold up tank.	10.0	Concrete at 1 ft at end of log: TD=10 ft bgs No GW encountered	11/24/2010	VOCs/Dioxane/GRO Primary & Secondary	SL-061-SA5C-SB-4.5 SL-061-SA5C-SB-4.0-5.0 SL-061-SA5C-SB-9.0-10.0
Surface	62	East of Building 4100	Stain, along drainage pathway HSA.			10/22/2010	Primary	SL-062-SA5C-SS-0.0-0.5
Subsurface	62	East of Building 4100	Stain, along drainage pathway HSA.	3.5	None indicated	11/23/2010	VOCs/Dioxane Primary	SL-062-SA5C-SB-3.0 SL-062-SA5C-SB-2.5-3.5
Subsurface	63	East of Building 4100	Stain, open storage area.	5.5	None indicated	11/24/2010	VOCs/Dioxane Primary	SL-063-SA5C-SB-4.5 SL-063-SA5C-SB-4.0-5.0
Subsurface	64	East of Building 4100	Stain, open storage area, septic tank.	7.0	None indicated	11/24/2010	VOCs/Dioxane/GRO Primary & Secondary	SL-064-SA5C-SB-4.5 SL-064-SA5C-SB-4.0-5.0
Surface	65	East of Building 4100	Geophysical anomaly, stain.			10/22/2010	Primary	SL-065-SA5C-SS-0.0-0.5
Subsurface	65	East of Building 4100	Geophysical anomaly, stain.	3.5	None indicated	11/23/2010	VOCs/Dioxane Primary	SL-065-SA5C-SB-3.0MS SL-065-SA5C-SB-2.5-3.5MS
Surface	66	East of Building 4100	Geophysical anomaly, previous excavation, MTMM, stain,			10/22/2010	Primary	SL-066-SA5C-SS-0.0-0.5
Subsurface	66	East of Building 4100	Geophysical anomaly, previous excavation, MMTM, stain, chemical use area/debris field.	4.0	None indicated	11/22/2010	VOCs/Dioxane/GRO Primary & Secondary	SL-066-SA5C-SB-3.5 SL-066-SA5C-SB-3.0-4.0
Surface	67	Open area between 22nd and 23rd street	Open storage area, waste disposal area, possible debris field, MMTM area, previous remedial excavation area.			10/21/2010	Primary	SL-067-SA5C-SS-0.0-0.5
Subsurface	67	Open area between 22nd and 23rd street	Open storage area, waste disposal area, possible debris field, MMTM area, previous remedial excavation area.	4.0	None indicated	11/18/2010	VOCs/Dioxane/GRO Primary & Secondary	SL-067-SA5C-SB-4.0 SL-067-SA5C-SB-3.0-4.0
Surface	68	Open area between 22nd and 23rd street	Open storage area, waste disposal area, previous remedial excavation area, Geophysical anomaly.			10/21/2010	Primary	SL-068-SA5C-SS-0.0-0.5
Subsurface	68	Open area between 22nd and 23rd street	Open storage area, waste disposal area, previous remedial excavation area, Geophysical anomaly.	4.5	None indicated	11/18/2010	VOCs/Dioxane/GRO Primary & Secondary	SL-068-SA5C-SB-4.5 SL-068-SA5C-SB-3.5-4.5
Surface	69	Open area between 22nd and 23rd street	Open storage area, previous remedial excavation area.			HGL did not collect surface sample here		
Subsurface	69	Open area between 22nd and 23rd street	Open storage area, previous remedial excavation area.			No samples collected due to refusal at 2 ft bgs		
Subsurface	70	West of Building 4100	Recommended in HSA document.	10.0	"Trace asphalt pea gravel just below asphalt to ~3.5 ft	11/30/2010	VOCs/Dioxane Primary Primary	SL-070-SA5C-SB-4.5 SL-070-SA5C-SB-4.0-5.0 SL-070-SA5C-SB-9.0-10.0
Subsurface	71	East of Building 4100	Along septic tank line in HSA document.	9.5	Fill material from 0.5 to 2.5 ft; artificial fill from 2.5 to 3.5	11/29/2010	VOCs/Dioxane/GRO Primary & Secondary VOCs/Dioxane/GRO Primary & Secondary	SL-071-SA5C-SB-4.5 SL-071-SA5C-SB-4.0-5.0 SL-071-SA5C-SB-9.5 SL-071-SA5C-SB-9.0-10.0
Surface	72	South section of open area between 22nd street and 23rd street	Open storage area, stain, waste disposal area, previous remedial excavation area.			10/21/2010	Primary	SL-072-SA5C-SS-0.0-0.5
Subsurface	72	South section of open area between 22nd street and 23rd street	Open storage area, stain, waste disposal area, previous remedial excavation area.	8.5	Graveley sand from surface to ~1 ft noted as fill	11/17/2010	VOCs/Dioxane/GRO Primary & Secondary Primary & Secondary	SL-072-SA5C-SB-4.5 SL-072-SA5C-SB-4.0-5.0 SL-072-SA5C-SB-7.5-8.5
Drainage	73	Drainage south of building 4100	Drainage (recommended in HSA)			10/27/2010	Primary	SL-073-SA5C-SS-0.0-0.5
Subsurface	74	South of Building 4100	Recommended in HSA document.	9.0	5% asphalt gravel with silt and sand indicated from just below asphalt to 2.5 ft	11/30/2010	VOCs/Dioxane Primary Primary	SL-074-SA5C-SB-4.5 SL-074-SA5C-SB-4.0-5.0 SL-074-SA5C-SB-8.0-9.0

Table 2-1
Soil Samples Collected from HSA Subarea 5C

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	South of Building 4100	Recommended in HSA document.	10.0	Fill material noted from just below asphalt to 3 ft	11/29/2010	VOCs/Dioxane Primary Primary	SL-075-SA5C-SB-4.5 SL-075-SA5C-SB-4.0-5.0 SL-075-SA5C-SB-9.0-10.0
Surface	76	East of Building 4100	Open storage area, previous soil radiation detection location, leachfield.			10/22/2010	Primary	SL-076-SA5C-SS-0.0-0.5
Subsurface	76	East of Building 4100	Open storage area, previous soil radiation detection location, leachfield.	4.0	Fill material noted from just below asphalt to 0.5 ft	11/23/2010	VOCs/Dioxane/GRO Primary & Secondary	SL-076-SA5C-SB-3.5 SL-076-SA5C-SB-3.0-4.0
Surface	77	East of Building 4100	Geophysical anomaly, open storage area, leachfield.			10/22/2010	Primary	SL-077-SA5C-SS-0.0-0.5
Subsurface	77	East of Building 4100	Geophysical anomaly, open storage area, leachfield.	4.0	None indicated	11/23/2010	VOCs/Dioxane/GRO Primary & Secondary	SL-077-SA5C-SB-3.5 SL-077-SA5C-SB-3.0-4.0
Surface	78	Open area west of 24th street and	Drainage area, previous soil radiation detection location.			10/22/2010	Primary	SL-078-SA5C-SS-0.0-0.5
Subsurface	78	Open area west of 24th street and north of G street	Drainage area, previous soil radiation detection location.	7.5	None indicated	11/22/2010	VOCs/Dioxane Primary	SL-078-SA5C-SB-3.5 SL-078-SA5C-SB-4.0-5.0
Surface	79	South section of open area between 22nd street and 23rd street	Open storage area, and stain.			10/21/2010	Primary	SL-079-SA5C-SS-0.0-0.5
Subsurface	79	South section of open area between 22nd street and 23rd street	Open storage area, and stain.	9.5	None indicated	11/17/2010	VOCs/Dioxane Primary Primary	SL-079-SA5C-SB-4.5 SL-079-SA5C-SB-4.0-5.0 SL-079-SA5C-SB-8.5-9.5
Surface	80	South section of open area between 22nd street and 23rd street	Open storage area, and stain.			10/21/2010	Primary	SL-080-SA5C-SS-0.0-0.5
Subsurface	80	South section of open area between 22nd street and 23rd street	Open storage area, and stain.	8.5	None indicated	11/17/2010	VOCs/Dioxane Primary Primary	SL-080-SA5C-SB-4.5 SL-080-SA5C-SB-4.0-5.0 MS SL-080-SA5C-SB-7.5-8.5
Subsurface	81	SE corner of open area between 22nd street and 23rd street	Gamma anomaly, stain.	4.0	Fill material noted from below asphalt to ~2.5 ft	11/17/2010	VOCs/Dioxane Primary	SL-081-SA5C-SB-3.5 SL-081-SA5C-SB-3.0-4.0
Surface	82	Northwest of Building 4463	General coverage decided in September 23, 2010 meeting.			HGL did not collect surface sample here		
Subsurface	82	Northwest of Building 4463	General coverage decided in September 23, 2010 meeting.			No samples collected due to refusal at 1.5 ft bgs		
Subsurface	83	Sanitary sewer northwest of Building 4462	Gamma anomaly.	9.5	Fill material noted from below asphalt to ~2 ft	11/16/2010	VOCs/Dioxane Primary	SL-083-SA5C-SB-3.5 SL-083-SA5C-SB-2.5-3.5
Subsurface	84	Northeast of Building 4463	Gamma anomaly, strorage area.	4.0	"Artificial fill" noted from just below asphalt to ~2 ft	No samples collected due to refusal at 4 ft bgs		
Subsurface	85	North of Building 4462	Storage area.	3.5	Fill material noted from below asphalt to ~ 2 ft	11/16/2010	VOCs/Dioxane Primary	SL-085-SA5C-SB-3.0 SL-085-SA5C-SB-2.5-3.0
Surface	86	North footprint of Building 4760 footprint	HSA document.			10/22/2010	Primary	SL-086-SA5C-SS-0.0-0.5
Subsurface	86	North footprint of Building 4760 footprint	HSA document.	8.0	None indicated	11/11/2010	VOCs/Dioxane Primary	SL-086-SA5C-SB-4.5 SL-086-SA5C-SB-4.0-5.0
Surface	87	North of Building 4662, and west of Building 4462	Gamma anomaly, storage area, may have captured surface drainage.			HGL did not collect surface sample here		
Subsurface	87	North of Building 4662, and west of Building 4462	Gamma anomaly, storage area, may have captured surface drainage.			No samples collected due to refusal at 2 ft bgs		
Surface	88	East of Building 4462	HSA document.			11/15/2010	Primary	SL-088-SA5C-SS-0.0-0.5
Subsurface	88	East of Building 4462	HSA document.	9.5	None indicated	11/12/2010	VOCs/Dioxane Primary Primary	SL-088-SA5C-SB-4.5 SL-088-SA5C-SB-4.0-5.0 SL-088-SA5C-SB-8.5-9.5
Surface	90	Southeast of Building 4662	Along north-south trending storm drain, and may have			10/22/2010	Primary	SL-090-SA5C-SS-0.0-0.5
Subsurface	90	Southeast of Building 4662	Along north-south trending storm drain, and may have captured surface drainage.	8.0	Fill material noted from below ground surface soil to almost 4 ft as "trace asphalt and	11/15/2010	VOCs/Dioxane Primary	SL-090-SA5C-SB-4.5 SL-090-SA5C-SB-4.0-5.0
Subsurface	92	South of Building 4463, north of impoundment	Near impoundment, may have captured surface flow.			Location in thick concrete and will not be sampled		

Table 2-1
Soil Samples Collected from HSA Subarea 5C

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	93	South-southwest of Building 4462	Gamma anomaly.	9.0	None indicated	11/15/2010	VOCs/Dioxane Primary Primary	SL-093-SA5C-SB-4.5 SL-093-SA5C-SB-4.0-5.0 SL-093-SA5C-SB-8.0-9.0
Subsurface	94	South of Building 4462	Gamma anomaly.	9.5	None indicated	11/15/2010	VOCs/Dioxane Primary Primary	SL-094-SA5C-SB-4.5 SL-094-SA5C-SB-4.0-5.0 SL-094-SA5C-SB-8.5-9.5
Surface	95	Southwest of Building 4461	HSA document, and near former storage tank location along interview line.			10/22/2010	Primary	SL-095-SA5C-SS-0.0-0.5
Subsurface	95	Southwest of Building 4461	HSA document, and near former storage tank location along interview line.			No samples collected due to refusal at 2 ft bgs		
Surface	96	South-southwest footprint of Building 4461	Possible open storage area.			10/22/2010	Primary	SL-096-SA5C-SS-0.0-0.5
Subsurface	96	South-southwest footprint of Building 4461	Possible open storage area.	10.0	None indicated	11/12/2010	VOCs/Dioxane Primary Primary	SL-096-SA5C-SB-4.5 SL-096-SA5C-SB-4.0-5.0 SL-096-SA5C-SB-9.0-10.0
Surface	97	South-southeast footprint of Building 4461	Geophysical anomaly, HSA document, and possible open storage area.			1/4/2011	Primary	SL-097-SA5C-SS-0.0-0.5
Subsurface	97	South-southeast footprint of Building 4461	Geophysical anomaly, HSA document, and possible open storage area.	10.0	None indicated	11/12/2010	VOCs/Dioxane Primary Primary	SL-097-SA5C-SB-4.5 SL-097-SA5C-SB-4.0-5.0 SL-097-SA5C-SB-9.0-10.0
Surface	98	Open space west of former Building 4486	Ground scar.			10/21/2010	Primary	SL-098-SA5C-SS-0.0-0.5
Subsurface	98	Open space west of former Building 4486	Ground scar.	10.0	None indicated	11/9/2010	VOCs/Dioxane Primary Primary	SL-098-SA5C-SB-4.5 SL-098-SA5C-SB-4.0-5.0 SL-098-SA5C-SB-9.0-10.0
Surface	99	Center footprint of former Building 4486	Ground scar.			10/21/2010	Primary	SL-099-SA5C-SS-0.0-0.5
Subsurface	99	Center footprint of former Building 4486	Ground scar.	10.0	None indicated	11/9/2010	VOCs/Dioxane Primary Primary	SL-099-SA5C-SB-4.5 SL-099-SA5C-SB-4.0-5.0 SL-099-SA5C-SB-9.0-10.0
Surface	100	Open space NW of former Building	Probable Stain.			10/21/2010	Primary	SL-100-SA5C-SS-0.0-0.5
Subsurface	100	Open space NW of former Building 4483, and SE of former Building 4486	Probable Stain.	9.5	None indicated	11/11/2010	VOCs/Dioxane Primary Primary	SL-100-SA5C-SB-4.5 SL-100-SA5C-SB-4.0-5.0 SL-100-SA5C-SB-8.5-9.5
Surface	101	Open space north of former Building 4483	Probable Stain.			10/21/2010	Primary	SL-101-SA5C-SS-0.0-0.5
Subsurface	101	Open space north of former Building 4483	Probable Stain.	8.0	None indicated	11/11/2010	VOCs/Dioxane Primary	SL-101-SA5C-SB-4.5 SL-101-SA5C-SB-4.0-5.0
Subsurface	102	Immediately northwest of former Building 4487	Geophysical anomaly and ground scar.	8.0	None indicated	11/9/2010	VOCs/Dioxane Primary	SL-102-SA5C-SB-4.5 SL-102-SA5C-SB-4.0-5.0
Surface	103	Northeast footprint of former Building 4487	Ground scar.			10/21/2010	Primary	SL-103-SA5C-SS-0.0-0.5
Subsurface	103	Northeast footprint of former Building 4487	Ground scar.	10.0	"10% gravel fill (mostly granite)" surface to 2 ft	11/10/2010	VOCs/Dioxane Primary Primary	SL-103-SA5C-SB-4.5 MS SL-103-SA5C-SB-4.0-5.0 MS SL-103-SA5C-SB-9.0-10.0
Surface	104	Center footprint of former Building 4485	Ground scar.			10/21/2010	Primary	SL-104-SA5C-SS-0.0-0.5
Subsurface	104	Center footprint of former Building 4485	Ground scar.	10.0	None indicated	11/11/2010	VOCs/Dioxane Primary	SL-104-SA5C-SB-4.5 SL-104-SA5C-SB-4.0-5.0
Subsurface	106	Immediately west of former Building 4487	Geophysical anomaly and ground scar.	10.0	None indicated	11/8/2010	VOCs/Dioxane Primary Primary	SL-106-SA5C-SB-4.5 SL-106-SA5C-SB-4.0-5.0 SL-106-SA5C-SB-9.0-10.0
Surface	107	Southwest footprint of former Building 4487	Geophysical anomaly and ground scar.			10/21/2010	Primary	SL-107-SA5C-SS-0.0-0.5

Table 2-1
Soil Samples Collected from HSA Subarea 5C

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	107	Southwest footprint of former Building 4487	Geophysical anomaly and ground scar.	10.0	"Concrete rock fragments (30%) from 5.0-5.5 ft bgs"	11/8/2010	VOCs/Dioxane Primary Primary	SL-107-SA5C-SB-4.5 SL-107-SA5C-SB-4.0-5.0 SL-107-SA5C-SB-9.0-10.0
Surface	108	South Center footprint of former Building 4487	Geophysical anomaly and ground scar.			10/21/2010	Primary	SL-108-SA5C-SS-0.0-0.5
Subsurface	108	South Center footprint of former Building 4487	Geophysical anomaly and ground scar.	10.0	None indicated	11/8/2010	VOCs/Dioxane Primary Primary	SL-108-SA5C-SB-4.5 SL-108-SA5C-SB-4.0-5.0 SL-108-SA5C-SB-9.0-10.0
Subsurface	109	East footprint of former Building 4487	Ground scar.	10.0	None indicated	11/8/2010	VOCs/Dioxane Primary Primary	SL-109-SA5C-SB-4.5 SL-109-SA5C-SB-4.0-5.0 SL-109-SA5C-SB-9.0-10.0
Subsurface	110	open storage E of former Building 4487, S former Building 4485, W former Building 4482	Leachfield, ground scar.	10.0	"trace rock fragments (granite & asphalt) - pea gravel sized" from surface to 1.5 ft	11/10/2010	VOCs/Dioxane Primary Primary	SL-110-SA5C-SB-4.5 SL-110-SA5C-SB-4.0-5.0 SL-110-SA5C-SB-9.0-10.0
Subsurface	111	Southwest footprint of former Building 4482	Leachfield.	10.0	"10% pea gravel" from surface to 1 ft "trace pea gravel" from 1 ft to 3 ft	11/10/2010	VOCs/Dioxane Primary Primary	SL-111-SA5C-SB-4.5 SL-111-SA5C-SB-4.0-5.0 SL-111-SA5C-SB-9.0-10.0
Surface	112	East footprint of former Parking Lot 4538	Low area and potential collection point of contaminated runoff.			10/20/2010	Primary	SL-112-SA5C-SS-0.0-0.5
Subsurface	112	East footprint of former Parking Lot 4538	Low area of site for possible collection of runoff?	7.4	None indicated	11/5/2010	VOCs/Dioxane Primary	SL-112-SA5C-SB-4.5 MS SL-112-SA5C-SB-4.0-5.0 MS
Surface	114	Storm drain Southwest of Former Building 4487	Inside storm drain container (was changed to surface sample)			10/27/2010	Primary	SL-114-SA5C-SS-0.0-0.5
Drainage	115	North of Building 4015	Western and northern storm drain/drainage ditch			10/19/2010	Primary	SL-115-SA5C-SS-0.0-0.5
Drainage	116	Northeast corner of field, east of Building 4015	Drainage linked to drainage ditch outlet			10/19/2010	Primary	SL-116-SA5C-SS-0.0-0.5
Drainage	117	Northeast corner of field, east of Building 4015	Previous soil radiation detection location, drainage outlet			10/19/2010	Primary	SL-117-SA5C-SS-0.0-0.5
Subsurface	118	Field northeast of Building 4015	Geophysical anomaly.	10.0	None indicated	11/3/2010	VOCs/Dioxane Primary Primary	SL-118-SA5C-SB-4.5 SL-118-SA5C-SB-4.0-5.0 SL-118-SA5C-SB-9.0-10.0
Subsurface	119	East of Building 4015	Geophysical anomaly.	8.0	None indicated	11/3/2010	VOCs/Dioxane Primary Primary	SL-119-SA5C-SB-4.5 SL-119-SA5C-SB-4.0-5.0 SL-119-SA5C-SB-6.0-7.0
Surface	120	Field east of Building 4015	Geophysical anomaly, aerial - fill area, debris field.			10/19/2010	Primary	SL-120-SA5C-SS-0.0-0.5
Subsurface	120	Field east of Building 4015	Geophysical anomaly, aerial - fill area, debris field.	10.0	None indicated	11/3/2010	VOCs/Dioxane Primary Primary	SL-120-SA5C-SB-4.5 SL-120-SA5C-SB-4.0-5.0 SL-120-SA5C-SB-9.0-10.0
Drainage	121	Northeast field of Building 4015	Along drainage ditch, previous soil radiation detection			10/19/2010	Primary	SL-121-SA5C-SS-0.0-0.5
Surface	122	Northeast field of Building 4015	Previous soil radiation detection location.			10/19/2010	Primary	SL-122-SA5C-SS-0.0-0.5
Subsurface	122	Northeast field of Building 4015	Previous soil radiation detection location.	10.0	None indicated	11/5/2010	VOCs/Dioxane Primary Primary	SL-122-SA5C-SB-4.5 SL-122-SA5C-SB-4.0-5.0 SL-122-SA5C-SB-9.0-10.0
Drainage	123	Field east of Building 4015	Between drainage ditch and intermittent stream			10/19/2010	Primary	SL-123-SA5C-SS-0.0-0.5
Surface	124	East of Building 4015	Geophysical anomaly.			10/20/2010	Primary	SL-124-SA5C-SS-0.0-0.5
Subsurface	124	East of Building 4015	Geophysical anomaly.	5.5	Sample collected using a hand auger; "trace pea gravel" from surface to 1 ft	1/5/2011	VOCs/Dioxane Primary	SL-124-SA5C-SB-5.0 SL-124-SA5C-SB-4.5-5.5
Surface	125	Southeast corner of Building 4015	Dark toned material/possible leakage.			10/18/2010	Primary	SL-125-SA5C-SS-0.0-0.5
Subsurface	125	Southeast corner of Building 4015	Dark toned material/possible leakage.	9.0	Fill gravel w/ sand and silt between 0.5 and 1.5 ft	11/1/2010	VOCs/Dioxane Primary	SL-125-SA5C-SB-4.5 SL-125-SA5C-SB-4.0-6.0
Subsurface	126	Field southeast of Building 4015	Geophysical anomaly.	10.0	None indicated	11/2/2010	VOCs/Dioxane Primary Primary	SL-126-SA5C-SB-4.5 SL-126-SA5C-SB-4.0-5.0 SL-126-SA5C-SB-9.0-10.0

Table 2-1
Soil Samples Collected from HSA Subarea 5C

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	127	Field SE of Building 4015, and east of former Building 4343	Geophysical anomaly.			10/18/2010	Primary	SL-127-SA5C-SS-0.0-0.5
Subsurface	127	Field SE of Building 4015, and east of former Building 4343	Geophysical anomaly.	8.5	None indicated	11/1/2010	VOCs/Dioxane Primary Primary	SL-127-SA5C-SB-4.5 SL-127-SA5C-SB-4.0-5.0 SL-127-SA5C-SB-7.5-8.5
Surface	128	Field east of Building 4015	Geophysical anomaly, aerial - fill area.			10/18/2010	Primary	SL-128-SA5C-SS-0.0-0.5
Subsurface	128	Field east of Building 4015	Geophysical anomaly, aerial - fill area.	9.5	None indicated	11/2/2010	VOCs/Dioxane Primary Primary	SL-128-SA5C-SB-4.5 MS SL-128-SA5C-SB-4.0-5.0 MS SL-128-SA5C-SB-8.0-9.0
Surface	129	Field east of Building 4015	Geophysical anomaly, aerial - fill area.			10/18/2010	Primary	SL-129-SA5C-SS-0.0-0.5
Subsurface	129	Field east of Building 4015	Geophysical anomaly, aerial - fill area.	10.0	None indicated	11/5/2010	VOCs/Dioxane Primary Primary	SL-129-SA5C-SB-4.5 SL-129-SA5C-SB-4.0-5.0 SL-129-SA5C-SB-9.0-10.0
Surface	130	Field east of Building 4015	Geophysical anomaly, aerial - fill area.			10/18/2010	Primary	SL-130-SA5C-SS-0.0-0.5
Subsurface	130	Field east of Building 4015	Geophysical anomaly, aerial - fill area.	10.0	None indicated	11/3/2010	VOCs/Dioxane Primary Primary	SL-130-SA5C-SB-4.5 SL-130-SA5C-SB-4.0-5.0 SL-130-SA5C-SB-9.0-10.0
Subsurface	131	Field east of Building 4015	Geophysical anomaly, aerial - fill area.	9.5	None indicated	11/4/2010	VOCs/Dioxane Primary Primary	SL-131-SA5C-SB-4.5 SL-131-SA5C-SB-4.0-5.0 SL-131-SA5C-SB-8.5-9.5
Surface	132	Field east of Building 4015	Geophysical anomaly, aerial - fill area.			10/18/2010	Primary	SL-132-SA5C-SS-0.0-0.5
Subsurface	132	Field east of Building 4015	Geophysical anomaly, aerial - fill area.	8.0	None indicated	11/4/2010	VOCs/Dioxane Primary	SL-132-SA5C-SB-4.5 SL-132-SA5C-SB-4.0-5.0
Surface	133	Field east of Building 4015	Geophysical anomaly, aerial - fill area.			10/18/2010	Primary	SL-133-SA5C-SS-0.0-0.5
Subsurface	133	Field east of Building 4015	Geophysical anomaly, aerial - fill area.	9.0	None indicated	11/4/2010	VOCs/Dioxane Primary Primary	SL-133-SA5C-SB-4.5 SL-133-SA5C-SB-4.0-5.0 SL-133-SA5C-SB-8.0-9.0
Surface	134	Field east of Building 4015	Geophysical anomaly, aerial - fill area.			10/19/2010	Primary	SL-134-SA5C-SS-0.0-0.5
Subsurface	134	Field east of Building 4015	Geophysical anomaly, aerial - fill area.	7.0	None indicated	11/4/2010	VOCs/Dioxane Primary	SL-134-SA5C-SB-4.5 SL-134-SA5C-SB-4.0-5.0
Drainage	135	Field NE of Building 4015	Along drainage ditch, previous soil radiation detection location			10/19/2010	Primary	SL-135-SA5C-SS-0.0-0.5
Drainage	136	Field east of Building 4015	Drainage ditch			10/20/2010	Primary	SL-136-SA5C-SS-0.0-0.5MS
Surface	137	Field east of Building 4015	Geophysical anomaly.			10/20/2010	Primary	SL-137-SA5C-SS-0.0-0.5
Subsurface	137	Field east of Building 4015	Geophysical anomaly.	5.5	Sample collected using a hand auger: "pea gravel" noted at 0 to 2 ft	1/5/2011	VOCs/Dioxane Primary	SL-137-SA5C-SB-5.0 SL-137-SA5C-SB-4.5-5.5
Subsurface	138	South of Building 4662, located inside in the bottom of the concrete lined IM	Added per Stakeholder request on October 5, 2010, also identified as an IM in aerial photographs.			Located at bottom of Gunite Pond at SPTF - HGL/EPA is evaluating H&S risk of subsurface sampling. May be sampled during Phase II		
Subsurface	139	South of Building 4662, located inside in the bottom of the concrete lined IM	Added per Stakeholder request on October 5, 2010, also identified as an IM in aerial photographs.			Located at bottom of Gunite Pond at SPTF - HGL/EPA is evaluating H&S risk of subsurface sampling. May be sampled during Phase II		
Subsurface	140	West of Building 4662	Added per Stakeholder request on October 5, 2010.	4.0	None indicated	12/14/2010	VOCs/Dioxane Primary	SL-140-SA5C-SB-3.5 SL-140-SA5C-SB-3.0-4.0
Drainage	141	Subarea 5C	Stakeholder request			10/20/2010	Primary	SL-141-SA5C-SS-0.0-0.5

Table 2-1
Soil Samples Collected from HSA Subarea 5C

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	142	Along Southeastern border of Area IV-Subarea 5C	Stakeholder request			10/27/2010	Primary	SL-142-SA5C-SS-0.0-0.5
Drainage	143	Along Southeastern border of Area IV-Subarea 5C	Stakeholder request			10/20/2010	Primary	SL-143-SA5C-SS-0.0-0.5
Drainage	144	Along Southeastern border of Area IV-Subarea 5C	Stakeholder request			10/20/2010	Primary	SL-144-SA5C-SS-0.0-0.5
Drainage	145	Along Southeastern border of Area IV-Subarea 5C	Stakeholder request			10/20/2010	Primary	SL-145-SA5C-SS-0.0-0.5

SB-060 was drilled from 10 to 11 feet and sampled on 12/14/2010 at request of DTSC.

N

Legend

- Sample Location
- Area IV Subarea
- Removed Building

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

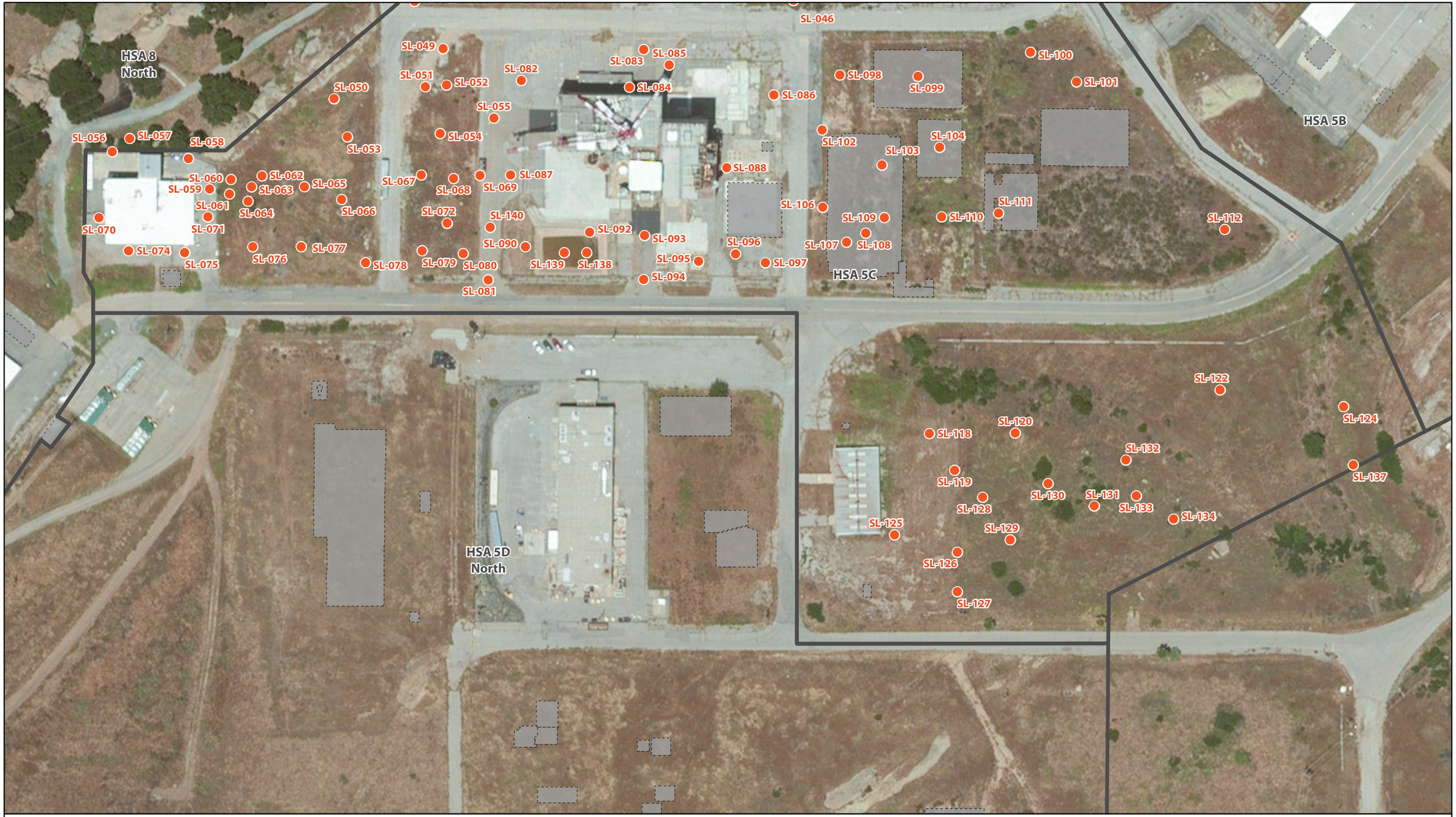
Subarea 5C Sample Locations North

0 50 100 200 Feet

Santa Susana Field Laboratory
Ventura County, California
Figure 1

CDM

Y:\SantaSusana\GIS\GIS_2011\MXD\SSFL_5C_Sampling_Locations_09072011_DDP.mxd 9/7/2011



N

Legend

- Sample Location
- Area IV Subarea
- Removed Building

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

Subarea 5C Sample Locations
South

0 50 100 200 Feet

Santa Susana Field Laboratory
Ventura County, California
Figure 2

CDM

Y:\SantaSusana\GIS\GIS_2011\MXD\SSFL_5C_Sampling_Locations_09072011_DDP.mxd 9/7/2011

2.3 Sample Handling

All soil samples collected were provided by the field samplers to CDMs Field Team Leader (FTL) after collection. The FTL ensured that the sample labels were complete and legible. Any discrepancies were discussed with the field samplers and corrections to the sample labels 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 placed onto a chain of custody (COC) form. Each sampler reviewed the COC and any discrepancies were corrected by the FTL. Each completed COC was signed by the samplers and the FTL as the individual responsible for release of samples to the courier. All samples were packed into coolers in accordance with Section 6.4 of the *Work Plan/ Field Sampling and Analysis Plan, Co-Located Chemical Sampling at Area IV, Santa Susana Field Laboratory* (CDM 2010).

2.4 Field Quality Control Procedures

Quality control 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 for analysis with any samples to be analyzed for VOCs, 1,4-dioxane, and/or TPH-GRO.

2.4.1 Duplicates and MS/MSD Samples

Both field duplicates and MS/MSD samples were to be collected at a frequency of 1 per 20 "parent" soil samples collected, thus both the duplicate and MS/MSD samples were collected from the same location. The duplicate samples were submitted to the laboratory as a separate (and blind) sample from the parent sample. The MS/MSD samples are parent samples collected in triple volume for the subsurface samples; a double volume of soil was sufficient for the surface MS/MSD samples.

Three duplicate samples and MS/MSD samples were collected for the surface samples and analyzed for primary analytes only. For the subsurface samples, eight duplicate samples and MS/MSD samples were collected for the non-volatile primary analyses; six duplicate samples and MS/MSD samples were collected for VOCs and 1,4-dioxane analyses, and three duplicate samples and MS/MSD samples were collected for secondary analytes including TPH-GRO.

2.4.2 Equipment Rinsate Blank Samples

The equipment rinsate blank reflects the final rinse water of field equipment, which is the final step of the equipment decontamination between soil sample locations. The equipment rinsate blank water sample is analyzed for the same chemical constituents as is performed on the soil samples. The equipment rinsate blank results are used to determine whether any contamination observed in the soil sample may have been contributed from the field equipment. Initially, to correspond with the frequency of collection of equipment rinsate blank samples associated with the radionuclide

sampling, equipment rinsate blanks for chemical analysis were to be prepared and submitted on a daily basis for each sampling technique and whenever there were changes in the sample collection procedures, sampling decontamination procedures, or sampling equipment. However, after 3 days of sampling, DTSC agreed to the reduction of frequency of collection of equipment rinsate blank samples for chemical analysis to 1 per 20 sample locations to be more consistent with blank collection under the RFI program. Three equipment blank rinsate samples were collected in association with the surface sampling and twelve equipment rinsate blank samples were collected in association with the subsurface sampling. Eleven of the subsurface equipment rinsate blank samples were collected in conjunction with soil samples collected using the direct push rig; the twelfth equipment blank rinsate sample was collected in conjunction with subsurface soil samples collected using a hand auger.

2.4.3 Field Blank Samples

The field blank represents the source water that is used as the final rinse water for equipment decontamination. The field blank water sample is analyzed for the same chemical constituents as the soil samples. The field blank results are used to determine whether any contamination observed in soil samples may have been contributed from the water used to clean the sample equipment. Initially, to correspond with the frequency of collection of field blank samples associated with the radionuclide sampling, field blanks for chemical analyses were collected on a daily basis. However, after 3 days of sampling, DTSC agreed to reduce the collection of field blank samples to one field blank sample for each new lot of American Society for Testing and Materials (ASTM) Type II water used by HGL for equipment decontamination. Five field blank samples were collected in conjunction with soil sampling in Subarea 5C.

2.4.4 Decontamination of Sampling Equipment

All drilling equipment was cleaned before and after completing each boring by HGL and its drilling subcontractor. 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:

- Equipment was washed with a solution of potable water and Liquinox, or equivalent laboratory-grade detergent;
- Rinsed thoroughly with copious quantities of potable water; then
- Followed by a final rinse with analyte-free water (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

2.5.1 Analytical Suites

The analytical methods for the co-located soil sampling were divided into two "suites." The primary suite reflects chemical analyses to be performed on all samples. The primary list includes:

- Metals using EPA Methods 6010B/6020, 7471A (mercury), and 7199 (chromium VI)
- Soil pH using EPA Method 9045C (pH was originally a secondary analyte under the original WP/FSAP – all HSA Subarea 5C samples that were analyzed for secondary analytes included pH analysis)
- Fluoride using EPA Method 300.0
- SVOCs using EPA Method 8270C and PAHs using Method 8270 selective ion monitoring (SIM)
- PCBs using EPA Method 8082
- Dioxins/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).

Also included as primary analytes for all surface soil samples are:

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

Also included as primary analytes for all subsurface soil samples are:

- EPA Method 8260B for volatile organic compounds
- EPA Method 8260B SIM for 1,4-dioxane.

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 and hydrazine[2] using EPA Method 8315A
- TPH-GRO and TPH extractable fuel hydrocarbons (TPH-EFH)
- n-Nitrosodimethylamine using EPA Method 1625C
- Energetics using EPA Method 8330A
- Cyanide using EPA Method 9012B
- Alcohols/triphenyls/glycols using EPA Method 8015B.

2.5.2 Analytical Laboratory and Procedures

The analytical laboratory used for the HSA Subarea 5C co-located soil sampling effort was Lancaster Laboratories Inc. (LLI) of Lancaster, Pennsylvania. LLI was selected (out of five laboratories that submitted proposals) based on their proposed method detection limits. Selection of LLI as the co-located soil analytical laboratory was discussed with the community on October 10, 2010.

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 Susanna Field Laboratory RCRA Facility Investigation, Surficial Media Operable Unit* (MEC^X 2009) (RFI QAPP) and are listed in Table 2-2. For the HSA 5C 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 method detection limit could be lowered, method modifications were discussed with DTSC chemists and LLI at the time of their implementation. Table 2-2 also identifies methods that have been modified in an effort to lower respective detection and reporting limits (RLs).

[2] Originally hydrazine analysis was requested for all 5C secondary samples. Analysis for hydrazine was stopped after consultation with DTSC when it was determined the chemical has a short half life and that formaldehyde, a breakdown product, could be used as an indicator of its former presence.

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
Select SVOCs	EPA 8270C SIM	No
SVOCs	EPA 8270C	No
n-Nitrosodimethylamine[1]	EPA 1625C	No
PCBs	EPA 8082	Yes
Pesticides	EPA 8081A	Yes
Herbicides	EPA 8151	Yes
Energetics	EPA 8330A	Yes
Perchlorate[2]	EPA 6850	No
Perchlorate	EPA 314.0	No
Alcohols	EPA 8015B	Yes
Terphenyls	EPA 8015B	Yes
Glycols	EPA 8015B	Yes
TPH (GRO and EFH)	EPA 8015B	Yes
Formaldehyde	EPA 8315A	Yes
Dioxin/Furan	EPA 1613B	No
Metals	EPA 6010B/6020/7471A	No
Chromium VI	EPA 7199	No
Anions (Nitrate and Fluoride)	EPA 300.0	No
Cyanide	EPA 9012B	No
pH	EPA 9045C	No

[1] n-Nitrosodimethylamine is also analyzed by both Methods 8270C and 8270C SIM
[2] Perchlorate by Method EPA 6850 was analyzed on 10 percent of samples analyzed by Method EPA 314.0

The listing below provides a description of the method modifications. The modifications primarily involved increasing the prescribed sample volume (soil mass extracted) and concentration resulting extract to a lower final volume.

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

- Method 8015B (Glycols) – 10 grams of sample is prepared and taken to a final volume of 5 mL

- Method 8015B (Terphenyls) – 60 grams of sample is prepared - the extract is concentrated to a final volume of 5 ml instead of 10 mL

For samples analyzed for glycols, an additional method modification was used. The normal method is water extraction of the soils followed by a concentration step and analysis by direct injection of the extract. The extraction procedure was altered by using acetone as the extraction solvent followed by a concentration step and direct injection in the gas chromatograph. This modification was developed as a response to observed continuing calibration exceedences that could not be corrected using the standard procedure. This was because the analytical column experienced rapid degradation from injecting water.

2.6 Data Review Processes

Data produced by LLI was 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 is typically transmitted to the data manager via e-mail 2 to 3 days after sample receipt and login and includes a summary of the requested analyses to be performed per sample. Sample log-in errors are 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 quality control (QC) sample information, sample location coordinates, and laboratory deliverables required including reports, electronic data deliverable, raw data, and the status of validation.

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

- Reconciliation of the reported data against the data that was requested via 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 missed holding times, poor spike recoveries in matrix or batch-specific QC samples, instrument calibration exceedences, and blank contamination. The laboratory normally consults with the CDM 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 Deviations from the Work Plan

2.7.1 Soil Sampling

Soil samples were not collected from three planned surface sample locations (SL-069, SL-082, and SL-087) and from 12 subsurface locations. At 9 of these 12 subsurface locations (SL-033, SL-042, SL-049, SL-055, SL-069, SL-082, SL-084, SL-087, and SL-095), refusal occurred at depths ranging between 1.8 and 4 feet bgs. However, at SL-042 a surface sample was collected in place of subsurface samples. SL-092 was located in thick concrete and therefore was not sampled. SL-138 and SL-139 were located at the bottom of the gunite-lined holding pond just south of the Sodium Pump Test Facility building and HGL is evaluating health and safety concerns regarding collection of subsurface samples from these locations. These two locations may be sampled during Phase 3 (step out) chemical sampling.

2.7.2 Analytical

There were no analytical deviations from the field sampling and analysis plan.

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Section 3
Area IV Subarea 5C Soil Sampling Results

Because this report 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 surface soil data. The table shows the chemicals analyzed for, the frequency at which they were detected, the minimum and maximum detected concentrations, the range of observed detection limits and RLs, and the location where the maximum concentration was observed. When screening criteria are developed to assess where contamination exists above the applicable criteria, the HSA Subarea 5C data will be combined with RFI data to develop a better understanding of the extent of surface soil contamination at HSA Subarea 5C.

Table 3-2 provides the same information for subsurface soil data. The table also indicates at what depth the maximum concentration was observed. Table 3-3 provides a summary of the HSA-5C data for the combined surface and subsurface datasets.

Appendix A provides the data tables for all validated data by analytical method and sample location. Appendix B provides the analytical data reports as received from LLI. Appendix D is the master database of all sample results presenting the data validation "flags" (qualifiers) for the results.

Table 3-1
Summary of Analytical Results for Chemicals - Validated Data
Surface Soils
HSA-5C

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	Depth of Maximum Concentration (ft)
Inorganic	Fluoride	16984-48-8	79 / 82	0.91 J	13 J	0.84 - 1.1	1 - 1.3	mg/kg	SL-039-SA5C	0 - 0.5
Inorganic	Aluminum	7429-90-5	82 / 82	8620	32600	5.12 - 6.59	20.4 - 26.2	mg/kg	SL-086-SA5C	0 - 0.5
Inorganic	Iron	7439-89-6	82 / 82	12600	31800	4.8 - 26.7	20.4 - 113	mg/kg	SL-018-SA5C	0 - 0.5
Inorganic	Lead	7439-92-1	82 / 82	3.86 J	514 J	0.0105 - 0.117	0.202 - 2.25	mg/kg	SL-090-SA5C	0 - 0.5
Inorganic	Lithium	7439-93-2	81 / 82	10	32	0.22 - 0.29	2 - 2.6	mg/kg	SL-018-SA5C	0 - 0.5
Inorganic	Magnesium	7439-95-4	82 / 82	2580	8930	2.59 - 3.33	10.2 - 13.1	mg/kg	SL-056-SA5C	0 - 0.5
Inorganic	Manganese	7439-96-5	82 / 82	177 J	709 J	0.0794 - 0.102	0.509 - 0.655	mg/kg	SL-095-SA5C	0 - 0.5
Inorganic	Mercury	7439-97-6	61 / 82	0.0032 J	1.01	0.0029 - 0.0152	0.0999 - 0.529	mg/kg	SL-104-SA5C	0 - 0.5
Inorganic	Molybdenum	7439-98-7	81 / 82	0.203	3.33 J	0.0506 - 0.0668	0.101 - 0.134	mg/kg	SL-054-SA5C	0 - 0.5
Inorganic	Nickel	7440-02-0	82 / 82	6.13	37.5	0.101 - 0.134	0.404 - 0.535	mg/kg	SL-117-SA5C	0 - 0.5
Inorganic	Potassium	7440-09-7	81 / 82	1590 J	6050 J	18.3 - 23.6	50.9 - 65.5	mg/kg	SL-018-SA5C	0 - 0.5
Inorganic	Silver	7440-22-4	72 / 82	0.0183 J	13.3	0.0121 - 0.016	0.101 - 0.134	mg/kg	SL-128-SA5C	0 - 0.5
Inorganic	Sodium	7440-23-5	82 / 82	62.2 J	619	38 - 48.9	102 - 131	mg/kg	SL-095-SA5C	0 - 0.5
Inorganic	Strontium	7440-24-6	82 / 82	12	97.2	0.0632 - 0.0813	0.509 - 0.655	mg/kg	SL-008-SA5C	0 - 0.5
Inorganic	Thallium	7440-28-0	81 / 82	0.127	0.435	0.0303 - 0.0401	0.101 - 0.134	mg/kg	SL-127-SA5C	0 - 0.5
Inorganic	Tin	7440-31-5	15 / 82	2.12	3.63	1.02 - 1.31	10.2 - 13.1	mg/kg	SL-117-SA5C	0 - 0.5
Inorganic	Titanium	7440-32-6	82 / 82	679	1780	0.404 - 2.2	1.06 - 5.8	mg/kg	SL-072-SA5C	0 - 0.5
Inorganic	Antimony	7440-36-0	62 / 82	0.0655 J	9.42 J	0.0607 - 0.0802	0.202 - 0.267	mg/kg	SL-090-SA5C	0 - 0.5
Inorganic	Arsenic	7440-38-2	82 / 82	2.48	10.6 J	0.0607 - 0.0802	0.404 - 0.535	mg/kg	SL-120-SA5C	0 - 0.5
Inorganic	Beryllium	7440-41-7	82 / 82	0.227	1.12	0.0162 - 0.0214	0.101 - 0.134	mg/kg	SL-056-SA5C	0 - 0.5
Inorganic	Barium	7440-39-3	82 / 82	55.3	286	0.109 - 0.581	0.404 - 2.15	mg/kg	SL-090-SA5C	0 - 0.5
Inorganic	Boron	7440-42-8	81 / 82	1.38 J	53	0.907 - 1.17	5.09 - 6.55	mg/kg	SL-039-SA5C	0 - 0.5
Inorganic	Cadmium	7440-43-9	82 / 82	0.0611 J	7.19	0.0364 - 0.0481	0.101 - 0.134	mg/kg	SL-056-SA5C	0 - 0.5
Inorganic	Chromium	7440-47-3	82 / 82	10.4	55.4	0.121 - 0.16	0.404 - 0.535	mg/kg	SL-117-SA5C	0 - 0.5
Inorganic	Cobalt	7440-48-4	81 / 82	3.36	17.6 J	0.0202 - 0.0267	0.101 - 0.134	mg/kg	SL-088-SA5C	0 - 0.5
Inorganic	Copper	7440-50-8	82 / 82	4.44	97.1 J	0.0667 - 0.0882	0.404 - 0.535	mg/kg	SL-080-SA5C	0 - 0.5
Inorganic	Vanadium	7440-62-2	82 / 82	22.6 J	74.7 J	0.0222 - 0.0294	0.101 - 0.134	mg/kg	SL-097-SA5C	0 - 0.5
Inorganic	Zinc	7440-66-6	82 / 82	38.1 J	1250 J	0.566 - 6.34	3.03 - 33.9	mg/kg	SL-056-SA5C	0 - 0.5
Inorganic	Zirconium	7440-67-7	82 / 82	1.76 J	24.7	0.856 - 1.1	5.09 - 6.55	mg/kg	SL-056-SA5C	0 - 0.5
Inorganic	Calcium	7440-70-2	82 / 82	2020 J	54600 J	6.24 - 8.03	20.4 - 26.2	mg/kg	SL-008-SA5C	0 - 0.5
Inorganic	Phosphorus	7723-14-0	81 / 82	151 J	706 J	0.57 - 0.734	10.2 - 13.1	mg/kg	SL-002-SA5C	0 - 0.5
Inorganic	Selenium	7782-49-2	68 / 82	0.05 J	0.727	0.0404 - 0.0535	0.404 - 0.535	mg/kg	SL-056-SA5C	0 - 0.5
Inorganic	Chromium VI	18540-29-9	42 / 82	0.24 J	7.1	0.21 - 0.27	1 - 1.3	mg/kg	SL-090-SA5C	0 - 0.5
Inorganic	Perchlorate-314	14797-73-0	11 / 82	10.7 J	45.4	9.4 - 12	31.3 - 40.1	ug/kg	SL-141-SA5C	0 - 0.5
Inorganic	Perchlorate-6850	14797-73-0	0 / 7			2.3 - 2.5	5.4 - 5.9	ug/kg		-
Inorganic	Percent Moisture		82 / 82	4.2	25.2	0.5 - 0.5	0.5 - 0.5	%	SL-115-SA5C	0 - 0.5
Inorganic	pH	pH	81 / 82	6.24	8.76	0.01 - 0.01	0.01 - 0.01	pH unit	SL-039-SA5C	0 - 0.5
Herbicides	Dichlorprop	120-36-5	0 / 82			0.84 - 19	1.8 - 40	ug/kg		-
Herbicides	Dicamba	1918-00-9	6 / 82	0.55 J	1.2 J	0.42 - 9.5	1.3 - 29	ug/kg	SL-073-SA5C	0 - 0.5
Herbicides	2,2-Dichlor-Propionic Acid	75-99-0	0 / 82			4.6 - 100	9.4 - 210	ug/kg		-
Herbicides	Dinitrobutyl Phenol	88-85-7	2 / 82	0.9	2.6 J	0.84 - 19	2.5 - 57	ug/kg	SL-090-SA5C	0 - 0.5
Herbicides	MCPP	93-65-2	23 / 82	130 J	960 J	79 - 1800	260 - 6000	ug/kg	SL-073-SA5C	0 - 0.5
Herbicides	2,4,5-TP	93-72-1	2 / 82	0.14 J	0.38	0.078 - 1.8	0.18 - 4	ug/kg	SL-128-SA5C	0 - 0.5
Herbicides	2,4,5-T	93-76-5	11 / 82	0.11 J	3.3	0.086 - 2	0.18 - 4	ug/kg	SL-056-SA5C	0 - 0.5
Herbicides	MCPA	94-74-6	34 / 82	120 J	1100 J	79 - 1800	260 - 6000	ug/kg	SL-125-SA5C	0 - 0.5
Herbicides	2,4-D	94-75-7	2 / 82	2.2 J	4.2 J	1.3 - 29	3.8 - 86	ug/kg	SL-073-SA5C	0 - 0.5
Herbicides	2,4 DB	94-82-6	18 / 82	2	23 J	0.65 - 15	1.8 - 40	ug/kg	SL-073-SA5C	0 - 0.5
Pesticides	Toxaphene	8001-35-2	0 / 82			2.3 - 25	6.9 - 76	ug/kg		-

Table 3-1
Summary of Analytical Results for Chemicals - Validated Data
Surface Soils
HSA-5C

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	Depth of Maximum Concentration (ft)
Pesticides	Heptachlor Epoxide	1024-57-3	3 / 82	0.15 J	1.1	0.035 - 4.4	0.17 - 4.4	ug/kg	SL-117-SA5C	0 - 0.5
Pesticides	Endosulfan Sulfate	1031-07-8	1 / 82	0.12 J	0.12 J	0.069 - 1.6	0.35 - 3.9	ug/kg	SL-097-SA5C	0 - 0.5
Pesticides	Mirex	2385-85-5	2 / 82	0.79 J	9.5 J	0.069 - 6.2	0.35 - 6.2	ug/kg	SL-039-SA5C	0 - 0.5
Pesticides	Aldrin	309-00-2	1 / 82	0.1	0.1	0.069 - 0.99	0.17 - 1.9	ug/kg	SL-132-SA5C	0 - 0.5
Pesticides	Alpha-BHC	319-84-6	2 / 82	0.36 J	0.54 J	0.035 - 1.4	0.17 - 1.9	ug/kg	SL-090-SA5C	0 - 0.5
Pesticides	Beta-BHC	319-85-7	23 / 82	0.065	0.66	0.063 - 0.69	0.17 - 1.9	ug/kg	SL-128-SA5C	0 - 0.5
Pesticides	Delta-BHC	319-86-8	20 / 82	0.049 J	0.57	0.038 - 0.42	0.17 - 1.9	ug/kg	SL-043-SA5C	0 - 0.5
Pesticides	Endosulfan II	33213-65-9	0 / 82			0.071 - 4.6	0.35 - 4.6	ug/kg		-
Pesticides	4,4'-DDT	50-29-3	0 / 82			0.07 - 41	0.36 - 41	ug/kg		-
Pesticides	Endrin Ketone	53494-70-5	1 / 82	3.8	3.8	0.069 - 3.3	0.35 - 3.9	ug/kg	SL-117-SA5C	0 - 0.5
Pesticides	Chlordane	57-74-9	0 / 82			0.88 - 38	3.6 - 39	ug/kg		-
Pesticides	Gamma-BHC (Lindane)	58-89-9	9 / 82	0.05 J	0.24 J	0.035 - 0.39	0.17 - 1.9	ug/kg	SL-108-SA5C	0 - 0.5
Pesticides	Dieldrin	60-57-1	2 / 82	0.1 J	0.34 J	0.069 - 15	0.36 - 15	ug/kg	SL-049-SA5C	0 - 0.5
Pesticides	Endrin	72-20-8	0 / 82			0.069 - 2.9	0.35 - 3.9	ug/kg		-
Pesticides	Methoxychlor	72-43-5	0 / 82			0.35 - 19	1.7 - 19	ug/kg		-
Pesticides	4,4'-DDD	72-54-8	0 / 82			0.07 - 5.2	0.36 - 5.2	ug/kg		-
Pesticides	4,4'-DDE	72-55-9	0 / 82			0.072 - 23	0.36 - 23	ug/kg		-
Pesticides	Endrin Aldehyde	7421-93-4	0 / 82			0.069 - 16	0.35 - 16	ug/kg		-
Pesticides	Heptachlor	76-44-8	4 / 82	0.15	0.39 J	0.063 - 1.1	0.17 - 1.9	ug/kg	SL-144-SA5C	0 - 0.5
Pesticides	Endosulfan I	959-98-8	0 / 82			0.046 - 0.51	0.17 - 1.9	ug/kg		-
Dioxins/Furans	2,3,7,8-TCDD	1746-01-6	32 / 82	0.0108 J	2.51	0.00507 - 0.545	1.04 - 5.36	ng/kg	SL-056-SA5C	0 - 0.5
Dioxins/Furans	1,2,3,7,8,9-HxCDD	19408-74-3	79 / 82	0.123 J	134	0.0111 - 1.9	5.22 - 26.8	ng/kg	SL-056-SA5C	0 - 0.5
Dioxins/Furans	OCDD	3268-87-9	82 / 82	17	76600 J	0.0135 - 6.39	10.4 - 53.6	ng/kg	SL-056-SA5C	0 - 0.5
Dioxins/Furans	1,2,3,4,6,7,8-HpCDD	35822-46-9	82 / 82	1.43 J	12900 J	0.0144 - 9.59	5.22 - 26.8	ng/kg	SL-056-SA5C	0 - 0.5
Dioxins/Furans	OCDF	39001-02-0	79 / 82	0.553 J	1000	0.0065 - 1.31	10.4 - 53.6	ng/kg	SL-125-SA5C	0 - 0.5
Dioxins/Furans	1,2,3,4,7,8-HxCDD	39227-28-6	65 / 82	0.0311 J	21.3	0.0106 - 1.83	5.22 - 26.8	ng/kg	SL-057-SA5C	0 - 0.5
Dioxins/Furans	1,2,3,7,8-PeCDD	40321-76-4	60 / 82	0.0244 J	16.9	0.00926 - 1.05	5.22 - 26.8	ng/kg	SL-056-SA5C	0 - 0.5
Dioxins/Furans	2,3,7,8-TCDF	51207-31-9	52 / 82	0.0201 J	5.57	0.00948 - 0.65	1.04 - 5.36	ng/kg	SL-056-SA5C	0 - 0.5
Dioxins/Furans	1,2,3,4,7,8,9-HpCDF	55673-89-7	54 / 82	0.112 J	18.5	0.00794 - 1.9	5.22 - 26.8	ng/kg	SL-117-SA5C	0 - 0.5
Dioxins/Furans	2,3,4,7,8-PeCDF	57117-31-4	54 / 82	0.141 J	15.6	0.00673 - 0.367	5.22 - 26.8	ng/kg	SL-056-SA5C	0 - 0.5
Dioxins/Furans	1,2,3,7,8-PeCDF	57117-41-6	61 / 82	0.0952 J	9.01	0.00761 - 0.35	5.22 - 26.8	ng/kg	SL-086-SA5C	0 - 0.5
Dioxins/Furans	1,2,3,6,7,8-HxCDF	57117-44-9	63 / 82	0.123 J	15.4	0.0075 - 0.704	5.22 - 26.8	ng/kg	SL-117-SA5C	0 - 0.5
Dioxins/Furans	1,2,3,6,7,8-HxCDD	57653-85-7	82 / 82	0.107 J	332	0.0105 - 2.05	5.22 - 26.8	ng/kg	SL-056-SA5C	0 - 0.5
Dioxins/Furans	2,3,4,6,7,8-HxCDF	60851-34-5	51 / 82	0.107 J	20.2	0.00772 - 0.657	5.22 - 26.8	ng/kg	SL-117-SA5C	0 - 0.5
Dioxins/Furans	1,2,3,4,6,7,8-HpCDF	67562-39-4	74 / 82	0.448 J	337	0.00639 - 2.05	5.22 - 26.8	ng/kg	SL-117-SA5C	0 - 0.5
Dioxins/Furans	1,2,3,4,7,8-HxCDF	70648-26-9	60 / 82	0.0959 J	23.7	0.00772 - 0.71	5.22 - 26.8	ng/kg	SL-117-SA5C	0 - 0.5
Dioxins/Furans	1,2,3,7,8,9-HxCDF	72918-21-9	56 / 82	0.144 J	9.49	0.00838 - 0.641	5.22 - 26.8	ng/kg	SL-117-SA5C	0 - 0.5
PCBs	Aroclor 1260	11096-82-5	74 / 82	0.39	430	0.35 - 92	1.8 - 470	ug/kg	SL-086-SA5C	0 - 0.5
PCBs	Aroclor 1254	11097-69-1	69 / 82	0.4 J	1100	0.35 - 92	1.8 - 470	ug/kg	SL-124-SA5C	0 - 0.5
PCBs	Aroclor 1268	11100-14-4	0 / 82			0.35 - 92	1.8 - 470	ug/kg		-
PCBs	Aroclor 1221	11104-28-2	0 / 82			0.53 - 140	1.8 - 470	ug/kg		-
PCBs	Aroclor 5460	11126-42-4	56 / 82	1.3 J	190	1.1 - 280	3.5 - 920	ug/kg	SL-096-SA5C	0 - 0.5
PCBs	Aroclor 1232	11141-16-5	0 / 82			0.55 - 140	1.8 - 470	ug/kg		-
PCBs	Aroclor 5442	12642-23-8	0 / 82			1.1 - 280	3.5 - 920	ug/kg		-
PCBs	Aroclor 1248	12672-29-6	0 / 82			0.35 - 92	1.8 - 470	ug/kg		-
PCBs	Aroclor 1016	12674-11-2	0 / 82			0.35 - 92	1.8 - 470	ug/kg		-
PCBs	Aroclor 1262	37324-23-5	0 / 82			0.35 - 92	1.8 - 470	ug/kg		-
PCBs	Aroclor 1242	53469-21-9	0 / 82			0.53 - 140	1.8 - 470	ug/kg		-

Table 3-1
Summary of Analytical Results for Chemicals - Validated Data
Surface Soils
HSA-5C

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	Depth of Maximum Concentration (ft)
PCBs	Aroclor 5432	63496-31-1	0 / 82			1.1 - 280	3.5 - 920	ug/kg		-
Semivolatiles	N-Nitrosodimethylamine	62-75-9	12 / 82	0.75 J	16	0.7 - 8.6	1.7 - 22	ug/kg	SL-130-SA5C	0 - 0.5
Semivolatiles	2,4-Dinitrotoluene	121-14-2	0 / 82			35 - 190	170 - 970	ug/kg		-
Semivolatiles	Nitrobenzene	98-95-3	0 / 82			17 - 97	170 - 970	ug/kg		-
Semivolatiles	1,4-Dichlorobenzene	106-46-7	0 / 82			17 - 97	170 - 970	ug/kg		-
Semivolatiles	1,2,4-Trichlorobenzene	120-82-1	0 / 82			17 - 97	170 - 970	ug/kg		-
Semivolatiles	1,3-Dichlorobenzene	541-73-1	0 / 82			17 - 97	170 - 970	ug/kg		-
Semivolatiles	Hexachlorobutadiene	87-68-3	0 / 82			70 - 390	170 - 970	ug/kg		-
Semivolatiles	1,2-Dichlorobenzene	95-50-1	0 / 82			17 - 97	170 - 970	ug/kg		-
Semivolatiles	4-Nitroaniline	100-01-6	0 / 82			70 - 390	170 - 970	ug/kg		-
Semivolatiles	4-Nitrophenol	100-02-7	0 / 82			170 - 970	520 - 2900	ug/kg		-
Semivolatiles	4-Bromophenyl Phenyl Ether	101-55-3	0 / 82			17 - 97	170 - 970	ug/kg		-
Semivolatiles	2,4-Dimethylphenol	105-67-9	0 / 82			35 - 190	170 - 970	ug/kg		-
Semivolatiles	4-Methylphenol	106-44-5	0 / 82			35 - 190	170 - 970	ug/kg		-
Semivolatiles	4-Chloroaniline	106-47-8	0 / 82			70 - 390	170 - 970	ug/kg		-
Semivolatiles	3,5-Dimethylphenol	108-68-9	0 / 82			35 - 190	170 - 970	ug/kg		-
Semivolatiles	Phenol	108-95-2	0 / 82			17 - 97	170 - 970	ug/kg		-
Semivolatiles	Bis(2-Chloroethyl) ether	111-44-4	0 / 82			17 - 97	170 - 970	ug/kg		-
Semivolatiles	Bis(2-Chloroethoxy) methane	111-91-1	0 / 82			17 - 97	170 - 970	ug/kg		-
Semivolatiles	Bis(2-Ethylhexyl) phthalate	117-81-7	57 / 82	6.8 J	620	6.4 - 97	19 - 1900	ug/kg	SL-123-SA5C	0 - 0.5
Semivolatiles	Di-N-Octyl Phthalate	117-84-0	20 / 82	8.5 J	80 J	6.3 - 97	19 - 970	ug/kg	SL-078-SA5C	0 - 0.5
Semivolatiles	Hexachlorobenzene	118-74-1	0 / 82			17 - 97	170 - 970	ug/kg		-
Semivolatiles	Anthracene	120-12-7	32 / 82	0.39 J	440	0.35 - 4.3	1.7 - 22	ug/kg	SL-124-SA5C	0 - 0.5
Semivolatiles	2,4-Dichlorophenol	120-83-2	0 / 82			17 - 97	170 - 970	ug/kg		-
Semivolatiles	1,2-Diphenylhydrazine	122-66-7	0 / 82			17 - 97	170 - 970	ug/kg		-
Semivolatiles	Pyrene	129-00-0	63 / 82	0.91 J	7600	0.7 - 37	1.7 - 220	ug/kg	SL-124-SA5C	0 - 0.5
Semivolatiles	Dimethylphthalate	131-11-3	0 / 82			6.3 - 97	19 - 970	ug/kg		-
Semivolatiles	Dibenzofuran	132-64-9	3 / 82	21	28	17 - 97	170 - 970	ug/kg	SL-117-SA5C	0 - 0.5
Semivolatiles	Benzo(g,h,i)perylene	191-24-2	54 / 82	0.75 J	570	0.71 - 97	1.8 - 970	ug/kg	SL-124-SA5C	0 - 0.5
Semivolatiles	Indeno(1,2,3-Cd)Pyrene	193-39-5	39 / 82	0.76 J	620	0.7 - 21	1.7 - 210	ug/kg	SL-124-SA5C	0 - 0.5
Semivolatiles	Benzo(b)fluoranthene	205-99-2	71 / 82	0.82 J	2700	0.7 - 97	1.7 - 970	ug/kg	SL-124-SA5C	0 - 0.5
Semivolatiles	Fluoranthene	206-44-0	58 / 82	0.74 J	8400	0.7 - 97	1.7 - 970	ug/kg	SL-124-SA5C	0 - 0.5
Semivolatiles	Benzo(k)fluoranthene	207-08-9	40 / 82	0.72 J	1100	0.7 - 19	1.7 - 190	ug/kg	SL-124-SA5C	0 - 0.5
Semivolatiles	Acenaphthylene	208-96-8	12 / 82	0.41 J	7.7 J	0.35 - 4.3	1.7 - 22	ug/kg	SL-116-SA5C	0 - 0.5
Semivolatiles	Chrysene	218-01-9	72 / 82	0.71 J	3400	0.35 - 97	1.8 - 970	ug/kg	SL-124-SA5C	0 - 0.5
Semivolatiles	bis(2-Chloroisopropyl) ether	39638-32-9	0 / 82			17 - 97	170 - 970	ug/kg		-
Semivolatiles	Benzo(a)pyrene	50-32-8	55 / 82	0.81 J	1800	0.71 - 22	1.8 - 220	ug/kg	SL-124-SA5C	0 - 0.5
Semivolatiles	2,4-Dinitrophenol	51-28-5	0 / 82			700 - 3900	2100 - 12000	ug/kg		-
Semivolatiles	4,6-Dinitro-2-Methylphenol	534-52-1	0 / 82			170 - 970	520 - 2900	ug/kg		-
Semivolatiles	Dibenzo(a,h)anthracene	53-70-3	28 / 82	0.8 J	230	0.7 - 21	1.7 - 210	ug/kg	SL-124-SA5C	0 - 0.5
Semivolatiles	Benzo(a)anthracene	56-55-3	52 / 82	0.79 J	3000	0.7 - 20	1.7 - 200	ug/kg	SL-124-SA5C	0 - 0.5
Semivolatiles	4-Chloro-3-Methylphenol	59-50-7	0 / 82			35 - 190	170 - 970	ug/kg		-
Semivolatiles	N-Nitroso-Di-N-Propylamine	621-64-7	0 / 82			17 - 97	170 - 970	ug/kg		-
Semivolatiles	Aniline	62-53-3	0 / 82			170 - 970	520 - 2900	ug/kg		-
Semivolatiles	Benzoic Acid	65-85-0	1 / 82	2100	2100	170 - 970	520 - 2900	ug/kg	SL-123-SA5C	0 - 0.5
Semivolatiles	Hexachloroethane	67-72-1	0 / 82			17 - 97	170 - 970	ug/kg		-
Semivolatiles	4-Chlorophenyl Phenylether	7005-72-3	0 / 82			35 - 190	170 - 970	ug/kg		-
Semivolatiles	Hexachlorocyclopentadiene	77-47-4	0 / 82			170 - 970	520 - 2900	ug/kg		-

Table 3-1
Summary of Analytical Results for Chemicals - Validated Data
Surface Soils
HSA-5C

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	Depth of Maximum Concentration (ft)
Semivolatiles	Isophorone	78-59-1	0 / 82			17 - 97	170 - 970	ug/kg		-
Semivolatiles	Acenaphthene	83-32-9	6 / 82	0.91 J	92	0.7 - 8.6	1.7 - 22	ug/kg	SL-124-SA5C	0 - 0.5
Semivolatiles	Diethylphthalate	84-66-2	1 / 82	14 J	14 J	6.3 - 97	19 - 970	ug/kg	SL-038-SA5C	0 - 0.5
Semivolatiles	Di-n-Butylphthalate	84-74-2	9 / 82	11 J	16000	6.3 - 710	19 - 2100	ug/kg	SL-056-SA5C	0 - 0.5
Semivolatiles	Phenanthrene	85-01-8	48 / 82	0.72 J	3000	0.7 - 97	1.7 - 970	ug/kg	SL-124-SA5C	0 - 0.5
Semivolatiles	Butylbenzylphthalate	85-68-7	14 / 82	7.5 J	280 J	6.3 - 97	19 - 970	ug/kg	SL-114-SA5C	0 - 0.5
Semivolatiles	N-Nitrosodiphenylamine	86-30-6	0 / 82			17 - 97	170 - 970	ug/kg		-
Semivolatiles	Fluorene	86-73-7	6 / 82	0.89 J	53	0.7 - 8.6	1.7 - 22	ug/kg	SL-124-SA5C	0 - 0.5
Semivolatiles	Carbazole	86-74-8	1 / 82	21	21	17 - 97	170 - 970	ug/kg	SL-117-SA5C	0 - 0.5
Semivolatiles	Pentachlorophenol	87-86-5	1 / 82	190 J	190 J	170 - 970	520 - 2900	ug/kg	SL-057-SA5C	0 - 0.5
Semivolatiles	2,4,6-Trichlorophenol	88-06-2	0 / 82			35 - 190	170 - 970	ug/kg		-
Semivolatiles	2-Nitroaniline	88-74-4	0 / 82			17 - 97	170 - 970	ug/kg		-
Semivolatiles	2-Nitrophenol	88-75-5	0 / 82			17 - 97	170 - 970	ug/kg		-
Semivolatiles	1-Methylnaphthalene	90-12-0	10 / 82	0.73	52	0.7 - 21	1.7 - 210	ug/kg	SL-117-SA5C	0 - 0.5
Semivolatiles	Naphthalene	91-20-3	33 / 82	0.81 J	23	0.7 - 21	1.7 - 210	ug/kg	SL-117-SA5C	0 - 0.5
Semivolatiles	2-Methylnaphthalene	91-57-6	11 / 82	0.88 J	51	0.7 - 21	1.7 - 210	ug/kg	SL-117-SA5C	0 - 0.5
Semivolatiles	2-Chloronaphthalene	91-58-7	0 / 82			17 - 97	170 - 970	ug/kg		-
Semivolatiles	3,3`-Dichlorobenzidine	91-94-1	0 / 82			100 - 580	350 - 1900	ug/kg		-
Semivolatiles	Benzidine	92-87-5	0 / 82			1200 - 6800	3500 - 19000	ug/kg		-
Semivolatiles	2-Methylphenol	95-48-7	0 / 82			35 - 190	170 - 970	ug/kg		-
Semivolatiles	2-Chlorophenol	95-57-8	0 / 82			17 - 97	170 - 970	ug/kg		-
Semivolatiles	2,4,5-Trichlorophenol	95-95-4	0 / 82			35 - 190	170 - 970	ug/kg		-
Semivolatiles	3-Nitroaniline	99-09-2	0 / 82			35 - 190	170 - 970	ug/kg		-
Semivolatiles	Benzyl Alcohol	100-51-6	0 / 82			170 - 970	520 - 2900	ug/kg		-
Semivolatiles	2,6-Dinitrotoluene	606-20-2	0 / 82			17 - 97	170 - 970	ug/kg		-

Table 3-2
Summary of Analytical Results for Chemicals - Validated Data
Subsurface Soils
HSA-5C

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	Depth of Maximum Concentration (ft)
Inorganic	Nitrate	14797-55-8	69 / 79	0.96 J	15.8 J	0.82 - 0.98	1.5 - 1.8	mg/kg	SL-028-SA5C	4 - 5
Inorganic	Fluoride	16984-48-8	174 / 180	0.9 J	31.7	0.82 - 0.98	1 - 1.2	mg/kg	SL-064-SA5C	4 - 5
Inorganic	Cyanide	57-12-5	1 / 79	1.2	1.2	0.18 - 0.23	0.5 - 0.63	mg/kg	SL-060-SA5C	9 - 10
Inorganic	Aluminum	7429-90-5	179 / 179	9670	40600	4.98 - 27.5	19.8 - 109	mg/kg	SL-071-SA5C	4 - 5
Inorganic	Iron	7439-89-6	179 / 179	14300	46200	4.66 - 27.9	19.8 - 118	mg/kg	SL-043-SA5C	2 - 3
Inorganic	Lead	7439-92-1	179 / 179	2.77 J	25.2 J	0.0104 - 0.0127	0.201 - 0.244	mg/kg	SL-101-SA5C	4 - 5
Inorganic	Lithium	7439-93-2	179 / 179	11.8	60.2	0.22 - 0.26	2 - 2.4	mg/kg	SL-043-SA5C	2 - 3
Inorganic	Magnesium	7439-95-4	179 / 179	2950	11400	2.52 - 3.04	9.9 - 12	mg/kg	SL-043-SA5C	2 - 3
Inorganic	Manganese	7439-96-5	179 / 179	80.4 J	1490 J	0.0772 - 0.411	0.495 - 2.64	mg/kg	SL-080-SA5C	7.5 - 8.5
Inorganic	Mercury	7439-97-6	80 / 179	0.0032 J	0.0831 J	0.0028 - 0.0035	0.0982 - 0.121	mg/kg	SL-096-SA5C	9 - 10
Inorganic	Molybdenum	7439-98-7	175 / 179	0.148 J	3.87 J	0.05 - 0.0611	0.1 - 0.122	mg/kg	SL-012-SA5C	9 - 10
Inorganic	Nickel	7440-02-0	179 / 179	6.48 J	50.6	0.1 - 0.122	0.4 - 0.489	mg/kg	SL-056-SA5C	4 - 5
Inorganic	Potassium	7440-09-7	179 / 179	1020	4790 J	17.8 - 21.6	49.5 - 59.9	mg/kg	SL-004-SA5C	9 - 10
Inorganic	Silver	7440-22-4	174 / 179	0.0123 J	0.298 J	0.012 - 0.0147	0.1 - 0.122	mg/kg	SL-131-SA5C	4 - 5
Inorganic	Sodium	7440-23-5	179 / 179	63.5 J	1530	36.9 - 44.7	99 - 120	mg/kg	SL-026-SA5C	9 - 10
Inorganic	Strontium	7440-24-6	179 / 179	10.9	123	0.0614 - 0.0743	0.495 - 0.599	mg/kg	SL-122-SA5C	4 - 5
Inorganic	Thallium	7440-28-0	179 / 179	0.176	0.657 J	0.03 - 0.0367	0.1 - 0.122	mg/kg	SL-060-SA5C	10 - 11
Inorganic	Tin	7440-31-5	25 / 179	2.18 J	2.98 J	0.99 - 1.2	9.9 - 12	mg/kg	SL-101-SA5C	4 - 5
Inorganic	Titanium	7440-32-6	179 / 179	799	2330	0.398 - 2.25	1.05 - 5.91	mg/kg	SL-043-SA5C	2 - 3
Inorganic	Antimony	7440-36-0	101 / 179	0.0627 J	0.559 J	0.06 - 0.0733	0.2 - 0.244	mg/kg	SL-001-SA5C	9 - 10
Inorganic	Arsenic	7440-38-2	179 / 179	2.41 J	16.7 J	0.06 - 0.0877	0.4 - 0.489	mg/kg	SL-066-SA5C	3 - 4
Inorganic	Beryllium	7440-41-7	179 / 179	0.304	1.6 J	0.016 - 0.0196	0.1 - 0.122	mg/kg	SL-071-SA5C	9 - 10
Inorganic	Barium	7440-39-3	179 / 179	40.9 J	321 J	0.108 - 0.316	0.4 - 1.17	mg/kg	SL-120-SA5C	9 - 10
Inorganic	Boron	7440-42-8	146 / 179	0.988 J	37.5	0.881 - 5.15	4.95 - 28.9	mg/kg	SL-074-SA5C	4 - 5
Inorganic	Cadmium	7440-43-9	151 / 179	0.0376 J	0.669	0.036 - 0.044	0.1 - 0.122	mg/kg	SL-111-SA5C	9 - 10
Inorganic	Chromium	7440-47-3	179 / 179	10.7 J	55.4	0.12 - 0.147	0.4 - 0.489	mg/kg	SL-001-SA5C	9 - 10
Inorganic	Cobalt	7440-48-4	179 / 179	3.18	35.1 J	0.02 - 0.0244	0.1 - 0.122	mg/kg	SL-101-SA5C	4 - 5
Inorganic	Copper	7440-50-8	179 / 179	4.83 J	32.5 J	0.066 - 0.0807	0.4 - 0.489	mg/kg	SL-101-SA5C	4 - 5
Inorganic	Vanadium	7440-62-2	179 / 179	29.5 J	101	0.0221 - 0.0269	0.1 - 0.122	mg/kg	SL-001-SA5C	9 - 10
Inorganic	Zinc	7440-66-6	179 / 179	32.7 J	129 J	0.56 - 0.685	3 - 3.67	mg/kg	SL-005-SA5C	9 - 10
Inorganic	Zirconium	7440-67-7	170 / 179	0.93 J	8.14	0.832 - 1.01	4.95 - 5.99	mg/kg	SL-071-SA5C	4 - 5
Inorganic	Calcium	7440-70-2	179 / 179	1190	89700	6.07 - 34	19.8 - 111	mg/kg	SL-122-SA5C	4 - 5
Inorganic	Phosphorus	7723-14-0	179 / 179	76.7 J	1120 J	0.555 - 1.18	9.9 - 21	mg/kg	SL-014-SA5C	4 - 5
Inorganic	Selenium	7782-49-2	157 / 179	0.0439 J	0.396 J	0.04 - 0.0489	0.4 - 0.489	mg/kg	SL-070-SA5C	4 - 5
Inorganic	Chromium VI	18540-29-9	93 / 180	0.23 J	2.5 J	0.21 - 0.24	1 - 1.2	mg/kg	SL-045-SA5C SL-065-SA5C	4 - 5 2.5 3.5
Inorganic	Perchlorate - 314	14797-73-0	15 / 175	9.7 J	156	9.3 - 10.9	30.9 - 36.2	ug/kg	SL-025-SA5C	9 - 10
Inorganic	Perchlorate - 6850	14797-73-0	2 / 24	2.6 J	4.6 J	2.2 - 2.5	5.2 - 5.9	ug/kg	SL-137-SA5C	4.5 - 5.5
Inorganic	Percent Moisture	MOIST	166 / 182	2.9	18.2	0.5 - 0.5	0.5 - 0.5	%	SL-012-SA5C	9 - 10
Inorganic	pH	pH	180 / 180	5.46	9.22	0.01 - 0.01	0.01 - 0.01	pH unit	SL-122-SA5C	4 - 5
Inorganic	Hydrazine	302-01-2	1 / 26	0.9 J	0.9 J	0.51 - 0.6	2.1 - 2.4	ng/g	SL-044-SA5C	9 - 10
Inorganic	Methylhydrazine	60-34-4	0 / 26			2.1 - 2.4	5.1 - 6	ng/g		-
Inorganic	1,1-Dimethylhydrazine	57-14-7	0 / 26			2.1 - 2.4	5.1 - 6	ng/g		-
Misc. Organics	Ethanol	64-17-5	33 / 79	110 J	330 J	100 - 120	510 - 610	ug/kg	SL-012-SA5C	9 - 10
Misc. Organics	Methanol	67-56-1	29 / 79	110 J	690	100 - 120	510 - 610	ug/kg	SL-002-SA5C	9 - 10
Misc. Organics	2-Propanol	67-63-0	0 / 79			100 - 120	510 - 610	ug/kg		-
Misc. Organics	Ethylene Glycol	107-21-1	0 / 72			5.1 - 13	13 - 15	mg/kg		-

Table 3-2
Summary of Analytical Results for Chemicals - Validated Data
Subsurface Soils
HSA-5C

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	Depth of Maximum Concentration (ft)
Misc. Organics	Diethylene Glycol	111-46-6	0 / 72			5.1 - 11	13 - 15	mg/kg		-
Misc. Organics	Propylene glycol	57-55-6	0 / 71			5.1 - 6.1	13 - 15	mg/kg		-
Misc. Organics	o-Terphenyl	84-15-1	0 / 79			1.5 - 3.3	3.6 - 7.7	mg/kg		-
Misc. Organics	m-Terphenyl	92-06-8	0 / 79			1.5 - 3.3	3.6 - 7.7	mg/kg		-
Misc. Organics	p-Terphenyl	92-94-4	0 / 79			1.5 - 3.3	3.6 - 7.7	mg/kg		-
Misc. Organics	Formaldehyde	50-00-0	15 / 79	670 J	10000	620 - 730	1500 - 1800	ug/kg	SL-059-SA5C	1 - 2
Misc. Organics	2,6-Dinitrotoluene	606-20-2	0 / 79			51 - 61	150 - 180	ug/kg		-
Misc. Organics	2,4,6-Trinitrotoluene	118-96-7	0 / 79			51 - 61	150 - 180	ug/kg		-
Misc. Organics	RDX	121-82-4	0 / 79			64 - 200	150 - 200	ug/kg		-
Misc. Organics	4-Amino-2,6-Dinitrotoluene	19406-51-0	0 / 79			77 - 92	150 - 180	ug/kg		-
Misc. Organics	HMX	2691-41-0	0 / 79			130 - 150	390 - 460	ug/kg		-
Misc. Organics	2-Amino-4,6-Dinitrotoluene	35572-78-2	0 / 79			51 - 61	150 - 180	ug/kg		-
Misc. Organics	Tetryl	479-45-8	0 / 79			79 - 140	150 - 180	ug/kg		-
Misc. Organics	Nitroglycerin	55-63-0	0 / 79			1000 - 1200	3100 - 3700	ug/kg		-
Misc. Organics	2,6-Diamino-4-nitrotoluene	59229-75-3	0 / 79			100 - 120	310 - 370	ug/kg		-
Misc. Organics	2,4-Diamino-6-nitrotoluene	6629-29-4	0 / 79			100 - 120	310 - 370	ug/kg		-
Misc. Organics	PETN	78-11-5	0 / 79			1000 - 1200	3100 - 3700	ug/kg		-
Misc. Organics	2-Nitrotoluene	88-72-2	0 / 79			100 - 120	150 - 180	ug/kg		-
Misc. Organics	3-Nitrotoluene	99-08-1	0 / 79			130 - 150	150 - 180	ug/kg		-
Misc. Organics	1,3,5-Trinitrobenzene	99-35-4	0 / 79			51 - 61	150 - 180	ug/kg		-
Misc. Organics	4-Nitrotoluene	99-99-0	0 / 79			100 - 120	150 - 180	ug/kg		-
Misc. Organics	2,4-Dinitrotoluene	121-14-2	0 / 79			51 - 61	150 - 180	ug/kg		-
Misc. Organics	Nitrobenzene	98-95-3	0 / 79			51 - 61	150 - 180	ug/kg		-
Misc. Organics	m-Dinitrobenzene	99-65-0	5 / 79	92 J	300	51 - 61	150 - 180	ug/kg	SL-044-SA5C	4 - 5
Dioxins/Furans	2,3,7,8-TCDD	1746-01-6	43 / 181	0.0152	0.177	0.0058 - 0.0589	1.03 - 1.22	ng/kg	SL-130-SA5C	4 - 5
Dioxins/Furans	1,2,3,7,8,9-HxCDD	19408-74-3	71 / 181	0.0295	3.35	0.00896 - 0.0705	5.15 - 6.11	ng/kg	SL-119-SA5C	4 - 5
Dioxins/Furans	OCDD	3268-87-9	95 / 181	0.405	2600	0.0118 - 0.141	10.3 - 12.2	ng/kg	SL-119-SA5C	4 - 5
Dioxins/Furans	1,2,3,4,6,7,8-HpCDD	35822-46-9	77 / 181	0.146	143	0.00942 - 0.148	5.15 - 6.11	ng/kg	SL-119-SA5C	4 - 5
Dioxins/Furans	OCDF	39001-02-0	46 / 181	0.181	31.4	0.00845 - 0.14	10.3 - 12.2	ng/kg	SL-119-SA5C	4 - 5
Dioxins/Furans	1,2,3,4,7,8-HxCDD	39227-28-6	64 / 181	0.0149	1.84	0.0085 - 0.0693	5.15 - 6.11	ng/kg	SL-119-SA5C	4 - 5
Dioxins/Furans	1,2,3,7,8-PeCDD	40321-76-4	70 / 181	0.0113 J	0.933 J	0.00902 - 0.0938	5.15 - 6.11	ng/kg	SL-041-SA5C	4 - 5
Dioxins/Furans	2,3,7,8-TCDF	51207-31-9	40 / 181	0.0167	0.647 J	0.00605 - 0.11	1.03 - 1.22	ng/kg	SL-067-SA5C	3 - 4
Dioxins/Furans	1,2,3,4,7,8,9-HpCDF	55673-89-7	22 / 181	0.0417	0.819 J	0.00643 - 0.162	5.15 - 6.11	ng/kg	SL-041-SA5C	4 - 5
Dioxins/Furans	2,3,4,7,8-PeCDF	57117-31-4	25 / 181	0.0618	1.4 J	0.0039 - 0.0558	5.15 - 6.11	ng/kg	SL-067-SA5C	3 - 4
Dioxins/Furans	1,2,3,7,8-PeCDF	57117-41-6	29 / 181	0.0296	0.721 J	0.00459 - 0.0548	5.15 - 6.11	ng/kg	SL-137-SA5C	4.5 - 5.5
Dioxins/Furans	1,2,3,6,7,8-HxCDF	57117-44-9	17 / 181	0.0666	1 J	0.00593 - 0.0538	5.15 - 6.11	ng/kg	SL-041-SA5C	4 - 5
Dioxins/Furans	1,2,3,6,7,8-HxCDD	57653-85-7	58 / 181	0.0272	2.26 J	0.00896 - 0.0707	5.15 - 6.11	ng/kg	SL-041-SA5C	4 - 5
Dioxins/Furans	2,3,4,6,7,8-HxCDF	60851-34-5	15 / 181	0.066	0.725 J	0.00604 - 0.0538	5.15 - 6.11	ng/kg	SL-041-SA5C	4 - 5
Dioxins/Furans	1,2,3,4,6,7,8-HpCDF	67562-39-4	26 / 181	0.269	2.71 J	0.00521 - 0.112	5.15 - 6.11	ng/kg	SL-014-SA5C	4 - 5
Dioxins/Furans	1,2,3,4,7,8-HxCDF	70648-26-9	17 / 181	0.052 J	4.07 J	0.00637 - 0.0537	5.15 - 6.11	ng/kg	SL-041-SA5C	4 - 5
Dioxins/Furans	1,2,3,7,8,9-HxCDF	72918-21-9	28 / 181	0.0543	1.91 J	0.00692 - 0.0628	5.15 - 6.11	ng/kg	SL-041-SA5C	4 - 5
PCBs	Aroclor 1260	11096-82-5	36 / 180	0.44 J	15	0.34 - 1.8	1.8 - 9.4	ug/kg	SL-131-SA5C	4 - 5
PCBs	Aroclor 1254	11097-69-1	42 / 180	0.39 J	49	0.34 - 1.8	1.8 - 9.4	ug/kg	SL-131-SA5C	4 - 5
PCBs	Aroclor 1268	11100-14-4	0 / 180			0.34 - 1.8	1.8 - 9.4	ug/kg		-
PCBs	Aroclor 1221	11104-28-2	0 / 180			0.38 - 2.8	1.8 - 9.4	ug/kg		-
PCBs	Aroclor 5460	11126-42-4	17 / 180	1.4 J	26	1 - 5.5	3.4 - 18	ug/kg	SL-072-SA5C	7.5 - 8.5
PCBs	Aroclor 1232	11141-16-5	0 / 180			0.38 - 2.9	1.8 - 9.4	ug/kg		-

Table 3-2
Summary of Analytical Results for Chemicals - Validated Data
Subsurface Soils
HSA-5C

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	Depth of Maximum Concentration (ft)
PCBs	Aroclor 5442	12642-23-8	0 / 180			1 - 5.5	3.4 - 18	ug/kg		-
PCBs	Aroclor 1248	12672-29-6	14 / 180	0.67 J	13	0.34 - 1.8	1.8 - 9.4	ug/kg	SL-109-SA5C	4 - 5
PCBs	Aroclor 1016	12674-11-2	0 / 180			0.34 - 1.8	1.8 - 9.4	ug/kg		-
PCBs	Aroclor 1262	37324-23-5	0 / 180			0.34 - 1.8	1.8 - 9.4	ug/kg		-
PCBs	Aroclor 1242	53469-21-9	0 / 180			0.38 - 2.8	1.8 - 9.4	ug/kg		-
PCBs	Aroclor 5432	63496-31-1	0 / 180			1 - 5.5	3.4 - 18	ug/kg		-
Semivolatiles	N-Nitrosodimethylamine	62-75-9	49 / 79	22.3 J	870	17.2 - 40.2	34.3 - 80.3	ng/kg	SL-044-SA5C	4 - 5
Semivolatiles	N-Nitrosodimethylamine	62-75-9	3 / 180	1.9	14 J	0.69 - 0.82	1.7 - 2	ug/kg	SL-050-SA5C	4 - 5
Semivolatiles	2,4-Dinitrotoluene	121-14-2	0 / 180			34 - 41	170 - 200	ug/kg		-
Semivolatiles	Nitrobenzene	98-95-3	0 / 180			17 - 20	170 - 200	ug/kg		-
Semivolatiles	1,4-Dichlorobenzene	106-46-7	0 / 180			17 - 20	170 - 200	ug/kg		-
Semivolatiles	1,2,4-Trichlorobenzene	120-82-1	0 / 180			17 - 20	170 - 200	ug/kg		-
Semivolatiles	1,3-Dichlorobenzene	541-73-1	0 / 180			17 - 20	170 - 200	ug/kg		-
Semivolatiles	Hexachlorobutadiene	87-68-3	0 / 180			69 - 81	170 - 200	ug/kg		-
Semivolatiles	1,2-Dichlorobenzene	95-50-1	0 / 180			17 - 20	170 - 200	ug/kg		-
Semivolatiles	4-Nitroaniline	100-01-6	0 / 180			69 - 81	170 - 200	ug/kg		-
Semivolatiles	4-Nitrophenol	100-02-7	0 / 180			170 - 200	510 - 610	ug/kg		-
Semivolatiles	4-Bromophenyl Phenyl Ether	101-55-3	0 / 180			17 - 20	170 - 200	ug/kg		-
Semivolatiles	2,4-Dimethylphenol	105-67-9	0 / 180			34 - 41	170 - 200	ug/kg		-
Semivolatiles	4-Methylphenol	106-44-5	0 / 180			34 - 41	170 - 200	ug/kg		-
Semivolatiles	4-Chloroaniline	106-47-8	0 / 180			69 - 81	170 - 200	ug/kg		-
Semivolatiles	3,5-Dimethylphenol	108-68-9	1 / 180	130 J	130 J	34 - 41	170 - 200	ug/kg	SL-017-SA5C	4 - 5
Semivolatiles	Phenol	108-95-2	0 / 180			17 - 20	170 - 200	ug/kg		-
Semivolatiles	Bis(2-Chloroethyl) ether	111-44-4	0 / 180			17 - 20	170 - 200	ug/kg		-
Semivolatiles	Bis(2-Chloroethoxy) methane	111-91-1	0 / 180			17 - 20	170 - 200	ug/kg		-
Semivolatiles	Bis(2-Ethylhexyl) phthalate	117-81-7	65 / 180	6.9 J	72	6.2 - 20	19 - 400	ug/kg	SL-021-SA5C	4 - 5
Semivolatiles	Di-N-Octyl Phthalate	117-84-0	8 / 180	6.9 J	13 J	6.2 - 7.3	19 - 22	ug/kg	SL-110-SA5C	4 - 5
Semivolatiles	Hexachlorobenzene	118-74-1	0 / 180			17 - 20	170 - 200	ug/kg		-
Semivolatiles	Anthracene	120-12-7	8 / 180	0.45 J	2.7	0.34 - 0.41	1.7 - 2	ug/kg	SL-050-SA5C	4 - 5
Semivolatiles	2,4-Dichlorophenol	120-83-2	0 / 180			17 - 20	170 - 200	ug/kg		-
Semivolatiles	1,2-Diphenylhydrazine	122-66-7	0 / 180			17 - 20	170 - 200	ug/kg		-
Semivolatiles	Pyrene	129-00-0	32 / 180	0.78 J	25	0.69 - 0.82	1.7 - 2	ug/kg	SL-088-SA5C	4 - 5
Semivolatiles	Dimethylphthalate	131-11-3	0 / 180			6.2 - 7.3	19 - 22	ug/kg		-
Semivolatiles	Dibenzofuran	132-64-9	0 / 180			17 - 20	170 - 200	ug/kg		-
Semivolatiles	Benzo(g,h,i)perylene	191-24-2	24 / 180	0.74 J	35 J	0.69 - 19	1.7 - 190	ug/kg	SL-051-SA5C	3 - 4
Semivolatiles	Indeno(1,2,3-Cd)Pyrene	193-39-5	13 / 180	0.75 J	21 J	0.69 - 18	1.7 - 180	ug/kg	SL-077-SA5C	3 - 4
Semivolatiles	Benzo(b)fluoranthene	205-99-2	47 / 180	0.79 J	24	0.69 - 0.82	1.7 - 2	ug/kg	SL-088-SA5C	4 - 5
Semivolatiles	Fluoranthene	206-44-0	32 / 180	0.74 J	24	0.69 - 0.82	1.7 - 2	ug/kg	SL-088-SA5C	4 - 5
Semivolatiles	Benzo(k)fluoranthene	207-08-9	23 / 180	0.75 J	13	0.69 - 0.82	1.7 - 2	ug/kg	SL-088-SA5C	4 - 5
Semivolatiles	Acenaphthylene	208-96-8	3 / 180	0.63 J	1.2 J	0.34 - 0.41	1.7 - 2	ug/kg	SL-041-SA5C	4 - 5
Semivolatiles	Chrysene	218-01-9	56 / 180	0.35 J	23 J	0.34 - 19	1.7 - 190	ug/kg	SL-093-SA5C	8 - 9
Semivolatiles	bis(2-Chloroisopropyl) ether	39638-32-9	0 / 180			17 - 20	170 - 200	ug/kg		-
Semivolatiles	Benzo(a)pyrene	50-32-8	38 / 180	0.77 J	20	0.69 - 0.82	1.7 - 2	ug/kg	SL-088-SA5C	4 - 5
Semivolatiles	2,4-Dinitrophenol	51-28-5	0 / 180			690 - 810	1100 - 2400	ug/kg		-
Semivolatiles	4,6-Dinitro-2-Methylphenol	534-52-1	0 / 180			170 - 200	510 - 610	ug/kg		-
Semivolatiles	Dibenzo(a,h)anthracene	53-70-3	7 / 180	0.94 J	20 J	0.69 - 18	1.7 - 180	ug/kg	SL-077-SA5C	3 - 4
Semivolatiles	Benzo(a)anthracene	56-55-3	28 / 180	0.8 J	17	0.69 - 0.82	1.7 - 2	ug/kg	SL-088-SA5C	4 - 5

Table 3-2
Summary of Analytical Results for Chemicals - Validated Data
Subsurface Soils
HSA-5C

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	Depth of Maximum Concentration (ft)
Semivolatiles	4-Chloro-3-Methylphenol	59-50-7	0 / 180			34 - 41	170 - 200	ug/kg		-
Semivolatiles	N-Nitroso-Di-N-Propylamine	621-64-7	0 / 180			17 - 20	170 - 200	ug/kg		-
Semivolatiles	Aniline	62-53-3	0 / 180			170 - 200	510 - 610	ug/kg		-
Semivolatiles	Benzoic Acid	65-85-0	0 / 180			170 - 200	510 - 610	ug/kg		-
Semivolatiles	Hexachloroethane	67-72-1	0 / 180			17 - 20	170 - 200	ug/kg		-
Semivolatiles	4-Chlorophenyl Phenylether	7005-72-3	0 / 180			34 - 41	170 - 200	ug/kg		-
Semivolatiles	Hexachlorocyclopentadiene	77-47-4	0 / 180			170 - 200	510 - 610	ug/kg		-
Semivolatiles	Isophorone	78-59-1	0 / 180			17 - 20	170 - 200	ug/kg		-
Semivolatiles	Acenaphthene	83-32-9	2 / 180	1 J	1.2 J	0.69 - 0.82	1.7 - 2	ug/kg	SL-041-SA5C	4 - 5
Semivolatiles	Diethylphthalate	84-66-2	1 / 180	8 J	8 J	6.2 - 7.3	19 - 22	ug/kg	SL-061-SA5C	9 - 10
Semivolatiles	Di-n-Butylphthalate	84-74-2	6 / 180	6.7 J	18 J	6.2 - 19	19 - 190	ug/kg	SL-057-SA5C	4 - 5
Semivolatiles	Phenanthrene	85-01-8	27 / 180	0.75 J	5.7	0.69 - 0.82	1.7 - 2	ug/kg	SL-010-SA5C	4 - 5
Semivolatiles	Butylbenzylphthalate	85-68-7	6 / 180	7.2 J	24	6.2 - 7.3	19 - 22	ug/kg	SL-020-SA5C	4 - 5
Semivolatiles	N-Nitrosodiphenylamine	86-30-6	0 / 180			17 - 20	170 - 200	ug/kg		-
Semivolatiles	Fluorene	86-73-7	3 / 180	1 J	2.3	0.69 - 0.82	1.7 - 2	ug/kg	SL-050-SA5C	4 - 5
Semivolatiles	Carbazole	86-74-8	0 / 180			17 - 20	170 - 200	ug/kg		-
Semivolatiles	Pentachlorophenol	87-86-5	0 / 180			170 - 200	510 - 610	ug/kg		-
Semivolatiles	2,4,6-Trichlorophenol	88-06-2	0 / 180			34 - 41	170 - 200	ug/kg		-
Semivolatiles	2-Nitroaniline	88-74-4	0 / 180			17 - 20	170 - 200	ug/kg		-
Semivolatiles	2-Nitrophenol	88-75-5	0 / 180			17 - 20	170 - 200	ug/kg		-
Semivolatiles	1-Methylnaphthalene	90-12-0	2 / 180	0.75 J	1.1 J	0.69 - 0.82	1.7 - 2	ug/kg	SL-041-SA5C	4 - 5
Semivolatiles	Naphthalene	91-20-3	8 / 180	0.76 J	1 J	0.69 - 0.82	1.7 - 2	ug/kg	SL-041-SA5C	4 - 5
Semivolatiles	2-Methylnaphthalene	91-57-6	2 / 180	0.86 J	1 J	0.69 - 0.82	1.7 - 2	ug/kg	SL-041-SA5C	4 - 5
Semivolatiles	2-Chloronaphthalene	91-58-7	0 / 180			17 - 20	170 - 200	ug/kg		-
Semivolatiles	3,3`-Dichlorobenzidine	91-94-1	0 / 180			100 - 120	340 - 410	ug/kg		-
Semivolatiles	Benzidine	92-87-5	0 / 180			1200 - 1400	3400 - 4100	ug/kg		-
Semivolatiles	2-Methylphenol	95-48-7	0 / 180			34 - 41	170 - 200	ug/kg		-
Semivolatiles	2-Chlorophenol	95-57-8	0 / 180			17 - 20	170 - 200	ug/kg		-
Semivolatiles	2,4,5-Trichlorophenol	95-95-4	0 / 180			34 - 41	170 - 200	ug/kg		-
Semivolatiles	3-Nitroaniline	99-09-2	0 / 180			34 - 41	170 - 200	ug/kg		-
Semivolatiles	Benzyl Alcohol	100-51-6	0 / 180			170 - 200	510 - 610	ug/kg		-
Semivolatiles	2,6-Dinitrotoluene	606-20-2	0 / 180			17 - 20	170 - 200	ug/kg		-
Volatiles	GRO (C5-C12)	GROC5C12	0 / 73			0.2 - 0.3	0.9 - 1.3	mg/kg		-
Volatiles	EFH (C15-C20)	PHCC15C20	16 / 71	0.46 J	13	0.41 - 8.6	1.2 - 26	mg/kg	SL-046-SA5C	4 - 5
Volatiles	EFH (C21-C30)	PHCC21C30	48 / 72	0.53 J	190	0.41 - 8.6	1.2 - 26	mg/kg	SL-039-SA5C	4 - 5
Volatiles	EFH (C30-C40)	PHCC30C40	62 / 72	0.45 J	520	0.41 - 8.6	1.2 - 26	mg/kg	SL-039-SA5C	4 - 5
Volatiles	EFH (C8-C11)	PHCC8C11	0 / 72			0.41 - 8.6	1.2 - 26	mg/kg		-
Volatiles	1,4-Dichlorobenzene	106-46-7	0 / 136			0.14 - 0.23	3.4 - 5.8	ug/kg		-
Volatiles	1,2,4-Trichlorobenzene	120-82-1	0 / 136			0.15 - 0.26	3.4 - 5.8	ug/kg		-
Volatiles	1,3-Dichlorobenzene	541-73-1	0 / 136			0.1 - 0.17	3.4 - 5.8	ug/kg		-
Volatiles	Hexachlorobutadiene	87-68-3	0 / 136			0.12 - 0.2	3.4 - 5.8	ug/kg		-
Volatiles	1,2-Dichlorobenzene	95-50-1	0 / 136			0.08 - 0.13	3.4 - 5.8	ug/kg		-
Volatiles	Isopropyltoluene	99-87-6	0 / 136			0.09 - 0.16	3.4 - 5.8	ug/kg		-
Volatiles	Ethylbenzene	100-41-4	1 / 136	0.07 J	0.07 J	0.05 - 0.09	3.4 - 5.8	ug/kg	SL-131-SA5C	4 - 5
Volatiles	Styrene	100-42-5	0 / 136			0.08 - 0.15	3.4 - 5.8	ug/kg		-
Volatiles	cis-1,3-Dichloropropene	10061-01-5	0 / 136			0.14 - 0.23	3.4 - 5.8	ug/kg		-
Volatiles	trans-1,3-Dichloropropene	10061-02-6	0 / 136			0.14 - 0.25	3.4 - 5.8	ug/kg		-

Table 3-2
Summary of Analytical Results for Chemicals - Validated Data
Subsurface Soils
HSA-5C

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	Depth of Maximum Concentration (ft)
Volatiles	N-Propylbenzene	103-65-1	0 / 136			0.06 - 0.1	3.4 - 5.8	ug/kg		-
Volatiles	N-Butylbenzene	104-51-8	0 / 136			0.1 - 0.17	3.4 - 5.8	ug/kg		-
Volatiles	4-Chlorotoluene	106-43-4	0 / 136			0.12 - 0.2	3.4 - 5.8	ug/kg		-
Volatiles	1,2-Dibromoethane	106-93-4	0 / 136			0.14 - 0.25	3.4 - 5.8	ug/kg		-
Volatiles	1,2-Dichloroethane	107-06-2	0 / 136			0.13 - 0.22	3.4 - 5.8	ug/kg		-
Volatiles	4-Methyl-2-Pentanone	108-10-1	4 / 136	0.47 J	9.7	0.33 - 0.56	6.8 - 12	ug/kg	SL-017-SA5C	9 - 10
Volatiles	1,3,5-Trimethylbenzene	108-67-8	0 / 136			0.08 - 0.15	3.4 - 5.8	ug/kg		-
Volatiles	Bromobenzene	108-86-1	0 / 136			0.11 - 0.19	3.4 - 5.8	ug/kg		-
Volatiles	Toluene	108-88-3	16 / 136	0.08 J	1.2 J	0.07 - 0.12	3.4 - 5.8	ug/kg	SL-133-SA5C	4 - 5
Volatiles	Chlorobenzene	108-90-7	0 / 136			0.09 - 0.16	3.4 - 5.8	ug/kg		-
Volatiles	2-Chloroethyl Vinyl Ether	110-75-8	0 / 136			0.25 - 0.43	3.4 - 5.8	ug/kg		-
Volatiles	1,4-Dioxane	123-91-1	0 / 136			4.2 - 7.2	13 - 22	ug/kg		-
Volatiles	Dibromochloromethane	124-48-1	0 / 136			0.17 - 0.29	3.4 - 5.8	ug/kg		-
Volatiles	Tetrachloroethene	127-18-4	0 / 136			0.17 - 0.29	3.4 - 5.8	ug/kg		-
Volatiles	sec-Butylbenzene	135-98-8	0 / 136			0.05 - 0.09	3.4 - 5.8	ug/kg		-
Volatiles	1,3-Dichloropropane	142-28-9	0 / 136			0.07 - 0.12	3.4 - 5.8	ug/kg		-
Volatiles	cis-1,2-Dichloroethene	156-59-2	0 / 136			0.16 - 0.27	3.4 - 5.8	ug/kg		-
Volatiles	trans-1,2-Dichloroethene	156-60-5	0 / 136			0.1 - 0.17	3.4 - 5.8	ug/kg		-
Volatiles	Methyl tert-Butyl Ether	1634-04-4	0 / 136			0.18 - 0.3	3.4 - 5.8	ug/kg		-
Volatiles	m,p-Xylene	179601-23-1	1 / 136	0.19 J	0.19 J	0.14 - 0.25	3.4 - 5.8	ug/kg	SL-131-SA5C	4 - 5
Volatiles	Carbon tetrachloride	56-23-5	0 / 136			0.12 - 0.2	3.4 - 5.8	ug/kg		-
Volatiles	1,1-Dichloropropene	563-58-6	0 / 136			0.11 - 0.19	3.4 - 5.8	ug/kg		-
Volatiles	2-Hexanone	591-78-6	0 / 136			1.4 - 2.3	6.8 - 12	ug/kg		-
Volatiles	2,2-Dichloropropane	594-20-7	0 / 136			0.14 - 0.25	3.4 - 5.8	ug/kg		-
Volatiles	1,1,1,2-Tetrachloroethane	630-20-6	0 / 136			0.09 - 0.16	3.4 - 5.8	ug/kg		-
Volatiles	Acetone	67-64-1	22 / 136	7.1 J	89	5.7 - 9.7	6.8 - 12	ug/kg	SL-027-SA5C	2.5 - 3.5
Volatiles	Chloroform	67-66-3	15 / 136	0.11 J	0.75 J	0.1 - 0.17	3.4 - 5.8	ug/kg	SL-125-SA5C	4 - 6
Volatiles	Benzene	71-43-2	1 / 136	0.11 J	0.11 J	0.08 - 0.15	3.4 - 5.8	ug/kg	SL-133-SA5C	4 - 5
Volatiles	1,1,1-Trichloroethane	71-55-6	0 / 136			0.17 - 0.29	3.4 - 5.8	ug/kg		-
Volatiles	Bromomethane	74-83-9	0 / 136			0.21 - 0.36	3.4 - 5.8	ug/kg		-
Volatiles	Chloromethane	74-87-3	0 / 136			0.28 - 0.48	3.4 - 5.8	ug/kg		-
Volatiles	Dibromomethane	74-95-3	0 / 136			0.2 - 0.35	3.4 - 5.8	ug/kg		-
Volatiles	Bromochloromethane	74-97-5	0 / 136			0.28 - 0.48	3.4 - 5.8	ug/kg		-
Volatiles	Chloroethane	75-00-3	0 / 136			0.11 - 0.19	3.4 - 5.8	ug/kg		-
Volatiles	Vinyl Chloride	75-01-4	0 / 136			0.17 - 0.29	3.4 - 5.8	ug/kg		-
Volatiles	Methylene chloride	75-09-2	17 / 136	0.31 J	16	0.2 - 0.35	3.4 - 5.8	ug/kg	SL-015-SA5C	4 - 5
Volatiles	Bromoform	75-25-2	0 / 136			0.34 - 0.58	3.4 - 5.8	ug/kg		-
Volatiles	Bromodichloromethane	75-27-4	0 / 136			0.07 - 0.12	3.4 - 5.8	ug/kg		-
Volatiles	1,1-Dichloroethane	75-34-3	0 / 136			0.08 - 0.15	3.4 - 5.8	ug/kg		-
Volatiles	1,1-Dichloroethene	75-35-4	0 / 136			0.33 - 0.56	3.4 - 5.8	ug/kg		-
Volatiles	Trichlorofluoromethane	75-69-4	0 / 136			0.25 - 0.42	3.4 - 5.8	ug/kg		-
Volatiles	Dichlorodifluoromethane	75-71-8	0 / 136			0.1 - 0.17	3.4 - 5.8	ug/kg		-
Volatiles	Freon 113a	75-88-7	0 / 136			0.42 - 0.72	4.2 - 7.2	ug/kg		-
Volatiles	Freon 113	76-13-1	0 / 136			0.09 - 0.16	3.4 - 5.8	ug/kg		-
Volatiles	1,2-Dichloropropane	78-87-5	0 / 136			0.14 - 0.25	3.4 - 5.8	ug/kg		-
Volatiles	2-Butanone	78-93-3	7 / 136	1.7 J	16	1 - 1.8	6.8 - 12	ug/kg	SL-027-SA5C	2.5 - 3.5
Volatiles	1,1,2-Trichloroethane	79-00-5	0 / 136			0.23 - 0.39	3.4 - 5.8	ug/kg		-

Table 3-2
Summary of Analytical Results for Chemicals - Validated Data
Subsurface Soils
HSA-5C

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	Depth of Maximum Concentration (ft)
Volatiles	Trichloroethene	79-01-6	2 / 136	0.18 J	0.87 J	0.13 - 0.22	3.4 - 5.8	ug/kg	SL-070-SA5C	4 - 5
Volatiles	1,1,2,2-Tetrachloroethane	79-34-5	0 / 136			0.19 - 0.33	3.4 - 5.8	ug/kg		-
Volatiles	Chlorotrifluoroethene	79-38-9	0 / 136			0.42 - 0.72	4.2 - 7.2	ug/kg		-
Volatiles	1,2,3-Trichlorobenzene	87-61-6	0 / 136			0.12 - 0.2	3.4 - 5.8	ug/kg		-
Volatiles	o-Xylene	95-47-6	0 / 136			0.14 - 0.25	3.4 - 5.8	ug/kg		-
Volatiles	2-Chlorotoluene	95-49-8	0 / 136			0.12 - 0.2	3.4 - 5.8	ug/kg		-
Volatiles	1,2,4-Trimethylbenzene	95-63-6	0 / 136			0.34 - 0.58	3.4 - 5.8	ug/kg		-
Volatiles	1,2-Dibromo-3-chloropropan	96-12-8	0 / 136			0.59 - 1	3.4 - 5.8	ug/kg		-
Volatiles	1,2,3-Trichloropropane	96-18-4	0 / 136			0.28 - 0.48	3.4 - 5.8	ug/kg		-
Volatiles	tert-Butylbenzene	98-06-6	0 / 136			0.14 - 0.23	3.4 - 5.8	ug/kg		-
Volatiles	Isopropylbenzene	98-82-8	0 / 136			0.05 - 0.09	3.4 - 5.8	ug/kg		-

Table 3-3
Summary of Chemical Results - Validated Data
Combined Surface and Subsurface Data
HSA-5C

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	Depth of Maximum Concentration (ft)
Inorganic	Nitrate	14797-55-8	69 / 79	0.96 J	15.8 J	0.82 - 0.98	1.5 - 1.8	mg/kg	SL-028-SA5C	4 - 5
Inorganic	Fluoride	16984-48-8	253 / 262	0.9 J	31.7	0.82 - 1.1	1 - 1.3	mg/kg	SL-064-SA5C	4 - 5
Inorganic	Cyanide	57-12-5	1 / 79	1.2	1.2	0.18 - 0.23	0.5 - 0.63	mg/kg	SL-060-SA5C	9 - 10
Inorganic	Aluminum	7429-90-5	261 / 261	8620	40600	4.98 - 27.5	19.8 - 109	mg/kg	SL-071-SA5C	4 - 5
Inorganic	Iron	7439-89-6	261 / 261	12600	46200	4.66 - 27.9	19.8 - 118	mg/kg	SL-043-SA5C	2 - 3
Inorganic	Lead	7439-92-1	261 / 261	2.77 J	514 J	0.0104 - 0.117	0.201 - 2.25	mg/kg	SL-090-SA5C	0 - 0.5
Inorganic	Lithium	7439-93-2	260 / 261	10	60.2	0.22 - 0.29	2 - 2.6	mg/kg	SL-043-SA5C	2 - 3
Inorganic	Magnesium	7439-95-4	261 / 261	2580	11400	2.52 - 3.33	9.9 - 13.1	mg/kg	SL-043-SA5C	2 - 3
Inorganic	Manganese	7439-96-5	261 / 261	80.4 J	1490 J	0.0772 - 0.411	0.495 - 2.64	mg/kg	SL-080-SA5C	7.5 - 8.5
Inorganic	Mercury	7439-97-6	141 / 261	0.0032 J	1.01	0.0028 - 0.0152	0.0982 - 0.529	mg/kg	SL-104-SA5C	0 - 0.5
Inorganic	Molybdenum	7439-98-7	256 / 261	0.148 J	3.87 J	0.05 - 0.0668	0.1 - 0.134	mg/kg	SL-012-SA5C	9 - 10
Inorganic	Nickel	7440-02-0	261 / 261	6.13	50.6	0.1 - 0.134	0.4 - 0.535	mg/kg	SL-056-SA5C	4 - 5
Inorganic	Potassium	7440-09-7	260 / 261	1020	6050 J	17.8 - 23.6	49.5 - 65.5	mg/kg	SL-018-SA5C	0 - 0.5
Inorganic	Silver	7440-22-4	246 / 261	0.0123 J	13.3	0.012 - 0.016	0.1 - 0.134	mg/kg	SL-128-SA5C	0 - 0.5
Inorganic	Sodium	7440-23-5	261 / 261	62.2 J	1530	36.9 - 48.9	99 - 131	mg/kg	SL-026-SA5C	9 - 10
Inorganic	Strontium	7440-24-6	261 / 261	10.9	123	0.0614 - 0.0813	0.495 - 0.655	mg/kg	SL-122-SA5C	4 - 5
Inorganic	Thallium	7440-28-0	260 / 261	0.127	0.657 J	0.03 - 0.0401	0.1 - 0.134	mg/kg	SL-060-SA5C	10 - 11
Inorganic	Tin	7440-31-5	40 / 261	2.12	3.63	0.99 - 1.31	9.9 - 13.1	mg/kg	SL-117-SA5C	0 - 0.5
Inorganic	Titanium	7440-32-6	261 / 261	679	2330	0.398 - 2.25	1.05 - 5.91	mg/kg	SL-043-SA5C	2 - 3
Inorganic	Antimony	7440-36-0	163 / 261	0.0627 J	9.42 J	0.06 - 0.0802	0.2 - 0.267	mg/kg	SL-090-SA5C	0 - 0.5
Inorganic	Arsenic	7440-38-2	261 / 261	2.41 J	16.7 J	0.06 - 0.0877	0.4 - 0.535	mg/kg	SL-066-SA5C	3 - 4
Inorganic	Beryllium	7440-41-7	261 / 261	0.227	1.6 J	0.016 - 0.0214	0.1 - 0.134	mg/kg	SL-071-SA5C	9 - 10
Inorganic	Barium	7440-39-3	261 / 261	40.9 J	321 J	0.108 - 0.581	0.4 - 2.15	mg/kg	SL-120-SA5C	9 - 10
Inorganic	Boron	7440-42-8	227 / 261	0.988 J	53	0.881 - 5.15	4.95 - 28.9	mg/kg	SL-039-SA5C	0 - 0.5
Inorganic	Cadmium	7440-43-9	233 / 261	0.0376 J	7.19	0.036 - 0.0481	0.1 - 0.134	mg/kg	SL-056-SA5C	0 - 0.5
Inorganic	Chromium	7440-47-3	261 / 261	10.4	55.4	0.12 - 0.16	0.4 - 0.535	mg/kg	SL-001-SA5C SL-117-SA5C	9 - 10 0 0.5
Inorganic	Cobalt	7440-48-4	260 / 261	3.18	35.1 J	0.02 - 0.0267	0.1 - 0.134	mg/kg	SL-101-SA5C	4 - 5
Inorganic	Copper	7440-50-8	261 / 261	4.44	97.1 J	0.066 - 0.0882	0.4 - 0.535	mg/kg	SL-080-SA5C	0 - 0.5
Inorganic	Vanadium	7440-62-2	261 / 261	22.6 J	101	0.0221 - 0.0294	0.1 - 0.134	mg/kg	SL-001-SA5C	9 - 10
Inorganic	Zinc	7440-66-6	261 / 261	32.7 J	1250 J	0.56 - 6.34	3 - 33.9	mg/kg	SL-056-SA5C	0 - 0.5
Inorganic	Zirconium	7440-67-7	252 / 261	0.93 J	24.7	0.832 - 1.1	4.95 - 6.55	mg/kg	SL-056-SA5C	0 - 0.5
Inorganic	Calcium	7440-70-2	261 / 261	1190	89700	6.07 - 34	19.8 - 111	mg/kg	SL-122-SA5C	4 - 5
Inorganic	Phosphorus	7723-14-0	260 / 261	76.7 J	1120 J	0.555 - 1.18	9.9 - 21	mg/kg	SL-014-SA5C	4 - 5
Inorganic	Selenium	7782-49-2	225 / 261	0.0439 J	0.727	0.04 - 0.0535	0.4 - 0.535	mg/kg	SL-056-SA5C	0 - 0.5
Inorganic	Chromium VI	18540-29-9	135 / 262	0.23 J	7.1	0.21 - 0.27	1 - 1.3	mg/kg	SL-090-SA5C	0 - 0.5
Inorganic	Perchlorate - 314	14797-73-0	26 / 257	9.7 J	156	9.3 - 12	30.9 - 40.1	ug/kg	SL-025-SA5C	9 - 10
Inorganic	Perchlorate - 6850	14797-73-0	2 / 31	2.6 J	4.6 J	2.2 - 2.5	5.2 - 5.9	ug/kg	SL-137-SA5C	4.5 - 5.5
Inorganic	Percent Moisture		248 / 264	2.9	25.2	0.5 - 0.5	0.5 - 0.5	%	SL-115-SA5C	0 - 0.5
Inorganic	Soil pH	pH	261 / 262	5.46	9.22	0.01 - 0.01	0.01 - 0.01	pH unit	SL-122-SA5C	4 - 5
Inorganic	Hydrazine	302-01-2	1 / 26	0.9 J	0.9 J	0.51 - 0.6	2.1 - 2.4	ng/g	SL-044-SA5C	9 - 10
Inorganic	Methylhydrazine	60-34-4	0 / 26			2.1 - 2.4	5.1 - 6	ng/g		-
Inorganic	1,1-Dimethylhydrazine	57-14-7	0 / 26			2.1 - 2.4	5.1 - 6	ng/g		-
Misc. Organics	Ethanol	64-17-5	33 / 79	110 J	330 J	100 - 120	510 - 610	ug/kg	SL-012-SA5C	9 - 10
Misc. Organics	Methanol	67-56-1	29 / 79	110 J	690	100 - 120	510 - 610	ug/kg	SL-002-SA5C	9 - 10
Misc. Organics	2-Propanol	67-63-0	0 / 79			100 - 120	510 - 610	ug/kg		-
Misc. Organics	Ethylene Glycol	107-21-1	0 / 72			5.1 - 13	13 - 15	mg/kg		-
Misc. Organics	Diethylene Glycol	111-46-6	0 / 72			5.1 - 11	13 - 15	mg/kg		-

Table 3-3
Summary of Chemical Results - Validated Data
Combined Surface and Subsurface Data
HSA-5C

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	Depth of Maximum Concentration (ft)
Misc. Organics	Propylene glycol	57-55-6	0 / 71			5.1 - 6.1	13 - 15	mg/kg		-
Misc. Organics	o-Terphenyl	84-15-1	0 / 79			1.5 - 3.3	3.6 - 7.7	mg/kg		-
Misc. Organics	m-Terphenyl	92-06-8	0 / 79			1.5 - 3.3	3.6 - 7.7	mg/kg		-
Misc. Organics	p-Terphenyl	92-94-4	0 / 79			1.5 - 3.3	3.6 - 7.7	mg/kg		-
Misc. Organics	Formaldehyde	50-00-0	15 / 79	670 J	10000	620 - 730	1500 - 1800	ug/kg	SL-059-SA5C	1 - 2
Misc. Organics	2,6-Dinitrotoluene	606-20-2	0 / 79			51 - 61	150 - 180	ug/kg		-
Misc. Organics	2,4,6-Trinitrotoluene	118-96-7	0 / 79			51 - 61	150 - 180	ug/kg		-
Misc. Organics	RDX	121-82-4	0 / 79			64 - 200	150 - 200	ug/kg		-
Misc. Organics	4-Amino-2,6-Dinitrotoluene	19406-51-0	0 / 79			77 - 92	150 - 180	ug/kg		-
Misc. Organics	HMX	2691-41-0	0 / 79			130 - 150	390 - 460	ug/kg		-
Misc. Organics	2-Amino-4,6-Dinitrotoluene	35572-78-2	0 / 79			51 - 61	150 - 180	ug/kg		-
Misc. Organics	Tetryl	479-45-8	0 / 79			79 - 140	150 - 180	ug/kg		-
Misc. Organics	Nitroglycerin	55-63-0	0 / 79			1000 - 1200	3100 - 3700	ug/kg		-
Misc. Organics	2,6-Diamino-4-nitrotoluene	59229-75-3	0 / 79			100 - 120	310 - 370	ug/kg		-
Misc. Organics	2,4-Diamino-6-nitrotoluene	6629-29-4	0 / 79			100 - 120	310 - 370	ug/kg		-
Misc. Organics	PETN	78-11-5	0 / 79			1000 - 1200	3100 - 3700	ug/kg		-
Misc. Organics	2-Nitrotoluene	88-72-2	0 / 79			100 - 120	150 - 180	ug/kg		-
Misc. Organics	3-Nitrotoluene	99-08-1	0 / 79			130 - 150	150 - 180	ug/kg		-
Misc. Organics	1,3,5-Trinitrobenzene	99-35-4	0 / 79			51 - 61	150 - 180	ug/kg		-
Misc. Organics	4-Nitrotoluene	99-99-0	0 / 79			100 - 120	150 - 180	ug/kg		-
Misc. Organics	2,4-Dinitrotoluene	121-14-2	0 / 79			51 - 61	150 - 180	ug/kg		-
Misc. Organics	Nitrobenzene	98-95-3	0 / 79			51 - 61	150 - 180	ug/kg		-
Misc. Organics	m-Dinitrobenzene	99-65-0	5 / 79	92 J	300	51 - 61	150 - 180	ug/kg	SL-044-SA5C	4 - 5
Herbicides	Dichlorprop	120-36-5	0 / 82			0.84 - 19	1.8 - 40	ug/kg		-
Herbicides	Dicamba	1918-00-9	6 / 82	0.55 J	1.2 J	0.42 - 9.5	1.3 - 29	ug/kg	SL-073-SA5C	0 - 0.5
Herbicides	2,2-Dichlor-Propionic Acid	75-99-0	0 / 82			4.6 - 100	9.4 - 210	ug/kg		-
Herbicides	Dinitrobutyl Phenol	88-85-7	2 / 82	0.9	2.6 J	0.84 - 19	2.5 - 57	ug/kg	SL-090-SA5C	0 - 0.5
Herbicides	MCPP	93-65-2	23 / 82	130 J	960 J	79 - 1800	260 - 6000	ug/kg	SL-073-SA5C	0 - 0.5
Herbicides	2,4,5-TP	93-72-1	2 / 82	0.14 J	0.38	0.078 - 1.8	0.18 - 4	ug/kg	SL-128-SA5C	0 - 0.5
Herbicides	2,4,5-T	93-76-5	11 / 82	0.11 J	3.3	0.086 - 2	0.18 - 4	ug/kg	SL-056-SA5C	0 - 0.5
Herbicides	MCPA	94-74-6	34 / 82	120 J	1100 J	79 - 1800	260 - 6000	ug/kg	SL-125-SA5C	0 - 0.5
Herbicides	2,4-D	94-75-7	2 / 82	2.2 J	4.2 J	1.3 - 29	3.8 - 86	ug/kg	SL-073-SA5C	0 - 0.5
Herbicides	2,4 DB	94-82-6	18 / 82	2	23 J	0.65 - 15	1.8 - 40	ug/kg	SL-073-SA5C	0 - 0.5
Pesticides	Toxaphene	8001-35-2	0 / 82			2.3 - 25	6.9 - 76	ug/kg		-
Pesticides	Heptachlor Epoxide	1024-57-3	3 / 82	0.15 J	1.1	0.035 - 4.4	0.17 - 4.4	ug/kg	SL-117-SA5C	0 - 0.5
Pesticides	Endosulfan Sulfate	1031-07-8	1 / 82	0.12 J	0.12 J	0.069 - 1.6	0.35 - 3.9	ug/kg	SL-097-SA5C	0 - 0.5
Pesticides	Mirex	2385-85-5	2 / 82	0.79 J	9.5 J	0.069 - 6.2	0.35 - 6.2	ug/kg	SL-039-SA5C	0 - 0.5
Pesticides	Aldrin	309-00-2	1 / 82	0.1	0.1	0.069 - 0.99	0.17 - 1.9	ug/kg	SL-132-SA5C	0 - 0.5
Pesticides	Alpha-BHC	319-84-6	2 / 82	0.36 J	0.54 J	0.035 - 1.4	0.17 - 1.9	ug/kg	SL-090-SA5C	0 - 0.5
Pesticides	Beta-BHC	319-85-7	23 / 82	0.065	0.66	0.063 - 0.69	0.17 - 1.9	ug/kg	SL-128-SA5C	0 - 0.5
Pesticides	Delta-BHC	319-86-8	20 / 82	0.049 J	0.57	0.038 - 0.42	0.17 - 1.9	ug/kg	SL-043-SA5C	0 - 0.5
Pesticides	Endosulfan II	33213-65-9	0 / 82			0.071 - 4.6	0.35 - 4.6	ug/kg		-
Pesticides	4,4'-DDT	50-29-3	0 / 82			0.07 - 41	0.36 - 41	ug/kg		-
Pesticides	Endrin Ketone	53494-70-5	1 / 82	3.8	3.8	0.069 - 3.3	0.35 - 3.9	ug/kg	SL-117-SA5C	0 - 0.5
Pesticides	Chlordane	57-74-9	0 / 82			0.88 - 38	3.6 - 39	ug/kg		-
Pesticides	Gamma-BHC (Lindane)	58-89-9	9 / 82	0.05 J	0.24 J	0.035 - 0.39	0.17 - 1.9	ug/kg	SL-108-SA5C	0 - 0.5
Pesticides	Dieldrin	60-57-1	2 / 82	0.1 J	0.34 J	0.069 - 15	0.36 - 15	ug/kg	SL-049-SA5C	0 - 0.5
Pesticides	Endrin	72-20-8	0 / 82			0.069 - 2.9	0.35 - 3.9	ug/kg		-

Table 3-3
Summary of Chemical Results - Validated Data
Combined Surface and Subsurface Data
HSA-5C

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	Depth of Maximum Concentration (ft)
Pesticides	Methoxychlor	72-43-5	0 / 82			0.35 - 19	1.7 - 19	ug/kg		-
Pesticides	4,4'-DDD	72-54-8	0 / 82			0.07 - 5.2	0.36 - 5.2	ug/kg		-
Pesticides	4,4'-DDE	72-55-9	0 / 82			0.072 - 23	0.36 - 23	ug/kg		-
Pesticides	Endrin Aldehyde	7421-93-4	0 / 82			0.069 - 16	0.35 - 16	ug/kg		-
Pesticides	Heptachlor	76-44-8	4 / 82	0.15	0.39 J	0.063 - 1.1	0.17 - 1.9	ug/kg	SL-144-SA5C	0 - 0.5
Pesticides	Endosulfan I	959-98-8	0 / 82			0.046 - 0.51	0.17 - 1.9	ug/kg		-
Dioxins/Furans	2,3,7,8-TCDD	1746-01-6	75 / 263	0.0108 J	2.51	0.00507 - 0.545	1.03 - 5.36	ng/kg	SL-056-SA5C	0 - 0.5
Dioxins/Furans	1,2,3,7,8,9-HxCDD	19408-74-3	150 / 263	0.0295	134	0.00896 - 1.9	5.15 - 26.8	ng/kg	SL-056-SA5C	0 - 0.5
Dioxins/Furans	OCDD	3268-87-9	177 / 263	0.405	76600 J	0.0118 - 6.39	10.3 - 53.6	ng/kg	SL-056-SA5C	0 - 0.5
Dioxins/Furans	1,2,3,4,6,7,8-HpCDD	35822-46-9	159 / 263	0.146	12900 J	0.00942 - 9.59	5.15 - 26.8	ng/kg	SL-056-SA5C	0 - 0.5
Dioxins/Furans	OCDF	39001-02-0	125 / 263	0.181	1000	0.0065 - 1.31	10.3 - 53.6	ng/kg	SL-125-SA5C	0 - 0.5
Dioxins/Furans	1,2,3,4,7,8-HxCDD	39227-28-6	129 / 263	0.0149	21.3	0.0085 - 1.83	5.15 - 26.8	ng/kg	SL-057-SA5C	0 - 0.5
Dioxins/Furans	1,2,3,7,8-PeCDD	40321-76-4	130 / 263	0.0113 J	16.9	0.00902 - 1.05	5.15 - 26.8	ng/kg	SL-056-SA5C	0 - 0.5
Dioxins/Furans	2,3,7,8-TCDF	51207-31-9	92 / 263	0.0167	5.57	0.00605 - 0.65	1.03 - 5.36	ng/kg	SL-056-SA5C	0 - 0.5
Dioxins/Furans	1,2,3,4,7,8,9-HpCDF	55673-89-7	76 / 263	0.0417	18.5	0.00643 - 1.9	5.15 - 26.8	ng/kg	SL-117-SA5C	0 - 0.5
Dioxins/Furans	2,3,4,7,8-PeCDF	57117-31-4	79 / 263	0.0618	15.6	0.0039 - 0.367	5.15 - 26.8	ng/kg	SL-056-SA5C	0 - 0.5
Dioxins/Furans	1,2,3,7,8-PeCDF	57117-41-6	90 / 263	0.0296	9.01	0.00459 - 0.35	5.15 - 26.8	ng/kg	SL-086-SA5C	0 - 0.5
Dioxins/Furans	1,2,3,6,7,8-HxCDF	57117-44-9	80 / 263	0.0666	15.4	0.00593 - 0.704	5.15 - 26.8	ng/kg	SL-117-SA5C	0 - 0.5
Dioxins/Furans	1,2,3,6,7,8-HxCDD	57653-85-7	140 / 263	0.0272	332	0.00896 - 2.05	5.15 - 26.8	ng/kg	SL-056-SA5C	0 - 0.5
Dioxins/Furans	2,3,4,6,7,8-HxCDF	60851-34-5	66 / 263	0.066	20.2	0.00604 - 0.657	5.15 - 26.8	ng/kg	SL-117-SA5C	0 - 0.5
Dioxins/Furans	1,2,3,4,6,7,8-HpCDF	67562-39-4	100 / 263	0.269	337	0.00521 - 2.05	5.15 - 26.8	ng/kg	SL-117-SA5C	0 - 0.5
Dioxins/Furans	1,2,3,4,7,8-HxCDF	70648-26-9	77 / 263	0.052 J	23.7	0.00637 - 0.71	5.15 - 26.8	ng/kg	SL-117-SA5C	0 - 0.5
Dioxins/Furans	1,2,3,7,8,9-HxCDF	72918-21-9	84 / 263	0.0543	9.49	0.00692 - 0.641	5.15 - 26.8	ng/kg	SL-117-SA5C	0 - 0.5
PCBs	Aroclor 1260	11096-82-5	110 / 262	0.39	430	0.34 - 92	1.8 - 470	ug/kg	SL-086-SA5C	0 - 0.5
PCBs	Aroclor 1254	11097-69-1	111 / 262	0.39 J	1100	0.34 - 92	1.8 - 470	ug/kg	SL-124-SA5C	0 - 0.5
PCBs	Aroclor 1268	11100-14-4	0 / 262			0.34 - 92	1.8 - 470	ug/kg		-
PCBs	Aroclor 1221	11104-28-2	0 / 262			0.38 - 140	1.8 - 470	ug/kg		-
PCBs	Aroclor 5460	11126-42-4	73 / 262	1.3 J	190	1 - 280	3.4 - 920	ug/kg	SL-096-SA5C	0 - 0.5
PCBs	Aroclor 1232	11141-16-5	0 / 262			0.38 - 140	1.8 - 470	ug/kg		-
PCBs	Aroclor 5442	12642-23-8	0 / 262			1 - 280	3.4 - 920	ug/kg		-
PCBs	Aroclor 1248	12672-29-6	14 / 262	0.67 J	13	0.34 - 92	1.8 - 470	ug/kg	SL-109-SA5C	4 - 5
PCBs	Aroclor 1016	12674-11-2	0 / 262			0.34 - 92	1.8 - 470	ug/kg		-
PCBs	Aroclor 1262	37324-23-5	0 / 262			0.34 - 92	1.8 - 470	ug/kg		-
PCBs	Aroclor 1242	53469-21-9	0 / 262			0.38 - 140	1.8 - 470	ug/kg		-
PCBs	Aroclor 5432	63496-31-1	0 / 262			1 - 280	3.4 - 920	ug/kg		-
Semivolatiles	N-Nitrosodimethylamine	62-75-9	49 / 79	22.3 J	870	17.2 - 40.2	34.3 - 80.3	ng/kg	SL-044-SA5C	4 - 5
Semivolatiles	N-Nitrosodimethylamine	62-75-9	15 / 262	0.75 J	16	0.69 - 8.6	1.7 - 22	ug/kg	SL-130-SA5C	0 - 0.5
Semivolatiles	2,4-Dinitrotoluene	121-14-2	0 / 262			34 - 190	170 - 970	ug/kg		-
Semivolatiles	Nitrobenzene	98-95-3	0 / 262			17 - 97	170 - 970	ug/kg		-
Semivolatiles	1,4-Dichlorobenzene	106-46-7	0 / 262			17 - 97	170 - 970	ug/kg		-
Semivolatiles	1,2,4-Trichlorobenzene	120-82-1	0 / 262			17 - 97	170 - 970	ug/kg		-
Semivolatiles	1,3-Dichlorobenzene	541-73-1	0 / 262			17 - 97	170 - 970	ug/kg		-
Semivolatiles	Hexachlorobutadiene	87-68-3	0 / 262			69 - 390	170 - 970	ug/kg		-
Semivolatiles	1,2-Dichlorobenzene	95-50-1	0 / 262			17 - 97	170 - 970	ug/kg		-
Semivolatiles	4-Nitroaniline	100-01-6	0 / 262			69 - 390	170 - 970	ug/kg		-
Semivolatiles	4-Nitrophenol	100-02-7	0 / 262			170 - 970	510 - 2900	ug/kg		-
Semivolatiles	4-Bromophenyl Phenyl Ether	101-55-3	0 / 262			17 - 97	170 - 970	ug/kg		-
Semivolatiles	2,4-Dimethylphenol	105-67-9	0 / 262			34 - 190	170 - 970	ug/kg		-

Table 3-3
Summary of Chemical Results - Validated Data
Combined Surface and Subsurface Data
HSA-5C

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	Depth of Maximum Concentration (ft)
Semivolatiles	4-Methylphenol	106-44-5	0 / 262			34 - 190	170 - 970	ug/kg		-
Semivolatiles	4-Chloroaniline	106-47-8	0 / 262			69 - 390	170 - 970	ug/kg		-
Semivolatiles	3,5-Dimethylphenol	108-68-9	1 / 262	130 J	130 J	34 - 190	170 - 970	ug/kg	SL-017-SA5C	4 - 5
Semivolatiles	Phenol	108-95-2	0 / 262			17 - 97	170 - 970	ug/kg		-
Semivolatiles	Bis(2-Chloroethyl) ether	111-44-4	0 / 262			17 - 97	170 - 970	ug/kg		-
Semivolatiles	Bis(2-Chloroethoxy) methane	111-91-1	0 / 262			17 - 97	170 - 970	ug/kg		-
Semivolatiles	Bis(2-Ethylhexyl) phthalate	117-81-7	122 / 262	6.8 J	620	6.2 - 97	19 - 1900	ug/kg	SL-123-SA5C	0 - 0.5
Semivolatiles	Di-N-Octyl Phthalate	117-84-0	28 / 262	6.9 J	80 J	6.2 - 97	19 - 970	ug/kg	SL-078-SA5C	0 - 0.5
Semivolatiles	Hexachlorobenzene	118-74-1	0 / 262			17 - 97	170 - 970	ug/kg		-
Semivolatiles	Anthracene	120-12-7	40 / 262	0.39 J	440	0.34 - 4.3	1.7 - 22	ug/kg	SL-124-SA5C	0 - 0.5
Semivolatiles	2,4-Dichlorophenol	120-83-2	0 / 262			17 - 97	170 - 970	ug/kg		-
Semivolatiles	1,2-Diphenylhydrazine	122-66-7	0 / 262			17 - 97	170 - 970	ug/kg		-
Semivolatiles	Pyrene	129-00-0	95 / 262	0.78 J	7600	0.69 - 37	1.7 - 220	ug/kg	SL-124-SA5C	0 - 0.5
Semivolatiles	Dimethylphthalate	131-11-3	0 / 262			6.2 - 97	19 - 970	ug/kg		-
Semivolatiles	Dibenzofuran	132-64-9	3 / 262	21	28	17 - 97	170 - 970	ug/kg	SL-117-SA5C	0 - 0.5
Semivolatiles	Benzo(g,h,i)perylene	191-24-2	78 / 262	0.74 J	570	0.69 - 97	1.7 - 970	ug/kg	SL-124-SA5C	0 - 0.5
Semivolatiles	Indeno(1,2,3-Cd)Pyrene	193-39-5	52 / 262	0.75 J	620	0.69 - 21	1.7 - 210	ug/kg	SL-124-SA5C	0 - 0.5
Semivolatiles	Benzo(b)fluoranthene	205-99-2	118 / 262	0.79 J	2700	0.69 - 97	1.7 - 970	ug/kg	SL-124-SA5C	0 - 0.5
Semivolatiles	Fluoranthene	206-44-0	90 / 262	0.74 J	8400	0.69 - 97	1.7 - 970	ug/kg	SL-124-SA5C	0 - 0.5
Semivolatiles	Benzo(k)fluoranthene	207-08-9	63 / 262	0.72 J	1100	0.69 - 19	1.7 - 190	ug/kg	SL-124-SA5C	0 - 0.5
Semivolatiles	Acenaphthylene	208-96-8	15 / 262	0.41 J	7.7 J	0.34 - 4.3	1.7 - 22	ug/kg	SL-116-SA5C	0 - 0.5
Semivolatiles	Chrysene	218-01-9	128 / 262	0.35 J	3400	0.34 - 97	1.7 - 970	ug/kg	SL-124-SA5C	0 - 0.5
Semivolatiles	bis(2-Chloroisopropyl) ether	39638-32-9	0 / 262			17 - 97	170 - 970	ug/kg		-
Semivolatiles	Benzo(a)pyrene	50-32-8	93 / 262	0.77 J	1800	0.69 - 22	1.7 - 220	ug/kg	SL-124-SA5C	0 - 0.5
Semivolatiles	2,4-Dinitrophenol	51-28-5	0 / 262			690 - 3900	1100 - 12000	ug/kg		-
Semivolatiles	4,6-Dinitro-2-Methylphenol	534-52-1	0 / 262			170 - 970	510 - 2900	ug/kg		-
Semivolatiles	Dibenzo(a,h)anthracene	53-70-3	35 / 262	0.8 J	230	0.69 - 21	1.7 - 210	ug/kg	SL-124-SA5C	0 - 0.5
Semivolatiles	Benzo(a)anthracene	56-55-3	80 / 262	0.79 J	3000	0.69 - 20	1.7 - 200	ug/kg	SL-124-SA5C	0 - 0.5
Semivolatiles	4-Chloro-3-Methylphenol	59-50-7	0 / 262			34 - 190	170 - 970	ug/kg		-
Semivolatiles	N-Nitroso-Di-N-Propylamine	621-64-7	0 / 262			17 - 97	170 - 970	ug/kg		-
Semivolatiles	Aniline	62-53-3	0 / 262			170 - 970	510 - 2900	ug/kg		-
Semivolatiles	Benzoic Acid	65-85-0	1 / 262	2100	2100	170 - 970	510 - 2900	ug/kg	SL-123-SA5C	0 - 0.5
Semivolatiles	Hexachloroethane	67-72-1	0 / 262			17 - 97	170 - 970	ug/kg		-
Semivolatiles	4-Chlorophenyl Phenylether	7005-72-3	0 / 262			34 - 190	170 - 970	ug/kg		-
Semivolatiles	Hexachlorocyclopentadiene	77-47-4	0 / 262			170 - 970	510 - 2900	ug/kg		-
Semivolatiles	Isophorone	78-59-1	0 / 262			17 - 97	170 - 970	ug/kg		-
Semivolatiles	Acenaphthene	83-32-9	8 / 262	0.91 J	92	0.69 - 8.6	1.7 - 22	ug/kg	SL-124-SA5C	0 - 0.5
Semivolatiles	Diethylphthalate	84-66-2	2 / 262	8 J	14 J	6.2 - 97	19 - 970	ug/kg	SL-038-SA5C	0 - 0.5
Semivolatiles	Di-n-Butylphthalate	84-74-2	15 / 262	6.7 J	16000	6.2 - 710	19 - 2100	ug/kg	SL-056-SA5C	0 - 0.5
Semivolatiles	Phenanthrene	85-01-8	75 / 262	0.72 J	3000	0.69 - 97	1.7 - 970	ug/kg	SL-124-SA5C	0 - 0.5
Semivolatiles	Butylbenzylphthalate	85-68-7	20 / 262	7.2 J	280 J	6.2 - 97	19 - 970	ug/kg	SL-114-SA5C	0 - 0.5
Semivolatiles	N-Nitrosodiphenylamine	86-30-6	0 / 262			17 - 97	170 - 970	ug/kg		-
Semivolatiles	Fluorene	86-73-7	9 / 262	0.89 J	53	0.69 - 8.6	1.7 - 22	ug/kg	SL-124-SA5C	0 - 0.5
Semivolatiles	Carbazole	86-74-8	1 / 262	21	21	17 - 97	170 - 970	ug/kg	SL-117-SA5C	0 - 0.5
Semivolatiles	Pentachlorophenol	87-86-5	1 / 262	190 J	190 J	170 - 970	510 - 2900	ug/kg	SL-057-SA5C	0 - 0.5
Semivolatiles	2,4,6-Trichlorophenol	88-06-2	0 / 262			34 - 190	170 - 970	ug/kg		-
Semivolatiles	2-Nitroaniline	88-74-4	0 / 262			17 - 97	170 - 970	ug/kg		-
Semivolatiles	2-Nitrophenol	88-75-5	0 / 262			17 - 97	170 - 970	ug/kg		-

Table 3-3
Summary of Chemical Results - Validated Data
Combined Surface and Subsurface Data
HSA-5C

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	Depth of Maximum Concentration (ft)
Semivolatiles	1-Methylnaphthalene	90-12-0	12 / 262	0.73	52	0.69 - 21	1.7 - 210	ug/kg	SL-117-SA5C	0 - 0.5
Semivolatiles	Naphthalene	91-20-3	41 / 262	0.76 J	23	0.69 - 21	1.7 - 210	ug/kg	SL-117-SA5C	0 - 0.5
Semivolatiles	2-Methylnaphthalene	91-57-6	13 / 262	0.86 J	51	0.69 - 21	1.7 - 210	ug/kg	SL-117-SA5C	0 - 0.5
Semivolatiles	2-Chloronaphthalene	91-58-7	0 / 262			17 - 97	170 - 970	ug/kg		-
Semivolatiles	3,3`-Dichlorobenzidine	91-94-1	0 / 262			100 - 580	340 - 1900	ug/kg		-
Semivolatiles	Benzidine	92-87-5	0 / 262			1200 - 6800	3400 - 19000	ug/kg		-
Semivolatiles	2-Methylphenol	95-48-7	0 / 262			34 - 190	170 - 970	ug/kg		-
Semivolatiles	2-Chlorophenol	95-57-8	0 / 262			17 - 97	170 - 970	ug/kg		-
Semivolatiles	2,4,5-Trichlorophenol	95-95-4	0 / 262			34 - 190	170 - 970	ug/kg		-
Semivolatiles	3-Nitroaniline	99-09-2	0 / 262			34 - 190	170 - 970	ug/kg		-
Semivolatiles	Benzyl Alcohol	100-51-6	0 / 262			170 - 970	510 - 2900	ug/kg		-
Semivolatiles	2,6-Dinitrotoluene	606-20-2	0 / 262			17 - 97	170 - 970	ug/kg		-
Volatiles	GRO (C5-C12)	GROC5C12	0 / 73			0.2 - 0.3	0.9 - 1.3	mg/kg		-
Volatiles	EFH (C15-C20)	PHCC15C20	16 / 71	0.46 J	13	0.41 - 8.6	1.2 - 26	mg/kg	SL-046-SA5C	4 - 5
Volatiles	EFH (C21-C30)	PHCC21C30	48 / 72	0.53 J	190	0.41 - 8.6	1.2 - 26	mg/kg	SL-039-SA5C	4 - 5
Volatiles	EFH (C30-C40)	PHCC30C40	62 / 72	0.45 J	520	0.41 - 8.6	1.2 - 26	mg/kg	SL-039-SA5C	4 - 5
Volatiles	EFH (C8-C11)	PHCC8C11	0 / 72			0.41 - 8.6	1.2 - 26	mg/kg		-
Volatiles	1,4-Dichlorobenzene	106-46-7	0 / 136			0.14 - 0.23	3.4 - 5.8	ug/kg		-
Volatiles	1,2,4-Trichlorobenzene	120-82-1	0 / 136			0.15 - 0.26	3.4 - 5.8	ug/kg		-
Volatiles	1,3-Dichlorobenzene	541-73-1	0 / 136			0.1 - 0.17	3.4 - 5.8	ug/kg		-
Volatiles	Hexachlorobutadiene	87-68-3	0 / 136			0.12 - 0.2	3.4 - 5.8	ug/kg		-
Volatiles	1,2-Dichlorobenzene	95-50-1	0 / 136			0.08 - 0.13	3.4 - 5.8	ug/kg		-
Volatiles	Isopropyltoluene	99-87-6	0 / 136			0.09 - 0.16	3.4 - 5.8	ug/kg		-
Volatiles	Ethylbenzene	100-41-4	1 / 136	0.07 J	0.07 J	0.05 - 0.09	3.4 - 5.8	ug/kg	SL-131-SA5C	4 - 5
Volatiles	Styrene	100-42-5	0 / 136			0.08 - 0.15	3.4 - 5.8	ug/kg		-
Volatiles	cis-1,3-Dichloropropene	10061-01-5	0 / 136			0.14 - 0.23	3.4 - 5.8	ug/kg		-
Volatiles	trans-1,3-Dichloropropene	10061-02-6	0 / 136			0.14 - 0.25	3.4 - 5.8	ug/kg		-
Volatiles	N-Propylbenzene	103-65-1	0 / 136			0.06 - 0.1	3.4 - 5.8	ug/kg		-
Volatiles	N-Butylbenzene	104-51-8	0 / 136			0.1 - 0.17	3.4 - 5.8	ug/kg		-
Volatiles	4-Chlorotoluene	106-43-4	0 / 136			0.12 - 0.2	3.4 - 5.8	ug/kg		-
Volatiles	1,2-Dibromoethane	106-93-4	0 / 136			0.14 - 0.25	3.4 - 5.8	ug/kg		-
Volatiles	1,2-Dichloroethane	107-06-2	0 / 136			0.13 - 0.22	3.4 - 5.8	ug/kg		-
Volatiles	4-Methyl-2-Pentanone	108-10-1	4 / 136	0.47 J	9.7	0.33 - 0.56	6.8 - 12	ug/kg	SL-017-SA5C	9 - 10
Volatiles	1,3,5-Trimethylbenzene	108-67-8	0 / 136			0.08 - 0.15	3.4 - 5.8	ug/kg		-
Volatiles	Bromobenzene	108-86-1	0 / 136			0.11 - 0.19	3.4 - 5.8	ug/kg		-
Volatiles	Toluene	108-88-3	16 / 136	0.08 J	1.2 J	0.07 - 0.12	3.4 - 5.8	ug/kg	SL-133-SA5C	4 - 5
Volatiles	Chlorobenzene	108-90-7	0 / 136			0.09 - 0.16	3.4 - 5.8	ug/kg		-
Volatiles	2-Chloroethyl Vinyl Ether	110-75-8	0 / 136			0.25 - 0.43	3.4 - 5.8	ug/kg		-
Volatiles	1,4-Dioxane	123-91-1	0 / 136			4.2 - 7.2	13 - 22	ug/kg		-
Volatiles	Dibromochloromethane	124-48-1	0 / 136			0.17 - 0.29	3.4 - 5.8	ug/kg		-
Volatiles	Tetrachloroethene	127-18-4	0 / 136			0.17 - 0.29	3.4 - 5.8	ug/kg		-
Volatiles	sec-Butylbenzene	135-98-8	0 / 136			0.05 - 0.09	3.4 - 5.8	ug/kg		-
Volatiles	1,3-Dichloropropane	142-28-9	0 / 136			0.07 - 0.12	3.4 - 5.8	ug/kg		-
Volatiles	cis-1,2-Dichloroethene	156-59-2	0 / 136			0.16 - 0.27	3.4 - 5.8	ug/kg		-
Volatiles	trans-1,2-Dichloroethene	156-60-5	0 / 136			0.1 - 0.17	3.4 - 5.8	ug/kg		-
Volatiles	Methyl tert-Butyl Ether	1634-04-4	0 / 136			0.18 - 0.3	3.4 - 5.8	ug/kg		-
Volatiles	m,p-Xylene	179601-23-1	1 / 136	0.19 J	0.19 J	0.14 - 0.25	3.4 - 5.8	ug/kg	SL-131-SA5C	4 - 5
Volatiles	Carbon tetrachloride	56-23-5	0 / 136			0.12 - 0.2	3.4 - 5.8	ug/kg		-

Table 3-3
Summary of Chemical Results - Validated Data
Combined Surface and Subsurface Data
HSA-5C

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	Depth of Maximum Concentration (ft)
Volatiles	1,1-Dichloropropene	563-58-6	0 / 136			0.11 - 0.19	3.4 - 5.8	ug/kg		-
Volatiles	2-Hexanone	591-78-6	0 / 136			1.4 - 2.3	6.8 - 12	ug/kg		-
Volatiles	2,2-Dichloropropane	594-20-7	0 / 136			0.14 - 0.25	3.4 - 5.8	ug/kg		-
Volatiles	1,1,1,2-Tetrachloroethane	630-20-6	0 / 136			0.09 - 0.16	3.4 - 5.8	ug/kg		-
Volatiles	Acetone	67-64-1	22 / 136	7.1 J	89	5.7 - 9.7	6.8 - 12	ug/kg	SL-027-SA5C	2.5 - 3.5
Volatiles	Chloroform	67-66-3	15 / 136	0.11 J	0.75 J	0.1 - 0.17	3.4 - 5.8	ug/kg	SL-125-SA5C	4 - 6
Volatiles	Benzene	71-43-2	1 / 136	0.11 J	0.11 J	0.08 - 0.15	3.4 - 5.8	ug/kg	SL-133-SA5C	4 - 5
Volatiles	1,1,1-Trichloroethane	71-55-6	0 / 136			0.17 - 0.29	3.4 - 5.8	ug/kg		-
Volatiles	Bromomethane	74-83-9	0 / 136			0.21 - 0.36	3.4 - 5.8	ug/kg		-
Volatiles	Chloromethane	74-87-3	0 / 136			0.28 - 0.48	3.4 - 5.8	ug/kg		-
Volatiles	Dibromomethane	74-95-3	0 / 136			0.2 - 0.35	3.4 - 5.8	ug/kg		-
Volatiles	Bromochloromethane	74-97-5	0 / 136			0.28 - 0.48	3.4 - 5.8	ug/kg		-
Volatiles	Chloroethane	75-00-3	0 / 136			0.11 - 0.19	3.4 - 5.8	ug/kg		-
Volatiles	Vinyl Chloride	75-01-4	0 / 136			0.17 - 0.29	3.4 - 5.8	ug/kg		-
Volatiles	Methylene chloride	75-09-2	17 / 136	0.31 J	16	0.2 - 0.35	3.4 - 5.8	ug/kg	SL-015-SA5C	4 - 5
Volatiles	Bromoform	75-25-2	0 / 136			0.34 - 0.58	3.4 - 5.8	ug/kg		-
Volatiles	Bromodichloromethane	75-27-4	0 / 136			0.07 - 0.12	3.4 - 5.8	ug/kg		-
Volatiles	1,1-Dichloroethane	75-34-3	0 / 136			0.08 - 0.15	3.4 - 5.8	ug/kg		-
Volatiles	1,1-Dichloroethene	75-35-4	0 / 136			0.33 - 0.56	3.4 - 5.8	ug/kg		-
Volatiles	Trichlorofluoromethane	75-69-4	0 / 136			0.25 - 0.42	3.4 - 5.8	ug/kg		-
Volatiles	Dichlorodifluoromethane	75-71-8	0 / 136			0.1 - 0.17	3.4 - 5.8	ug/kg		-
Volatiles	Freon 113a	75-88-7	0 / 136			0.42 - 0.72	4.2 - 7.2	ug/kg		-
Volatiles	Freon 113	76-13-1	0 / 136			0.09 - 0.16	3.4 - 5.8	ug/kg		-
Volatiles	1,2-Dichloropropane	78-87-5	0 / 136			0.14 - 0.25	3.4 - 5.8	ug/kg		-
Volatiles	2-Butanone	78-93-3	7 / 136	1.7 J	16	1 - 1.8	6.8 - 12	ug/kg	SL-027-SA5C	2.5 - 3.5
Volatiles	1,1,2-Trichloroethane	79-00-5	0 / 136			0.23 - 0.39	3.4 - 5.8	ug/kg		-
Volatiles	Trichloroethene	79-01-6	2 / 136	0.18 J	0.87 J	0.13 - 0.22	3.4 - 5.8	ug/kg	SL-070-SA5C	4 - 5
Volatiles	1,1,2,2-Tetrachloroethane	79-34-5	0 / 136			0.19 - 0.33	3.4 - 5.8	ug/kg		-
Volatiles	Chlorotrifluoroethene	79-38-9	0 / 136			0.42 - 0.72	4.2 - 7.2	ug/kg		-
Volatiles	1,2,3-Trichlorobenzene	87-61-6	0 / 136			0.12 - 0.2	3.4 - 5.8	ug/kg		-
Volatiles	o-Xylene	95-47-6	0 / 136			0.14 - 0.25	3.4 - 5.8	ug/kg		-
Volatiles	2-Chlorotoluene	95-49-8	0 / 136			0.12 - 0.2	3.4 - 5.8	ug/kg		-
Volatiles	1,2,4-Trimethylbenzene	95-63-6	0 / 136			0.34 - 0.58	3.4 - 5.8	ug/kg		-
Volatiles	1,2-Dibromo-3-chloropropane	96-12-8	0 / 136			0.59 - 1	3.4 - 5.8	ug/kg		-
Volatiles	1,2,3-Trichloropropane	96-18-4	0 / 136			0.28 - 0.48	3.4 - 5.8	ug/kg		-
Volatiles	tert-Butylbenzene	98-06-6	0 / 136			0.14 - 0.23	3.4 - 5.8	ug/kg		-
Volatiles	Isopropylbenzene	98-82-8	0 / 136			0.05 - 0.09	3.4 - 5.8	ug/kg		-

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Section 4
Data Usability Assessment

The purposes of the data usability and assessment report (DUAR) provided in Appendix C and summarized here are to: 1) summarize the data validation performed on the data sets, and 2) determine whether the sample results meet the DQOs outlined in the *Draft Work Plan/Field Sampling and Analysis Plan Co-Located Chemical Sampling at Area IV Santa Susan Field Laboratory, Ventura County, California* (CDM 2010).

4.1 Usability Summary

For this data usability assessment, 61 data sets were reviewed. A data set consists of 20 or fewer samples grouped together for analyses depending on the time and date of when the samples were received by the laboratory. A data set is called a sample delivery group or SDG. The analyses performed are discussed in Section 2.5.

Samples were collected and analyzed in accordance with the field sampling and analysis plan (CDM 2010). Deviations from what was prescribed were encountered during the field investigations and are discussed in Section 2.7.

The data generated for HSA Subarea 5C are usable as reported with the data validation qualifiers added, with the exception of 312 individual analyte results (0.6 percent of all analytes) that were rejected. Specific details are provided in the validation reports in Appendix C and below.

4.2 Data Validation Procedures

Data were validated by an independent data validation firm. 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 employed 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 (all QC parameters except calibrations and raw data) protocols.

Table 4-1 shows all the SDGs for the HSA Subarea 5C and which SDGs were validated as Level III or Level IV. Some SDGs contain samples from other subareas[3] 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 HSA Subarea 5C SDGs. The purpose of the review was to identify any quality control 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 CDMs 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 ongoing QC and evaluating and measuring data quality throughout the project.

A review of the collected data is necessary to determine if data measurement objectives established in the field sampling and analysis plan (CDM 2010) have been met. The following data measurement objectives were considered:

- 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 have been met
- Verification that field procedures were followed, deviations were documented, and determination of impact on data quality from these deviations.

The data validation review of the QA objectives 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 accordance with the approved work plan (CDM 2010). A total of 276 soil samples were collected in Subarea 5C and analyzed. Table 2-1 provides a summary of the samples collected and the laboratory analyses requested.

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[3] During the course of sampling within Subarea 5C, EPA transitioned sampling into subarea 5B. Therefore some sample delivery groups contain sample results for both 5C and 5B.

Table 4-1 presents the SDGs and validation level for the HSA Subarea 5C data. An index of samples associated with each SDG is presented at the beginning of Appendix C. The work plan (CDM 2010) defined the procedures to be followed and the data quality requirements for the field sampling events.

Table 4-1 Sample Delivery Groups and Validation Levels

Sample Delivery Group	Level III Validation Performed	Level IV Validation Performed	CDM Review
DE001	YES		YES
DE002		YES	
DE003	YES		
DE004	YES		
DE005	YES		YES
DE006	YES		
DE007	YES		
DE008	YES		
DE009	YES		
DE010	YES		
DE011	YES		
DE012	YES		
DE013	YES		
DE014	YES		
DE015	YES		YES
DE016	YES		
DE017	YES		
DE018		YES	
DE019	YES		
DE020	YES		
DE021	YES		
DE022	YES		
DE023	YES		YES
DE024	YES		
DE025	YES		
DE026	YES		
DE027	YES		
DE028	YES		
DE029		YES	
DE030	YES		
DE033	YES		
DE034	YES		
DE035	YES		
DE037	YES		
DE039		YES	
DE052	YES		
DE053	YES		
DE076	YES		
DOE01			YES
DX001	YES		
DX002		YES	
DX003	YES		
DX004	YES		YES
DX005	YES		
DX006	YES		
DX007	YES		
DX008	YES		
DX009		YES	
DX010	YES		
DX011	YES		

Table 4-1 Sample Delivery Groups and Validation Levels

Sample Delivery Group	Level III Validation Performed	Level IV Validation Performed	CDM Review
DX012	YES		YES
DX013	YES		
DX014	YES		
DX017		YES	
DX018	YES		
DX019	YES		
DX021	YES		
DX023	YES		YES
DX035	YES		
DX047	YES		

4.5 Field Quality QA/QC

Field QC samples, such as MS/MSDs and field duplicates, were to be collected at a frequency of 1 per 20 samples (5 percent) for MS/MSDs and field duplicates. Eighty-four MS samples and 59 MSD samples were analyzed by LLI (count includes all MS/MSD samples analyzed per analyses). Thirteen field duplicate samples were collected. MS/MSD and field duplicate samples met the frequency requirements detailed in the field sampling and analysis plan (CDM 2010).

Fifteen equipment rinsate blank samples and five field blank samples were collected. These are discussed in Section 2.4. All equipment rinsate blank and field blank results are presented in Appendix C and a summary of only the detected results is presented on Tables 4-2 and 4-3, respectively.

Trip blank samples were included with all volatile samples and all trip blank results are presented in Appendix C. No analytes were detected in the trip blank samples. Temperature blanks were included with each shipment of samples.

The number of field quality control samples collected satisfies the minimum requirements for the HSA Subarea 5C sampling event.

Field QA/QC objectives were accomplished through the use of appropriate sampling techniques and collection of the required QC samples at the required frequencies.

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, laboratory control samples (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 hundred and twelve individual analyte results (0.6 percent of all the analytes) were rejected and are discussed in detail below 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 CDM 2010. 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. The closer the results of the measurements are together, the greater is the precision. Precision has nothing to do with accuracy or true values in the sample. Instead it is focused upon the random errors inherent in the analysis that stem from the measurement process and are compounded by the sample vagaries. Precision is measured by analyzing two portions of the sample (sample and duplicate) and then comparing the results. This comparison is expressed in terms of relative percent difference (RPD). RPD is calculated as the difference between the two measurements divided by the average of the two measurements.

$$RPD = 2(A-B)/A+B \times 100$$

The problem with this 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 it is not indicating 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.

Because of these problems, precision is normally calculated on spike samples as either a matrix spike (MS) and a matrix spike duplicate (MSD) or as a laboratory control sample (LCS) and laboratory control sample duplicate (LCSD). In this case, a constant level 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 HSA 5C data set, precision was evaluated by reviewing laboratory QC parameters consisting of MS/MSDs, LCS/LCSDs and laboratory duplicates and by the field duplicate RPD results.

Laboratory RPD control limits are presented in CDM 2010 or are laboratory specific. For laboratory duplicates, if one or both of the sample results are less than 2 times the RL, a control limit of the RL absolute value is used for comparison.

The field duplicate RPD criterion is 50 percent. For field duplicates, if one result is non-detect and the other result is above the reporting limit, the RPD result is calculated at 200 percent and the field duplicate sample and parent sample results are qualified as estimated "J" or "UJ." If the field duplicate RPD was above the 50 percent criteria (and both sample results were above the RL), the field duplicate and parent sample results for that analyte are qualified as estimated "J."

Qualifiers are applied to applicable sample analyte results during the validation process based on laboratory and field RPD results. Details of the validation and the number of analytes qualified are discussed in the data usability assessment report and laboratory validation reports in Appendix C.

In summary, some of the fluoride results, perchlorate results, various metal analyte results, one hexavalent chromium result, one TPH result, SVOCs results, PAH results, pesticides, herbicides, and PCB individual analyte results are qualified as estimated "J/UJ" due to laboratory precision criteria.

Some of the pesticide analyte results are qualified as estimated "J/UJ" due to the RPD results between the two columns being outside of criteria.

Eight individual metal analyte results were rejected due to laboratory precision criteria. These results are not usable for project decisions.

Field duplicate precision criteria required the qualification of some fluoride results, perchlorate results, various metal analyte results, hexavalent chromium results, mercury results, one alcohol result, one individual energetic analyte, TPH results, VOC results, n-nitrosodimethylamine results, SVOCs, PAH results, pesticide results, herbicide results, dioxin results, and PCB results. The associated results were qualified as estimated "J/UJ" due to field duplicate precision criteria. No results were rejected based on field duplicate precision criteria. All field duplicate RPD results are presented in Appendix C.

RPD objectives are analyte dependent. There is no discernable pattern or reason for the exceedances. No field sampling issues were identified from the RPD results that were outside of criteria and the 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. Results that have been rejected are not usable.

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:

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

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.

A single detection of accuracy on a sample is not significant statistically, although many people will treat it as if it is. Statistics is the science of prediction of reality based on a limited number of observations. The more limited the number of observations, the worse the prediction is going to be. A minimum of two recovery values are needed to estimate accuracy. The following QC samples are used to help assess laboratory accuracy:

Matrix Spikes: Matrix spikes are the addition of a known amount of a target analyte to a sample. 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.

Post Digestion Spikes: Post digestion spikes are performed after the sample has been prepared and is ready for analysis. These are also termed "analytical spikes." The technique is used in conjunction with a matrix spike 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: Laboratory control samples consist of a portion of analyte-free water or solid phase sample that is spiked with target analytes at a known concentration.

Surrogates: Surrogate recovery is a quality control 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 on a 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 quality control unique to metals analysis using inductively coupled plasma atomic emission spectrometry. Each element, when it is excited, emits light of set wavelengths. The wavelengths of light emitted from a sample can be

measured to provide a qualitative and a quantitative evaluation of the elemental composition of the sample.

Calibrations and Internal Standards: Calibration/internal standards determine the establishment of a quantitative relationship between the response of the analytical procedure and the concentration of the target analyte. Calibration is the technique that performs the quantitative analysis on the sample. A necessary prerequisite is that a confident identification of the target analyte has already been established.

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 HSA 5C data set, accuracy was evaluated by reviewing the percent recovery (%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) interferences, and by performing serial dilution checks during metals analyses, in conjunction with method blank, calibration blank, equipment rinsate blank, and trip blank results. These QC results assist in identifying the type and magnitude of effects that contributed to the system error introduced via field and/or laboratory procedures.

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.

Qualifiers are applied to applicable sample analyte 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 data usability assessment report and laboratory validation reports in Appendix C.

In summary, some of the fluoride results, perchlorate results, various metal analyte results, one hexavalent chromium result, one mercury result, hydrazine results, one glycol result, TPH results, one VOC result, one n-nitrosodimethylamine result, SVOC results, PAH results, pesticide results, herbicide results, one dioxin result, and PCB results were qualified as estimated "J/UJ" due to matrix spike accuracy criteria.

One of the perchlorate results, some of the various metal analyte results, glycol results, one VOC result, SVOC results, PAH results, pesticide results, herbicide results, and PCB results are qualified as estimated "J/UJ" due to laboratory control sample accuracy criteria.

Some of the metal analyte results and one hexavalent chromium result are qualified as estimated "J/UJ" due to serial dilution criteria.

Some of the glycol analyte results, n-nitrosodimethylamine results, SVOC results, PAH results, pesticide results, herbicide results, and PCB results are qualified as estimated "J/UJ" due to surrogate criteria.

Some of the energetic analyte results, VOC results, pesticide results, herbicide results and PCB results are qualified as estimated "J/UJ" due to calibration criteria.

Some of the PAH analyte results and dioxin analyte results are qualified as estimated "J/UJ" due to internal standard recovery results.

Results were rejected based on matrix spike accuracy criteria. These results included one TPH result.

Results were rejected based on laboratory control sample accuracy criteria. These results included three individual metal analyte results.

Results were rejected based on surrogate recovery accuracy criteria. These results included 160 individual analyte results, 42 individual pesticide analyte results, three herbicide analyte results.

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 the collection of the sample from the source in the field and the beginning of the analysis procedure. Preservation is defined as techniques used to maintain the target analytes at concentrations representative of those in the source sampled until the sample is analyzed in the laboratory. Published holding times are viewed as valid as long as the associated preservation and container requirements have been met. All sample preservation and handling criteria were met except for those discussed in the data usability assessment report and laboratory validation reports in Appendix C.

In summary, some of the cyanide results and dioxin results are qualified as estimated "J/UJ" due to preservation and holding time criteria.

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 for the purpose of determining 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 and the analytical instrument sample introduction equipment. Each area of analysis 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. Field blanks, equipment blanks, and trip blanks and laboratory method blanks are analyzed to identify possible sources of contamination. The data assessment summary report and laboratory validation reports in Appendix C discuss the results qualified based on field and laboratory blank contamination.

In summary, some VOC results, n-nitrosodimethylamine results, SVOCs results, PAH results, pesticide results, dioxin results, and PCB results were qualified as non-detect due to blank contamination criteria. Table 4-2 provides a summary chemicals observed in equipment blank samples while Table 4-3 provides a summary of the chemicals observed in the field blank samples.

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 field sampling and analysis plan 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.

Table 4-2. Equipment Blanks for HSA 5C - Detected Results Only

EB01-SA5C-102510
6124077
10/25/2010
Equipment Blank

Analyte	Units	Concentration	Final Qualifer
1,2,3,4,6,7,8-HPCDD	pg/l	0.998	J
Bis(2-ethylhexyl)phthalate	ug/l	0.13	J
Diethylphthalate	ug/l	0.055	J
Di-n-butylphthalate	ug/l	0.17	J
Naphthalene	ug/l	0.077	

EB02-SA5C-102610
6124094
10/26/2010
Equipment Blank

Analyte	Units	Concentration	Final Qualifer
Benzo(a)anthracene	ug/l	0.011	J
Benzo(k)fluoranthene	ug/l	0.012	J
Bis(2-ethylhexyl)phthalate	ug/l	0.18	J
Chrysene	ug/l	0.014	J
Diethylphthalate	ug/l	0.082	J
Di-n-butylphthalate	ug/l	0.16	J
Heptachlor	ug/l	0.011	
Naphthalene	ug/l	0.027	J

EB03-SA5C-102710
6125241
10/27/2010
Equipment Blank

Analyte	Units	Concentration	Final Qualifer
2,3,7,8-TCDF	pg/l	0.15	J
Diethylphthalate	ug/l	0.14	J
Di-n-butylphthalate	ug/l	0.47	J
Naphthalene	ug/l	0.041	J

EB04-SA5C-110110
6128970
11/1/2010
Equipment Blank

Analyte	Units	Concentration	Final Qualifer
2,3,4,7,8-PECDF	pg/l	0.756	J
2-Methylnaphthalene	ug/l	0.011	J
Di-n-butylphthalate	ug/l	0.48	J
Naphthalene	ug/l	0.13	

EB05-SA5C-110510
6133898
11/5/2010
Equipment Blank

Analyte	Units	Concentration	Final Qualifer
1,2,3,4,6,7,8-HPCDD	pg/l	1.21	
Di-n-butylphthalate	ug/l	0.13	J
Di-n-octylphthalate	ug/l	0.21	J
Naphthalene	ug/l	0.051	
OCDD	pg/l	2.53	
OCDF	pg/l	0.615	

EB06-SA5C-110910
6136202
11/9/2010
Equipment Blank

Analyte	Units	Concentration	Final Qualifer
Bis(2-ethylhexyl)phthalate	ug/l	0.39	J
Diethylphthalate	ug/l	0.081	J
Di-n-butylphthalate	ug/l	0.19	J
Naphthalene	ug/l	0.052	
Phenanthrene	ug/l	0.013	J

Table 4-2. Equipment Blanks for HSA 5C - Detected Results Only

EB07-SA5C-111110
6138692
11/11/2010
Equipment Blank

Analyte	Units	Concentration	Final Qualifer
Barium	mg/l	0.0006	J
Bis(2-ethylhexyl)phthalate	ug/l	0.2	J
Diethylphthalate	ug/l	0.12	J
Di-n-butylphthalate	ug/l	0.23	J
Lead	mg/l	0.000057	J
Naphthalene	ug/l	0.058	

EB08-SA5C-111610
6143356
11/16/2010
Equipment Blank

Analyte	Units	Concentration	Final Qualifer
1,2,3,7,8,9-HXCDD	pg/l	0.218	J
2,3,7,8-TCDD	pg/l	0.25	J
Diethylphthalate	ug/l	0.073	J
Iron	mg/l	0.0545	J
Lead	mg/l	0.000055	J
Molybdenum	mg/l	0.00026	J
Naphthalene	ug/l	0.048	J

EB10-SA5C-112310
6149371
11/23/2010
Equipment Blank

Analyte	Units	Concentration	Final Qualifer
1,2,3,4,6,7,8-HPCDD	pg/l	1.44	J
1,2,3,4,6,7,8-HPCDF	pg/l	7.01	J
1,2,3,4,7,8,9-HPCDF	pg/l	0.839	J
1,2,3,4,7,8-HXCDF	pg/l	1.06	J
1,2,3,6,7,8-HXCDF	pg/l	0.819	J
1,2,3,7,8,9-HXCDD	pg/l	0.204	J
1,2,3,7,8,9-HXCDF	pg/l	0.512	J
1,2,3,7,8-PECDF	pg/l	0.308	J
2,3,4,6,7,8-HXCDF	pg/l	1.5	J
2,3,4,7,8-PECDF	pg/l	0.838	J
OCDD	pg/l	3.05	J
OCDF	pg/l	3.21	J
RDX	ug/l	2.9	J

EB17-SA5C-010511
6178511
1/5/2011
Equipment Blank

Analyte	Units	Concentration	Final Qualifer
1-Methylnaphthalene	ug/l	0.014	J
2-Methylnaphthalene	ug/l	0.017	J
Naphthalene	ug/l	0.17	
Zinc	mg/l	0.0047	J

Table 4-2. Equipment Blanks for HSA 5C - Detected Results Only

EB11-SA5C-113010
6152652
11/30/2010
Equipment Blank

Analyte	Units	Concentration	Final Qualifer
2,3,7,8-TCDD	pg/l	0.428	J
Bis(2-ethylhexyl)phthalate	ug/l	0.22	J
Diethylphthalate	ug/l	0.066	J
Di-n-butylphthalate	ug/l	0.2	J
Iron	mg/l	0.0697	J
Manganese	mg/l	0.0011	J
Molybdenum	mg/l	0.00041	J
Naphthalene	ug/l	0.034	J

EB12-SA5C-120110
6153697
12/1/2010
Equipment Blank

Analyte	Units	Concentration	Final Qualifer
HMX	ug/l	0.86	J
N-nitrosodimethylamine	ng/l	1.36	

EB13-SA5C-120710
6158233
12/7/2010
Equipment Blank

Analyte	Units	Concentration	Final Qualifer
2,3,7,8-TCDD	pg/l	1.3	J
Diethylphthalate	ug/l	0.14	J
Di-n-butylphthalate	ug/l	0.61	J
Naphthalene	ug/l	0.033	J
N-nitrosodimethylamine	ug/l	0.024	J
Perchlorate	ug/l	1.6	J

EB14-SA5C-120810
6162870
12/8/2010
Equipment Blank

Analyte	Units	Concentration	Final Qualifer
Ethanol	ug/l	520	J
Formaldehyde	ug/l	12	J

Notes:
ug/L - micrograms per liter
mg/L - milligrams per liter
pg/L - picograms per liter
ng/L - nanograms per liter
J - Estimated

Table 4-3. Field Blank Results for HSA 5C

Analyte	Units	Concentration	Final Qualifer
Field Blank Number: FB01-SA5C-102510			
Date of Collection: 10/25/2010			
2,3,7,8-TCDF	pg/l	0.114	J
Bis(2-ethylhexyl)phthalate	µg/l	0.11	J
Diethylphthalate	µg/l	0.056	J
Di-n-butylphthalate	µg/l	0.16	J
Field Blank Number: FB02-SA5C-102610			
Date of Collection: 10/26/2010			
Analyte	**Units**	**Concentration**	**Final Qualifer**
Bis(2-ethylhexyl)phthalate	µg/l	0.11	J
Diethylphthalate	µg/l	0.078	J
Di-n-butylphthalate	µg/l	0.15	J
Heptachlor	µg/l	0.0095	J
Naphthalene	µg/l	0.032	J
Field Blank Number: FB03-SA5C-102710			
Date of Collection: 10/27/2010			
Analyte	**Units**	**Concentration**	**Final Qualifer**
Diethylphthalate	µg/l	0.13	J
Di-n-butylphthalate	µg/l	0.48	J
Naphthalene	µg/l	0.039	J
Field Blank Number: FB04-SA5C-110110			
Date of Collection: 11/1/2010			
Analyte	**Units**	**Concentration**	**Final Qualifer**
Naphthalene	µg/l	0.047	J
Field Blank Number: FB05-SA5C-111810			
Date of Collection: 11/18/2010			
Analyte	**Units**	**Concentration**	**Final Qualifer**
Formaldehyde	µg/l	11	J

Notes:
µg/L - micrograms per liter
mg/L - milligrams per liter
pg/L - picograms per liter
ng/L - nanograms per liter
J - Estimated

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 field sampling and analysis plan (CDM 2010) and laboratory statements of work (SOWs) to ensure that the laboratory analytical results were representative of true field conditions.

Field sampling accuracy was attained through strict adherence to the approved field sampling and analysis plan and by using approved standard operating procedures for

field data collection. Based on this, the data should represent as near as possible the actual field conditions at the time of sampling.

Representativeness, as defined above, has met the applicable requirements for the 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, 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-approved analytical methods were utilized by CDM. The sample analyses were performed by LLI in Lancaster, Pennsylvania. Method modifications were approved and/or discussed with DTSC that overall increased data quality by allowing lower detection limits and RLs to be achieved. 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 instrument detection limit (IDL) acknowledges the presence of baseline electronic or background noise in the instrument and then attempts to provide guidance as to what signal should be regarded as noise and what signal arises from a target analyte. The IDL is determined by repetitively using the instrument to test a target analyte-free sample or extract over several days, then calculating the standard deviation of the repetitive determinations. The IDL is a measure of the maximum performance capability of the instrument in the absence of any other effects.

The method detection limit 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 reporting limit (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. The result for an analyte is flagged with a "U" if that analyte was not detected, or qualified with a "J" flag if blank or other QC results fall outside the appropriate tolerance limits.

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.

Qualifiers were applied to applicable sample analyte results during the validation process based on sample results being reported as detected and below the reporting limit/MDL. Details of the validation and the number of analytes qualified are discussed in detail in the data usability assessment report and laboratory validation reports in Appendix C.

In summary, some of the analytes for all methods analyzed were qualified as estimated due to reporting limit criteria.

In general, for the data validated in this report, detection limits for the sample results were low enough to compare to the action levels stated in the work plan (CDM 2010).

The data validation process also determines the most valid analyte result to use for samples that are re-analyzed or diluted. These validated results are entered into the project database and used for decision-making.

In general, detection limits met project goals and objectives.

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 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 final work plan 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. $$\%Completeness = Cx\frac{100}{n}$$

Where:

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

Equation B. $$\%Completeness = Vx\frac{100}{n'}$$

Where:

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

The overall completeness goal for these sampling events was 90 percent for all project data.

A total of 276 environmental samples for HSA Subarea 5C were collected and analyzed. This sample count included field duplicates, MS/MSDs, and trip blanks, equipment blanks and field blanks. A total of 291 samples were to be collected for analyses. As discussed in Section 2.7, 15 samples were not collected based on field conditions and locations. Ninety-five percent of the samples identified in the work plan were collected meeting the completeness goal for the number of samples collected versus number of samples planned.

The completeness goal for acceptable data achieved was 99.4 percent of the number of measurements judged to be valid versus the total number of measurements made for all sample analyses for Subarea 5C. Table 4-4, Completeness Calculation Summary, shows a summary of all results that were estimated or rejected.

The following individual analyte results were rejected per analyses:

- Method 6010B
  - 2 individual metal analyte results out of 2524 results (0.07%)
- Method 6020
  - 9 individual metal analyte results out of 1465 results (0.61%)
- Method 8082
  - 2 individual PCB analyte results out of 2984 results (0.06%)
- Method 8081A
  - 52 individual pesticide analyte results out of 1,628 results (3%)

- Method 8151A
  - 74 individual herbicide analyte results out of 708 results (10%)

- Method 8270C
  - 172 individual SVOC analyte results out of 12,421 results (1.3%)

- Method 8015M
  - 1 individual terphenyl/TPH analyte results out of 320 results (0.3%)

Table 4-4 Summary of Data Completeness Following Data Validation

	Number of Analyte Detections	Number of Estimated Results	Number of Rejected Results	Number of Non-Detect Results	Number of Estimated Non-Detect Results	Total Analyses	Percentage of Completeness
Inorganics	4290	4223	11	1019	122	5431	99.80%
Misc. Organics	17	65	0	2083	25	2125	100.00%
PCBs & Dioxins	744	1394	2	5230	245	6219	99.97%
Pesticides	86	80	126	2048	202	2336	94.61%
Semivolatiles	564	734	172	17212	261	18037	99.05%
Volatiles	112	100	1	9360	35	9507	99.99%
Sum	5813	6596	312	36952	890	43655	99.29%
Total Completeness Percent		86.95%	99.38%			0	99.38%
					All Sample Results in Data Set	50563	

Analysis Rejection Summary

Percent of all Data Rejected	0.71	
Percent of all Inorganics Rejected	0.20	
Percent of all Misc. Organics Rejected	0.00	
Percent of all PCBs & Dioxins Rejected	0.03	
Percent of all Pesticides Rejected	5.39	
Percent of all Semivolatiles Rejected	0.95	
Percent of all Volatiles Rejected Estimated	0.01	
Percent of all Hits Estimated	15.11	(does not include estimated non-detect data)
Percent complete (judged valid)	0.71	(Includes all estimated data)

Notes:
The counts and calculations above do not include field or trip blank samples

The completeness goals for both the number of samples collected for sampling events and the number of measurements judged to be valid were met.

Sample deviations are discussed in Section 2.7 of this report. 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 field sampling and analytical plan (CDM 2010) met appropriate criteria. The achievement of the completeness goals for the data provides sufficient quality data for project decisions.

4.10 Assessment of Data Usability and Reconciliation with Work Plan Goals

Ninety-nine percent of the data validated 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 detection limits 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 nondetect due to the low detection limits. This data is considered usable for project decisions.

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 as well. 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.

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Section 5
References

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Appendix A
Analytical Results Tables
(On CD)

Appendix B
Laboratory Reports
(On CD)

Appendix C
Data Validation Reports
(On CD)

Appendix D
Master Database Table
(On CD)