Addendum No. 5 to
Master Field Sampling Plan for Chemical Data Gap Investigation
Phase 3 Soil Chemical Sampling at Area IV
Santa Susana Field Laboratory
Ventura County, California

Subareas 3 and 6

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Contract DE-EM0001128
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"I certify that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted.
Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete."

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Introduction

This document supports implementation of the soil sampling program described in the *Master Field Sampling Plan for Chemical Data Gap Investigation, Phase 3 Soil Chemical Sampling at Area IV, Santa Susana Field Laboratory, Ventura County, California* (Master FSP, CDM Smith 2012a). The Master FSP addresses soil sampling within Area IV of the Santa Susana Field Laboratory (SSFL) as required under the *Administrative Order on Consent for Remedial Action* (Docket Number HSA-CO 10/11-037) (AOC) signed by the California Department of Toxic Substances Control (DTSC) and the Department of Energy (DOE). The Master FSP includes field Standard Operating Procedures (SOPs) describing the details of sampling activities and sample management at SSFL. For all samples collected at locations within Subareas 3 and 6, the Master FSP and the SSFL SOPs dictate the procedures pertaining to:

- locating and verifying sampling points
- surface soil sampling techniques
- subsurface soil sampling techniques using a direct push technology (DPT) rig and a hand auger and slide hammer for those locations not accessible by the DPT rig
- sampling of test pits
- sample handling and shipping
- analytical, quality control, and data review
- instrument calibration and maintenance

The AOC between DTSC and DOE was signed on December 6, 2010. The AOC is a legally binding order that describes the characterization of Area IV and Northern Buffer Zone soils/sediments and further defines DOE's obligations in relation to radiologic and chemical cleanup of soils within these areas. It stipulates that during Phase 1 of the chemical investigation activities, DOE was to analyze a soil sample for chemical constituents at locations where EPA collected a sample for radiological analysis. Phase 1 co-located sampling with EPA in Subareas 3 and 6 was completed in November 2011. Phase 2 (random co-located sampling with EPA in the Northern Buffer Zone) was completed in April 2011.

Phase 3 of the AOC is the data gap investigation, which includes an assessment of data adequacy using the data collected under the Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI) program, the results of co-located soil samples collected during Phase 1 of the AOC, and multiple lines of evidence as described in the *Work Plan for Chemical Data Gap Investigation, Phase 3 Soil Chemical Sampling at Area IV, Santa Susana Field Laboratory, Ventura County, California* (CDM 2010b) (Phase 3 Work Plan). The purpose of the data gap investigation is to identify

additional soil chemical data needed to support the Soil Remedial Action Implementation Plan for Area IV. The sampling that will be performed under this FSP Addendum is based on the results of the data gap investigation.

The Phase 3 sampling within Subareas 3 and 6 is governed by the Phase 3 Work Plan and its elements including the Master FSP, Phase 3 Quality Assurance Project Plan (CDM Smith 2012c) (QAPP), Worker Health and Safety Plan (CDM Smith 2012d), and the Phase 3 SSFL SOPs (attachments to the Master FSP and QAPP). These documents are incorporated into this FSP Addendum by reference.

Purpose of FSP Addendum

This FSP Addendum addresses Phase 3 sampling in Subareas 3 and 6. Figure 1 of this document illustrates the location of Subareas 3 and 6 within Area IV of SSFL. The rationale for sample location and chemical analytes is provided in the document *Subareas 3 and 6 Phase 3 Data Gap Analysis Technical Memorandum, Santa Susana Field Laboratory, Ventura County, California* (MWH 2012[1]) (*Subareas 3 and 6 Data Gap TM*). The *Subareas 3 and 6 Data Gap TM* is included as Attachment 1 to this FSP Addendum. It illustrates the proposed sample locations and includes Table 1, which provides the sampling rationale for each location. Figure 1 of the *Subareas 3 and 6 Data Gap TM* (MWH 2012) provides soil sample locations in Subarea 3 and the northern portion of Subarea 6, and Figure 2 shows the soil sample locations in the southern portion of Subarea 6. All sample locations were identified through the data gap analysis. Attachment 2 to this Subareas 3 and 6 FSP Addendum provides additional information beyond the rationale in Table 1 of the *Subareas 3 and 6 Data Gap TM* for sample locations that target three different conditions that will be encountered in the field. This information will be useful during sample staking and collection.

For Subareas 3 and 6, surface and subsurface soil samples will be collected. For surface soil samples, only the top 6-inches of soil (surface soil) will be collected. The majority of sample locations will involve collection of subsurface samples. A direct push technology (DPT) rig will be used to sample subsurface soil at all locations except those inaccessible due to terrain constraints. Borings located in areas inaccessible to the DPT rig will be sampled using a hand auger and slide hammer as described in Phase 3 SSFL SOP 3.

CDM Smith will be responsible for all aspects of the field sampling program under Phase 3 of the AOC. This includes locating in the field the sample locations selected during the data gap investigation and that were initially generated and displayed electronically using Geographic Information System (GIS) coordinates. The GIS coordinates are downloaded into a Geographic Positioning System (GPS) unit for physically locating the samples in the field. SSFL SOP 1 provides the process for

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[1] MWH prepared this Technical Memorandum under contract with The Boeing Company, which is under direct contract with DOE. Through this contractual relationship and under the regulatory oversight of DTSC, MWH has represented DOE in conducting the Chemical Data Gap Analysis and in the preparation of this Technical Memorandum.

verifying that the sample locations initially identified by GIS review reflect the targeted feature described in Table 1 and are consistent with the GPS coordinates generated in the field. If necessary the sample location will be adjusted in the field so that the targeted feature is sampled. Adjusted and all final sample location coordinates will be provided back to the GIS managers so that the GIS database can be updated.

CDM Smith will be responsible for the physical collection of all samples per the procedures and controls specified in the Master FSP. CDM Smith personnel will be responsible for the sample container preparation, sample handling and documentation, sample shipment, laboratory coordination, chemical analyses of the samples, and chemical data review. Soil samples collected by CDM Smith will be analyzed for chemical analytes identified in Table 1 of the *Subareas 3 and 6 Data Gap TM* (MWH 2012). Analytical methods and quality control criteria to be used are stipulated in Table 8-3 (Quality Control Objectives for Analytical Methods) of the QAPP (CDM Smith 2012c) and Table 6-1 (Analytical Methods, Containers, Preservatives, and Holding Times) of the Master FSP (CDM Smith 2012a).

Table 1 of the *Subareas 3 and 6 Data Gap TM* also identifies proposed target depths for sample collection. Samples will also be collected from depth intervals (until refusal) that exhibit evidence of staining, odor, debris, or photoionization detector (PID) readings above background.

This FSP Addendum only addresses the collection of surface soil and subsurface soil to the bedrock interface. The sampling of soil gas or other media will be addressed in a future sampling plan.

Sample Analytes

Table 1 of the *Subareas 3 and 6 Data Gap TM* (MWH 2012) provides the chemical analyses (analytes) for each sample proposed for collection under this FSP Addendum and the respective rationale for sample location and chemical analyses. The chemical analyses by location were identified through the data gap investigation process.

Field Locating Soil Sample Locations

CDM Smith will be responsible for determining the precise position of soil sample locations in the field in accordance with SSFL SOP 1. At the same time, each sample location will also be cleared for buried utilities, and assessing the presence of cultural and biological resources for their protection.

Surface Soil Sampling

Surface soil samples will be collected at each location as proposed in Table 1. Surface soil samples will be collected in accordance with SSFL SOP 2. A slide hammer with stainless steel sleeve will be used to collect the soil sample to be analyzed for semi-volatile organic compounds and polychlorinated biphenyls. Volatile organic

compounds and total petroleum hydrocarbon samples will be collected using Encore samplers. Soil for all other sample analytes will be place in one or more glass jars.

Subsurface Soil Sampling

Subsurface soil samples will be collected primarily through the use of a DPT rig. SSFL SOP 4 describes the DPT sampling procedures. Sampling will be conducted through the use of 5-foot long acetate sleeves placed within the DPT sampling tool. All cores will be screened using a PID instrument for volatiles and a Micro R gamma detection instrument and a dual phosphor alpha/beta detection instrument (SSFL SOPs 6 and 7, respectively). Soil samples will be collected at the depths specified in Table 1 of the *Subareas 3 and 6 Data Gap TM* (MWH 2012) and/or at locations where instrument readings, soil staining, or evidence of debris is observed.

To determine depth of contamination at locations where prior data indicates contamination at the surface but depth has not been defined, the core will be divided into one-foot long samples and with the sample depth intervals identified in Table 1 prepared for shipment to the laboratory. Table 1 also identifies the chemical analyses proposed for each depth interval.

There may be proposed sampling locations that the DPT rig will not be able to access. At those locations, subsurface samples will be collected using a hand auger to access the sample depth and a slide hammer sampler with stainless steel sleeves will be used to collect the actual sample. SSFL SOP 3 describes the hand auger sampling procedure.

The soil logging of all surface and subsurface samples will be conducted following SSFL SOP 9.

Test Pit Sampling

The investigation of Subarea 6 will include the characterization of debris and fill areas through sampling of test pits. Figures 1 and 2 of the *Subareas 3 and 6 Data Gap TM* identify the test pit locations. The primary purpose of the test pits will be to visually characterize fill material and to sample subsurface soil within the test pits.

Where sampling can be performed safely, soil samples will be collected from the side wall of the test pit to 5 feet below ground surface (bgs) using an impact sampler with extended rod. Soil samples deeper than 5 feet below ground surface (or when samples cannot be collected safely at 5 feet bgs) will be collected directly from the backhoe bucket using the impact sampler. SSFL SOP 5 describes the test pit sampling procedure.

Sampling of Locations with Sustained Instrument Readings, Odor, or Staining

For any locations where PID instrument readings remain above measured background readings, there is an odor, or the soil appears to be stained with hydrocarbons, samples will be collected at the sample depth interval and analyzed for VOCs, 1,4-dioxane, and total petroleum hydrocarbons-gasoline range organics (TPH-GRO) using Encore samplers, in addition to the target analytes specified in Table 1 of the *Subareas 3 and 6 Data Gap TM*. Any sustained instrument readings above background (PID, Micro R gamma detection, and dual phosphor alpha/beta detection instruments) will be immediately reported to DOE by the CDM Smith Field Team Leader and DOE will contact Boeing with this information in accordance with the Worker Health and Safety Plan requirements. The monitoring instruments will be operated per SSFL SOPs 6 (volatile organics) and 7 (radiation).

Decontamination of Sampling Equipment

Equipment that comes in contact with sample material will be decontaminated per SSFL SOP 12. Investigation derived waste will be handled per SSFL SOP 13.

Sample Handling, Recording, and Shipment

SSFL SOPs 10 and 11 describe the sample custody, handling, information recording, preservation, and shipping procedures. Any photographic documentation of sampling activities will be performed per SSFL SOP 15.

Instrument Calibration and Maintenance

All instruments used to screen samples for volatile organics and radioactivity will be calibrated and maintained per SSFL SOP 16.

Laboratory Sample Preparation (Homogenization)

Soil samples intended for chemical analyses of non-volatile and non-semivolatile constituents (e.g. metals, PCBs, and dioxins) will be homogenized by the analytical laboratory in the laboratory in accordance with SSFL SOP 17.

Schedule

Soil sampling activities under this FSP Addendum will most likely start the week of November 5, 2012, following DTSC approval of this Subareas 3 and 6 FSP Addendum, with the locating and staking of proposed sample locations and utilities clearance. Surface soil sampling will start November 6, and subsurface soil borings (hand-auger and DPT) will start by November 12. It is anticipated that 40 surface samples, 32 shallow hand auger samples, and 32 DPT boring samples will be collected each week. As a budget saving measure, the test pit sampling in Subarea 6 will be performed together with test pit sampling planed for Subareas 5C, 5B, and 5A. The test pit sampling will not occur until after completion of the surface, DPT, and hand auger

sampling proposed in this Subareas 3 and 6 FSP Addendum. The test pit sampling will not be performed until after the rainy season ends, probably not before April 2013. Each test pit will take one day to dig, describe, sample, and backfill.

References

CDM Smith. 2012a. *Master Field Sampling Plan for Chemical Data Gap Investigation, Phase 3 Soil Chemical Sampling at Area IV, Santa Susana Field Laboratory, Ventura County, California.* April.

CDM Smith. 2012b. *Work Plan for Chemical Data Gap Investigation, Phase 3 Soil Chemical Sampling at Area IV, Santa Susana Field Laboratory, Ventura County, California.* April.

CDM Smith. 2012c. *Quality Assurance Project Plan for Chemical Data Gap Investigation, Phase 3 Soil Chemical Sampling at Area IV, Santa Susana Field Laboratory, Ventura County, California.* April.

CDM Smith. 2012d. *Worker Health and Safety Plan for Chemical Data Gap Investigation, Phase 3 Soil Chemical Sampling at Area IV, Santa Susana Field Laboratory, Ventura County, California.* April.

MWH 2012. *Subareas 3 and 6 Phase 3 Data Gap Analysis Technical Memorandum Santa Susana Field Laboratory, Ventura County, California.* October.

Attachment 1

Subareas 3 and 6 Phase 3 Data Gap Analysis Technical Memorandum, Santa Susana Field Laboratory, Ventura County, (MWH 2012)

SUBAREAS 3 AND 6 PHASE 3 DATA GAP ANALYSIS
TECHNICAL MEMORANDUM
SANTA SUSANA FIELD LABORATORY
VENTURA COUNTY, CALIFORNIA

Prepared For:

THE UNITED STATES DEPARTMENT OF ENERGY

Prepared By:

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October 2012

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

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Program Director

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ACRONYMS AND ABBREVIATIONS

AOC	Administrative Order on Consent
DOE	Department of Energy
DQO	Data Quality Objective
DTSC	Department of Toxic Substances Control
EPA	Environmental Protection Agency
GIS	geographic information system
HGL	Hydrogeologic, Inc.
HSA	historical site assessment
ISL	interim screening level
MFSP	Master Field Sampling Plan
MWH	MWH Americas, Inc.
NDMA	n-Nitrosodimethylamine
NBZ	Northern Buffer Zone
PAH	polyaromatic hydrocarbon
PCB	polycyclic biphenyls
PDU	Process Development Unit
R/A	radioactive
RCRA	Resource Conservation and Recovery Act
RFI	RCRA Facility Investigation
SRE	Sodium Reactor Experiment
SSFL	Santa Susana Field Laboratory
TIC	tentatively identified compound
TM	technical memorandum
VOC	Volatile Organic Compound

1.0 INTRODUCTION

This technical memorandum (TM) has been prepared to describe the chemical data gap analysis performed by MWH Americas, Inc. (MWH) for the U.S. Department of Energy (DOE) for Subareas 3 and 6 within Area IV and the Northern Buffer Zone (NBZ) at the Santa Susana Field Laboratory (SSFL). The chemical data gap analysis was performed in compliance with the Administrative Order on Consent (AOC) for Remedial Action (AOC; Docket No. HSA-CO 10/11 - 037), and serves as the basis for the Phase 3 data gap investigation being performed in Subareas 3 and 6 within Area IV by DOE and implemented by CDM Smith, a contractor to DOE. This Data Gap TM is included as an appendix to the Master Field Sampling Plan (MFSP) Addendum for Subareas 3 and 6 prepared by CDM Smith for review and approval by the California Environmental Protection Agency Department of Toxic Substances Control (DTSC).

Information provided in this Data Gap TM describes the overall background and approach for the chemical data gap analysis and investigation, followed by a description of specific application of the data gap analysis approach or unique circumstances within Subareas 3 and 6.

2.0 DATA GAP ANALYSIS PROCESS

The AOC requires a chemical data gap investigation to identify locations within Area IV, the NBZ, or contiguous areas where additional chemical investigation is necessary. Per the AOC (Section 2.5.3.2):

> "In determining the scope, DOE and DTSC shall evaluate the results from the Phase 1 Co-Located sampling effort, the results from the Phase 2 Co-Located sampling effort[1], the results of the U.S. EPA's radiological survey and characterization efforts, the data and information presented in the previous RFI reports and RFI work plans, and any available historical Site data. This scoping effort shall be used to determine the locations at the Site where insufficient chemical data exists and additional chemical investigation is necessary."

This Data Gap TM describes the data evaluation process that has been used to identify chemical data gaps. Data gaps exist where more information is needed for DTSC and DOE to make remedial planning decisions, (i.e., whether soil contamination exists, and if so, to what extent). The data gap analysis approach was developed using the U.S. Environmental Protection Agency's (EPA's) seven-step Data Quality Objective (DQO) process that presents a systematic approach to identify chemical sampling needs, address existing data gaps, and obtain environmental data and information required for future remedial planning. The Phase 3 chemical

[1] According to the AOC, the Phase 2 random sampling is to be conducted with EPA. EPA has completed random sampling within the NBZ. The data gap analysis will use the results from Phase 2 sampling within the NBZ to assess additional sampling for that area.

data gap investigation DQOs are the framework for the analysis described in this TM and are presented in Section 4.0 of the MFSP (CDM Smith, 2012b).

The Phase 3 data gap analysis described in this TM will be an iterative process. At this time in the data gap analysis process, data are compared with the interim screening levels (ISLs) developed for evaluation of available data (see Master Phase 3 Work Plan Table 2-1, CDM Smith, 2012a). The ISLs were developed jointly by DTSC and DOE, and reflect the 2005 background soil concentrations for metals and dioxins, and analytical reporting limits for chemicals not having a background value. In the future, background values will be updated based on the ongoing DTSC soil chemical background study and evaluation of the precision and accuracy requirements for reporting limits. Ultimately, all available previous data, including EPA radionuclide data, will be evaluated based on the final soil cleanup values (Look-up Table values) per the AOC. Therefore, a final data gap analysis will be required incorporating data collected as described in this TM and the Master Phase 3 Work Plan (CDM Smith, 2012a), prior chemical data, and EPA radionuclide results.

The data gap analysis described in this TM is based on available results from EPA's radiological investigation activities (e.g., gamma surveys, geophysical surveys, aerial photograph interpretations), prior Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI) results, the Phase 1 co-located sample results, and historical information on activities within Area IV. Since recent radiological data have not been completely published by EPA, this data gap analysis used available EPA summaries of these results for planning purposes.

The data gap analysis identifies where additional information is needed for remedial planning by:

- Comparing existing soil sampling results to ISL criteria to identify additional sample locations needed to define the extent of contamination (based on criteria exceedance) and/or gradients in chemical concentrations away from a potential source;
- Evaluating migration pathways to ensure that samples are collected where contamination may have migrated via natural or anthropogenic processes; and
- Evaluating historical documents and site survey information to identify potential release areas that may not have been adequately characterized.

Each of these evaluation steps are described below.

2.1 COMPARISON OF PREVIOUS SAMPLING DATA TO SCREENING CRITERIA

To determine future chemical sampling needs (to be implemented under the Master Phase 3 Work Plan and MFSP), validated soil chemistry results are compared with ISL criteria. The

ISLs reflect either existing 2005 soil background concentrations for metals and dioxins[2] or analytical reporting limits for chemicals that do not have 2005 background concentrations. Table 2-1 in the Master Phase 3 Work Plan (CDM, 2012a) lists the ISL values currently being used for the data gap analysis.

This data comparison is conducted to answer several questions:

- Are the data adequate to define the extent of soil contamination? (i.e., What is the areal extent? How deep does contamination go?)
- Where are additional data needed to address areal and depth extent?
- What types of chemical data are needed at each location?

The soil chemical results within the analytical database are "filterable," meaning each individual soil chemical result can be selectively evaluated or results can be collectively reviewed for each prior sample point. The analytical database incorporates data files for soil chemical data collected under the RFI and co-located sampling programs. A geographic information system (GIS) is used to spatially display the sampling results. To display the data, the sampling results are compared with the ISL values for all chemicals analyzed at each sample location using a computer algorithm. The algorithm calculates the ratio of the soil concentration to the ISL value. The GIS is then used to display the maximum comparison value (i.e., 'ratio') at a sampling location, so that the highest result relative to the ISL is displayed. The GIS uses a color-coded system to display the soil concentration relative to the ISL value. For example, soil concentrations that are at or below the ISL value are displayed as a blue symbol. Locations where the soil concentration exceeds the ISL are displayed as yellow, orange, magenta, or red, depending on the degree of exceedance of the ISL value. Maps displaying the sampling results as color-coded symbols are included in this Data Gap TM (Figures 1, 2, and 3) to help display this evaluation step in the context of proposed sampling locations.

The data gap evaluation includes review of sampling results for combined chemicals, individual chemical groups (e.g. volatile organic compounds [VOCs], polyaromatic hydrocarbons [PAHs], polycyclic biphenyls [PCBs], etc.), and individual chemicals (e.g., barium, perchlorate). Sampling results in the database are 'filtered' to determine which chemicals are above ISLs, their depth of occurrence, and which chemicals are co-located. This allows for effective evaluation and selection of step-out sample locations and analytical suites for assessing the extent and/or distribution of chemicals that exceed their respective ISLs. In some cases where detected chemical concentrations slightly exceed ISL values, Phase 3 step-out sampling is not proposed in this Data Gap TM, but will be subject to an additional data gap review once the final AOC Look-

[2] DTSC is in the process of completing a new soil background study that includes additional chemicals not analyzed in the 2005 study. When the new background values are finalized they will replace the existing background values and will be used for subsequent data gap analyses.

Up Table values are made available. Similarly, sampling to address elevated reporting limits in historical data is not proposed in all areas of Subareas 3 and 6 in this Data Gap TM. In areas where other data gaps have been identified, sampling for elevated reporting limits is also proposed as needed. In other areas, data gap evaluation for elevated reporting limits in historical data will be addressed after final Look-Up Table values are established and in the context of recent sampling results.

The GIS display of the ISL-compared sampling results is used to evaluate potential sampling locations. In areas where detected concentrations exceed ISLs, previous sampling data are evaluated to determine if the lateral or vertical extent of the exceedance is limited by other sampling results below ISLs or other features at the site (e.g., bedrock). If not, then additional sampling is proposed in that area. Conversely, in some areas existing sampling results are adequate to support remedial planning or cleanup decisions. A review of the distribution of results along with other lines of evidence (described below) is used to identify where additional sampling is needed.

Some locations with significant exceedances of ISL values have been identified by DOE and DTSC as soil "clearly contaminated areas." These are areas most likely requiring remediation based on the existing elevated sampling results, and are displayed in GIS and on maps in this TM with pink shading. The data gap analysis for these areas considers whether sufficient information is available to determine the lateral and vertical extent of contamination. In many cases, more data are needed to determine a volume of soil to be removed for use in remedial planning, and additional sampling is proposed in these areas.

2.2 EVALUATION OF MIGRATION PATHWAYS

Migration pathways are the means by which chemicals can move in the environment, including surface water transport, downward movement to subsurface soil, or air/wind dispersion. Migration pathways are evaluated to answer several questions:

- Where could potentially contaminated soil migrate via surface water flow?
- Where could contaminants migrate in subsurface soils? Could groundwater be affected by the soil contamination?
- Were chemicals potentially released into the air, dispersed by wind and deposited in surrounding areas at concentrations exceeding ISLs?

The topographic and surface water flow data in the GIS is used to identify surface water pathways from potential contamination sources. Prior data for those pathways will be evaluated as to the adequacy for addressing contaminant migration. If additional data are needed to define

the extent of chemicals moved by surface water, downward migration in the subsurface, or to assess air dispersion, sampling locations are proposed for the migration pathways.

This data gap analysis identifies previous soil sampling locations or features where there may be outstanding groundwater investigation program data needs. At these features, the data gap analysis is evaluating the adequacy of existing soil sampling results to assess potential migration of contaminants to groundwater, and proposing additional soil sampling to the top of bedrock if gaps are identified.

2.3 HISTORIC AND SITE SURVEY INFORMATION REVIEWS

The data gap analysis also addresses potential sources of contamination not covered by prior sampling events. Historical survey and site operational information for Area IV is represented in GIS and viewed in context of previous sampling results. Historical and site survey information will be used to answer two questions:

- Are there any potential chemical use/release features that have not been sampled?
- If a potential chemical use area has already been sampled (but not for all chemicals potentially used), are additional samples/analyses needed to complete characterization?

A checklist has been developed that is reviewed along with the chemical data to ensure that features not covered by RFI or Phase 1 co-located sampling are addressed. The checklist includes the results of the historical site assessment (HSA) conducted by Sapere (2005), site operational and aerial photographic information recently compiled for the RFI, and the recent HSA completed by EPA (Hydrogeologic, Inc. [HGL], 2012). The "lines of evidence" reviewed as part of the checklist are published in the Master Phase 3 Work Plan Table 2-2, and provided herein (Table 4) for how they were applied in Subareas 3 and 6.

Site information includes various site features or survey information that is displayed in GIS using a common coordinate system (similar to latitude and longitude). Tanks, buildings, leach fields, geophysical survey results, historical aerial photos, storage areas, debris/disposal areas, identified chemical use areas, and surface water flow paths are examples of site information/features used to identify potential data gaps and proposed sampling locations. Site information is shown as layers in GIS that can be displayed individually or combined with sampling results. The site information features, compiled from historical documents, aerial photo review, and site surveys are evaluated using existing data to assess the completeness of characterization. If gaps are identified (e.g., a storage area not previously sampled), sampling is proposed with the analytical suites developed based on surrounding site operational uses and existing sample result exceedances.

In addition to site historical use or survey information, soil borings and trench logs are reviewed to identify relevant soil conditions (e.g., debris, staining, bedrock depth) since unique soil characteristics may also guide proposed sampling intervals. For example, sampling may be proposed both within and below stained horizons, or in another case, both within fill materials and below fill materials in underlying native soils. In both of these cases, sampling is needed below a potential contamination zone to identify how far contamination has migrated downward.

Data gaps associated with some historical operational use features are not addressed in this Data Gap TM but will be included in future documents. Historical operational use features not addressed in this plan include the Area IV sewer system, the natural gas pipelines within Area IV, and features within existing Area IV buildings. Data gaps associated with the sewer system and natural gas pipelines are being evaluated for these systems as a whole, and will be addressed in a separate Data Gap TM. Where applicable, sampling is proposed in this TM where sewer pipelines leave former or existing buildings since these are considered site-specific sampling features. Data gaps associated with existing buildings are being evaluated as part of this process, but sampling requirements within or below existing buildings will be detailed in forthcoming demolition plans since that work will proceed under a different schedule and process.

2.4 DATA GAP ANALYSIS PROCESS SUMMARY

A systematic process that incorporates the evaluation components discussed in Sections 2.1 through 2.3 is being used during data gap analysis to ensure available information from multiple sources is considered during data gap review. Thus, combining data gap recommendations from the three evaluation components (data screening evaluations, migration pathway evaluations, and historical document/site survey reviews), sampling is proposed for the evaluated subarea.

The outcome of the data gap analysis process is the identification of soil sampling requirements for Phase 3, including rationale for Phase 3 samples, their locations, depths, and proposed analytical suites. Both soil and soil vapor sampling for chemicals in Phase 3 are proposed in this TM ('soil' sampling is often referred to as 'soil matrix' sampling to distinguish it from soil vapor sampling). Soil matrix and soil vapor media provide different types of chemical data for remedial planning purposes. Soil vapor sampling is preferred to assess the potential release of solvents, which contain VOCs. Since VOCs are highly volatile, they are best evaluated in soil vapor samples, not soil matrix. Therefore, soil vapor sampling is proposed in this TM to evaluate locations where solvents may have been used, stored, or released, or to step-out around previous detections of VOCs above ISLs. Soil vapor sampling is also proposed to provide VOC data over larger areas to evaluate potential solvent release locations when historical operations are uncertain (e.g., large storage areas), or to assess vapor transport from an underlying groundwater plume.

The analytical parameters proposed for step-out or step-down sampling locations are based both on what the prior data indicate are chemicals of potential concern for the location, in conjunction with data needs identified based on review of migration pathways and other lines of evidence. Proposed sample spacing is based on the types of operations and releases, the magnitude and gradients of nearby sampling results, and site conditions (e.g., depth of soil, proximity of bedrock outcrops). Generally, samples are located with a 25 to 100 foot spacing laterally, and at 0.5-, 5-, and 10-foot depth intervals vertically. In many cases the deepest samples will be placed on 'hold' by the laboratory, and analyzed if elevated results are detected in the shallower samples. In special cases, sampling is proposed at shallower depths (e.g., 2 feet) to assess potentially more limited downward migration of large organic molecules like PCBs, dioxins, or PAHs.

The data gap analysis also identifies additional investigation techniques for some areas to aid in selection of sampling locations. The additional investigation techniques can include trenching or test pit excavation to observe soil conditions prior to sampling, or geophysical surveying of areas to identify targeted features, such as pipelines, underground storage tanks, or fill areas. In some cases, field reconnaissance or mapping is needed to refine proposed sampling locations, such as along drainages. The sampling rationales included in this Data Gap TM specify these additional investigative techniques where applicable.

The data gap analysis can identify future sampling locations outside of the subarea being evaluated. These future locations are displayed with pink '+' symbols on Figures 1 and 2. In some cases, the samples are located outside of Area IV and will require additional surveys and coordination prior to sampling. In other cases, the proposed samples are within another subarea, and will be included in the corresponding Data Gap TM.

The information presented in this Data Gap TM, along with supporting GIS and analytical information, is reviewed with DTSC during the data gap process and with interested stakeholders at the end of the data gap process. Input received from DTSC during review and from the public during meetings is incorporated into the proposed sampling included in this Data Gap TM.

3.0 SUBAREAS 3 AND 6 DATA GAP ANALYSIS

The data gap analysis for Subareas 3 and 6 was performed following the process outlined above and using the DQOs presented in Section 4 of the MFSP (CDM Smith, 2012b). The proposed sampling for this subarea is presented in Tables 1 (Soil Matrix), and 2 (Soil Vapor) and Figures 1 (3 and 6 North), 2 (6 South), and 3 (Soil Vapor). Table 3 presents the lines of evidence evaluation summary for this subarea, with checkmarks indicating what information resulted in proposed data gap samples.

As part of the Subareas 3 and 6 data gap analysis, some areas were identified where the DQOs were uniquely applied, or where specific sampling approaches have been recommended. These are briefly described below. More detailed, sample-specific rationales for these (and all) areas are provided in Tables 1 and 2. As indicated in the proposed sampling tables and figures, most of the samples proposed within Subareas 3 and 6 are to provide data to laterally and/or vertically delineate previously detected results. Unlike some subareas, this portion of Area IV has had extensive sampling already performed to address DTSC comments on the RFI report or implemented as part of Phase 1 co-located sampling with EPA. Because of this, there are fewer 'unique' or specific sampling approaches identified and discussed below than in previous TMs.

- At representative geophysical anomaly locations, investigation using test pits are proposed to evaluate potential subsurface features associated with each anomaly and to inspect soil conditions prior to collecting a soil sample (e.g., 6_DG-68, 6_DG-69, and 6_DG-70).
- Within historical unlined drainages in Subareas 3 and 6, sampling locations are proposed based on aerial photograph review. These unlined drainage ditches occur along E Street and G Street, and within the New Con and Subarea 6 South data gap areas. Samples will be collected down to bedrock to evaluate potential vertical migration into the bedrock and groundwater.
- Sampling to address potential impacts to groundwater is proposed at several locations (listed below and shown on Figure 3). Proposed sampling at these locations includes vertical sampling to top of bedrock (including VOC analysis in the deepest samples collected) and soil vapor sampling. In addition, further evaluation by the groundwater team is recommended for mobile chemicals detected in soil in the vicinity of these features, including VOCs, perchlorate, hexavalent chromium, nitrate, and n-nitrosodimethylamine (NDMA). Since some of these mobile chemicals are being evaluated as part of the DTSC background study, characterization of these constituents may be completed after background is established. No potential groundwater input features/locations were identified in Subarea 3. The potential features/locations identified in Subarea 6 are:
    - Sodium Reactor Experiment (SRE) Radioactive (R/A) Liquid Waste Holdup Tanks
    - Building 4143 SRE Reactor Vault
    - Building 4003 Leach Field and Dry Well
    - SRE Pond
    - Building 4003 Hot Cave
    - Building 4064 Leach Field

- SRE Pipeline Discharge / Old Con Low Spot

4.0 REFERENCES

CDM Smith. 2012a. Work Plan for Chemical Data Gap Investigation, Phase 3 Chemical Sampling at Area IV, Santa Susana Field Laboratory, Ventura County, California. April.

CDM Smith. 2012b. Master Field Sampling Plan for Chemical Data Gap Investigation Sampling at Area IV, Santa Susana Field Laboratory, Ventura County, California. April.

Hydrogeologic, Inc. (HGL) 2012. Draft Final Historic Site Assessment Santa Susana Field Laboratory Site Area IV Radiological Study, Ventura County, California.

TABLES

Table 1
Subareas 3 and 6 Phase 3 Proposed Soil Sample Locations
(1 of 13)

Location ID[1]	Area	Location Description	Sample Type	Depth (feet bgs)	Analytical Method														Data Gap Checklist[3]	Rationale / Comments[4]
					PAHs (EPA Method 8270C [SIM])	PCBs / PCTs (EPA Method 8082)	Dioxins/Furans (EPA Method 1613)	Metals[2] (EPA Methods 6010B/6010C /6020/6020A/7471A/7471B)	Cr(VI) (EPA Method 7196A)	Energetics (EPA Method 8330A)	Perchlorate (EPA Method 6850/6860)	TPH (EPA Method 8015B)	Formaldehyde (EPA Method 8315A)	Morpholine (EPA Method 8260 TIC)	Pesticides (EPA Method 8081)	Herbicides (EPA Method 8151A)	pH (EPA Method 9045C)	Soil Moisture (ASTM D2216/ EPA Method 160.3)		
Subarea 6																				
6_DG-502	SRE North	East of B4686	Soil Boring	0.5	X	X	X	X				X					X	X	√	Location targets area of cleared vegetation observed during EPA HSA. Shallow bedrock anticipated. If soil is present at 10 feet bgs, collect sample and hold pending shallow results.
				5	X	X	X	X				X					X	X		
6_DG-503	SRE North	North of B4686	Soil Boring	0.5			X					X						X	√	Location targets area of cleared vegetation observed during EPA HSA; also serves as stepout for TPH at SRBS1058. Analyze dioxins due to lack of data in area and elevated dioxin detects downslope to the southwest at SL-070-SA6. Shallow bedrock anticipated. If soil is present at 10 feet bgs, collect sample and hold pending shallow results.
				5			X					X						X		
6_DG-504	SRE North	East of B4686	Soil Boring	0.5			X					X						X	√	Location targets area of cleared vegetation observed during EPA HSA; also serves as stepout for TPH at SRBS1058. Analyze dioxins due to lack of data in area and elevated dioxin detects downslope to the southwest at SL-070-SA6. Shallow bedrock anticipated. If soil is present at 10 feet bgs, collect sample and hold pending shallow results.
				5			X					X						X		
6_DG-505	SRE North	West of B4686	Soil Boring	0.5			X					X						X		Stepout for TPH and dioxins (co-located with Cs-137 detections above RTLs). Hold deeper samples pending shallow results since assessing potential surficial relrease.
				5			X					X						X		
				10			H					H						H		
6_DG-506	SRE North	Southwest of B4686	Soil Boring	0.5			X					X						X	√	Stepout for TPH and dioxins (co-located with Cs-137 detections above RTLs); also targets former rad storage and cleared vegetation areas identified in EPA HSA. Hold deeper samples pending shallow results since assessing potential surficial relrease.
				5			X					X						X		
				10			H					H						H		
6_DG-507	SRE North	South of B4686	Soil Boring	0.5	X	X	X	X				X					X	X	√	Stepout for TPH. Analyze for complete standard analytical suite since location is downslope and receives surface water runoff from former rad storage and within area of cleared vegetation identfied in EPA HSA. Position sample along road edge within drainage or rill if observed. Hold deeper samples pending shallow results since assessing potential surficial relrease.
				5	X	X	X	X				X					X	X		
				10	H	H	H	H				H					H	H		
6_DG-508	SRE North	Hillslope North of B4686	Soil Boring	0.5	X	X	X	X				X					X	X		Stepout for PAHs, PCBs, dioxins, and TPH detects to the south. Shallow bedrock anticipated (approximately 5 feet bgs). If deeper soil is present, collect and hold deepest sample pending shallow results.
				5	X	X	X	X				X					X	X		
				10	H	H	H	H				H					H	H		
6_DG-509	SRE North	Hillslope East of B4686	Soil Boring	0.5	X	X	X	X				X					X	X		Stepout for PAHs, TPH, and dioxins to the south and southwest. Hold deepest samples pending shallow results. If actual field location is on top of bedrock, place sample in adjacent area where soil is present. Shallow bedrock anticipated (approximately 5 feet bgs). If deeper soil is present, collect and hold deepest sample pending shallow results.
				5	X	X	X	X				X					X	X		
				10	H	H	H	H				H					H	H		
6_DG-510	SRE North	Hillslope Southeast of B4686	Soil Boring	0.5	X	X	X	X				X					X	X		Stepout for PAHs, PCBs, dioxins, metals, and TPH to the south and west. If actual field location is on top of bedrock, place sample in adjacent area where soil is present. Shallow bedrock anticipated (approximately 5 feet bgs). If deeper soil is present, collect and hold deepest sample pending shallow results.
				5	X	X	X	X				X					X	X		
				10	H	H	H	H				H					H	H		
6_DG-511	SRE North	Road South of B4686	Soil Boring	0.5	X	X	X	X				X					X	X		Location targets road edge and surface water pathway (via sheetflow) downslope of B4686. Hold deepest samples pending shallow results to evaluate surficial release.
				5	X	X	X	X				X					X	X		
				10	H	H	H	H				H					H	H		
6_DG-512	SRE North	South of B4653	Soil Boring	0.5	X	X	X	X				X					X	X	√	Location targets pipeline on hillslope that conveyed liquid rad waste from SRE to Hot Waste Storage Tanks; also serves as lateral stepout for PAHs, PCBs, TPH, dioxins, and metals detected above ISLs in samples to the west and upslope to the north. Analyze all samples since targeting subsurface pipeline and location of documented seepage from tanks.
				5	X	X	X	X				X					X	X		
				10	X	X	X	X				X					X	X		
6_DG-513	SRE North	West of B4687	Soil Boring	0.5	X	X	X	X				X					X	X		Stepout for PAHs, PCBs, TPH, and dioxins in samples to the north (SL-286-SA6) and southeast (SRBS1141/1143); also targets road edge and surface water pathway (via sheetflow) downslope of B4686. Hold deeper samples pending shallow results.
				5	X	X	X	X				X					X	X		
				10	H	H	H	H				H					H	H		
6_DG-514	SRE North	Northwest of B4143	Soil Boring	0.5	X	X	X	X			X	X					X	X	√	Stepout for PAHs, PCBs, and TPH; location also targets former pipeline to Hot Waste Storage Tanks north of SRE. Analyze perchlorate since detect in operational area (SL-103-SA6). Analyze all samples since targeting subsurface pipeline.
				5	X	X	X	X			X	X					X	X		
				10	X	X	X	X			X	X					X	X		
6_DG-515	SRE North	West of B4143	Soil Boring	0.5	X	X	X	X			X	X					X	X		Representative sample to assess potential contamination in operational area west of B4143; location also delineates northwest extent of Clearly Contaminated Area. Analyze perchlorate since detect in operational area (SL-103-SA6). Hold deepest sample pending shallow results. If fill is observed, collect sample at top of native and analyze to evaluate potential for B4143 excavation and soil movement impacts at depth.
				5	X	X	X	X			X	X					X	X		
				10	H	H	H	H			H	H					H	H		

Table 1
Subareas 3 and 6 Phase 3 Proposed Soil Sample Locations
(2 of 13)

Location ID[1]	Area	Location Description	Sample Type	Depth (feet bgs)	Analytical Method														Data Gap Checklist[3]	Rationale / Comments[4]
					PAHs (EPA Method 8270C [SIM])	PCBs / PCTs (EPA Method 8082)	Dioxins/Furans (EPA Method 1613)	Metals[2] (EPA Methods 6010B/6010C /6020/6020A/7471A/7471B)	Cr(VI) (EPA Method 7196A)	Energetics (EPA Method 8330A)	Perchlorate (EPA Method 6850/6860)	TPH (EPA Method 8015B)	Formaldehyde (EPA Method 8315A)	Morpholine (EPA Method 8260 TIC)	Pesticides (EPA Method 8081)	Herbicides (EPA Method 8151A)	pH (EPA Method 9045C)	Soil Moisture (ASTM D2216/ EPA Method 160.3)		
6_DG-516	SRE North	Southwest of B4143	Soil Boring	0.5	X	X	X	X			X	X					X	X		Representative sample to assess potential contamination in operational area west of B4143; location also delineates northwest extent of Clearly Contaminated Area. Analyze perchlorate since detect in operational area (SL-103-SA6). Hold deepest sample pending shallow results.
				5	X	X	X	X			X	X					X	X		
				10	H	H	H	H			H	H					H	H		
6_DG-517	SRE North	Southwest of B4143	Soil Boring	0.5	X	X	X	X			X	X					X	X		Representative sample to assess potential contamination in operational area between Clearly Contaminated Areas; also targets linear terrain conductivity anomaly. Analyze perchlorate since detect in operational area (SL-103-SA6). Hold deepest sample pending shallow results.
				5	X	X	X	X			X	X					X	X		
				10	H	H	H	H			H	H					H	H		
6_DG-518	SRE North	Southern portion of B4143	Soil Boring	0.5	X	X	X	X			X	X					X	X		Stepout between Clearly Contaminated Areas for PCBs, PAHs, TPH, dioxins, and metals in surrounding samples; also targets magnetic anomaly. Analyze perchlorate since detect in operational area (SL-103-SA6). Collect samples at 5 foot intervals to bedrock and analyze all samples based on TPH and dioxin congener detections above ISLs at depth in previous sampling in area.
				5	X	X	X	X			X	X					X	X		
				10	X	X	X	X			H	X					X	X		
6_DG-519	SRE North	East of B4143	Soil Boring	0.5	X	X	X	X				X					X	X		Stepout for PAHs, PCBs, TPH, dioxins, and metals in surrounding samples. Location also delineates Clearly Contaminated Areas (B4143 Area and Mercury Release Area). Collect samples at 5 foot intervals to bedrock and analyze all samples based on detections above ISLs at depth in previous sampling in area.
				5	X	X	X	X				X					X	X		
				10	X	X	X	X				X					X	X		
6_DG-520	SRE North	East of B4143	Soil Boring	0.5	X	X	X	X				X					X	X		Stepout for PAHs, PCBs, TPH, dioxins, and metals in surrounding samples. Location also delineates Clearly Contaminated Areas (B4143 Area and Mercury Release Area). Collect samples at 5 foot intervals to bedrock and analyze all samples based on detections above ISLs at depth in previous sampling in area.
				5	X	X	X	X				X					X	X		
				10	X	X	X	X				X					X	X		
6_DG-521	SRE North	B4163	Soil Boring	0.5	X	X	X	X				X					X	X		Representative sample in B4163 footprint and operational area based on nearby results, and delineates southern extent of Mercury Release Area CCA. Collect samples at 5 foot intervals to bedrock and analyze all samples based on TPH detections above ISLs at depth in previous sampling in area.
				5	X	X	X	X				X					X	X		
				10	X	X	X	X				X					X	X		
6_DG-522	SRE North	West of B4686	Soil Boring	0.5	X	X	X	X				X					X	X		Stepout for TPH in area north of B4686. Hold deeper samples pending shallow results since assessing potential surficial relrease.
				5	X	X	X	X				X					X	X		
				10	H	H	H	H				H					H	H		
6_DG-523	SRE North	Northwest of SRE Pond	Soil Boring	0.5	X	X	X	X				X					X	X		Stepout for PCBs,TPH and dioxins to the south and southwest. Shallow bedrock anticipated; if deeper soil is present, collect 10 foot sample and hold pending shallow results.
				5	X	X	X	X				X					X	X		
6_DG-524	SRE North	North of SRE Pond	Soil Boring	0.5	X	X	X	X				X					X	X		Stepout for dioxins at SED-016-SIV. Location targets historical dirt road, where surface water flows to area downstream of SRE dam. Analyze for full suite based on downslope detections. Shallow bedrock anticipated; if deeper soil is present, collect 10 foot sample and hold pending shallow results.
				5	X	X	X	X				X					X	X		
6_DG-525	SRE North	Northeast of SRE Pond	Soil Boring	0.5	X	X	X	X				X					X	X		Stepout for PAHs, PCBs, TPH, dioxins, and metals to the south and east. Shallow bedrock anticipated; if deeper soil is present, collect 10 foot sample and hold pending shallow results.
				5	X	X	X	X				X					X	X		
6_DG-526	SRE North	Northeast of SRE Pond	Soil Boring	0.5	X	X	X	X				X					X	X		Stepout for PAHs, PCBs, TPH, dioxins, and metals to the south and east. Shallow bedrock anticipated; if deeper soil is present, collect 10 foot sample and hold pending shallow results.
				5	X	X	X	X				X					X	X		
6_DG-527	SRE North	Northeast of SRE Pond	Soil Boring	0.5	X	X	X	X				X					X	X		Stepout for TPH and dioxins to the west and delineates eastern extent of Clearly Contaminated Area (SRE Drainage). Shallow bedrock anticipated; if deeper soil is present, collect 10 foot sample and hold pending shallow results.
				5	X	X	X	X				X					X	X		
6_DG-528	SRE North	Northeast of SRE Pond	Soil Boring	0.5	X	X	X	X				X					X	X		Location targets dirt road leading from OCY. Shallow bedrock anticipated; if deeper soil is present, collect 10 foot sample and hold pending shallow results.
				5	X	X	X	X				X					X	X		
6_DG-529	SRE North	Northeast of Building 4723	Soil Boring	0.5	X	X	X	X				X					X	X		Location targets road downslope of Sodium Cleaning Pad (B4723). Location is at the top of an unlined surface water pathway leading to SL-050-SA6 (elevated TPH and dioxins). Shallow bedrock anticipated (less than 5 feet bgs); collect and analyze deepest sample just above bedrock.
				5	X	X	X	X				X					X	X		
6_DG-530	SRE North	Northeast of B4723	Soil Boring	0.5	X	X	X	X				X					X	X	√	Stepout for TPH to the west and dioxins in derbis Chemical Use Area identifed in RFI Group 6 SAP. Shallow bedrock anticipated (potentially less than 5 feet bgs). If deeper soil is present, collect 10 foot sample and hold pending shallow results; otherwise, collect and analyze deepeset sample just above bedrock.
				5	X	X	X	X				X					X	X		
6_DG-531	SRE North	West of Building 4723	Soil Boring	0.5	X	X	X	X				X					X	X		Stepout for PCBs, TPH, and dioxins detected at the Sodium Cleaning Pad (B4723). Shallow bedrock anticipated (less than 5 feet bgs).
				5	X	X	X	X				X					X	X		
6_DG-532	SRE North	South of Building 4723	Soil Boring	0.5	X	X	X	X				X					X	X		Stepout for TPH, dioxins, and metals (Hg) in surrounding samples at the Sodium Cleaning Pad (B4723). Shallow bedrock anticipated (less than 5 feet bgs); collect and analyze deepest sample just above bedrock.
				5	X	X	X	X				X					X	X		
6_DG-533	SRE North	East of Building 4723	Soil Boring	0.5	X	X	X	X				X					X	X		Stepout for TPH, dioxins, and metals (Hg) in upslope samples at the Sodium Cleaning Pad; location positioned in sheet flow surface water pathway along road. Shallow bedrock anticipated (less than 5 feet bgs); collect and analyze deepest sample just above bedrock.
				5	X	X	X	X				X					X	X		

Table 1
Subareas 3 and 6 Phase 3 Proposed Soil Sample Locations
(3 of 13)

Location ID[1]	Area	Location Description	Sample Type	Depth (feet bgs)	Analytical Method														Data Gap Checklist[3]	Rationale / Comments[4]
					PAHs (EPA Method 8270C [SIM])	PCBs / PCTs (EPA Method 8082)	Dioxins/Furans (EPA Method 1613)	Metals[2] (EPA Methods 6010B/6010C /6020/6020A/7471A/7471B)	Cr(VI) (EPA Method 7196A)	Energetics (EPA Method 8330A)	Perchlorate (EPA Method 6850/6860)	TPH (EPA Method 8015B)	Formaldehyde (EPA Method 8315A)	Morpholine (EPA Method 8260 TIC)	Pesticides (EPA Method 8081)	Herbicides (EPA Method 8151A)	pH (EPA Method 9045C)	Soil Moisture (ASTM D2216/ EPA Method 160.3)		
6_DG-534	SRE North	East of Building 4723	Soil Boring	0.5	X	X	X	X				X					X	X		Location is downslope stepout for TPH, dioxins, and metals (Hg) detected above ISLs. SL-303-SA6 also identified as PGRAY (Cs-137) in EPA Area IV Rad Characterization. Shallow bedrock anticipated (less than 5 feet bgs); collect and analyze deepest sample just above bedrock.
				5	X	X	X	X				X					X	X		
6_DG-535	SRE North	Southeast of Building 4723	Soil Boring	0.5	X	X	X	X				X					X	X		Stepout for TPH, dioxins, and metals (Hg) detected above ISLs on rock outcrop (identified as PGRAY in EPA Area IV Rad Characterization). Shallow bedrock anticipated (less than 5 feet bgs); collect and analyze deepest sample just above bedrock.
				5	X	X	X	X				X					X	X		
6_DG-536	SRE South	Storage Yard Northeast of B4003	Soil Boring	0.5	X	X	X	X				X					X	X		Stepout for PCBs, TPH, and dioxins; location targets storage yard area east of B4003. Bedrock anticipated to be less than 5 feet bgs; collect deepest sample just above bedrock and analyze. If soils are deeper than 10 feet, collect and hold sample pending shallow results.
				5	X	X	X	X				X					X	X		
				10	H	H	H	H				H					H	H		
6_DG-537	SRE South	Drainage swale east of B4003	Soil Boring	0.5	X	X	X	X				X					X	X	√	Location targets drainage swale on east side of B4003. Bedrock anticipated to be less than 5 feet bgs. Collect samples at 5 foot intervals with the deepest sample targeting soil just above bedrock. Analyze all depths due to potential recharge from drainage.
				5	X	X	X	X				X					X	X		
6_DG-542	SRE South	B4003	Soil Boring	0.5	X	X	X	X	X			X	X				X	X		Location targets western portion of B4003, adjacent to the former 'Hot Cave' test cell location. Analytical suite includes corrosion inhibitors to address cooling tower at B4003. Collect samples at 5 foot intervals to bedrock with deepest sample targeting soil just above bedrock to characterize potential for lateral migration along bedrock. If fill is observed, collect sample at the top of native soil. Analyze all samples based on detects at depth in previous sampling within B4003 footprint.
				5	X	X	X	X	X			X	X				X	X	√	
				10	X	X	X	X	X			X	X				X	X		
6_DG-545	SRE South	B4003	Soil Boring	0.5	X	X	X	X	X			X	X				X	X		Representative location within B4003 footprint. Analytical suite includes corrosion inhibitors to address cooling tower at B4003. Analyze all samples based on detects at depth in previous sampling within B4003 footprint.
				5	X	X	X	X	X			X	X				X	X	√	
				10	X	X	X	X	X			X	X				X	X		
6_DG-546	SRE South	North side of B4003	Soil Boring	0.5	X	X	X	X	X			X	X				X	X		Location targets storage observed in historical aerial phtograph (1974). Analytical suite includes corrosion inhibitors to address cooling tower at B4003. Analyze all samples based on detects at depth in previous sampling within B4003 footprint.
				5	X	X	X	X	X			X	X				X	X	√	
				10	X	X	X	X	X			X	X				X	X		
6_DG-547	SRE South	East side of B4003	Soil Boring	0.5	X	X	X	X	X			X	X				X	X		Location targets storage observed in historical aerial phtograph (1974). Analytical suite includes corrosion inhibitors to address cooling tower at B4003. Analyze all samples based on detects at depth in previous sampling within B4003 footprint.
				5	X	X	X	X	X			X	X				X	X	√	
				10	X	X	X	X	X			X	X				X	X		
6_DG-548	SRE South	Northwest side of B4003	Soil Boring	0.5	X	X	X	X	X			X	X				X	X		Stepout for PAHs, PCBs, dioxins, and metals in SL-19-SA6 and SL-20-SA6. Analytical suite includes corrosion inhibitors to address cooling tower at B4003. Analyze all samples based on detects at depth in previous sampling within B4003 footprint.
				5	X	X	X	X	X			X	X				X	X		
				10	X	X	X	X	X			X	X				X	X		
6_DG-549	SRE South	Transformer 693 (East of B4003)	Soil Boring	0.5	X	X	X	X				X					X	X		Stepout for elevated PCBs above ISLs at former transformer 693 east of B4003 and metals/dioxins in the storage area to the northeast (SL-028-SA6). Hold deep sample pending shallow results.
				3	H	H	H	H				H					H	H		
6_DG-550	Subarea 6 South	Southeast Portion of Subarea 6 South	Soil Boring	0.5	X	X	X	X				X					X	X		Location characterizes area downslope from operations in Area III (SPA RFI Site). Shallow bedrock anticipated. Collect 10 foot sample if soil is present and hold pending shallow results.
				5.0	X	X	X	X				X					X	X		
6_DG-552	SRE South	West of B4273	Soil Boring	0.5	X	X	X	X				X					X	X		Stepout for PAHs and dioxins at SL-301-SA6; location downslope of B4273 (SRE Laundry Facility) operational area. Hold deep sample pending shallow results.
				5	X	X	X	X				X					X	X		
				10	H	H	H	H				H					H	H		
6_DG-553	SRE South	West of B4273	Soil Boring	0.5	X	X	X	X				X					X	X		Stepout for PAHs and dioxins at SL-301-SA6; location downslope of B4273 (SRE Laundry Facility) operational area. Hold deep sample pending shallow results.
				5	X	X	X	X				X					X	X		
				10	H	H	H	H				H					H	H		
6_DG-555	SRE South	Southeast of B4273	Soil Boring	0.5	X	X	X	X				X					X	X		Stepout for PAHs, PCBs, and dioxins; location downslope of B4273 (SRE Laundry Facility) operational area. Shallow bedrock anticipated (less than 5 feet bgs); collect sample at 10 feet if soil present and hold pending shallow results. Hold deep sample pending shallow results.
				5	X	X	X	X				X					X	X		
				10	H	H	H	H				H					H	H		
6_DG-556	SRE South	Southwest of B4063	Soil Boring	0.5	X		X										X	X		Stepout for PAHs and dioxins; location downslope of SRE Laundry Facility (B4273); analytical suite based on limited operations and detected analytes. Shallow bedrock anticipated (less than 5 feet bgs); collect sample at 10 feet if soil present and hold pending shallow results. Hold deep sample pending shallow results.
				5	X		X										X	X		
				10	H		H										H	H		

Table 1
Subareas 3 and 6 Phase 3 Proposed Soil Sample Locations
(4 of 13)

Location ID[1]	Area	Location Description	Sample Type	Depth (feet bgs)	Analytical Method														Data Gap Checklist[3]	Rationale / Comments[4]
					PAHs (EPA Method 8270C [SIM])	PCBs / PCTs (EPA Method 8082)	Dioxins/Furans (EPA Method 1613)	Metals[2] (EPA Methods 6010B/6010C /6020/6020A/7471A/7471B)	Cr(VI) (EPA Method 7196A)	Energetics (EPA Method 8330A)	Perchlorate (EPA Method 6850/6860)	TPH (EPA Method 8015B)	Formaldehyde (EPA Method 8315A)	Morpholine (EPA Method 8260 TIC)	Pesticides (EPA Method 8081)	Herbicides (EPA Method 8151A)	pH (EPA Method 9045C)	Soil Moisture (ASTM D2216/ EPA Method 160.3)		
6_DG-557	New Con Area	Drainage Swale Northeast of B4114	Soil Boring	0.5	X	X	X	X				X					X	X	√	Location targets lined drainage north of B4114 and stepout for PAHs at SL-218-SA6 downslope. Bedrock anticipated less than 5 feet bgs. Collect deepest sample at bedrock to evaluate potential downward migration.
				5	X	X	X	X				X					X	X		
				10	X	X	X	X				X					X	X		
6_DG-558	SRE South	Drainage along E Street at Entrance to B4003	Soil Boring	0.5	X	X	X	X				X					X	X	√	Location targets potential historical unlined drainage along E Street. Collect deepest sample just above bedrock due to potential recharge; analyze all samples.
				5	X	X	X	X				X					X	X		
				10	X	X	X	X				X					X	X		
6_DG-559	SRE South	East of B4063	Soil Boring	0.5	X	X	X	X				X					X	X		Stepout for PAHs, PCBs, and dioxins in samples to the west. Hold deep sample pending shallow results.
				5	X	X	X	X				X					X	X		
				10	H	H	H	H				H					H	H		
6_DG-560	SRE South	East of B4063	Soil Boring	0.5	X	X	X	X				X					X	X		Stepout location downslope of detections at B4063; positioned in potential surface water pathway (field check and locate actual position based on field observations). Hold deep sample pending shallow results.
				5	X	X	X	X				X					X	X		
				10	H	H	H	H				H					H	H		
6_DG-561	B4064 Area	Northwest of B4064	Soil Boring	0.5	X	X	X	X				X					X	X	√	Stepout for TPH and dioxins; also targets area noted as open storage and "soil hot spot" in EPA HSA TM. Shallow bedrock anticipated (less than 5 feet bgs). If soils are shallower than 3 feet, collect one sample targeting soil just above bedrock.
				5	X	X	X	X				X					X	X		
6_DG-562	B4064 Area	South of B4064 Leach Field	Soil Boring	0.5			X					X						X		Stepout for TPH and dioxins; location also targets B4064 access road. Shallow bedrock anticipated (less than 5 feet bgs). If deeper soils are encountered, collect 10-foot sample and hold pending shallow results.
				5			X					X						X		
6_DG-563	SRE South	Ridge Southeast of Sodium Cleaning Pad	Soil Boring	0.5	X	X	X	X				X					X	X		Location characterizes area where various debris was observed during sitewide debris survey northeast of B4003. Hold deep sample pending shallow results.
				5	X	X	X	X				X					X	X		
				10	H	H	H	H				H					H	H		
6_DG-564	SRE South	Northeast of B4003	Soil Boring	0.5	X	X	X	X				X					X	X	√	Location targets dirt road/pathway leading from B4283 (SRE Laundry Facility) to B4724 (Hot Oil Sodium Cleaning Facility) observed in historical aerial photos (1965 - 1995). Hold deep sample pending shallow results.
				5	X	X	X	X				X					X	X		
				10	H	H	H	H				H					H	H		
6_DG-565	B4064 Area	Storage Area Southwest of B4064	Soil Boring	0.5			X											X		Stepout for dioxins. Shallow bedrock anticipated (less than 5 feet bgs). If deeper soils encountered, hold deep sample pending shallow results.
				5			X											X		
6_DG-566	SRE South	Southwest of B4003	Soil Boring	0.5	X	X	X	X				X					X	X		Location targets footpath between B4003 and B4093 operational areas and stepout for dioxins at SL-029-SA6; also adjacent to aboveground pipeline. Shallow bedrock anticipated (less than 5 feet bgs).
				5	X	X	X	X				X					X	X		
6_DG-567	SRE South	Southwest of B4003	Soil Boring	0.5	X	X	X	X				X					X	X		Same as 6_DG-66.
				5	X	X	X	X				X					X	X		
6_DG-568	B4064 Area	Parking Lot 4513 Area	Test Pit/Soil Boring	0.5	X	X	X	X				X					X	X	√	Stepout for TPH at L4BS1018. Conduct exploratory test pit to investigate linear magnetic anomaly; if pipe or buried metal observed, collect sample in soil beneath feature.
				5	X	X	X	X				X					X	X		
				10	H	H	H	H				H					H	H		
6_DG-569	B4064 Area	West of Parking Lot 4513 Area	Test Pit/Soil Boring	0.5	X	X	X	X				X					X	X	√	Stepout for TPH at L4BS1018 and SL-171-SA6. Conduct exploratory test pit to investigate linear terrain conductivity anomaly; if fill observed, collect sample at top of native immediately beneath fill.
				5	X	X	X	X				X					X	X		
				10	H	H	H	H				H					H	H		
6_DG-570	B4064 Area	Parking Lot 4513 Area	Test Pit/Soil Boring	0.5	X	X	X	X				X					X	X		Stepout for TPH at L4BS1018; analyze standard suite since characterizing area for potential storage. Conduct exploratory test pit to investigate linear magnetic anomaly; if pipe or buried metal observed, collect sample in soil beneath feature.
				5	X	X	X	X				X					X	X		
				10	H	H	H	H				H					H	H		
6_DG-571	B4064 Area	Parking Lot 4513 Area	Soil Boring	0.5	X	X	X	X				X					X	X	√	Stepout for TPH at L4BS1018 and SL-171-SA6; also targets historical unlined drainage. Analyze all depths due to potential downward migration from feature.
				5	X	X	X	X				X					X	X		
				10	X	X	X	X				X					X	X		
6_DG-572	B4064 Area	South of B4014	Soil Boring	0.5	X	X	X	X				X					X	X	√	Stepout for PAHs, PCBs, TPH, and dioxins in SL-169-SA6; location also targets historical unlined drainage. Shallow bedrock anticipated (less than 5 feet bgs). If soils are shallower than 3 feet, collect one sample targeting soil just above bedrock.
				5	X	X	X	X				X					X	X		
6_DG-573	B4064 Area	Northeast of B4014	Soil Boring	0.5	X	X	X	X				X					X	X		Stepout for PAHs, PCBs, TPH, and dioxins in SL-168-SA6 and SL-169-SA6; locationtargets historical unlined drainage observed in aerial photographs. Shallow bedrock anticipated (less than 5 feet bgs). If soils are shallower than 3 feet, collect one sample targeting soil just above bedrock.
				5	X	X	X	X				X					X	X		

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Subareas 3 and 6 Phase 3 Proposed Soil Sample Locations
(5 of 13)

Location ID[1]	Area	Location Description	Sample Type	Depth (feet bgs)	Analytical Method														Data Gap Checklist[3]	Rationale / Comments[4]
					PAHs (EPA Method 8270C [SIM])	PCBs / PCTs (EPA Method 8082)	Dioxins/Furans (EPA Method 1613)	Metals[2] (EPA Methods 6010B/6010C /6020/6020A/7471A/7471B)	Cr(VI) (EPA Method 7196A)	Energetics (EPA Method 8330A)	Perchlorate (EPA Method 6850/6860)	TPH (EPA Method 8015B)	Formaldehyde (EPA Method 8315A)	Morpholine (EPA Method 8260 TIC)	Pesticides (EPA Method 8081)	Herbicides (EPA Method 8151A)	pH (EPA Method 9045C)	Soil Moisture (ASTM D2216/ EPA Method 160.3)		
6_DG-574	B4064 Area	East of B4014	Soil Boring	0.5	X	X	X	X				X					X	X		Stepout for PAHs, PCBs, TPH, and dioxins in SL-169-SA6; also targets unlined drainage east of B4014. Shallow bedrock anticipated (less than 5 feet bgs). If soils are shallower than 3 feet, collect one sample targeting soil just above bedrock.
				5	X	X	X	X				X					X	X		
6_DG-575	B4064 Area	Slope Southwest of B4064	Soil Boring	0.5	X	X	X	X				X					X	X		Stepout for PAHs and dioxins in SL-066-SA6; also targets historical unlined drainage at base of slope observed in aerial photograph (1967). Shallow bedrock anticipated (less than 5 feet bgs). If soils are shallower than 3 feet, collect one sample targeting soil just above bedrock.
				5	X	X	X	X				X					X	X		
6_DG-576	B4064 Area	Slope Southwest of B4064	Soil Boring	0.5	X	X	X	X				X					X	X		Stepout for PAHs and dioxins in SL-066-SA6, SL-103-SA6, and SL-104-SA6. Shallow bedrock anticipated (less than 5 feet bgs).
				5	X	X	X	X				X					X	X		
6_DG-577	B4064 Area	Slope Southwest of B4064	Soil Boring	0.5	X	X	X	X				X					X	X		Stepout for PAHs and dioxins in SL-066-SA6, SL-103-SA6, and SL-104-SA66; also targets historical unlined drainage observed in aerial photograph (1967). Shallow bedrock anticipated (less than 5 feet bgs).
				5	X	X	X	X				X					X	X		
6_DG-578	B4064 Area	Storage Area Southwest of B4064	Soil Boring	0.5	X	X	X	X				X					X	X		Stepout for PAHs, TPH, and dioxins. Shallow bedrock anticipated (less than 5 feet bgs). If deeper soils encountered, hold deep sample pending shallow results.
				5	X	X	X	X				X					X	X		
6_DG-579	B4064 Area	Southeast of B4064	Soil Boring	0.5	X	X	X	X				X					X	X	√	Location targets santitary sewer exit from former B4064. Shallow bedrock anticipated (less than 5 feet bgs). If soils are shallower than 3 feet, collect one sample targeting soil just above bedrock.
				5	X	X	X	X				X					X	X		
6_DG-580	B4064 Area	North of B4064	Soil Boring	0.5	X	X	X	X				X					X	X		Stepout for TPH in B4064 and sideyard samples, and dioxins downdrainage to the east. Shallow bedrock anticipated (less than 5 feet bgs). If deeper soils are encountered, collect 10-foot sample and hold pending shallow results.
				5	X	X	X	X				X					X	X		
6_DG-581	B4064 Area	Northeast of B4064	Soil Boring	0.5	X	X	X	X				X					X	X		Stepout for TPH and dioxins in samples to south and east. Shallow bedrock anticipated (less than 5 feet bgs). If deeper soils are encountered, collect 10-foot sample and hold pending shallow results.
				5	X	X	X	X				X					X	X		
6_DG-582	B4064 Area	Southeast of B4064 Along G Street	Soil Boring	0.5	X	X	X	X				X					X	X	√	Stepout for TPH and dioxins in upslope samples and targets historical unlined drainage (1960 aerial photograph). Shallow bedrock anticipated (less than 5 feet bgs). If soils are shallower than 3 feet, collect one sample targeting soil just above bedrock. Analyze all depths due to potential recharge from drainage.
				5	X	X	X	X				X					X	X		
6_DG-583	B4064 Area	Drainage East of B4064	Soil Boring	0.5	X	X	X	X				X					X	X		Stepout for TPH and dioxins in SL-321-SA6 and SL-322-SA6 and targets drainage east of B4064. Shallow bedrock anticipated (less than 5 feet bgs). If deeper soils are encountered, collect 10-foot sample and hold pending shallow results.
				5	X	X	X	X				X					X	X		
6_DG-584	B4064 Area	East of B4064	Soil Boring	0.5	X	X	X	X				X					X	X		Stepout for PAHs, TPH (lube oil up to 5,100 ppm) and dioxins in SL-305-SA6; location upslope along G Street. Shallow bedrock anticipated (less than 5 feet bgs). If deeper soils are encountered, collect 10-foot sample and hold pending shallow results.
				5	X	X	X	X				X					X	X		
6_DG-585	B4064 Area	East of B4064	Soil Boring	0.5	X	X	X	X				X					X	X		Stepout for PAHs, TPH (lube oil up to 5,100 ppm) and dioxins in SL-305-SA6; location downslope in shallow drainage along G Street. Shallow bedrock anticipated (less than 5 feet bgs). If deeper soils are encountered, collect 10-foot sample. Analyze all samples due to potential downward migration from feature.
				5	X	X	X	X				X					X	X		
6_DG-586	New Con Area	Area South of B4040 Along G Street	Soil Boring	0.5	X	X	X	X				X			X	X	X	X		Location upslope of elevated dioxins and PAHs; also targets slope on side of G Street and adjacent sewer manhole. Shallow bedrock anticipated (less than 5 feet bgs). If deeper soils are encountered, collect 10-foot sample and hold pending shallow results.
				5	X	X	X	X				X			X	X	X	X		
6_DG-587	New Con Area	Area South of B4040 East of G Street	Soil Boring	0.5	X	X	X	X				X					X	X		Stepout in downslope area receiving surface water runoff from elevated PAH detects (L4BS1014). Shallow bedrock anticipated (less than 5 feet bgs); if deeper soils are present, collect 10 foot sample and place on hold pending shallow results.
				5	X	X	X	X				X					X	X		
6_DG-588	New Con Area	Area South of B4040 East of G Street	Soil Boring	0.5	X	X	X	X				X					X	X		Stepout for PAHs at L4BS1014 and PAHs/dioxins at SL-307-SA6. Shallow bedrock anticipated (approximately 5 feet bgs or less); if deeper soils are present, collect 10 foot sample and place on hold pending shallow results.
				5	X	X	X	X				X					X	X		
6_DG-589	New Con Area	Area South of B4040 East of G Street	Soil Boring	0.5	X	X	X	X				X					X	X		Stepout for dioxins in SL-309-SA6. Shallow bedrock anticipated (approximately 5 feet bgs or less); if deeper soils are present, collect 10 foot sample and place on hold pending shallow results.
				5	X	X	X	X				X					X	X		
6_DG-590	New Con Area	Area South of B4040 Along G Street	Soil Boring	0.5	X	X	X	X				X					X	X		Stepout for TPH and dioxins in SL-306-SA6; also targets road edge east of G Street. Shallow bedrock anticipated (approximately 5 feet bgs or less); if deeper soils are present, collect 10 foot sample and place on hold pending shallow results.
				5	X	X	X	X				X					X	X		
6_DG-591	New Con Area	West of B4040	Soil Boring	0.5	X	X	X	X				X					X	X		Stepout for pesticides in SL-241-SA6 and SL-242-SA6 and dioxins in SL-242-SA6; also targets road edge east of G Street. Collect 10 foot sample if soil is present and hold pending shallow results.
				5.0	X	X	X	X				X					X	X		
				10	H	H	H	H				H					H	H		

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Subareas 3 and 6 Phase 3 Proposed Soil Sample Locations
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Location ID[1]	Area	Location Description	Sample Type	Depth (feet bgs)	Analytical Method														Data Gap Checklist[3]	Rationale / Comments[4]
					PAHs (EPA Method 8270C [SIM])	PCBs / PCTs (EPA Method 8082)	Dioxins/Furans (EPA Method 1613)	Metals[2] (EPA Methods 6010B/6010C /6020/6020A/7471A/7471B)	Cr(VI) (EPA Method 7196A)	Energetics (EPA Method 8330A)	Perchlorate (EPA Method 6850/6860)	TPH (EPA Method 8015B)	Formaldehyde (EPA Method 8315A)	Morpholine (EPA Method 8260 TIC)	Pesticides (EPA Method 8081)	Herbicides (EPA Method 8151A)	pH (EPA Method 9045C)	Soil Moisture (ASTM D2216/ EPA Method 160.3)		
6_DG-592	New Con Area	Northwest of B4040	Soil Boring	0.5	X	X	X	X				X					X	X		Stepout for PAHs, TPH, dioxins, and metals in adjacent samples and delineates western extent of Clearly Contaminated Area; also targets lined subsurface stormwater pipeline. Collect deepest sample just above bedrock and analyze all samples to characterize soil beneath pipeline.
				5.0	X	X	X	X				X					X	X		
				10	X	X	X	X				X					X	X		
6_DG-593	New Con Area	Northeast of B4040	Soil Boring	0.5	X	X	X	X				X					X	X		Location targets unlined drainage on south of E Street and assesses potential subsurface impacts. Collect 10 foot sample if soil is present; analyze all depths due to potential downward migration from unlined drainage.
				5.0	X	X	X	X				X					X	X	√	
				10	X	X	X	X				X					X	X		
6_DG-594	New Con Area	Northeast of B4040	Soil Boring	0.5	X	X	X	X				X					X	X		Stepout for PAHs, PCBs, dioxins, and metals in downstream sample SL-310-SA6; targets unlined drainage south of E Street. Collect 10 foot sample if soil is present; analyze all samples due to potential downward migration from drainage.
				5.0	X	X	X	X				X					X	X	√	
				10	X	X	X	X				X					X	X		
6_DG-595	New Con Area	East of B4040	Soil Boring	0.5	X	X	X	X				X					X	X		Location targets north bank of unlined drainage; also serves as stepout for metals (Ag) at NCBS17 and dioxins in Clearly Contaminated Area. Collect 10 foot sample if soil is present; analyze all depths due to downward migration from unlined drainage.
				5.0	X	X	X	X				X					X	X		
				10	H	H	H	H				H					H	H		
6_DG-596	New Con Area	East of B4040	Soil Boring	0.5	X	X	X	X				X					X	X		Stepout for PAHs, PCBs, TPH, dioxins, and metals at SL-215-SA6 and characterizes slope on western bank of Old Con/New Con drainage. Collect 10 foot sample if soil is present and hold pending shallow results.
				5.0	X	X	X	X				X					X	X		
				10	H	H	H	H				H					H	H		
6_DG-597	New Con Area	East of B4040	Soil Boring	0.5	X	X	X	X				X					X	X		Location targets dirt road west of New Conservation Yard; also provides lateral definition for potential dioxins on eastern bank of drainage. Shallow bedrock anticipated (less than 5 feet bgs). Collect 10 foot sample if soil is present; analyze all depths to address potential deposition over time on drainage bank.
				5.0	X	X	X	X				X					X	X		
				10	X	X	X	X				X					X	X		
6_DG-598	New Con Area	East of B4040	Soil Boring	0.5	X	X	X	X				X					X	X		Location evaluates potential dioxin migration from ash pile downslope to the Old Con/New Con drainage. Stepou for dioxins at NCBS12 and NCBS11, and metals (Ag) at NCBS17. Collect 10 foot sample if soil is present and hold pending shallow results.
				5.0	X	X	X	X				X					X	X		
				10	H	H	H	H				H					H	H		
6_DG-599	New Con Area	East of B4040	Soil Boring	0.5	X	X	X	X				X			X	X	X	X		Stepout for PAHs, PCBs,TPH, dioxins and pesticides at SL-228-SA6. Location should be field located based on drainage course; collect sample approximately 15 feet from west bank of drainage. Collect 10 foot sample if soil i present and hold pending shallow results.
				5.0	X	X	X	X				X			X	X	X	X		
				10	H	H	H	H				H			H	H	H	H		
6_DG-600	New Con Area	Southeast of B4040	Soil Boring	0.5	X	X	X	X				X					X	X		Location targets dirt road southeast of B4040; also addresses potential aerial dispersion and deposition from B4040 incinerator. Collect 10 foot sample if soil is present and hold pending shallow results.
				5.0	X	X	X	X				X					X	X		
				10	H	H	H	H				H					H	H		
6_DG-601	New Con Area	East of B4040	Soil Boring	0.5	X	X	X	X				X					X	X		Location downslope of elevated dioxins and silver at B4040 ash pile Clearly Contaminated Area; evaluates potential migration/connection to dioxin detects along west bank of Old Con/New Con drainage. Collect 10 foot sample if soil is present and hold pending shallow results.
				5.0	X	X	X	X				X					X	X		
				10	H	H	H	H				H					H	H		
6_DG-602	New Con Area	Southeast of B4040	Soil Boring	0.5	X	X	X	X				X					X	X		Location targets dirt road southeast of B4040; also addresses potential aerial dispersion/deposition from B4040 incinerator. Collect 10 foot sample if soil is present and hold pending shallow results.
				5.0	X	X	X	X				X					X	X		
				10	H	H	H	H				H					H	H		
6_DG-603	New Con Area	NCY Access Road Area	Soil Boring	0.5	X	X	X	X				X					X	X		Stepout for PAHs, PCBs, dioxins, metals, and pesticides detected in samples collected along the New Con Yard access road. Shallow bedrock anticipated (less than 5 feet bgs). Collect 10 foot sample if soil is present and hold pending shallow results.
				5.0	X	X	X	X				X					X	X		
6_DG-604	New Con Area	NCY Access Road Area	Soil Boring	0.5	X	X	X	X				X					X	X		Same as 6_DG-103.
				5.0	X	X	X	X				X					X	X		
6_DG-605	New Con Area	NCY Access Road Area	Soil Boring	0.5	X	X	X	X				X					X	X		Same as 6_DG-103.
				5.0	X	X	X	X				X					X	X		
6_DG-606	New Con Area	NCY Access Road Area	Soil Boring	0.5	X	X	X	X				X					X	X		Same as 6_DG-103.
				5.0	X	X	X	X				X					X	X		
6_DG-607	New Con Area	NCY Access Road Area	Soil Boring	0.5	X	X	X	X				X					X	X		Same as 6_DG-103.
				5.0	X	X	X	X				X					X	X		
6_DG-608	New Con Area	NCY Access Road Area	Soil Boring	0.5	X	X	X	X				X					X	X		Location targets dirt road west of New Conservation Yard; also provides lateral definition for potential dioxins on eastern bank of drainage. Shallow bedrock anticipated (less than 5 feet bgs). Collect 10 foot sample if soil is present; analyze all depths to address potential deposition over time on drainage bank.
				5.0	X	X	X	X				X					X	X	√	

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6_DG-609	New Con Area	Slope South of NCY	Soil Boring	0.5	X	X	X	X				X					X	X		Stepout for metals at NCBS02 and PAHs/PCBs at NCBS1005; also delineates southern extent of Clearly Contaminated. Shallow bedrock anticipated (less than 5 feet bgs). Collect 10 foot sample if soil is present and hold pending shallow results.
				5.0	X	X	X	X				X					X	X		
6_DG-610	New Con Area	Slope South of NCY	Soil Boring	0.5	X	X	X	X				X					X	X		Stepout for metals at NCBS02 and PAHs/PCBs at NCBS1005; also delineates southern extent of Clearly Contaminated. Shallow bedrock anticipated (less than 5 feet bgs). Collect 10 foot sample if soil is present and hold pending shallow results.
				5.0	X	X	X	X				X					X	X		
6_DG-611	Subarea 6 South	Northeast Portion of Subarea 6 South	Soil Boring	0.5	X	X	X	X				X					X	X	√	Location targets dirt road south of Old Con/New Con Drainage; also addresses potential aerial dispersion/depostion on hillslope southeast of B4040 incinerator. Shallow bedrock anticipated (less than 5 feet bgs). Collect 10 foot sample if soil is present and hold pending shallow results.
				5.0	X	X	X	X				X					X	X		
6_DG-612	Subarea 6 South	Northeast Portion of Subarea 6 South	Soil Boring	0.5	X	X	X	X				X					X	X	√	Location targets dirt road south of Old Con/New Con Drainage; also addresses potential aerial dispersion/depostion on hillslope southeast of B4040 incinerator. Shallow bedrock anticipated (less than 5 feet bgs). Collect 10 foot sample if soil is present and hold pending shallow results.
				5.0	X	X	X	X				X					X	X		
6_DG-613	Subarea 6 South	Northeast Portion of Subarea 6 South	Soil Boring	0.5	X	X	X	X				X					X	X	√	Targets dirt road and area of cleared vegetation observed in historical aerial photograph (1980). Location also downslope of observed debris, and addresses potential aerial dispersion/deposition from B4040 incinerator. Shallow bedrock anticipated (less than 5 feet bgs). Collect 10 foot sample if soil is present and hold pending shallow results.
				5.0	X	X	X	X				X					X	X		
6_DG-614	New Con Area	East of NCY	Soil Boring	0.5	X	X	X	X				X					X	X	√	Location targets historical dirt roads east of the New Conservation Yard. Shallow bedrock anticipated. Collect 10 foot sample if soil is present and hold pending shallow results.
				5.0	X	X	X	X				X					X	X		
6_DG-615	Subarea 6 South	Northwest Portion of Subarea 6 South	Soil Boring	0.5	X	X	X	X				X					X	X	√	Location targets dirt road. Shallow bedrock anticipated (less than 5 feet bgs). Collect 10 foot sample if soil is present and hold pending shallow results.
				5.0	X	X	X	X				X					X	X		
6_DG-616	Subarea 6 South	Northwest Portion of Subarea 6 South	Soil Boring	0.5	X	X	X	X				X					X	X	√	Same as 6_DG-115.
				5.0	X	X	X	X				X					X	X		
6_DG-617	New Con Area	South of B4040	Soil Boring	0.5	X	X	X	X				X					X	X	√	Location targets dirt road south of B4040 and area where debris (metal siding) observed. Shallow bedrock anticipated (less than 5 feet bgs). Collect 10 foot sample if soil is present and hold pending shallow results.
				5.0	X	X	X	X				X					X	X		
6_DG-618	Subarea 6 South	Southwest Portion of Subarea 6 South	Soil Boring	0.5	X	X	X	X				X					X	X	√	Same as 6_DG-115.
				5.0	X	X	X	X				X					X	X		
6_DG-619	Subarea 6 South	Southeast Portion of Subarea 6 South	Soil Boring	0.5	X	X	X	X				X					X	X	√	Location targets area where dirt road terminates at bedrock outcrop; characterizes area for potential dumping/disposal. Shallow bedrock anticipated (less than 5 feet bgs). Collect 10 foot sample if soil is present and hold pending shallow results.
				5.0	X	X	X	X				X					X	X		
6_DG-620	Subarea 6 South	Northeast Portion of Subarea 6 South	Soil Boring	0.5	X	X	X	X				X					X	X		Location downslope of observed debris (torn piece of hose and sheet metal). Shallow bedrock anticipated (less than 5 feet bgs). Collect 10 foot sample if soil is present and hold pending shallow results.
				5.0	X	X	X	X				X					X	X		
6_DG-621	Subarea 6 South	Southwest Portion of Subarea 6 South	Soil Boring	0.5	X	X	X	X				X					X	X	√	Same as 6_DG-115.
				5.0	X	X	X	X				X					X	X		
6_DG-622	Subarea 6 South	Northwest Portion of Subarea 6 South	Soil Boring	0.5	X	X	X	X				X					X	X	√	Same as 6_DG-115.
				5.0	X	X	X	X				X					X	X		
6_DG-623	Subarea 6 South	Southwest Portion of Subarea 6 South	Soil Boring	0.5	X	X	X	X				X					X	X	√	Same as 6_DG-115.
				5.0	X	X	X	X				X					X	X		
6_DG-624	Subarea 6 South	Southwest Portion of Subarea 6 South	Soil Boring	0.5	X	X	X	X				X					X	X	√	Same as 6_DG-115.
				5.0	X	X	X	X				X					X	X		
6_DG-625	Subarea 6 South	Southwest Portion of Subarea 6 South	Soil Boring	0.5	X	X	X	X				X					X	X	√	Same as 6_DG-115.
				5.0	X	X	X	X				X					X	X		
6_DG-626	Area III	Old Con/New Con Drainage, Area III	Soil Boring	0.5	X	X	X	X				X			X	X	X	X	√	Stepout for PAHs, dioxins, and metals (Ni, Ag) located downstream from impacts in SL-233-SA6 (and samples to the west). Analyze for pesticides due to elevated detections in updrainage locations. Shallow bedrock anticipated (less than 5 feet bgs). If soils are shallower than 3 feet, collect single sample targeting soil just above bedrock.
				5.0	X	X	X	X				X			X	X	X	X		
6_DG-627	Subarea 6 South	Old Con/New Con Drainage, Inside Area III/IV Boundary	Soil Boring	0.5	X	X	X	X				X					X	X	√	Stepout for upstream impacts in Old Con/New Con Drainage (TPH, dioxins). Shallow bedrock anticipated (less than 5 feet bgs). If soils are shallower than 3 feet, collect single sample targeting soil just above bedrock.
				5.0	X	X	X	X				X					X	X		

Table 1
Subareas 3 and 6 Phase 3 Proposed Soil Sample Locations
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Location ID[1]	Area	Location Description	Sample Type	Depth (feet bgs)	Analytical Method														Data Gap Checklist[3]	Rationale / Comments[4]
					PAHs (EPA Method 8270C [SIM])	PCBs / PCTs (EPA Method 8082)	Dioxins/Furans (EPA Method 1613)	Metals[2] (EPA Methods 6010B/6010C /6020/6020A/7471A/7471B)	Cr(VI) (EPA Method 7196A)	Energetics (EPA Method 8330A)	Perchlorate (EPA Method 6850/6860)	TPH (EPA Method 8015B)	Formaldehyde (EPA Method 8315A)	Morpholine (EPA Method 8260 TIC)	Pesticides (EPA Method 8081)	Herbicides (EPA Method 8151A)	pH (EPA Method 9045C)	Soil Moisture (ASTM D2216/ EPA Method 160.3)		
6_DG-628	Subarea 6 South	Old Con/New Con Drainage Southeastern Subarea 6	Soil Boring	0.5	X	X	X	X				X			X	X	X	X	√	Transect/stepout for PAHs, PCBs, TPH, dioxins, metals and pesticides detected updrainage to characterize overbank deposits. Four lateral stepout locations comprise the drainage transect; collect stepouts 15 feet laterally from center of drainage. Shallow bedrock anticipated (less than 5 feet bgs). Collect samples at 5 foot intervals to bedrock; analyze all samples to evaluate sediment deposition over time.
				5.0	X	X	X	X				X			X	X	X	X		
6_DG-629	Subarea 6 South	Old Con/New Con Drainage Southeastern Subarea 6	Soil Boring	0.5	X	X	X	X				X					X	X	√	
				5.0	X	X	X	X				X					X	X		
6_DG-630	Subarea 6 South	Old Con/New Con Drainage Southeastern Subarea 6	Soil Boring	0.5	X	X	X	X				X			X	X	X	X	√	
				5.0	X	X	X	X				X			X	X	X	X		
6_DG-631	Subarea 6 South	Old Con/New Con Drainage Southeastern Subarea 6	Soil Boring	0.5	X	X	X	X				X					X	X	√	
				5.0	X	X	X	X				X					X	X		
6_DG-632	Subarea 6 South	Old Con/New Con Drainage Southeastern Subarea 6	Soil Boring	0.5	X	X	X	X				X			X	X	X	X	√	
				5.0	X	X	X	X				X			X	X	X	X		
6_DG-633	Subarea 6 South	Old Con/New Con Drainage Southeastern Subarea 6	Soil Boring	0.5	X	X	X	X				X					X	X	√	Stepout downstream of SL-230-SA6 for PAHs, TPH, dioxins, and metals (Ag) based on upstream impacts from NCY drainage and potential impacts from Area III. Shallow bedrock anticipated (less than 5 feet bgs). If soil is present, collect 10 foot sample and hold pending shallow results.
				5.0	X	X	X	X				X					X	X		
6_DG-634	Subarea 6 South	Old Con/New Con Drainage Southeastern Subarea 6	Soil Boring	0.5	X	X	X	X				X			X	X	X	X	√	Transect/stepout for PAHs, PCBs, TPH, dioxins, metals and pesticides detected updrainage to characterize overbank deposits. Two lateral stepout locations comprise the drainage transect; collect stepouts approximately 15 feet laterally from center of drainage. Shallow bedrock anticipated (less than 5 feet bgs). Collect samples at 5 foot intervals to bedrock; analyze all samples to evaluate sediment deposition over time.
				5.0	X	X	X	X				X			X	X	X	X		
6_DG-635	Subarea 6 South	Old Con/New Con Drainage Southeastern Subarea 6	Soil Boring	0.5	X	X	X	X				X					X	X	√	
				5.0	X	X	X	X				X					X	X		
6_DG-636	Subarea 6 South	Old Con/New Con Drainage Southeastern Subarea 6	Soil Boring	0.5	X	X	X	X				X					X	X	√	
				5.0	X	X	X	X				X					X	X		
6_DG-637	Old Con Area	Northeast of Tank 4731	Soil Boring	0.5	X	X	X	X				X					X	X	√	Representative location to assess the southwestern extent of the North Slope Storage Area / North Slope Debris Area A (PCBs and PAHs) and the northeastern extent of potential contamination associated with former tank berm fill soils (TPH and PCBs). Location is within mapped extent of historical storage area. Bedrock anticipated <5'; if fill with debris is present, collect and analyze sample within fill, at top of native (if encountered), and just above bedrock.
				5	X	X	X	X				X					X	X		
6_DG-638	Old Con Area	Northwest of Former Tank 4731	Soil Boring	0.5	X	X	X	X				X			X	X	X	X	√	Location targets uncharacterized area within North Slope Debris Area B; also a stepout to delineate northern extent of Northern Bench Clearly Contaminated Area (TPH, dioxins, PAHs, PCBs, perchlorate, pesticides, metals). Location is within mapped extent of historical storage area. Bedrock anticipated <5'; if fill with debris is present, collect and analyze sample within fill, at top of native (if encountered), and just above bedrock.
				5	X	X	X	X				X			X	X	X	X		
6_DG-639	Old Con Area	North Slope Debris Area B	Soil Boring	0.5	X	X	X	X				X					X	X	√	Collect surface sample at SL-267-SA6 (previous sampling deep only) to characterize North Slope Debris Area B and delineate northern extent of Northern Bench Clearly Contaminated Area (TPH, dioxins, PAHs, PCBs, perchlorate, pesticides, metals). Location is within mapped extent of historical storage area. Bedrock anticipated >10'.
6_DG-640	Old Con Area	Northwest of Former Tank 4731	Soil Boring	0.5	X	X	X	X				X					X	X	√	Location targets uncharacterized area within North Slope Debris Area B; also a stepout for TPH at SL-249-SA6, SL-267-SA6, and OCBS92 and targets terrain conductivity area. Bedrock anticipated <5'; if fill with debris is present, collect and analyze sample within fill, at top of native (if encountered), and just above bedrock.
				5	X	X	X	X				X					X	X		
6_DG-641	Old Con Area	East of Tank 4731	Soil Boring	0.5	X	X	X	X				X					X	X	√	Same as 6_DG-328.
6_DG-642	Old Con Area	East of Tank 4731	Soil Boring	0.5	X	X	X	X				X					X	X	√	Representative location to characterize an area potentially used for open storage and downslope of operational activities based on debris identified during 2008 debris survey and elevated TPH and dioxins at SL-317-SA6; positioned within surface water pathway. Bedrock anticipated <2'.
6_DG-643	Old Con Area	East of Tank 4731	Soil Boring	0.5	X	X	X	X				X					X	X	√	Representative location to characterize an area potentially used for open storage and downslope of operational activities based on debris identified during 2008 debris survey and elevated TPH and dioxins at SL-317-SA6; also a stepout for PAHs at OCBS1083. Bedrock anticipated <2'.

Table 1
Subareas 3 and 6 Phase 3 Proposed Soil Sample Locations
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Location ID[1]	Area	Location Description	Sample Type	Depth (feet bgs)	Analytical Method														Data Gap Checklist[3]	Rationale / Comments[4]
					PAHs (EPA Method 8270C [SIM])	PCBs / PCTs (EPA Method 8082)	Dioxins/Furans (EPA Method 1613)	Metals[2] (EPA Methods 6010B/6010C /6020/6020A/7471A/7471B)	Cr(VI) (EPA Method 7196A)	Energetics (EPA Method 8330A)	Perchlorate (EPA Method 6850/6860)	TPH (EPA Method 8015B)	Formaldehyde (EPA Method 8315A)	Morpholine (EPA Method 8260 TIC)	Pesticides (EPA Method 8081)	Herbicides (EPA Method 8151A)	pH (EPA Method 9045C)	Soil Moisture (ASTM D2216/ EPA Method 160.3)		
6_DG-644	Old Con Area	East of Tank 4731	Soil Boring	0.5	X	X	X	X				X					X	X	√	Representative location to characterize an area potentially used for open storage and downslope of operational activities based on debris identified during 2008 debris survey and elevated TPH and dioxins at SL-317-SA6. Bedrock anticipated <2'.
6_DG-645	Old Con Area	Northwest of Former Tank 4732	Soil Boring	0.5	X	X	X	X				X			X	X	X	X	√	Stepout to delineate southwestern extent of Northern Bench Clearly Contaminated Area (TPH, dioxins, PAHs, PCBs, perchlorate, pesticides, metals); location is within mapped extent of historical storage area. Bedrock anticipated <5'.
				5	X	X	X	X				X			X	X	X	X		
6_DG-646	Old Con Area	Northwest of Former Tank 4732	Soil Boring	0.5	X	X	X	X				X			X	X	X	X	√	Same as 6_DG-318.
				5	X	X	X	X				X			X	X	X	X		
6_DG-647	Old Con Area	West of Tank 4732	Soil Boring	0.5	X	X	X	X				X					X	X	√	Location targets uncharacterized area within former tank berm fill soils extent; also a stepout for TPH at OCTS06. Bedrock anticipated <10'; collect and analyze deepest sample targeting soil just above bedrock to characterize potential for lateral migration along bedrock.
				5	X	X	X	X				X					X	X		
				10	X	X	X	X				X					X	X		
6_DG-648	Old Con Area	North of Tank 4732	Soil Boring	0.5	X	X	X	X				X					X	X	√	Location targets uncharacterized area within former tank berm fill soils extent; also a stepout for TPH, dioxins, PCBs, and/or metals (Hg and Ag) at OCBS1016, OCTS07, OCTS08, SL-197-SA6, SL-208-SA6, and SL-246-SA6. Location is within mapped extent of historical storage area. Bedrock anticipated <10'; collect and analyze deepest sample targeting soil just above bedrock to characterize potential for lateral migration along bedrock.
				5	X	X	X	X				X					X	X		
				10	X	X	X	X				X					X	X		
6_DG-649	Old Con Area	North of Atomics International Conservation Yard	Soil Boring	0.5	X	X	X	X				X			X	X	X	X	√	Stepout to delineate northern extent of Atomics International Yard Clearly Contaminated Area (TPH, PCBs, pesticides, dioxins, metals, PAHs) and targets debris identified during 2008 debris survey. Location is within mapped extent of historical storage area and near mapped extent of Atomics International Conservation Yard. Bedrock anticipated ~5'; if fill with debris is present, collect and analyze sample within fill, at top of native (if encountered), and just above bedrock.
				5	X	X	X	X				X			X	X	X	X		
6_DG-650	Old Con Area	East of Atomics International Conservation Yard	Soil Boring	0.5	X	X	X	X				X			X	X	X	X	√	Stepout to delineate eastern extent of Atomics International Yard Clearly Contaminated Area (TPH, PCBs, pesticides, dioxins, metals, PAHs) and for TPH and PAHs at OCBS1045; positioned along historical dirt road within mapped extent of historical storage area. Bedrock anticipated ~5'.
				5	X	X	X	X				X			X	X	X	X		
6_DG-651	Old Con Area	North of Eastern Debris Clearly Contaminated Area	Soil Boring	0.5	X	X	X	X				X					X	X	√	Stepout to delineate northern extent of Eastern Debris Clearly Contaminated Area (dioxins, PAHs, metals, TPH, PCBs); positioned along historical dirt road and within mapped extent of historical storage area. Bedrock anticipated <5'.
				5	X	X	X	X				X					X	X		
6_DG-652	Old Con Area	East of Atomics International Conservation Yard	Soil Boring	0.5	X	X	X	X				X			X	X	X	X	√	Stepout to delineate southeastern extent of Atomics International Yard Clearly Contaminated Area (TPH, PCBs, pesticides, dioxins, metals, PAHs); for metals (Ag) and PCBs at OCBS1043; and for TPH and PAHs at OCBS1045. Positioned along historical dirt road, within mapped extent of historical storage area, and mapped extent of Atomics International Conservation Yard. Bedrock anticipated ~5'.
				5	X	X	X	X				X			X	X	X	X		
6_DG-653	Old Con Area	South of Tank 4732	Soil Boring	0.5	X	X	X	X				X					X	X	√	Location targets uncharacterized area within former tank berm fill soils extent; also a stepout for TPH at SL-213-SA6. Bedrock anticipated <10'; collect and analyze deepest sample targeting soil just above bedrock to characterize potential for lateral migration along bedrock.
				5	X	X	X	X				X					X	X		
				10	X	X	X	X				X					X	X		
6_DG-654A	Old Con Area	Transformer - B4320	Soil Boring	0.5	X	X	X	X				X					X	X	√	Location targets former transformer to address uncertainty with respect to previous sample placement; current sample placement based on facility drawing in EPA Technical Memorandum (Figure 2.5.1b) and photograph in the EPA HSA. Collect samples at three discrete locations and analyze 0.5' and 3' samples for PCBs due to locations potentially within the former tank berm fill soils extent. Eastern sample (6_DG-327A) also targets sanitary sewer connection to B4320 and a historic dirt road, and is a stepout for TPH at OCBS04 and SL-213-SA6. Location is within mapped extent of historical storage area. Bedrock anticipated <10'; collect and analyze deepest sample targeting soil just above bedrock to characterize potential for lateral migration along bedrock.
				3		X												X		
				10	X	X	X	X				X					X	X		
6_DG-654B	Old Con Area	Transformer - B4320	Soil Boring	0.5		X												X		
				3		X												X		
6_DG-654C	Old Con Area	Transformer - B4320	Soil Boring	0.5		X												X		
				3		X												X		
6_DG-655	Old Con Area	Container Storage Area Southwest of B4320	Test Pit/Soil Boring	0.5	X	X	X	X				X					X	X	√	Location targets uncharacterized area within former tank berm fill soils extent; also a stepout for TPH at SL-217-SA6. Location is within mapped extent of historical storage area. Conduct exploratory test pit to investigate and characterize layer of greenish fuel staining noted in soil borings between approximately 3.5 and 6 feet bgs in the central portion of the Container Storage Area; if observed, collect sample of greenish stained soil. Bedrock anticipated <10'; collect and analyze deepest sample targeting soil just above bedrock to characterize potential for lateral migration along bedrock.
				5	X	X	X	X				X					X	X		
				10	X	X	X	X				X					X	X		

Table 1
Subareas 3 and 6 Phase 3 Proposed Soil Sample Locations
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Location ID[1]	Area	Location Description	Sample Type	Depth (feet bgs)	Analytical Method														Data Gap Checklist[3]	Rationale / Comments[4]
					PAHs (EPA Method 8270C [SIM])	PCBs / PCTs (EPA Method 8082)	Dioxins/Furans (EPA Method 1613)	Metals[2] (EPA Methods 6010B/6010C /6020/6020A/7471A/7471B)	Cr(VI) (EPA Method 7196A)	Energetics (EPA Method 8330A)	Perchlorate (EPA Method 6850/6860)	TPH (EPA Method 8015B)	Formaldehyde (EPA Method 8315A)	Morpholine (EPA Method 8260 TIC)	Pesticides (EPA Method 8081)	Herbicides (EPA Method 8151A)	pH (EPA Method 9045C)	Soil Moisture (ASTM D2216/ EPA Method 160.3)		
6_DG-656	Old Con Area	SRE Pipeline/Container Storage Area Southeast of B4320	Test Pit/Soil Boring	0.5	X	X	X	X				X			X	X	X	X	√	Location targets uncharacterized area within former tank berm fill soils extent and the former SRE Pond discharge pipeline; also a stepout to delineate northern extent of Old Con/New Con Drainage Clearly Contaminated Area (dioxins, metals, PCBs, pesticides, TPH), TPH at OCBS05 and SL-217-SA6, and PAHs, PCBs, metals (Cd, Ag), and TPH at OCBS1036. Location is within mapped extent of historical storage area. Conduct exploratory test pit to investigate and characterize layer of greenish fuel staining noted in soil borings between approximately 3.5 and 6 feet bgs in the central portion of the Container Storage Area; if observed, collect sample of greenish stained soil. Bedrock anticipated <10'; collect and analyze deepest sample targeting soil just above bedrock to characterize potential for lateral migration along bedrock.
				5	X	X	X	X				X			X	X	X	X		
				10	X	X	X	X				X					X	X		
6_DG-657	Old Con Area	Container Storage Area Southeast of B4320	Test Pit/Soil Boring	0.5	X	X	X	X				X					X	X	√	Location targets uncharacterized area within former tank berm fill soils extent; also a stepout for TPH at OCBS05 and OCBS43 and PAHs, PCBs, metals (Cd, Ag), and TPH at OCBS1036. Location is within mapped extent of historical storage area. Conduct exploratory test pit to investigate and characterize layer of greenish fuel staining noted in soil borings between approximately 3.5 and 6 feet bgs in the central portion of the Container Storage Area; if observed, collect sample of greenish stained soil. Bedrock anticipated <10'; collect and analyze deepest sample targeting soil just above bedrock to characterize potential for lateral migration along bedrock.
				5	X	X	X	X				X					X	X		
				10	X	X	X	X				X					X	X		
6_DG-658	Old Con Area	Container Storage Area East of B4320	Soil Boring	0.5	X	X	X	X				X			X	X	X	X	√	Location targets uncharacterized area within former tank berm fill soils extent; also a stepout to delineate southwestern extent of Atomics International Yard Clearly Contaminated Area (TPH, PCBs, pesticides, dioxins, metals, PAHs) and for PAHs, PCBs, metals (Cd, Ag), and TPH at OCBS1036. Location is within mapped extent of historical storage area. Bedrock anticipated <5'; collect and analyze deepest sample targeting soil just above bedrock to characterize potential for lateral migration along bedrock.
				5	X	X	X	X				X			X	X	X	X		
6_DG-659	Old Con Area	Container Storage Area Southeast of B4320	Soil Boring	0.5	X	X	X	X				X					X	X	√	Location targets uncharacterized area within former tank berm fill soils extent; also a stepout for PAHs, PCBs, metals (Cd, Ag), and TPH at OCBS1036. Bedrock anticipated ~5'; collect and analyze deepest sample targeting soil just above bedrock to characterize potential for lateral migration along bedrock.
				5	X	X	X	X				X					X	X		
6_DG-660	Old Con Area	South of Atomics International Conservation Yard	Soil Boring	0.5	X	X	X	X				X			X	X	X	X	√	Location is one of four samples (6_DG-355, 6_DG-356, 6_DG-362) targeting surface water flow pathway (asphalt swale and sheet flow) from Atomics International Yard to Old Con/New Con Drainage with this sample positioned at beginning of asphalt swale. Also is a stepout to delineate southern extent of Atomics International Yard Clearly Contaminated Area (TPH, PCBs, pesticides, dioxins, metals, PAHs) and metals/PCBs at OCBS1044. Location is within mapped extent of historical storage area. Bedrock anticipated <5'; collect and analyze deepest sample targeting soil just above bedrock to characterize potential for lateral migration along bedrock.
				5	X	X	X	X				X			X	X	X	X		
6_DG-661	Old Con Area	North of Rocketdyne Conservation Yard	Soil Boring	0.5	X	X	X	X				X					X	X	√	Stepout to delineate western extent of Telephone Pole Storage Clearly Contaminated Area (dioxins and PAHs); also for dioxins, PAHs, metals (Ag), and TPH at SL-258-SA6. Location is within mapped extent of historical storage area. Bedrock anticipated <5'.
				5	X	X	X	X				X					X	X		
6_DG-662	Old Con Area	North of Rocketdyne Conservation Yard	Soil Boring	0.5	X	X	X	X				X					X	X	√	Stepout to delineate northwestern extent of Telephone Pole Storage Clearly Contaminated Area (dioxins and PAHs). Bedrock anticipated <5'.
				5	X	X	X	X				X					X	X		
6_DG663	Old Con Area	North of Rocketdyne Conservation Yard	Soil Boring	0.5	X	X	X	X				X					X	X	√	Stepout to delineate northeastern extent of Telephone Pole Storage Clearly Contaminated Area (dioxins and PAHs) and western extent of Eastern Debris Clearly Contaminated (dioxins, PAHs, metals, TPH, PCBs); also targets a magnetometer anomaly. Bedrock anticipated <5'.
				5	X	X	X	X				X					X	X		
6_DG-664	Old Con Area	North of Rocketdyne Conservation Yard	Soil Boring	0.5	X	X	X	X				X					X	X	√	Stepout to delineate eastern extent of Telephone Pole Storage Clearly Contaminated Area (dioxins and PAHs) and southern extent of Eastern Debris Clearly Contaminated Area (dioxins, PAHs, metals, TPH, PCBs). Location is within mapped extent of historical storage area. Bedrock anticipated <5'.
				5	X	X	X	X				X					X	X		
6_DG-665	Old Con Area	West of ESG Storage Yard	Soil Boring	0.5	X	X	X	X				X					X	X	√	Location characterizes area west of ESG storage yard identified in 1988 Radiological Survey Report. Bedrock anticipated ~5'.
				5	X	X	H	X				X					X	X		
6_DG-666	Old Con Area	ESG Storage Yard West of Container Storage Area	Soil Boring	0.5	X	X	X	X				X					X	X	√	Stepout to characterize ESG storage yard identified in 1988 Radiological Survey Report based on PAHs at OCBS1033; positioned near ground penetrating radar anomalies. Bedrock anticipated ~5'; collect and analyze deepest sample targeting soil just above bedrock to characterize potential for lateral migration along bedrock.
				5	X	X	H	X				X					X	X		
6_DG-667	Old Con Area	ESG Storage Yard West of Container Storage Area	Soil Boring	0.5	X	X	X	X				X					X	X	√	Stepout to characterize ESG storage yard identified in 1988 Radiological Survey Report based on PAHs at OCBS1033; positioned on surface water flow pathway and historical dirt road. Bedrock anticipated <2'.
6_DG-668	Old Con Area	ESG Storage Yard West of Container Storage Area	Soil Boring	0.5	X	X	X	X				X					X	X	√	Stepout to characterize ESG storage yard identified in 1988 Radiological Survey Report based on PAHs at OCBS1033; also targets magnetometer anomaly and delineates lateral and vertical extent of former tank berm soils. Bedrock anticipated ~10'.
				5	X	X	H	X				X					X	X		
				10	H	H	H	H				H					H	H		

Table 1
Subareas 3 and 6 Phase 3 Proposed Soil Sample Locations
(11 of 13)

Location ID[1]	Area	Location Description	Sample Type	Depth (feet bgs)	Analytical Method														Data Gap Checklist[3]	Rationale / Comments[4]
					PAHs (EPA Method 8270C [SIM])	PCBs / PCTs (EPA Method 8082)	Dioxins/Furans (EPA Method 1613)	Metals[2] (EPA Methods 6010B/6010C /6020/6020A/7471A/7471B)	Cr(VI) (EPA Method 7196A)	Energetics (EPA Method 8330A)	Perchlorate (EPA Method 6850/6860)	TPH (EPA Method 8015B)	Formaldehyde (EPA Method 8315A)	Morpholine (EPA Method 8260 TIC)	Pesticides (EPA Method 8081)	Herbicides (EPA Method 8151A)	pH (EPA Method 9045C)	Soil Moisture (ASTM D2216/ EPA Method 160.3)		
6_DG-669	Old Con Area	Container Storage Area Southwest of B4320	Soil Boring	0.5	X	X	X	X				X					X	X	√	Location targets uncharacterized area within former tank berm fill soils extent; also a stepout for TPH at OCBS04 and PCBs at OCBS1076. Bedrock anticipated ~10'; collect and analyze deepest sample targeting soil just above bedrock to characterize potential for lateral migration along bedrock.
				5	X	X	X	X				X					X	X		
				10	X	X	X	X				X					X	X		
6_DG-670	Old Con Area	Container Storage Area Southwest of B4320	Soil Boring	0.5	X	X	X	X				X					X	X	√	Location targets uncharacterized area within former tank berm fill soils extent. Bedrock anticipated ~10'; collect and analyze deepest sample targeting soil just above bedrock to characterize potential for lateral migration along bedrock.
				5	X	X	X	X				X					X	X		
				10	X	X	X	X				X					X	X		
6_DG-671	Old Con Area	Former Fueling Area South of B4320	Soil Boring	0.5	X	X	X	X				X			X	X	X	X	√	Stepout to delineate northwestern extent of OldCon/NewCon Drainage Clearly Contaminated Area (dioxins, metals, PCBs, pesticides, TPH), for PCBs at OCBS1076, and TPH at SL-217-SA6; location also targets former location of clarifier. Location is within mapped extent of historical storage area. Bedrock anticipated ~5'; collect and analyze deepest sample targeting soil just above bedrock to characterize potential for lateral migration along bedrock.
				5	X	X	X	X				X			X	X	X	X		
6_DG-672	Old Con Area	South of Container Storage Area	Soil Boring	0.5	X	X	X	X				X			X	X	X	X	√	Stepout to delineate western extent of Old Con/New Con Drainage Clearly Contaminated Area (dioxins, metals, PCBs, pesticides, TPH). Location is within mapped extent of historical storage area. Bedrock anticipated ~5'; collect and analyze deepest sample targeting soil just above bedrock to characterize potential for lateral migration along bedrock.
				5	X	X	X	X				X			X	X	X	X		
6_DG-673	Old Con Area	Southeast of Container Storage Area	Soil Boring	0.5	X	X	X	X				X			X	X	X	X	√	Stepout to delineate northeastern extent of Old Con/New Con Drainage Clearly Contaminated Area (dioxins, metals, PCBs, pesticides, TPH), TPH at OCBS05 and SL-217-SA6, and PAHs, PCBs, metals (Cd, Ag), and southern extent of potential contamination associated with former tank berm fill soils. Bedrock anticipated ~5'; collect and analyze deepest sample targeting soil just above bedrock to characterize potential for lateral migration along bedrock.
				5	X	X	X	X				X			X	X	X	X		
6_DG-674	Old Con Area	West of Rocketdyne Conservation Yard	Soil Boring	0.5	X	X	X	X				X			X	X	X	X	√	Location is one of four samples (6_DG-339, 6_DG-356, 6_DG-362) targeting surface water flow pathway (asphalt swale and sheet flow) from Atomics International Yard to OldCon/NewCon Drainage with this samples positioned within sheet flow area. Also is a stepout to delineate eastern extent of OldCon/NewCon Drainage Clearly Contaminated Area (dioxins, metals, PCBs, pesticides, TPH). Location is within mapped extent of historical storage area. Bedrock anticipated ~5'; collect and analyze deepest sample targeting soil just above bedrock to characterize potential for lateral migration along bedrock.
				5	X	X	X	X				X			X	X	X	X		
6_DG-675	Old Con Area	West of Rocketdyne Conservation Yard	Soil Boring	0.5	X	X	X	X				X					X	X	√	Location is one of four samples (6_DG-339, 6_DG-355, 6_DG-362) targeting surface water flow pathway (asphalt swale and sheet flow) from Atomics International Yard to Old Con/New Con Drainage with this sample positioned within sheet flow area. Also is a stepout for TPH at OCBS07 and OLDCONS-1. Location is within mapped extent of historical storage area. Bedrock anticipated ~5'; collect and analyze deepest sample targeting soil just above bedrock to characterize potential for lateral migration along bedrock.
				5	X	X	X	X				X					X	X		
6_DG-676	Old Con Area	Rocketdyne Conservation Yard	Soil Boring	0.5	X	X	X	X				X					X	X	√	Location is one of four samples (6_DG-339, 6_DG-355, 6_DG-356) targeting surface water flow pathway (asphalt swale and sheet flow) from Atomics International Yard to Old Con/New Con Drainage with this sample positioned within asphalt swale. Also is a stepout for dioxins, PAHs, metals (Ag), and TPH at SL-258-SA6 and TPH at OCBS07 and OLDCONS-1. Location is within mapped extent of historical storage area. Bedrock anticipated ~5'; collect and analyze deepest sample targeting soil just above bedrock to characterize potential for lateral migration along bedrock.
				5	X	X	X	X				X					X	X		
6_DG-677A	Old Con Area	Transformers - Southwestern Rocketdyne Conservation Yard	Soil Boring	0.5		X												X	√	Locations target former transformers. Transformers in Area IV with previous ND composite results are being resampled with discrete samples. Collect six samples at three discrete locations; hold deeper samples pending shallow results.
				3		H												H		
6_DG-677B	Old Con Area	Transformers - Southwestern Rocketdyne Conservation Yard	Soil Boring	0.5		X												X		
				3		H												H		
6_DG-677C	Old Con Area	Transformers - Southwestern Rocketdyne Conservation Yard	Soil Boring	0.5		X												X		
				3		H												H		
6_DG-678	Old Con Area	Rocketdyne Conservation Yard	Soil Boring	0.5	X	X	X	X				X					X	X	√	Representative location to characterize open storage within the Rocketdyne Conservation Yard; also a stepout to delineate southern extent of Telephone Pole Storage Clearly Contaminated Area (dioxins and PAHs). Bedrock anticipated ~5'; collect and analyze deepest sample targeting soil just above bedrock to characterize potential for lateral migration along bedrock.
				5	X	X	H	X				X					X	X		

Table 1
Subareas 3 and 6 Phase 3 Proposed Soil Sample Locations
(12 of 13)

Location ID[1]	Area	Location Description	Sample Type	Depth (feet bgs)	Analytical Method														Data Gap Checklist[3]	Rationale / Comments[4]
					PAHs (EPA Method 8270C [SIM])	PCBs / PCTs (EPA Method 8082)	Dioxins/Furans (EPA Method 1613)	Metals[2] (EPA Methods 6010B/6010C /6020/6020A/7471A/7471B)	Cr(VI) (EPA Method 7196A)	Energetics (EPA Method 8330A)	Perchlorate (EPA Method 6850/6860)	TPH (EPA Method 8015B)	Formaldehyde (EPA Method 8315A)	Morpholine (EPA Method 8260 TIC)	Pesticides (EPA Method 8081)	Herbicides (EPA Method 8151A)	pH (EPA Method 9045C)	Soil Moisture (ASTM D2216/ EPA Method 160.3)		
6_DG-679	Old Con Area	Rocketdyne Conservation Yard	Soil Boring	0.5	X	X	X	X				X					X	X	√	Representative location to characterize open storage within the Rocketdyne Conservation Yard; also a stepout to delineate western extent of Southeast Transformer Clearly Contaminated Area (PCBs). Bedrock anticipated ~5'; collect and analyze deepest sample targeting soil just above bedrock to characterize potential for lateral migration along bedrock.
				5	X	X	H	X				X					X	X		
6_DG-680	Old Con Area	East of Rocketdyne Conservation Yard	Soil Boring	0.5	X	X	X	X				X			X	X	X	X	√	Location targets low spot at entrance to culvert under E Street to characterize area receiving surface water flow from three Clearly Contaminated Areas (Eastern Debris Area, Southeast Transformer, and HSA3 Debris Area) and the drainage along E Street from Subarea 3. Bedrock anticipated ~5'; collect and analyze deepest sample targeting soil just above bedrock to characterize potential for lateral migration along bedrock.
				5	X	X	X	X				X			X	X	X	X		
6_DG-681	Old Con Area	East of Rocketdyne Conservation Yard	Soil Boring	0.5	X	X	X	X				X					X	X	√	Stepout to delineate southern extent of Eastern Debris Clearly Contaminated Area (dioxins, PAHs, metals, TPH, PCBs) and dioxins at OCBS35 and OCBS36; positioned within surface water flow pathway downslope of Eastern Debris Clearly Contaminated Area, OCBS35, and OCBS36. Bedrock anticipated ~10'; collect and analyze deepest sample targeting soil just above bedrock to characterize potential for lateral migration along bedrock.
				5	X	X	X	X				X					X	X		
				10	X	X	X	X				X					X	X		
6_DG-682	Old Con Area	ESG Storage Yard West of Container Storage Area	Soil Boring	0.5	X	X	X	X				X					X	X	√	Stepout to characterize ESG storage yard identified in 1988 Radiological Survey Report based on PAHs at OCBS1033; positioned within potential surface water flow pathway along former dirt road. Bedrock anticipated ~10'; collect and analyze deepest sample targeting soil just above bedrock to characterize potential for lateral migration along bedrock.
				5	X	X	X	X				X					X	X		
				10	X	X	X	X				X					X	X		
6_DG-683A	Old Con Area	Transformers - Southwestern OCY Along E Street	Soil Boring	0.5		X												X	√	Locations target former transformers. Transformers in Area IV with previous ND composite results are being resampled with discrete samples. Collect six samples at three discrete locations; hold deeper samples pending shallow results.
				3		H												H		
6_DG-683B	Old Con Area	Transformers - Southwestern OCY Along E Street	Soil Boring	0.5		X												X		
				3		H												H		
6_DG-683C	Old Con Area	Transformers - Southwestern OCY Along E Street	Soil Boring	0.5		X												X		
				3		H												H		
6_DG-684	Old Con Area	E Street Drainage South of Container Storage/ B4320 Area	Soil Boring	0.5	X	X	X	X				X					X	X	√	Location targets drainage that flows east along E Street into OldCon/NewCon Drainage; located within mapped extent of historical storage area. Bedrock anticipated <5'; collect and analyze deepest sample targeting soil just above bedrock to characterize potential for lateral migration along bedrock.
				5	X	X	X	X				X					X	X		
6_DG-685	Old Con Area	E Street Drainage South of Container Storage/ B4320 Area	Soil Boring	0.5	X	X	X	X				X			X	X	X	X	√	Location targets drainage that flows east along E Street into Old Con/New Con Drainage; also a stepout to delineate western extent of Old Con/New Con Drainage Clearly Contaminated Area (dioxins, metals, PCBs, pesticides, TPH). Location is within mapped extent of historical storage area. Bedrock anticipated ~5'; collect and analyze deepest sample targeting soil just above bedrock to characterize potential for lateral migration along bedrock.
				5	X	X	X	X				X			X	X	X	X		
6_DG-686	Old Con Area	West of ESG Storage Yard	Test Pit/Soil Boring	0.5	X	X	X	X				X					X	X	√	Location characterizes area west of ESG storage yard identified in 1988 Radiological Survey Report and targets surface water flow pathway at end of historical dirt road; also addresses potential aerial dispersion/deposition to the northwest of incinerator at B4040. Conduct exploratory test pit to investigate ground penetrating radar anomaly area; if fill with debris is present, collect and analyze sample within fill and just above bedrock. Bedrock anticipated <2'.
6_DG-687	Old Con Area	Southwest of OCY West of Substation 4783	Test Pit/Soil Boring	0.5	X	X	X	X				X					X	X	√	Stepout for dioxins at SL-154-SA6; also characterizes debris area identified during 2008 debris survey. Conduct exploratory test pit to investigate geophysical anomaly (terrain conductivity and ground penetrating radar) area; if fill with debris is present, collect and analyze sample within fill, at top of native (if encountered), and just above bedrock. Bedrock anticipated ~5'.
				5	X	X	X	X				X					X	X		
6_DG-688A	Old Con Area	Former Substation 4783 (Southwest of OCY Along E Street)	Soil Boring	0.5		X												X	√	Locations target former substation. Transformers in Area IV with previous composite ND results are being resampled with discrete samples. Collect samples at six discrete locations; hold deeper samples pending shallow results.
				3		H												H		
6_DG-688B	Old Con Area	Former Substation 4783 (Southwest of OCY Along E Street)	Soil Boring	0.5		X												X		
				3		H												H		
6_DG-688C	Old Con Area	Former Substation 4783 (Southwest of OCY Along E Street)	Soil Boring	0.5		X												X		
				3		H												H		
6_DG-688D	Old Con Area	Former Substation 4783 (Southwest of OCY Along E Street)	Soil Boring	0.5		X												X		
				3		H												H		
6_DG-688E	Old Con Area	Former Substation 4783 (Southwest of OCY Along E Street)	Soil Boring	0.5		X												X		
				3		H												H		
6_DG-688F	Old Con Area	Former Substation 4783 (Southwest of OCY Along E Street)	Soil Boring	0.5		X												X		
				3		H												H		

Table 1
Subareas 3 and 6 Phase 3 Proposed Soil Sample Locations
(13 of 13)

Location ID[1]	Area	Location Description	Sample Type	Depth (feet bgs)	Analytical Method														Data Gap Checklist[3]	Rationale / Comments[4]
					PAHs (EPA Method 8270C [SIM])	PCBs / PCTs (EPA Method 8082)	Dioxins/Furans (EPA Method 1613)	Metals[2] (EPA Methods 6010B/6010C /6020/6020A/7471A/7471B)	Cr(VI) (EPA Method 7196A)	Energetics (EPA Method 8330A)	Perchlorate (EPA Method 6850/6860)	TPH (EPA Method 8015B)	Formaldehyde (EPA Method 8315A)	Morpholine (EPA Method 8260 TIC)	Pesticides (EPA Method 8081)	Herbicides (EPA Method 8151A)	pH (EPA Method 9045C)	Soil Moisture (ASTM D2216/ EPA Method 160.3)		
6_DG-689	Old Con Area	E Street Drainage Southwest of OCY	Soil Boring	0.5	X	X	X	X				X					X	X	√	Location targets drainage that flows east along E Street into OldCon/NewCon Drainage; also a stepout for dioxins at SL-154-SA6. Bedrock anticipated <5'; collect and analyze deepest sample targeting soil just above bedrock to characterize potential for lateral migration along bedrock.
				5	X	X	X	X				X					X	X		
6_DG-690	Old Con Area	Southwest of B4320 Area	Soil Boring	0.5	X	X	X	X				X			X	X	X	X	√	Location targets drainage that flows east along E Street into Old Con/New Con Drainage; also addresses potential aerial dispersion/deposition northwest of incinerator at B4040. Bedrock anticipated ~5'; collect and analyze deepest sample targeting soil just above bedrock to characterize potential for lateral migration along bedrock.
				5	X	X	X	X				X			X	X	X	X		
Subarea 3																				
3_DG-501	Subarea 3	Drainage along E Street	Soil Boring	0.5	X	X	X	X				X					X	X	√	Stepout for TPH at SL-013-SA3 targeting drainage along E Street. Shallow bedrock anticpiated (less than 5 feet bgs). Collect samples at 5 foot intervals to bedrock and analyze all depths since potential recharge feature.
				5.0	X	X	X	X				X					X	X		
3_DG-502	Subarea 3	North of Drainage along E Street	Soil Boring	0.5	X	X	X	X				X					X	X		Stepout for TPH at SL-013-SA3 and PCBs in BUBS1026; location delineates southern extent of Clearly Contaminated Area. Shallow bedrock anticpiated (less than 5 feet bgs). If soil present, collect 10 foot sample and hold pending shallow results.
				5.0	X	X	X	X				X					X	X		
3_DG-503	Subarea 3	North of Drainage along E Street	Soil Boring	0.5	X	X	X	X				X					X	X		Stepout to delineate eastern extent of Clearly Contaminated Area Shallow bedrock anticpiated (less than 5 feet bgs). If soil present, collect 10 foot sample and hold pending shallow results.
				5.0	X	X	X	X				X					X	X		
3_DG-504	Subarea 3	Drainage along E Street	Soil Boring	0.5	X	X	X	X				X					X	X	√	Location targets lined drainage along E Street downstream of operations in Area II and III. Analyze all depths to evaluate potential downward migration beneath drainage.
				5.0	X	X	X	X				X					X	X		
3_DG-505	Subarea 3	South of SCE Substation	Soil Boring	0.5	X	X	X	X				X					X	X		Stepout to delineate western extent of Clearly Contaminated Area. Shallow bedrock anticpiated (less than 5 feet bgs). If soil present, collect 10 foot sample and hold pending shallow results.
				5.0	X	X	X	X				X					X	X		
3_DG-506	Subarea 3	South of SCE Substation	Soil Boring	0.5	X	X	X	X				X					X	X		Stepout to delineate northwest extent of Clearly Contaminated Area Shallow bedrock anticpiated (less than 5 feet bgs). If soil present, collect 10 foot sample and hold pending shallow results.
				5.0	X	X	X	X				X					X	X		
3_DG-507	Subarea 3	Southeast of SCE Substation	Soil Boring	0.5	X	X	X	X				X					X	X		Stepout for PCBs and dioxins at SL-009-SA3; location also delineates northern extent of Clearly Contaminated Area. Shallow bedrock anticpiated (less than 5 feet bgs). If soil present, collect 10 foot sample and hold pending shallow results.
				5.0	X	X	X	X				X					X	X		
3_DG-508	Subarea 3	Southeast of SCE Substation	Soil Boring	0.5	X	X	X	X				X					X	X		Stepout for PCBs and dioxins at SL-009-SA3. Shallow bedrock anticpiated (less than 5 feet bgs). If soil present, collect 10 foot sample and hold pending shallow results.
				5.0	X	X	X	X				X					X	X		

Footnotes
1. Sampling will generally be at 5 foot intervals to bedrock. In areas where fill is encountered or anticipated, samples will be collected from the top of native soil (beneath fill) and soil just above bedrock. Samples collected at 0.5 feet and 5 feet will be analyzed with deeper samples placed on hold pending shallower results, unless otherwise stated. If deeper soils are encountered, additional sampling will be added as needed. Sample intervals may be added or adjusted based on field conditions.

2. Standard metals analysis includes silver and mercury, but does not include hexavalent chromium.
3. Checkmark in column indicates sample was proposed based on review of information source indicated in Table 3 (Data Gap Checklist) for the area listed in "Location Description" (GIS or aerial photo review layers).
4. The Subareas 3 and 6 analytical suite for general operations includes primary chemical groups: PAHs, PCB/PCTs, Metals, and TPH. The corrosion inhibitor suite is proposed in operational areas associated with or located downslope from cooling tower operations and includes analysis for formaldehyde and NDMA to address hydrazine use, hexavalent chromium, arsenic, and morpholine (EPA Method 8260 TIC).

Acronyms
Ag = silver
AST = above-ground storage tank
B(a)P = benzo(a)pyrene
bgs = below ground surface
Cd = cadmium
Cr(VI) = hexavalent chromium
EPA = Environmental Protection Agency
ESG = Energy Systems Group
ft = foot or feet
Hg = mercury
HSA = Historical Site Assessment
ISL = interim screening level
kg = kilogram
LF = leach field
ng = nanogram
NDMA = n-nitrosodimethylamine
NCY = New Conservation Yard
OCY = Old Conservation Yard
PAH = polyaromatic hydrocarbons
PCB = polychlorinated biphenyls
PCT = polychlorinated terphenyls
ppm = parts per million
ppt = parts per trillion
RL = Reporting Limit
RTL = radiological trigger level
SCE = Southern California Edison
SM = soil matrix
SRE = Sodium Reactor Experiment
SV = soil vapor
TEQ = toxicity equivalent quotient
TIC = temporary identified compound
TPH = total petroleum hydrocarbons
VOC = volatile organic compound

Table 2
Subareas 3 and 6 Phase 3 Proposed Soil Vapor Sample Locations
(1 of 2)

Location ID	Area	Location Description	Depth (feet bgs)[1]	Data Gap Checklist[2]	Rationale / Comments
Subarea 6					
6SV_DG-509	SRE North	B4143	5 10 15 25 35 45 55	√	Location targets reactor vault in SRE excavation. Bedrock anticipated at approximately 55 feet bgs. Collect samples at 5-foot intervals to 15 feet bgs, then at 10-foot intervals to bedrock with deepest sample targeting soil/fill just above bedrock.
6SV_DG-515	SRE North	B4003 Leach Field	5 10		Recollect at previous location with rejected data (SRSV1017).
6SV_DG-516	SRE North	East of SRE Cooling Tower	5 10		Location targets area downslope of TPH detects at SRE cooling tower. Shallow bedrock anticipated; position selected in area of soil likely deep enough for soil vapor probe installation.
6SV_DG-517	SRE North	SRE Pond	5 10		Targets previous location where refusal was encountered (SRSV1075); install soil vapor probe slightly northwest of previous location where deeper soils are anticipated.
6SV_DG-521	SRE North	West of SRE Drainage	5 10		Location targets area near west bank of drainage where elevated TPH was detected in previous sampling. Note: if soils are too thin to collect soil vapor sample, move location westward away from drainage for potential deeper soils.
6SV_DG-522	SRE North	East of SRE Drainage	5 10		Location targets TPH detect east of SRE drainage.
6SV_DG-527	SRE South	B4003	5 10	√	Representative location in southern portion of B4003 footprint.
6SV_DG-528	SRE South	B4063	5 10		Targets previous location with rejected data (SRSV1054). Recent sampling indicates soils in area are deep enough for soil vapor sampling; reattempt to collect soil vapor sample slightly south of former location.
6SV_DG-529	B4064 Area	B4014	5 10	√	Location targets historical unlined drainage.
6SV_DG-531	B4064 Area	Drainage Along 10th Street	5 10	√	Location targets collection point at intersection of drainages along G Street and 10th Street.
6SV_DG-537	New Con Area	Dirt Road Southeast of B4040	5 10	√	Location targets dirt road southeast of B4040 operational area.
6SV_DG-538	New Con Area	Unlined Drainage Northeast of B4040	5 10	√	Location targets historical unlined drainage northeast of B4040 receiving surface flow from E Street and Building 4064 operational area.
6SV_DG-539	New Con Area	West of Old Con / New Con Drainage	5 10	√	Location targets western bank of Old Con/New Con Drainage and characterizes area where elevated TPH was detected in previous sampling.
6SV_DG-540	New Con Area	New Conservation Yard	5 10	√	Resample previous location with rejected data (NCSV1003).
6SV_DG-541	New Con Area	New Conservation Yard	5 10	√	Location characterizes bank at intersection of Old Con/ New Con Drainage and drainage from E Street to the north.
6SV_DG-542	Old Con Area	Drainage Along E Street	5 10	√	Location targets drainage along E Street.
6SV_DG-543	Old Con Area	Drainage Along E Street	5 10	√	Location targets drainage along E Street and fuel pipeline from AST T-372.
6SV_DG-544	Old Con Area	Field Southwest of Old Conservation Yard	5 10	√	Location targets termination of historical dirt road in area downslope from Old Conservation Yard.
6SV_DG-549	Old Con Area	Storage Yard West of Old Con/New Con Drainage	5 10	√	Location targets drainage along E Street.
6SV_DG-551	Old Con Area	Drainage South of SRE Pipeline Discharge	5 10		Location targets low spot in drainage south of SRE pipeline discharge and evaluates area as potential input location to groundwater contamination.
6SV_DG-553	Old Con Area	Rocketdyne Conservation Yard	5 10		Recollect sample at OCSV01 to confirm previous data results.
6SV_DG-554	Old Con Area	Rocketdyne Conservation Yard	5 10	√	Location provides additional coverage in the yard and addresses elevated RLs in previous sample (OCSV02).
6SV_DG-555	Old Con Area	Rocketdyne Conservation Yard	5 10		Recollect sample at OCSV03 to confirm previous data results. Sample OCSV1017 was attempted during the Group 6 SAP investigation, however data from sample at 5 feet was rejected and refusal encountered at 7.5 feet bgs.
6SV_DG-556	Old Con Area	Rocketdyne Conservation Yard	5 10		Resample previous location with rejected data (OCSV1014).
6SV_DG-557	Old Con Area	Rocketdyne Conservation Yard	5 10		Resample previous location with rejected data (OCSV1018).
6SV_DG-558	Old Con Area	Entrance to Rocketdyne Conservation Yard	5 10	√	Location targets entrance to former Rocketdyne Conservation Yard.
6SV_DG-559	Old Con Area	UT-28 East of B4320	5 10		Location addresses elevated RLs in previous sampling at UT-28 (OCSV07, OCSV08).
6SV_DG-560	Old Con Area	Old Conservation Yard South of Former AST T-732	5 10		Location addresses elevated RLs in area where soil from former earthen berm surrounding fuel storage tanks was graded and spread.
6SV_DG-562	Old Con Area	Former AST T-732	5 10		Location addresses elevated RLs in previous sample targeting former fuel AST T-732 (1.5 million gallon capacity).
6SV_DG-565	Old Con Area	Old Conservation Yard South of Former AST T-731	5 10		Same as 6SV_DG-560.
6SV_DG-567	Old Con Area	Former AST T-731	5 10		Same as 6SV_DG-562.
6SV_DG-568	Subarea 6 South	Northwest Portion of Subarea 6 South	5 10	√	Location targets historical dirt road and area of cleared vegetation observed in aerial photograph (1980).
6SV_DG-569	Old Con Area	West of Former AST T-731	5 10	√	Representative location in storage area observed in historical aerial photograph.
6SV_DG-570	Old Con Area	North of Former AST T-731	5 10	√	Representative location in storage area observed in historical aerial photograph.
6SV_DG-571	Subarea 6 South	Northwest Portion of Subarea 6 South	5 10	√	Location targets historical dirt road.

Table 2
Subareas 3 and 6 Phase 3 Proposed Soil Vapor Sample Locations
(2 of 2)

Location ID	Area	Location Description	Depth (feet bgs)[1]	Data Gap Checklist[2]	Rationale / Comments
6SV_DG-572	Old Con Area	Northeast of Former AST T-731	5 10	√	Representative location in storage area observed in historical aerial photograph; also addresses elevated RLs in previous sample characterizing soil grading/spreading of earthen berm surrounding former fuel tanks.
6SV_DG-573	Old Con Area	North of Atomics Internation Yard	5 10	√	Location targets former sample (OCSV1005) with rejected date; also addresses elevated TPH detects in SL-205-SA6.
6SV_DG-574	Subarea 6 South	Northwest Portion of Subarea 6 South	5 10	√	Same as 6SV_DG-571.
6SV_DG-575	Subarea 6 South	Southwest Portion of Subarea 6 South	5 10	√	Same as 6SV_DG-571.
6SV_DG-576	Subarea 6 South	Southwest Portion of Subarea 6 South	5 10	√	Same as 6SV_DG-571.
6SV_DG-577	Subarea 6 South	Southeast Portion of Subarea 6 South	5 10	√	Location targets area downslope of SPA operational area.
Subarea 3					
3SV_DG-501	Subarea 3	South of Edison Substation	5 10		Location addresses elevated TPH detects in SL-01-SA3 and provides additional definition of eastern extent of Clearly Contaminated Area (Subarea 3 Debris Area).
3SV_DG-502	Subarea 3	Drainage Along E Street	5 10	√	Location targets drainage along E Street which receives surface water runoff from operational areas in Areas II and III.

Footnotes

1. Soil vapor sampling field protocols still being defined; proposed sampling included in table to be implemented after DTSC approval of Soil Vapor SOP. It is anticipated that soil vapor samples will be collected at 5-foot intervals to a depth of 20 feet bgs, and at 10-foot intervals thereafter to bedrock with the deepest sample targeting soil just above bedrock. All soil vapor samples will be collected and analyzed in accordance with approved procedures in a Soil Vapor SOP. In areas where soils are not deep enough for soil vapor analysis, soil matrix samples will be collected for VOC analysis using EPA Method 8260B if soils are more than 2 feet thick.

2. Checkmark in column indicates sample was proposed based on review of information source indicated in Table 3 for the area listed in "Location Description" (GIS or aerial photo review layers).

Acronyms

AST = aboveground storage tank
bgs = below ground surface
DTSC = California Department of Toxic Substances Control
EPA = Environmental Protection Agency
RL = reporting limit
SAP = sampling and analysis plan
SOP = standard operating procedures
SRE = Sodium Reactor Experiement
TPH = total petroleum hydrocarbons
VOC = volatile organic compound

Table 3
Subareas 3 and 6 Data Gap Checklist
(Page 1 of 1)

INFORMATION SOURCE	Subareas 3 and 6 Data Gap Evaluation Areas [1]						
	SRE North	SRE South	B4064 Area	Old Con Area	New Con Area	Subarea 6 South	Subarea 3
GIS Base Map Layers							
Tanks (and Sitewide Tank Inventory Table)	√	√	√	√	√	√	√
Transformers	√	√	√	√	√	√	√
Structures	√	√	√	√	√	√	√
Sumps	√	√	√	√	√	√	√
Vaults	√	√	√	√	√	√	√
Pipes	√	√	√	√	√	√	√
Undefined features	√	√	√	√	√	√	√
Chemical Use Areas (RFI)	√	√	√	√	√	√	√
Streams/ditches	√	√	√	√	√	√	√
Leachfields	√	√	√	√	√	√	√
Storage Yard Areas	√	√	√	√	√	√	√
Roads	√	√	√	√	√	√	√
Soil Disturbance (Veg clearance, excavation, grading, etc)	√	√	√	√	√	√	√
Migration Pathways							
Surface Water	√	√	√	√	√	√	√
Aerial Dispersion [2]	√	√	√	√	√	√	√
Subsurface Soil	√	√	√	√	√	√	√
Site-wide Infrastructure							
IWW - spray fields	√	√	√	√	√	√	√
Natural Gas Pipelines (site-wide approach also in progress)	√	√	√	√	√	√	√
Sewer (site-wide approach also in progress)	√	√	√	√	√	√	√
Aerial Photo Review							
Historical aerial photographs from 17 years (1953 - 2005)	√	√	√	√	√	√	√
EPA Layers							
Gamma Scan	√	√	√	√	√	√	√
Potential Gamma Anomalies (PGRAY)	√	√	√	√	√	√	√
Tank Points	N/A	N/A	N/A	N/A	N/A	N/A	N/A
HSA Line Layer (HSA linear features)	N/A	N/A	N/A	N/A	N/A	N/A	N/A
HSA Photo Layer (HSA aerial photo review features)	√	√	√	√	√	√	√
Historical Use Data (chem use, storage, leach fields, releases, interviews, etc.)	√	√	√	√	√	√	√
Area IV Conduit (pipelines)	√	√	√	√	√	√	√
Geophysical Survey (EM, GPR, TC)	√	√	√	√	√	√	√
Other [3]							
Existing Building Feature Documentation - process info reviewed	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Historical Facility Diagrams - deep feature info reviewed	√	√	√	√	√	N/A	N/A

Table 3
Subareas 3 and 6 Data Gap Checklist

INFORMATION SOURCE

	Subareas 3 and 6 Data Gap Evaluation Areas [1]						
	SRE North	**SRE South**	**B4064 Area**	**Old Con Area**	**New Con Area**	**Subarea 6 South**	**Subarea 3**
Groundwater Impacts / Potential Inputs to Groundwater Evaluated [4]	√	√	√	√	√	√	√
Site-wide Tank Inventory Table for unlocated tanks (viewed with Tanks Base Map layer)	√	√	√	√	√	√	√
EPA Area IV radiological sampling results [5]	√	√	√	√	√	√	√
Uncollected EPA Phase 1 sample locations [6]	√	√	√	√	√	√	√

√	Feature reviewed during data gaps evaluation
√	Indicates sampling proposed based on reviewed feature
--	No buildings present for inspection
N/A	Information source not available for this subarea

Notes

1. Data gap evaluations were performed over smaller footprints within each subarea. Subarea 3 includes the Edison Substation and surrounding areas. For Subarea 6: SRE North includes B4686, B4653, B4687, B4689, B4041, B4143, B4743, B4733, B4753, B4153, B4695, B4183, B4185, B4684, B4714, B4505, B4163, B4003 Leach Field, SRE Pond, and the area surrounding these buildings and features; SRE South includes B4003, B4825, B4273, B4316, B4283, B4063, and the area surrounding these buildings; B4064 Area includes B4043, B4033, B4053, B4104, B4064, B4064 Leach Field, and surrounding areas; Old Con Area includes B4320, B4313, Old Conservation Yard, Atomics Internation Conservation Yard, Rocketdyne Conservation Yard, and surrounding areas; New Con Area includes B4040, B4623, B4113, B4114, New Conservation Yard, and surrounding areas; and Subarea 6 South includes area with limited or no documented operational activities south of B4064 Area and New Con Area.

2. Evaluation of air dispersion migration pathways was performed using existing sampling results, or proposing additional sampling as warranted along predominant wind directions (NW-SE), and/or in adjacent drainages. No air dispersion sources were identfied in Subarea 3. For Subarea 6, three air dispersion sources were evaluated: stacks at B4143, B4003, and the incinerator at B4040. Additional future sampling is recommended in the NBZ to assess this pathway, but existing data along with newly proposed Phase 3 locations is considered sufficient to assess potential contamination with Subarea 6 from this pathway.

3. Other notes and resources used in the data gap process included data dotmaps, a co-located sampling boring log summary table (including analytical and sample depth info), boring and trench logs from the RFI, EPA boring logs from co-located sampling, filterable dataset, and the EPA HSA document. Previous RFI Group reports were used as a reference on an as-needed basis in evaluation of selected features (e.g. building use descriptions).

4. Feature/area identified that may warrant further consideration of groundwater input sources and threat to groundwater sampling requirements by DTSC and SSFL groundwater teams. Identification based on type of feature (typically, a liquid waste disposal or storage feature), and soil detections of mobile chemicals (e.g., VOCs, NDMA, perchlorate, 1,4-dioxane), and/or multiple chemical detections signficantly above ISLs.

5. EPA radiological sampling results summaries included as part of chemical data gap evaluation process; validated data from EPA will be reviewed when available. For Subarea 6, no chemical data gaps indicated based only on radiological sampling results although chemical sampling proposed at areas with radiological trigger level exceedances within SRE North, SRE South, B4064 Area, Old Con Area, and New Con Area.

6. Proposed Phase 1 sampling locations where no radiological sample was collected by EPA (due to refusal, safety concerns, etc.) were evaluated to determine if a chemical data gap still existed, with additional sampling proposed in Phase 3 if a gap was identified.

FIGURES

Drainage courses are approximate based on topography, sample locations and aerial photograph review. Actual locations will be refined based on field reconnaissance during sampling.

Northern Buffer Zone

Subarea 3

Subarea 6 North

Subarea 6 South

Subarea 7

Subarea 5A

Edison Building

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

Base Map Legend

- Administrative Area Boundary
- HSA Subareas
- Clearly Contaminated Areas
- Existing Building or Structure
- Removed Building or Structure
- Ponds
- Excavated Area
- Backfilled Excavation Area
- Pipe
- Leach Field
- Drainage
- Concrete Lined Drainage
- Surface Water Divide
- Rock Outcrop
- Dirt Road
- A/C Paving

Groundwater Wells

- Near Surface
- Chatsworth

Trenches

- Previous
- Proposed

For the "Combined Analyte" Data Summary, ratios of dioxin TEQ (2,3,7,8-TCDD TEQ), perchlorate, energetics, herbicides, pesticides, metals, NDMA, PAHs, and PCB/PCT results to respective DOE Interim Screening Levels (ISLs) were calculated. The maximum ratio was used to color code symbols at each location as shown in the legend. For locations where at least one chemical was detected, the maximum detected concentration/ISL ratio was used; otherwise the maximum RL/ISL ratio was used and the location was symbolized as ND. Locations for which detected concentrations or RLs are below both the ISL and LDC are shown as green. The chemicals included in the "combined analyte" comparison were selected to provide a single, integrated representation of primary, commonly detected chemicals for trend evaluation. Dioxin congeners, VOCs, TPH, glycols/alcohols, and formaldehyde are not included in the "combined analyte" comparison.

Proposed Area IV Data Gap Locations

- Future Sample Location
- Add to Analytical Suite at Sample Location
- Re-analysis Sample Location (RLs)
- Other Targeted Sample Location
- Tank Sample location
- Stepout/Stepdown Sample location
- Test Pit Location
- Post Demolition Sampling Area

Combined Detect / LDC	Combined Detect / ISL	Combined ND / ISL
<1x LDC	< 1x ISL	< 1x ISL
Combined ND / LDC	1x to 2x ISL	1x ISL to 2x ISL
< 1x LDC	2x to 10x ISL	2x ISL to 10x ISL
	10x to 100x ISL	10x ISL to 19x ISL
	> 100x ISL	

LDC = Lower Display Criteria
ISL = Interim Screening Level

Subareas 3 and 6 North
Phase 3 Proposed Soil Matrix Sampling Locations and Previous Data Summary
SANTA SUSANA FIELD LABORATORY

Path: T:\projects\rock3\HSA\Working\Subarea 6 & 3\HSA_3_6N_Summary.mxd

Date: 10/30/2012

1 inch = 105 feet

0 50 100 Feet

FIGURE 1

Drainage courses are approximate based on topography, sample locations and aerial photograph review. Actual locations will be refined based on field reconnaissance during sampling.

Subarea 3

Subarea 6 North

Subarea 6 South

Subarea 5A

Area IV

Area III

Edison Building

Generator

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

Base Map Legend

- Administrative Area Boundary
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- Clearly Contaminated Areas
- Existing Building or Structure
- Removed Building or Structure
- Ponds
- Excavated Area
- Backfilled Excavation Area
- Pipe
- Leach Field
- Drainage
- Concrete Lined Drainage
- Surface Water Divide
- Rock Outcrop
- Dirt Road
- A/C Paving

Groundwater Wells

- Near Surface
- Chatsworth

Trenches

- Previous
- Proposed

For the "Combined Analyte" Data Summary, ratios of dioxin TEQ (2,3,7,8-TCDD TEQ), perchlorate, energetics, herbicides, pesticides, metals, NDMA, PAHs, and PCB/PCT results to respective DOE Interim Screening Levels (ISLs) were calculated. The maximum ratio was used to color code symbols at each location as shown in the legend. For locations where at least one chemical was detected, the maximum detected concentration/ISL ratio was used; otherwise the maximum RL/ISL ratio was used and the location was symbolized as ND. Locations for which detected concentrations or RLs are below both the ISLs and LDC are shown as green. The chemicals included in the "combined analyte" comparison were selected to provide a single, integrated representation of primary, commonly detected chemicals for trend evaluation. Dioxin congeners, VOCs, TPH, glycols/alcohols, and formaldehyde are not included in the "combined analyte" comparison.

Proposed Area IV Data Gap Locations

- Future Sample Location
- Add to Analytical Suite at Sample Location
- Re-analysis Sample Location (RLs)
- Other Targeted Sample Location
- Tank Sample location
- Stepout/Stepdown Sample location
- Test Pit Location
- Post Demolition Sampling Area

Combined Detect / LDC	Combined Detect / ISL	Combined ND / ISL
<1x LDC	< 1x ISL	< 1x ISL
Combined ND / LDC	1x to 2x ISL	1x ISL to 2x ISL
< 1x LDC	2x to 10x ISL	2x ISL to 10x ISL
	10x to 100x ISL	10x ISL to 19x ISL
	> 100x ISL	

LDC = Lower Display Criteria
ISL = Interim Screening Level

Subarea 6 South
Phase 3 Proposed Soil Matrix Sampling Locations and Previous Data Summary

SANTA SUSANA FIELD LABORATORY

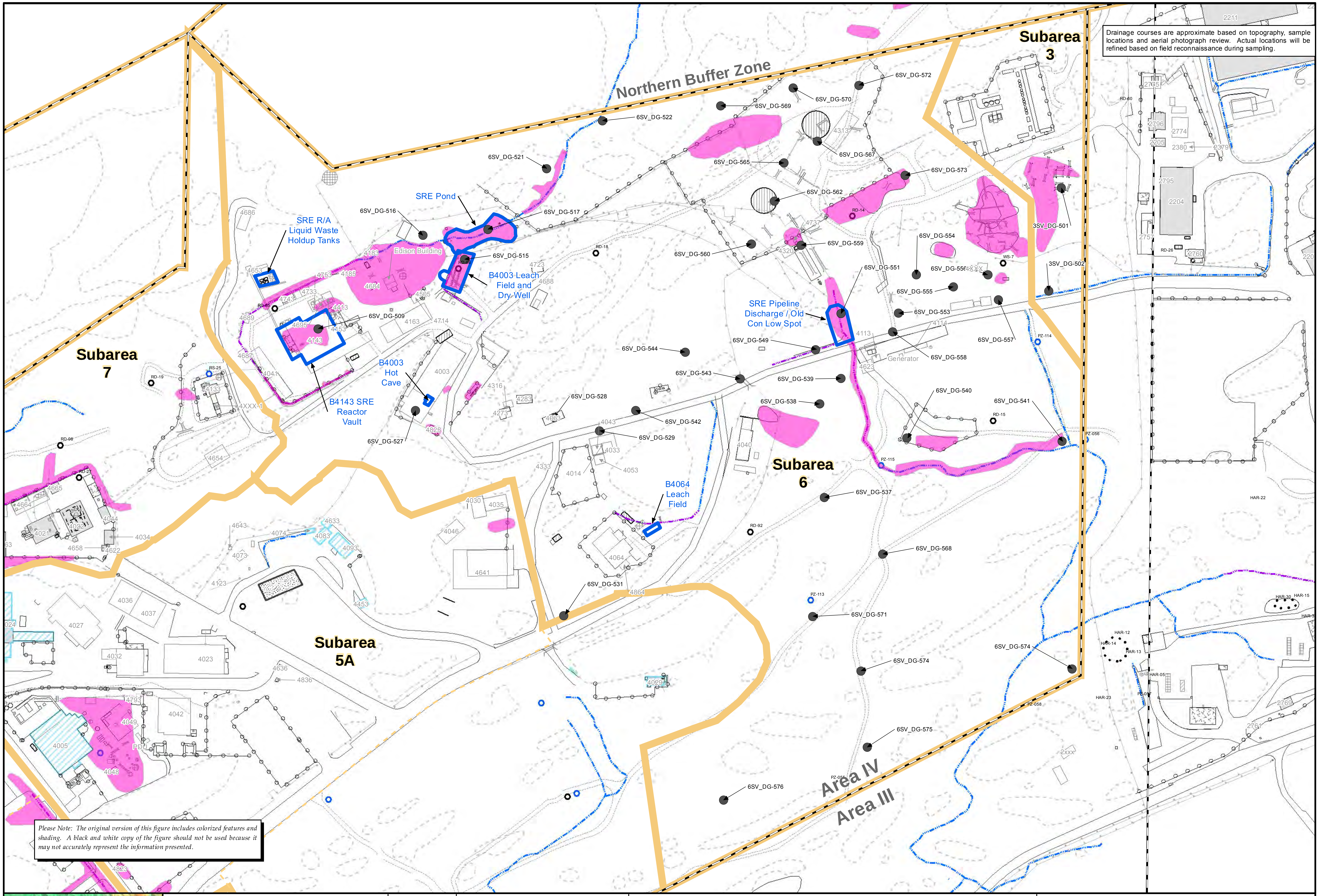
Path: T:\projects\rock3\HSA\Working\Subarea 6 & 3\HSA_6S_Summary.mxd

Date: 10/26/2012

1 inch = 105 feet

0 50 100 Feet

FIGURE 2


Northern Buffer Zone
Subarea 3
Subarea 6
Subarea 7
Subarea 5A
Area IV
Area III
Drainage courses are approximate based on topography, sample locations and aerial photograph review. Actual locations will be refined based on field reconnaissance during sampling.
SRE Pond
SRE R/A Liquid Waste Holdup Tanks
Edison Building
B4003 Leach Field and Dry Well
B4143 SRE Reactor Vault
B4003 Hot Cave
SRE Pipeline Discharge / Old Con Low Spot
B4064 Leach Field
Generator
6SV_DG-509
6SV_DG-515
6SV_DG-516
6SV_DG-517
6SV_DG-521
6SV_DG-522
6SV_DG-527
6SV_DG-528
6SV_DG-529
6SV_DG-531
6SV_DG-537
6SV_DG-538
6SV_DG-539
6SV_DG-540
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6SV_DG-568
6SV_DG-569
6SV_DG-570
6SV_DG-571
6SV_DG-572
6SV_DG-573
6SV_DG-574
6SV_DG-575
6SV_DG-576
3SV_DG-501
3SV_DG-502
RD-14
RD-15
RD-18
RD-19
RD-26
RD-27
RD-60
RD-85
RD-92
RD-98
RS-25
WS-7
PZ-056
PZ-057
PZ-058
PZ-113
PZ-114
PZ-115
HAR-05
HAR-12
HAR-13
HAR-14
HAR-15
HAR-22
HAR-23
HAR-30
Please Note: The original version of this figure includes colorized features and shading. A black and white copy of the figure should not be used because it may not accurately represent the information presented.

Base Map Legend

- Administrative Area Boundary
- HSA Subareas
- Clearly Contaminated Areas
- Existing Building or Structure
- Removed Building or Structure
- Ponds
- Excavated Area
- Backfilled Excavation Area
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- Leach Field
- Drainage
- Concrete Lined Drainage
- Surface Water Divide
- Rock Outcrop
- Dirt Road
- A/C Paving

Groundwater Wells

- Near Surface
- Chatsworth

Trenches

- Previous
- Proposed

For the "Combined Analyte" Data Summary, ratios of dioxin TEQ (2,3,7,8-TCDD TEQ), perchlorate, energetics, herbicides, pesticides, metals, NDMA, PAHs, and PCB/PCT results to respective DOE Interim Screening Levels (ISLs) were calculated. The maximum ratio was used to color code symbols at each location as shown in the legend. For locations where at least one chemical was detected, the maximum detected concentration/ISL ratio was used; otherwise the maximum RL/ISL ratio was used and the location was symbolized as ND. Locations for which detected concentrations or RLs are below both the ISL and LDC are shown as green. The chemicals included in the "combined analyte" comparison were selected to provide a single, integrated representation of primary, commonly detected chemicals for trend evaluation. Dioxin congeners, VOCs, TPH, glycols/alcohols, and formaldehyde are not included in the "combined analyte" comparison.

Proposed Area IV Data Gap Locations

- Proposed Soil Vapor Sample Locations
- Area/Feature Identifed as Potential Input Location to Groundwater Contamination

Subareas 3 and 6
Phase 3 Proposed Soil Vapor Sampling Locations

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Path: T:\projects\rock3\HSA\Working\Subarea 6 & 3\HSA_6_3_SoilVapor.mxd

Date: 10/26/2012

1 inch = 150 feet

0 150 300 Feet

FIGURE 3

Attachment 2
Table F
Field Tracker
Subarea 3/6

Table A
Go Back Tracker
Draft for Review
Revised: October 29, 2012

Location	Explanation
Subarea 5C	
Slightly elevated detections above ISLs	Evaluate concentrations at or slightly above ISLs once final Lookup Table and background values are published.
Elevated RLs	Final check of historical data with elevated RLs to determine that sufficent nearby sampling has been performed and historical data uncertainties resolved.
Remaining Structures	Features located within buildings identified during the Building Feature Survey will be evaluated during demolition and sampling will be performed following building removal when soil is exposed (see Table B for details). Existing buildings/features that will be evaluated during demolition have been identified in proposed sampling location figures as "Post Demo."
B4100	Two phenanthrene detections on east side of B4100 (BHBS1011, BHBS1012) are slighly above the ISL, and are colocated with TPH. These samples targeted a feature and no significant detects were observed. No sampling recommended pending final Lookup Table values.
NDMA	NDMA exceeds the ISL (0.037 µg/kg) for low level Method 1625 at six locations up to 13x (SL-059-SA5C, 0.48 µg/kg), but is below the 8270 LDC of 1.8 µg/kg. Therefore no additional sampling is recommended at this time; however, NDMA occurrence will be re-evaluated after final Lookup Table values have been established. Locations will also be addressed / resampled for formaldehyde at that time, specifically at B4015 Field, B4383 Leach Field Area, B4100,B4065 metals clarifier, and SNAP.
SE portion of B4015 Fill Area	Sample locations are proposed in Area III based on observed extent of fill area, downdrainage, and downslope of existing sample results and and will be collected at a future date pending receipt of SHPO approval. These sample locations are identified as "future locations" in proposed sampling location figures.
Sewer / Natural Gas Pipelines	Investigation and proposed sampling strategies for existing sitewide infrastructure including natural gas pipelines and sanitary sewer lines and associated infrastructure are in progress and will be evaluated separately.
Northwest of B100 Trench (within Subarea 8N)	Evaluate aerial dispersion/deposition from burning activities at B100 Trench within Building 4056 landfill annex area. Proposed sampling at landfill annex sufficiently dense to evaluate potential impacts from B100 trench burning activites, although additional surface samples could be added to address this uncertainty. Consider surface/random sampling NW of trench within Subarea 8N. Sampling density in all directions sufficient to evaluate impacts of air dispersion (Subarea 8 locations pending).
B4038	Add post demo location in west portion of B4038 footprint to characterize open storage area.
Potential Laboratory Contaminants	Review laboratory contaminant uncertainties after all new VOC (e.g. methylene chloride) and SVOC (phthalates) data is collected and after background is finalized.
Perchlorate	Confirmation sampling and/or additional stepout/stepdown sampling may be required depending on additional data review of previous Phase 1 results.
EPA Radiological Data	EPA data summaries used for current gap analysis. Phase 1 co-located sampling results and previous RFI data will be re-evaluated following release of final EPA Area IV radiological sampling results for subarea.
Air dispersion from B4055	Sampling density north of Building 4055 within subarea 5C will be evaluated for potential aerial dispersion during the HSA 5D North data gap analysis.
Deep boring data at B4059	Review laboratory analytical data for three deep boring locations at Building 4059 (SNAP).
Radiological sampling at B4015 field	Check radiological sampling results to ensure sampling is performed at east end of B4015 field.
B4015 Demo Documentation	Follow up with Boeing for recent B4015 demolition documentation (feature removal logs, sample results).
Subarea 5B	
PCBs at SCTI	Evaluate sporadic PCB detections (up to 41 ppb - 2.0x ISL) in the SCTI area after final Lookup Table values are established.
Air dispersion from stacks at SNAP facilities	Sampling density north of Building 4010, 4012, and B4019 will be evaluated for potential aerial dispersion during the Subarea 7 data gap analysis.
Subarea 5A	
Potential leach field near B4030	Evaluate soil boring log and trench log information from sampling locations near B4030 for fill or any indication of leach field materials – gravels, terra cotta piping, etc.
Air dispersion from B4024	Sampling density north of Building 4024 will be evaluated for potential aerial dispersion during the Subarea 7 data gap analysis.
Deep boring data near B4073	Review laboratory analytical data for two deep boring locations near Building 4073 (KEWB).
Subarea 6	
Deep boring data near B4143	Review laboratory analytical data for deep boring locations near Building 4143 (SRE).

Table A
Go Back Tracker
Draft for Review
Revised: October 29, 2012

Location	Explanation
Analyze morpholine at B4003	Cooling tower documented at B4003. Evaluate morpholine results in samples collected in Subarea 5B to determine if analysis warranted in Subarea 6.
SRE demo activities (2000) soil borrow source	Research soil borrow source location for SRE demolition activities performed in 2000.
Subarea 3	
Recent Subarea 3 analytical results	Obtain analytical results for sampling performed in 2012 from NASA and evaluate for data gaps.

Note: Table A is a compiled list of action items and issues that require resolution at a future date. The table will be updated and augmented with each subsequent data gap analysis to create a master list. Locations shaded grey indicate go back items that apply to all subareas in Area IV.

Table B
Building Feature Sampling Recommendations for Demolition Program
Subarea 3/6
Draft for Review

Feature No.	Feature Type	Description	Sampling Rationale
All buildings in Subarea 6 had been removed prior to Building Feature Surveys being performed as part of the RFI. Therefore, Building Feature Documentation Logs were not completed.			

Table C
Tank Summary and Tracker
Subarea 3/6
Draft for Review

Tank ID	Tank location known?	If no, proposed resolution
Subarea 6		
UT-27	Y	
UT-71	Y	
UT-74	Y	
Unknown-UT-SR-1	Y	
Unknown-UT-SR-2	Y	
Unknown-UT-SR-3	Y	
Unknown-UT-SR-4	Y	
Unknown-UT-SR-5	Y	
Unknown-UT-SR-6	Y	
Unknown-UT-SR-7	Y	
Unknown-UT-SR-8	Y	
Unknown-UT-SR-9	Y	
Unknown-UT-SR-10	Y	
Unknown-UT-SR-11	Y	
Unknown-UT-SR-12	Y	
Unknown-UT-SR-13	Y	
Unknown-UT-SR-14	Y	
UT-28 (OCY)	Y	
Unknown-UT-NC-1 (NCY)	Y	
Unknown-AT-SR-1	Y	
Unknown-AT-SR-2	Y	
Unknown-AT-SR-3	Y	
Unknown-AT-SR-4	Y	
Unknown-AT-SR-5	Y	
Unknown-AT-SR-6	Y	
Unknown-AT-SR-7	Y	
Unknown-AT-SR-8	Y	
Unknown-AT-L4-1	Y	
Unknown-AT-L4-2	Y	
TK-731	Y	
TK-732	Y	
Unknown-AT-OC-1	N	Two HDMS documents are referenced in Sitewide Tank Tech Memo for this tank. Document HDMSe00621095 references 1,500-gallon fuel oil clarifier located at B4320 and document HDMSe00038509 references 1,500-gallon steel tank formerly containing NTO located near Old Conservation Yard (OCY). The fuel oil clarifier location is known and was addressed by sampling during the RFI. The location of the former steel tank containing NTO is not known; however, no additional sampling warranted since NTO breaks down into nitrogen dioxide and nitric acid in the environment.
UnknownTank-SR-1	Y	
UnknownTank-SR-2	Y	
UnknownTank-SR-3	Y	
UnknownTank-SR-4	Y	
UnknownTank-SR-5	Y	
UnknownTank-SR-6	Y	
UnknownTank-SR-7	Y	
Subarea 3		
Unknown-AT-BU-2	Y	
Unknown-AT-BU-3	Y	
Unknown-AT-BU-4	Y	
Unknown-AT-BU-5	Y	
Unknown-AT-BU-6	Y	
Unknown-AT-BU-7	Y	
Unknown-AT-BU-8	Y	

Notes:
1. Tank identification numbers were taken from the Sitewide Inventory of Tanks Technical Memorandum (CH2M Hill, 2011).

Acronyms
ISL = interim screening level
NDMA = n-nitrosodimethylamine
NTO = nitrogen tetroxide
OCY = Old Conservation Yard

Table D
Potential
Threat to Groundwater Tracker
Subarea 3/6
Draft for Review

Location	Explanation
SRE R/A Liquid Waste Holdup Tanks	Two 5,000-gallon liquid waste holdup tanks which received waste from operations at SRE were located in vaults on the hill slope northeast of SRE. The tanks were located in subsurface vaults and posed potential recharge to groundwater if leaks occurred. Constituents detected above background/ISLs in soil at or near the waste holdup tanks/vaults included PAHs (benzo(b)fluoranthene up to 1,500 ppb and B(a)P up to 770 ppb at 0.5 ft in SL-142-SA6), metals (mercury up to 2.5 ppm at 1 ft in SRBS1056), and TPH (up to 320 ppm). The nearest groundwater monitoring well is RD-85, located approximately 65 ft to the south. Sampling performed in previous investigations is sufficient for characterization and no new soil matrix or soil vapor sample locations are proposed in Phase 3.
Building 4143 (SRE) Reactor	The SRE reactor core and moderator elements were located in a subgrade vault in the northeast corner of Building 4143. Constituents detected above background/ISLs in soil surrounding B4143 include VOCs (trichlorofluoromethan up to 2.8 ppb at 10.5 ft in SRSV1026), PAHs (naphthalene up to 4,440 ppb at 21 ft and B(a)P up to 550 at 5 ft), PCBs (up to 47.8 ppm at 8 ft in SL-123-SA6), metals (Hg up to 5.7 ppm at 8 ft in SL-071-SA6), and TPH (up to 9,200 ppm at 23 ft in SL-325-SA6). Three shallow groundwater wells, PZ-150, PZ-160, PZ-161, are located to the west, east, and north, respectively, of B4143. The nearest deep groundwater well is RD-85, located approximately 100 feet to the northwest. As part of Phase 3 sampling, 7 soil matrix locations have been proposed surrounding the building footprint, and one soil vapor sample location is proposed targeting fill soils in the former reactor vault.
Building 4003 Leach Field and Dry Well	Leach field and dry well may warrant additional consideration by GW teams for threat to groundwater and additional sampling needs since liquid waste disposal features that may have caused focused recharged conditions. Constituents detected above background/ISLs in soil at or near the leach field and dry well include PAHs (fluoranthene up to 25,000 ppb and B(a)P up to 15,000 ppb at at 4 ft in SRTS02S02), metals (mercury up to 2.7 ppm and silver up to 11.4 ppm at 4 ft in SRTS02S02), and TPH (TPH-lubricant oil up to 270 ppm and TPH-gasoline up to 10 ppm at 4 ft in SRTS02S02). Groundwater at the leach field is monitored by one well within the leach field footprint (RD-86). Previous sampling in the soil matrix is sufficient for characterization and no additional sampling is proposed in Phase 3. One soil vapor location has been proposed at previous location with rejected data (SRSV1017) to evaluate lateral and vertical migration in soil.
SRE Pond	The SRE retention pond is located down-gradient from Building 4143 and was used to contain surface water runoff or liquid waste discharge from SRE operations. Constituents detected above background/ISLs in soil within or adjacent to the pond include VOCs (toluene up to 3,600 ppb at 2.5 ft in PS_SREI-8), PAHs (fluoranthene up to 800 ppb and B(a)P up to 240 ppb in shallow soils at PS-7), dioxins (TEQ up to 276.0 ppt at 6 ft in SRBS1077), metals (mercury up to 1.4 ppm at 1 ft in SRBS1077), and TPH (up to 170 ppm). The nearest groundwater monitoring well is RD-86 in the leach field approximately 20 feet to the south. As part of Phase 3 sampling, one soil vapor location has been proposed in an area of likely deeper soils near SRSV1075 where shallow refusal was previously encountered. Previous sampling in soil matrix is sufficient for characterization and no additional sampling is proposed.
Building 4003 Hot Cave	The hot cave in B4003 consisted of two cells used for remote manipulation of radioactive materials. The cells were approximately 4 feet deep and contained radioactive liquid waste lines and holdup tanks below each cell. Constituents detected above background/ISLs in soil near these features include VOCs (trichlorofluoromethane up to 0.12 ppb at 12 ft in SRSV1009) and TPH (up to 18.8 ppm). The nearest groundwater monitoring well is RD-86 in the leachfield over 300 feet to the northeast. As part of Phase 3 sampling, 5 soil matrix and 1 soil vapor location have been proposed near the Hot Cave to evaluate lateral and vertical migration in soil.
Building 4064 Leach Field	The B4064 leach field may warrant additional investigation since liquid waste disposal features may have caused focused recharge conditions. Constituents detected above background/ISLs at or near the leach field include dioxins (TEQ up to 10.3 ppt at 3 ft in SL-321-SA6) and TPH (up to 34 ppm at 0.5 ft in SL-321-SA6). The nearest groundwater monitoring well is RD-92 approximately 200 feet to the east. Analytical data from samples collected during previous investigations are considered sufficient and no new soil vapor or soil matrix samples are proposed in Phase 3.
SRE Pipeline Discharge / Old Con Low Spot	Operational wastewater and surface water runoff was collected in the SRE Pond and conveyed via above ground piping to an area south of the Old Conservatation Yard. The discharge point was a depression/low spot which lead under G Street and into a natural drainage west of the New Conservation Yard. The low spot may require additional consideration since a potential recharge feature. Constituents detected above background/ISLs in soil near these features include VOCs (toluene up to 0.31 ppb at 5 ft in OCSV1011), PAHs (B(a)P up to 280 ppb at 0.5 ft in OCBS10), PCBs (up to 480 ppm in OCBS10), dioxins (TEQ up to 184.5 ppt in OCBS10), metals (mercury up to 2.6 ppm at 0.5 ft in OCBS66), and TPH (up to 920 ppm at OCBS10). The nearest groundwater monitoring well is RD-14 over 200 feet to the north. As part of Phase 3 sampling, 3 soil matrix and 1 soil vapor location have been proposed to evaluate lateral and vertical migration in soil.

Notes:

ft = feet
B(a)P = benzo(a)pyrene
bgs = below ground surface
ISL = interim screening level
ppm = parts per million
ppb = parts per billion
ppt = parts per trillion
PAH = polycyclic aromatic hydrocarbons
PCB = polychlorinated biphenyl
R/A = radioactive
SRE = Sodium Reactor Experiment
TEQ = toxicity equivalency quotient
TPH = total petroleum hydrocarbon
VOC = volatile organic compound

Table E
GIS Feature Tracker
Subarea 6
Draft for Review

Feature	Feature Class	Explanation
SRE Transformer 683	Transformers	Location shown in Basemap Group_Chemical Use Areas approximatley 20 feet east of where location is shown and sampled for in RFI report. Move location in GIS to correct RFI location and update GDB.
SRE Chemical Use Areas	Chemical Use Areas	Add SRE chemical use areas defined in Group 6 SAP to Gold Copy GDB.
B4003 Pits	Sumps	Add two pits to B4003 according to Figure 2.1.1.b in EPA HSA 6 Tech Memo.
SRE Drainage, Old Con/New Con Drainage, SPA drainage	Streams	Adjust drainages based on new 2-foot contours.

Acronyms:
EPA = U.S. Environmental Protection Agency
GDB = geodatabase
GIS = geographical information system
HSA = Historical Site Assessment
RFI = RCRA Facility Investigation
SPA = Storage Propellant Area
SRE = Sodium Reactor Experiment

Table F
Field Tracker
Subarea 3/6
Draft for Review

Location Description	Location ID(s)	Explanation and Notes
TPH layer in OCY	6_DG-655 6_DG-656 6_DG-657	Conduct exploratory test pit to investigate and characterize layer of greenish fuel staining noted in soil borings between approximately 3.5 and 6 feet bgs in the central portion of the Container Storage Area; if observed, collect sample of greenish stained soil, and map in trench log extent.
Ground scar on hillslope north of SRE	6_DG-502	Place location on flat portion of hillslope east of B4686. Location may need to be adjusted in the field if soils not deep enough or bedrock expressed at ground surface.
Drainage Transects	6_DG-628 6_DG-629 6_DG-630 6_DG-631 6_DG-632 6_DG-634 6_DG-635 6_DG-636	Samples are proposed across drainage in a transect. Recollect sample within the drainage pathway and advance boring to bedrock; collect samples at 5-foot and 10-foot stepouts on each bank laterally from the drainage and also advance to bedrock.