Department of Energy

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May 15, 2014

Ms. Laura Rainey, P.G.
DOE SSFL Project Manager
Department of Toxic Substances Control
5796 Corporate Avenue
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Subject: Submittal of Addendum No. 11 to Master Field Sampling Plan for Chemical Data Gap Investigation Phase 3 Go-Back Soil Chemical Sampling at Area IV Santa Susana Field Laboratory for Subareas 5A, 5D, 8, and Northern Buffer Zone

The United States Department of Energy (DOE) is pleased to submit Addendum No. 11 to the Chemical Data Gap Investigation Work Plan, Phase 3 Soil Chemical Sampling at Area IV for chemical soil sampling in Subareas 5A, 5D, 8, and the Northern Buffer Zone (Addendum No. 11; CDM Federal Programs Corporation, May 2014). The Chemical Data Gap Investigation Work Plan, Phase 3 Soil Chemical Sampling at Area IV (Phase 3 Work Plan; CDM Programs Corporation, April 2012) was approved by DTSC on April 11, 2012. This addendum includes the data gap analysis and the proposed sampling locations and objectives for each sample and reflects the incorporation of DTSC comments and input we received at the technical stakeholder meeting we had on April 22, 2014 and all of DTSC's additional comments.

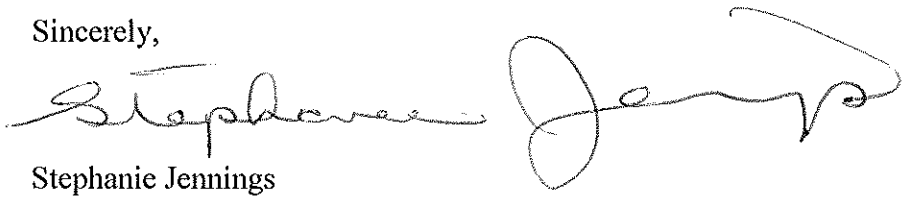
Due to the size of the files, Addendum No. 11 prepared by CDM Smith, the Data Gap Analysis document (Attachment 1) prepared by MWH, and a copy of this letter has been placed on DTSC's ftp site.

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 believe, true, accurate and complete.

DOE requests approval of Addendum No. 11 to the Master Field Sampling Plan for Chemical Data Gap Investigation Phase 3 Go-Back Soil Chemical Sampling at Area IV Santa Susana Field Laboratory for Subareas 5A, 5D, 8, and the Northern Buffer Zone.

If you have any questions regarding this document, please contact me at 805-416-0990.

Sincerely,



Stephanie Jennings
Deputy Federal Project Director

CC: Mr. John Jones, DOE
Mr. Buck King, DTSC
Mr. Richard Hume, DTSC
Mr. Mark Malinowski, DTSC
Mr. David Dassler, Boeing
Mr. John Wondolleck, CDM Smith
Ms. Dixie Hambrick, MWH

Addendum No. 11 to
Master Field Sampling Plan for Chemical Data Gap Investigation
Phase 3 Go-Back Soil Chemical Sampling at Area IV
Santa Susana Field Laboratory
Ventura County, California

Subareas 5A, 5D, 8, and Northern Buffer Zone

Prepared for:

Department of Energy
Energy Technology and Engineering Center
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Prepared by:

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Prepared under:

US Department of Energy
EM Consolidated Business Center
Contract DE-EM0001128
CDM Smith Task Order DE-DT0003515

May 2014
Revision 0

Addendum No. 11 to
Master Field Sampling Plan for Chemical Data Gap Investigation
Phase 3 Go-Back Soil Chemical Sampling at Area IV
Santa Susana Field Laboratory
Ventura County, California

Subareas 5A, 5D, 8, and Northern Buffer Zone

Contract DE-EM0001128
CDM Smith Task Order DE-DT0003515

Expires Oct 2014

Prepared by: _____ **May 14, 2014**
Michael Hoffman, P.G. **Date**
CDM Smith Geologist

Approved by: _____ **May 14, 2014**
John Wondolleck **Date**
CDM Smith Project Manager

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Introduction

This document supports implementation of the soil sampling program 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* (Phase 3 Work Plan, CDM Smith 2012a). The Phase 3 Work Plan contains four appendices. Appendix A is 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 2012b). Appendix B is the *Quality Assurance Project Plan, Chemical Sampling at Area IV, Santa Susana Field Laboratory, Ventura County, California* (Phase 3 QAPP, CDM Smith 2012c). Appendix C is the *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* (Safety Plan, CDM Smith 2012d). And Appendix D of the Phase 3 Work Plan provides the Standard Operating Procedures (SOPs) (Phase 3 SOPs, CDM Smith 2012e) describing the details of sampling activities and sample management at SSFL.

The Master FSP addresses soil sampling within Area IV and the Northern Buffer Zone (NBZ) 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). For all samples collected at locations within Area IV Subareas 5A, 5D, 8, and the NBZ, 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
- subsurface soil sampling using a backhoe to dig test pits and trenches
- 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 NBZ soils/sediments and further defines DOE's obligations in relation to radiologic and chemical cleanup of soils within these areas. It stipulates that during phases 1 and 2 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. The

prior sampling with EPA within Area IV was conducted during October 2010 through November 2011.

Phase 3 of the AOC is the data gap analysis, which includes an assessment of data adequacy using the data collected under the Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI) program, incorporated the results of co-located soil samples collected during phases 1 and 2 of the AOC, and multiple lines of evidence as described in the Phase 3 Work Plan (CDM 2012a). The purpose of the Phase 3 data gap analysis was to identify additional soil chemical data needed to support the Soil Remedial Action Implementation Plan for Area IV.

An additional data gap analysis, termed the "Go-Back Data Gap Analysis", evaluated the completeness of the Phase 1, 2 and 3 soil sampling and RFI datasets in completing site characterization. The sampling that will be performed under this FSP Addendum is based on the results of the final data gap analysis. The methodology for the "Go-Back Data Gap Analysis" is described in the document *Final Phase 3 Data Gap Analysis for Subareas 5A, 5D, 8 and the Northern Buffer Zone, Technical Memorandum, Santa Susana Field Laboratory, Ventura County, California* (MWH 2014[1]) (*Go-Back 2 Data Gap TM*), which is included as Attachment 1 to this FSP Addendum.

The "Go-Back" soil sampling within Subareas 5A, 5D, 8, and NBZ is governed by the Phase 3 Work Plan and its elements including the Master FSP, the QAPP, Safety Plan, and the Phase 3 SSFL SOPs. These documents are incorporated into this FSP Addendum by reference.

Purpose of FSP Addendum

This FSP Addendum addresses Phase 3 Go-Back Round 2 soil sampling within Subareas 5A, 5D, 8, and the NBZ. Figure 1 of this document illustrates the location of all subareas within Area IV of SSFL. The rationale for sample location and chemical analytes is provided in the document *Go-Back 2 Data Gap TM* (MWH 2014). The *Go-Back 2 Data Gap TM* includes Tables 4A for Subarea 5A, Table 4B for Subarea 5D, Table 4C for Subareas 8, and Table 4C for the NBZ providing the sampling rationale for each location. Figure 4 of the *Go-Back 2 Data Gap TM* (MWH 2014) provides the proposed soil sample locations in the Subareas 5D and 8, Figure 5 for Subareas 5D, and Figure 6 for the NBZ. Soil sample locations were identified during the Go-Back data gap analysis as well as from public comments received during the April 2014 Go-Back 2 public meeting. Tables 1, 2, and 3 of the *Go-Back 2 Data Gap TM* provide additional information for sample rationale, analytes, and locations for the additional soil sampling. Information on specific field conditions and sample locations will be necessary as part of sample point staking and soil collection.

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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.

For the Go-Back 2 exercise, surface and subsurface samples will be collected. For surface soil samples, only the top 6-inches of soil (surface soil) will be collected. Many of the 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. All borings will be drilled to the target depth specified in Tables 4A, 4B, 4C, and 4D of the *Go-Back 2 Data Gap TM*. The cores will be visually inspected and monitored with field instruments for the presence of contamination, including discoloration, debris, and fill. Soil samples will be targeted where contamination is evident.

The Round 2 soil sampling event will also involve the use of a backhoe to dig exploratory test pits and trenches throughout Area IV. This includes test pits and trenches identified during Phase 3 data gap recommendations that digging was deferred until all test pit requirements had been defined. Sample collection will be informed based on visual details observed of subsurface conditions by the site geologists. Phase 3 SOP 5 describes the soil sample collection process using a backhoe.

CDM Smith will be responsible for the physical collection of all samples per the procedures and controls specified in the Master FSP. CDM Smith will be responsible for the hand auger and DPT rig sampling aspects of the field sampling program. 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 verifying that the sample locations initially identified by GIS review reflect the targeted feature described in Tables 4A, 4B, 4C, and 4D 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 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. A CDM Smith sample coordinator will be responsible for sample preparation and shipment to an analytical laboratory under contract with CDM Smith. Soil samples collected by CDM Smith will be analyzed for chemical analytes identified in Tables 4A, 4B, 4C, 4D of the *Go-Back 2 Data Gap TM* (MWH 2014). 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 2012b).

Tables 4A, 4B, 4C, and 4D of the *Go-Back 2 Data Gap TM* also identify 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.

MWH will be responsible for procuring and directing the backhoe operations. This includes logging observations of materials found in the test pits and trenches. MWH will identify locations for soil sampling and provide CDM Smith with sample material. Sample material provided by MWH will be handled in accordance to sample management procedures outlined in this Addendum.

Sample Analytes

Table 4A for Subareas 5A, Table 4B for Subarea 5D, Table 4C for Subarea 8, and Table 4D for the NBZ of the *Go-Back 2 Data Gap TM* (MWH 2014) provide 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 Tables 4A, 4B, 4C, and 4D. 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 Tables 4A, 4B, 4C, and 4D of the *Go-Back 2 Data Gap TM* (MWH 2014) 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 4A, 4B, 4C, and 4D prepared for shipment to the laboratory. These tables also identify the chemical analyses proposed for each depth interval.

There will 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/Trench Soil Sampling

Test pits and/or trenches will be excavated using a back hoe directed by MWH. A CDM Smith geologist and sampler will collect soil from test pit sidewalls or from the back-hoe bucket per Phase 3 SSFL SOP 5. The geologist will be responsible for logging the test pit and describing soil samples. A CDM Smith sample coordinator will be responsible for sample preparation and shipment to an analytical laboratory under contract with CDM Smith. Test pit sampling will occur during late May/early June 2014.

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 Tables 4A, 4B, 4C, and 4D of the *Go-Back 2 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 May 12, 2014, following DTSC approval of this FSP Addendum. Sample locations will be marked by the site geologist in advance of sampling. It is anticipated that completion of all soil boring locations will be by May 23. The digging of test pits/trenches is scheduled starting May 19 to accommodate this means of soil sampling within all relevant subareas.

References

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

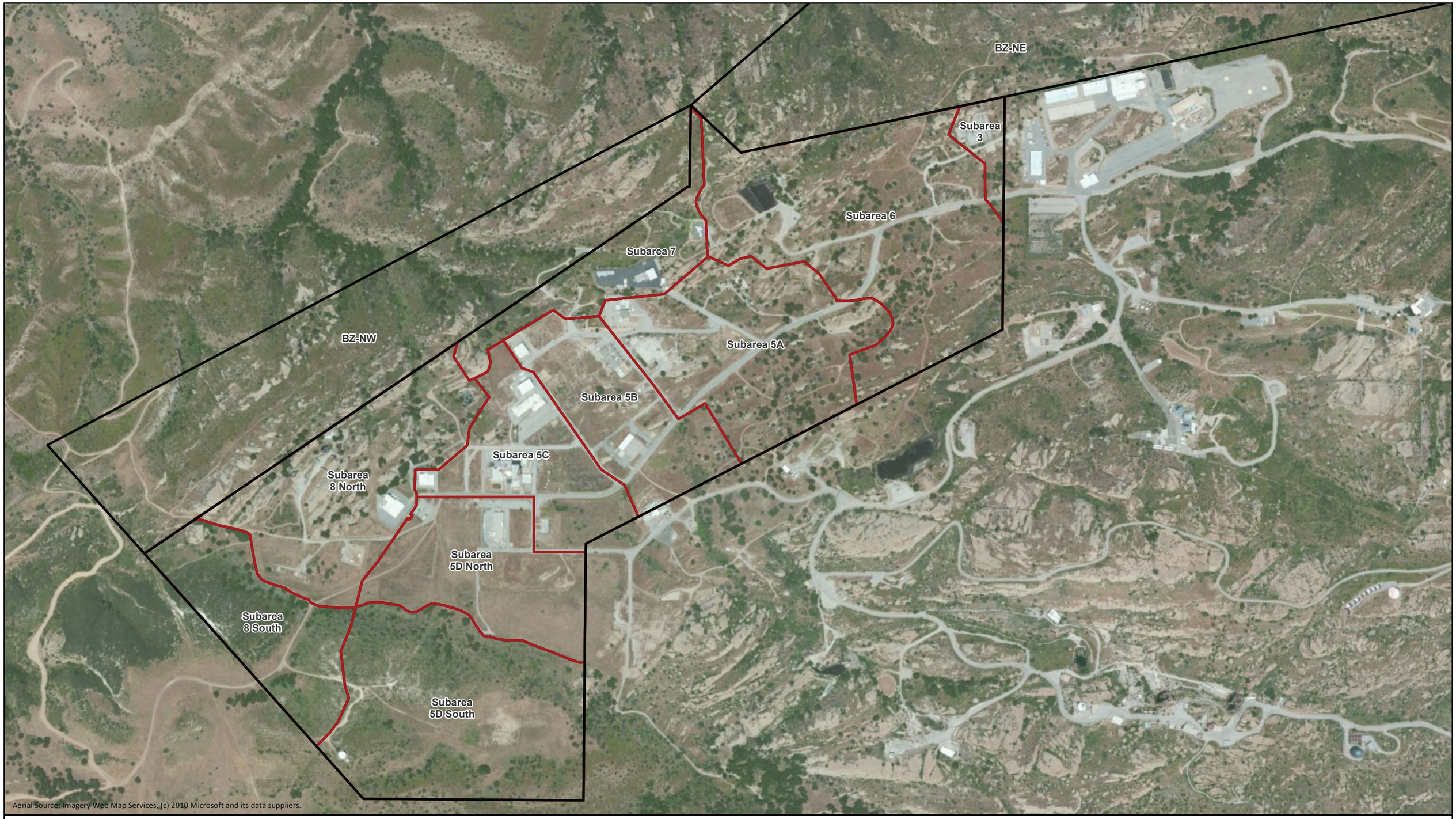
CDM Smith. 2012b. *Master Field Sampling Plan for Chemical Data Gap Investigation, Phase 3 Soil Chemical Sampling at Area IV, Santa Susana Field Laboratory, Ventura County, California.* April.

CDM Smith. 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.

CDM Smith. 2012e. *Standard Operating Procedures.*

MWH 2014. *Final Phase 3 Data Gap Analysis for Subareas 5A, 5D, 8, and the Northern Buffer Zone, Technical Memorandum Santa Susana Field Laboratory, Ventura County, California. (Go-Back 2 Data Gap TM)*. May.



Aerial Source: Imagery Web Map Services, (c) 2010 Microsoft and its data suppliers.

Legend

Area IV & Northern Buffer Zone

Area IV Subarea

Subarea Designations
Area IV

0 300 600 1,200 Feet

Santa Susana Field Laboratory
Ventura County, California
Figure 1

CDM Smith

FarmerRA C:_projects\SantaSusana\GIS\MXD\SSFL_Subarea_Designations_AreaIV_11x17.mxd 8/16/2013

Attachment 1

Final Phase 3 Data Gap Analysis for Subareas 5A, 5D, 8, and the Northern Buffer Zone

Technical Memorandum, Santa Susana Field Laboratory, Ventura County, (MWH 2014)

FINAL PHASE 3 DATA GAP ANALYSIS FOR SUBAREAS 5A, 5D, 8, AND THE NORTHERN BUFFER ZONE
TECHNICAL MEMORANDUM
SANTA SUSANA FIELD LABORATORY
VENTURA COUNTY, CALIFORNIA

Prepared For:

THE UNITED STATES DEPARTMENT OF ENERGY

Prepared By:

MWH Americas, Inc.
618 Michillinda Ave, Suite 200
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May 2014

Dixie Hambrick, P.G., 5487
MWH Program Director

Alex Fischl
Subarea Data Gap Manager

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TABLES

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FIGURES

Figure No.

ATTACHMENTS

Attachment No.

ACRONYMS AND ABBREVIATIONS

AOC	Administrative Order on Consent
CCA	Clearly Contaminated Area
DOE	Department of Energy
DQO	Data Quality Objective
DTSC	Department of Toxic Substances Control
EPA	Environmental Protection Agency
GIS	geographic information system
ISL	interim screening level
LUT	Look-up Table
MFSP	Master Field Sampling Plan
MRL	method reporting limit
MWH	MWH Americas, Inc.
NBZ	Northern Buffer Zone
PAH	polyaromatic hydrocarbon
PCB	polychlorinated biphenyl
PRA	Preliminary Remediation Area
RCRA	Resource Conservation and Recovery Act
RFI	RCRA Facility Investigation
RL	reporting limit
SSFL	Santa Susana Field Laboratory
TM	technical memorandum
TPH	total petroleum hydrocarbon

1.0 INTRODUCTION

This technical memorandum (TM) has been prepared to describe the final Phase 3 chemical data gap analysis performed by MWH Americas, Inc. (MWH) for the U.S. Department of Energy (DOE) for Subareas 5A, 5D, and 8 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 Area IV and the NBZ, 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 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 final chemical data gap analysis, followed by a summary of the evaluation results for Subareas 5A, 5D, 8, and the NBZ. Specifically, it describes final data gaps that remain after completion of the initial Phase 3 sampling performed for these subareas. Since this TM presents rationale for completion of the Phase 3 sampling, background information provided in earlier TMs has been summarized to allow focus on the final data gap evaluation process.

2.0 DATA GAP ANALYSIS PROCESS

The AOC requires a chemical data gap investigation to identify locations within Area IV and 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, 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."

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). A 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 data gap investigation

DQOs are the framework for the data gap analysis process and are presented in Section 4.0 of the MFSP (CDM Smith, 2012).

The DTSC Chemical Look-up Table (LUT) values provide the AOC standard for remediation and are therefore used in the Phase 3 data gap analysis. The LUT values were established by DTSC in June 2013 for the chemicals most frequently detected within Area IV (Attachment 1). The June 2013 Look-up Table includes all background constituents and additional chemicals of interest to DTSC. A second part of the Chemical Look-up Table is currently being prepared by DTSC, and will reflect required method reporting limits (MRLs) for the remaining chemicals being investigated at the site. Since the second part of the Look-up Table has not yet been issued, MRLs achievable by several analytical laboratories for the remaining chemicals were used as the comparison values in the data gap analysis. Once issued by DTSC, the data gap analysis process will use the LUT values based on MRLs.

The Phase 3 data gap analysis is an iterative process. Initially, all available chemical data, including Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI) results and Phase 1 and 2 chemical data, information regarding historical activities, and results from EPA's investigation activities (e.g., radionuclide sampling results, gamma surveys, geophysical surveys, aerial photograph interpretations) were evaluated. Data gaps were identified by performing the following evaluation steps:

- Comparing existing soil sampling results to screening criteria[1] to identify additional sample locations needed to define the extent of contamination (based on criteria exceedance) and/or chemical concentration gradients;
- 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.

Additional information regarding each of these steps is described in previous Data Gap TMs.

Using the evaluation steps above, data gaps were identified and an initial Phase 3 Data Gap sampling plan was developed for each subarea. The plans were reviewed by DTSC, shared with public stakeholders, finalized to address DTSC and public input, and approved by DTSC prior to field work. Implementation of the initial Phase 3 data gap sampling plans began in Spring 2012 and completed in December 2013. Following completion of the initial Phase 3 sampling and data validation for each subarea, an evaluation was performed to ensure that the DQOs were met and identify any remaining data needs for remedial planning. Because DOE was re-visiting the

[1] Interim screening levels (ISLs) were used for data screening prior to DTSC issuing Chemical Look-up Table (LUT) values in June 2013 as described in previous data gap TMs.

Area IV subareas for final data needs, this step is being called a 'Go-Back' evaluation. The data gaps identified during this process using the recently obtained initial Phase 3 data and LUT values were presented in Final Phase 3 Data Gap TMs. The Final Phase 3 Data Gap TM for Subareas 5B, 5C, 3/6, and 7 was finalized in December 2013. This document is the Final Phase 3 Data Gap TM for Subareas 5A, 5D, 8, and the NBZ.

As described in the initial Phase 3 Data Gap TMs, at the completion of Phase 3 sampling, all available chemical data will be evaluated and summarized in the Final Data Summary Report.

The following sections describe the approach used to identify final data gaps after data from initial Phase 3 samples have been analyzed, validated, and screened using LUT values. The additional data gap analysis steps include:

- Identifying Preliminary Remediation Areas (PRAs) and assessing whether they are adequately defined both laterally and vertically; and
- Re-evaluating data needs for site-wide features or sampling requirements that were tracked throughout the data gap process in a 'Go-Back' table to determine whether they are adequately characterized and can proceed to remedial planning.

2.1 IDENTIFICATION OF PRELIMINARY REMEDIATION AREAS

Prior to Look-up Table development as part of the data gap analysis process, DOE and DTSC previously identified areas most likely requiring remediation called "Clearly Contaminated Areas." Sample locations in these areas contained a high frequency and number of chemicals with significantly elevated concentrations. Clearly Contaminated Areas (CCAs) are shown on maps in this TM with pink shading.

Once LUT values were established, DOE began identifying areas called 'Preliminary Remediation Areas' (PRAs) where soil sample results exceed the LUT values. PRAs are being identified to include areas with a common suite of chemicals exceeding the LUT values and/or a similar depth of exceedance. Per the AOC, remediation planning will be required for chemicals that are 'contiguous and emanating from' Area IV or the NBZ; thus, PRAs are identified to extend offsite or into other SSFL Administrative Areas (e.g., Area III) if similar chemicals exceeding the LUT values were detected downgradient within migration pathways (typically a drainage or surface water pathway). Both chemicals exceeding LUT values and average depths are being tracked for each PRA for remedial planning purposes. PRAs are shown on maps in this TM with purple shading.

PRAs identified herein are considered preliminary because some sample data are still pending collection and/or validation, soil treatability studies are ongoing, and DTSC has not yet issued the second part of the Look-up Table (MRL-based values). PRAs may require further sampling

to better define either the lateral extent or vertical extent (depth) of chemical exceedance(s), which are important for estimating the soil volume that may require remediation. In a few cases, additional sampling is proposed as part of this TM to complete assessment of specific geophysical or chemical use features (e.g., pipelines, leach fields) within a PRA that may have had a release of chemicals different than surrounding sample results. Also, PRAs do not account for potential areas of sensitive habitat or cultural resources; these environmentally sensitive areas will be evaluated during remedial planning. PRAs will be finalized after Phase 3 sampling is complete and documented in the Final Data Summary Report.

2.2 EVALUATION OF SITE-WIDE FEATURES AND OTHER SAMPLING REQUIREMENTS

Throughout the data gap process, site-wide features and other sampling requirements were tracked for re-evaluation once the LUT values were established and initial Phase 3 sampling results were obtained. The items requiring follow-up were summarized in a 'Go-Back' table at the end of each subarea's data gap analysis. Some items were global in nature and apply to all subareas; others were subarea-specific. As part of the final data gap analysis, these 'Go-Back' items are being checked and evaluated to identify any outstanding data gap sampling needs. The following briefly describes the global items being tracked as part of the final data gap analysis process.

Site-Wide Features: Site-wide infrastructure systems, including the sewer system, water conveyance systems, and natural gas pipelines cross subarea boundaries and were tracked as 'Go-Back' items to ensure complete characterization at the end of the process. Each of these site-wide features may have resulted in chemical releases to soil either by (1) discharge of wastewater from industrial operations (sewer and water conveyance systems), or (2) degradation of mastic wrap containing polychlorinated biphenyls (PCBs) and polyaromatic hydrocarbons (PAHs) (natural gas pipelines). During initial Phase 3 sampling, portions of these systems were targeted for sampling (e.g., a sewer line exit from a building, a drainage ditch that also served as a wastewater conveyance feature overlying a subgrade sewer pipeline). During the final data gap analysis, existing data near site-wide infrastructure systems are assessed to identify if any additional sampling is required to complete characterization of these features for remedial planning.

Sample Reporting Limits (RLs): Within each subarea, some sample RLs are elevated above LUT values. The distribution of these elevated RLs are assessed in the final data gap analysis to ensure that current data are adequate for remedial planning. Typically, elevated sample RLs occur sporadically throughout the PRA and are interspersed with numerous samples with acceptable RLs and/or low-level detected concentrations, and as such, are considered acceptable for remedial planning. In most cases, elevated sample RLs have not resulted in additional sampling recommendations since acceptable RLs are present for most

chemicals, or because the chemicals will be included in the PRA confirmation sample suite during remediation.

Laboratory Contaminants: Laboratory contaminants are chemicals used in analytical laboratories as part of routine procedures (e.g., acetone, methylene chloride, bis-2-ethylhexyl phthalate). These chemicals may be reported in a sample result due to laboratory activities, not due to onsite operations. Since they may be reported in a sample above LUT values, they would either require resampling to confirm their presence/absence, or be tracked as a chemical for the PRA and addressed by the planned confirmation sampling suite during remediation. For the final data gap analysis, laboratory contaminants are typically resampled if identified outside of a PRA, but not resampled if within a PRA since they will be added to the PRA confirmation sampling suite.

Perchlorate: Perchlorate characterization completeness is being evaluated since two analytical methods have been used for laboratory analysis, one with lower RLs than the other. The more typical analytical procedure for perchlorate frequently has RLs that exceed the LUT value. However, perchlorate was not commonly used in Area IV, was infrequently detected, and sufficient low-RL non-detected results exist within the PRAs to complete characterization. Where detected, perchlorate is added to the chemical list for a PRA. In some cases, final data gap sampling for perchlorate may be recommended to confirm its presence/absence before finalizing the PRA's list of exceedance chemicals.

Deep Boring Results: EPA drilled several deep soil borings throughout Area IV, and these sample results were not available for the initial Phase 3 data gap analysis for some subareas. The deep boring data are now being screened against LUT values as part of the final data gap analysis.

Building Demolition: A few buildings have been demolished since the initial Phase 3 sampling was conducted. During demolition, soil conditions were monitored by an onsite geologist. Building features that may have contained or used chemicals were inspected, and soil conditions throughout the demolition footprint observed. The final data gap analysis includes review of building demolition records and targets Phase 3 samples where significant building features (e.g., a deep subgrade storage vault) were located or where stained soils were observed.

Initial Phase 3 Implementation Review: Initial Phase 3 field sampling information is reviewed to evaluate characterization completeness for remedial planning considering geophysical surveying results, proximity to targeted chemical use features, adequacy of analytical analyses, and depth to bedrock and/or soil fill conditions. Specifically:

- Geophysical Surveying: In some initial Phase 3 sampling areas, geophysical surveying was proposed prior to sampling to better target locations for suspected fill or other chemical use features. In these cases, the geophysical survey results are reviewed and final data gap sampling locations proposed.

- Uncollected Samples or Missing Analyses: A few samples proposed in the previous Phase 3 data gap sampling plans could not be collected due to safety issues such as proximity to active utility pipelines or transformers, because they were located in biological or cultural sensitive areas, or because they required trenching. In a few other cases, requested analyses were inadvertently omitted or deemed unacceptable based on validation. As part of the final data gap analysis, these locations were checked to evaluate if those sample requirements had been met by surrounding results, or whether a data gap still exists. If a data gap is identified, then sampling or additional investigation (e.g., excavation of trenches or test pits) are proposed to obtain data required for remedial planning.

- Depth of Bedrock or Fill Soils: Initial Phase 3 boring logs are reviewed to identify depth of bedrock or fill soils locations to ensure sufficient information for remedial planning. If the depth of LUT exceedances is not adequately characterized in areas of fill soils or where the depth to bedrock is uncertain, final data gap sampling is proposed.

A checklist has been developed and is used by the data gap team, along with the chemical data and PRAs, to confirm each 'Go-Back' item is addressed as part of the final data gap analysis.

2.3 FINAL DATA GAP ANALYSIS PROCESS SUMMARY

The final data gap analysis process builds on previous Phase 3 data gap efforts by including recent sampling results and screening available analytical data against LUT values to identify PRAs. A systematic process is applied that incorporates the evaluation of data, features, and components tracked during the initial Phase 3 data gap analysis to ensure that characterization is adequate for remedial planning.

The outcome of this data gap analysis process is the identification of final soil sampling requirements for Phase 3, including sampling rationale, locations, depths, and proposed analytical suites. Soil 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[2]).

[2] Soil vapor sampling is not included in this TM since initial Phase 3 soil vapor sampling has not yet been conducted.

The analytical parameters proposed for step-out or step-down sampling locations are based on chemicals with results exceeding LUT values, in conjunction with data needs identified by historical operational chemical use, review of migration pathways, and other lines of evidence. Proposed sample spacing is based on operations and potential releases, the magnitude and gradients of existing chemical data, and site conditions (e.g., soil depth, bedrock occurrence).

The data gap analysis also identifies additional investigation techniques for some areas to aid in sample location selection. As in previous Phase 3 data gap efforts, trenching and test pit excavation is proposed to observe soil conditions prior to sampling. In some cases (e.g., along drainages), field reconnaissance or mapping is needed to refine proposed sampling locations. The sampling rationales included in this TM specify these additional investigative techniques where applicable. As discussed above, geophysical surveys were conducted as part of the initial Phase 3 data gap field work, and those results are being used to aid in final data gap location selection.

The information presented in this TM, along with supporting geographic information system (GIS) and analytical information, has been 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 has been incorporated into the proposed sampling included in this TM.

3.0 FINAL DATA GAP ANALYSIS FOR SUBAREAS 5A, 5D, 8, AND THE NBZ

The final data gap analysis for Subareas 5A, 5D, 8, and the NBZ was performed following the process outlined above and using the DQOs presented in Section 4 of the MFSP (CDM Smith, 2012). The status of 'Go-Back' tracking items for these subareas is summarized in Table 1, and the data gap checklist is provided in Table 2. Site-wide infrastructure data evaluations are presented on Figures 1, 2, and 3 for the sewer system, water conveyance system, and natural gas pipelines, respectively. Sampling status and DQO evaluation of proposed, but uncollected samples for Subareas 5A, 5D, 8, and the NBZ are presented in Tables 3A, 3B, 3C, and 3D, respectively.

The proposed final data gap soil matrix sampling is presented in Table 4A and on Figure 4 for Subarea 5A, in Tables 4B and 4C and on Figure 5 for Subareas 5D and 8, and in Table 4D and on Figures 6 and 7 for the NBZ. Table 5 and Figure 8 present the proposed final data gap soil matrix resampling for total petroleum hydrocarbon (TPH) within undeveloped portions of Area IV and the NBZ (this data gap is further described in the bullets below).

The following is a summary of the final data gap sampling proposed for Subareas 5A, 5D, 8, and the NBZ based on applying the process described above. More detailed, sample-specific rationales for these (and all) areas are provided in Tables 4A, 4B, 4C, 4D, and 5.

- Some initial Phase 3 proposed sample locations were not implemented since they occur adjacent to active transformers or utilities, within an environmentally sensitive area, or because the planned sampling was a trench or test pit (schedule constraints did not allow implementation of trenches/test pits during prior Phase 3 field work).
    - In most cases, results from nearby samples or samples in similar areas are used to meet the previously proposed sample DQOs for remedial planning, and the unsampled locations are included in PRAs since surrounding sample results exceed LUT values.
    - In a few cases, as described below, where trenches or test pits targeted chemical use features such as a pipeline that could impact the lateral or vertical extent and/or chemical list of a PRA, trenches and test pits are included for final data gap sampling.
- Re-sampling for TPH is proposed at 37 locations to obtain analytical results using EPA-approved sample preparation methods that remove organic sources of hydrocarbons. This re-sampling is recommended since data review of Phase 3 first round sample results in the NBZ indicated that reported TPH results in undeveloped areas may reflect organic-derived (i.e., plant and animal) matter, rather than site-related releases of petroleum hydrocarbons. Possible inclusion of organic-derived hydrocarbons in reported TPH results has been identified by EPA scientists as well as other researchers (RWQCB, 2012; TPH Criteria Working Group, 1998). The additional sample preparation step was developed by EPA to help eliminate non-petroleum hydrocarbon results in reported TPH concentrations. Re-sampling is proposed at 23 locations within or north of the NBZ and at 14 locations within undeveloped portions of Area IV.
- Geophysical surveying is proposed to identify any subsurface anomalies in the reported leach field location south of Building 4353 (Figure 5). Surveying will extend from the area covered by EPA during Phase 1 sampling to west of the reported location. Trenching and sampling will be performed if geophysical anomalies are identified during this survey.
- Trenching and test pits are proposed to investigate debris or hummocky areas identified during the 2008 debris survey (i.e., 8_DG-534 and 8_DG-611).
- At geophysical anomaly locations in areas requiring further characterization, test pits or trenches are proposed to evaluate potential subsurface features associated with each anomaly and to inspect soil conditions prior to collecting a soil sample (e.g., 5A_DG-587, 5A_DG-636, and 5A_DG-730).
- Sampling offsite or into other SSFL administrative Areas (e.g., Area III) is proposed to evaluate if LUT exceedances are contiguous and emanating from Area IV by targeting

sampling within surface water migration pathways (e.g., 5D_DG-584, 5D_DG-611, and NBZ_DG-560.

- Sampling is proposed within PRAs where the vertical extent of exceedances is not sufficiently defined for remedial planning by existing data (e.g., 5A_DG-877 and 8_DG-623) and where additional sampling is required to complete characterization near site-wide infrastructure systems (i.e., 5A_DG-874 and 5A_DG-875).
- Sampling is proposed to evaluate potential air dispersion impacts related to burning and treatment activities at the former FSDF Ponds, with locations southwest of the former ponds in the periodic 'Santa Ana' wind direction (i.e., 8_DG-619 through 8_DG-622). Sufficient sampling has been completed in the prevailing wind direction to the northwest as well as the southeastern direction.

4.0 REFERENCES

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

TPH Criteria Working Group, 1998. Volume 1, Analysis of Petroleum Hydrocarbons in Environmental Media. March.

RWQCB, 2012. Leaking Underground Fuel Tank Guidance Manual. September.

TABLES

Table 1
Go Back Tracker Status
Final Phase 3 Data Gap Analysis
(1 of 5)

Location / Action	Explanation	Status After First Round of Phase 3 Sampling
	Subarea 5C	
Slightly elevated detections above ISLs	Evaluate concentrations at or slightly above ISLs once final Look-up Table and background values are published.	No further action required. Current screening and development of PRAs and final data gap sampling is performed using LUT values.
Elevated RLs	Final check of historical data with elevated RLs to determine that sufficient nearby sampling has been performed and historical data uncertainties resolved.	Sufficient low level detects below LUT values, as well as LUT exceedances, exist within the subareas to address uncertainty regarding potential releases masked by elevated MRLs for some chemicals. For Subareas 5A, 5B, 5C, 5D, 3/6, 7, 8, and NBZ either the entire area or the vast majority of the area has been identified as PRAs with a broad suite of COCs, including those chemicals with elevated MRLs (see below). No further sampling is needed to address the elevated MRLs since sufficient data currently exists for remedial planning. DOE will document the COCs (including those with elevated MRLs where warranted) in the Data Summary Report for remedial planning, and will include these COCs for post-remediation confirmation sampling. Summary of action: PRAs to include elevated MRL COCs, DOE will include elevated MRL COCs in confirmation sampling plans. > SVOCs/ PAHs: included in most PRAs in Subareas 5A, 5B, 5C, 5D, 3/6, 7, 8 and NBZ > PCBs: included in most PRAs in Subareas 5A, 5B, 5C, 5D, 3/6, 7, 8 and NBZ > Pesticides: included in some PRAs in Subareas 5A, 5B, 5C, 5D, 3/6, 7, 8 and NBZ > Herbicides: included in some PRAs in Subareas 5A, 5B, 5C, 5D, 3/6, 7, 8 and NBZ > Perchlorate: included in few PRAs in Subareas 5A, 5C, 5D, 6, 7, 8 and NBZ
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. Existing buildings/features that will be evaluated during demolition have been identified in proposed sampling location figures as "Post Demo."	Final data gap sampling is planned at select features as listed below in demolished buildings within the subareas. If future demolition of remaining structures occur before the remediation project, additional characterization needs will be obtained during remedial planning. > Subarea 5B - Building 4006 post demo sampling includes 3 locations (removed dry well and storage wells). - Building 4816 post demo sampling includes 1 location where stained soil was observed. - Building 4011 post demo sampling includes 1 location where stained soil was observed. > Subarea 5C - none (no anomalous soil conditions or deep features present at B4015 demo area) > Subareas 3/6 - none (no demo activities) > Subareas 7 - none (no demo activities) > Subarea 5A - Building 4093 post demo evaluation in progress. > Subarea 5D - none (no demo activities) > Subarea 8 - none (no demo activities) > NBZ - none (no demo activities)
B4100	Two phenanthrene detections on east side of B4100 (BHBS1011, BHBS1012) are slightly above the ISL, and are co-located with TPH. These samples targeted a feature and no significant detects were observed. No sampling recommended pending final Look-up Table values.	No action required; detects above LUT values and no sampling required for remedial planning.

Table 1
Go Back Tracker Status
Final Phase 3 Data Gap Analysis
(2 of 5)

Location / Action	Explanation	Status After First Round of Phase 3 Sampling
	Subarea 5C continued	
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 Look-up 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.	NDMA is included in the current LUT issued by DTSC and being included where detected for remedial planning (LUT value 10 ug/kg). If some existing MRLs are elevated they are being addressed as indicated in Item 1 above regarding elevated MRLs. Sufficient formaldehyde sampling has also been performed in Subarea 5C for remedial planning and will be included where appropriate based on detections or elevated MRLs as COCs for the PRAs.
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 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.	DOE plans on collecting the 'future' samples identified in Area III during this final data gap phase of sampling in downslope and down-drainage locations to assess if Look-up Table exceedances have migrated from Area IV. A select few 'Future' sampling locations are not planned for sampling at this time since they were proposed to delineate lateral extent not associated within a migration pathway (details provided in Tables 2A and 3A). Also, 'Future' locations planned for other subareas have been already collected during initial Phase 3 sampling (see below).
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.	A review of existing data mapped within 15 feet of either side of the sanitary sewer, natural gas, and water distribution pipelines was performed. Summary of action: > Subarea 5A - Added one location adjacent to a water distribution pipeline (5A_DG-874) and one location adjacent to a sanitary sewer and natural gas pipeline (5A_DG-875) > Subarea 5B - none (sufficient data exist for PRA planning purposes) > Subarea 5C - Added one location adjacent to a sanitary sewer pipeline (5C_DG-755) > Subarea 5D - none (sufficient data exist for PRA planning purposes) > Subarea 3/6 - none (sufficient data exist for PRA planning purposes) > Subarea 7 - none (sufficient data exist for PRA planning purposes) > Subarea 8 - none (sufficient data exist for PRA planning purposes) > NBZ - N/A (no infrastructure)
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 activities, 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	No further action required. Phase 3 sampling proposed in Subarea 8N.
B4038	Add post demo location in west portion of B4038 footprint to characterize open storage area.	Demolition not completed. Sampling will be performed either post-demo or during remediation as part of confirmation sampling.
Potential Laboratory Contaminants	Review laboratory contaminant uncertainties after all new VOC (e.g. methylene chloride) and SVOC (phthalates) data are collected and after background is finalized.	Potential laboratory contaminants are included in the Chemical LUT and are being screened as part of the dataset. If these detections occur within a PRA, they will be added to the COC list and included in confirmation sampling plans. In areas outside PRAs, sporadic detections of laboratory contaminants will be proposed for sampling to resolve this uncertainty. Summary of action: > Subarea 5A - none (all detects above LUTs within PRAs) > Subarea 5B - none (all detects above LUTs within PRAs) > Subarea 5C - none (all detects above LUTs within PRAs) > Subarea 5D - none (all detects above LUTs within PRAs) > Subarea 3/6 - none (all detects above LUTs within PRAs) > Subarea 7 - none (all detects above LUTs within PRAs) > Subarea 8 - none (all detects above LUTs within PRAs) > NBZ - none (all detects above LUTs within PRAs)

Table 1
Go Back Tracker Status
Final Phase 3 Data Gap Analysis
(3 of 5)

Location / Action	Explanation	Status After First Round of Phase 3 Sampling
	Subarea 5C continued	
Perchlorate	Confirmation sampling and/or additional stepout/stepdown sampling may be required depending on additional data review of previous Phase 1 results.	Perchlorate is included in the Chemical LUT and is being screened as part of the dataset. If perchlorate detections occur within a PRA, it will be added to the COC list and included in confirmation sampling plans. In areas outside PRAs, sporadic detections of perchlorate will be proposed for sampling to resolve this uncertainty. Summary of action: > Subarea 5A - none (all detects within PRAs) > Subarea 5B - none (all detects within PRAs) > Subarea 5C - none (all detects within PRAs) > Subarea 5D - none (all detects within PRAs) > Subarea 3/6 - none (all detects within PRAs) > Subarea 7 - none (all detects within PRAs) > Subarea 8 - none (all detects within PRAs) > NBZ - none (all detects within PRAs)
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.	A separate radiological data gap evaluation and sampling effort will be performed to supplement EPA's radiological investigation. Radiological and chemical sampling results will be presented in the Data Summary Report for remedial planning including waste disposal requirements. No action required for final chemical data gap analysis.
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.	No action required since adequate sampling previously performed in Subarea 5C, and entire operational area identified as PRAs.
Deep boring data at B4059	Review laboratory analytical data for three deep boring locations at Building 4059 (SNAP).	Completed. Exceedances of PCBs and TPH detected down to 56 feet bgs in the 3 borings; SNAP excavation area identified as a PRA.
Radiological sampling at B4015 field	Check radiological sampling results to ensure sampling is performed at east end of B4015 field.	Area will be evaluated as part of radiological data gap evaluation. No action for final chemical data gap analysis.
B4015 Demo Documentation	Follow up with Boeing for recent B4015 demolition documentation (feature removal logs, sample results) and evaluate for data gaps.	Demolition report states no soil staining observed and no deep or previously unknown features identified. No sampling proposed.
Initial Phase 3 Implementation Review	Initial Phase 3 field sampling information is reviewed to evaluate characterization completeness for remedial planning considering geophysical surveying results, proximity to targeted chemical use features, adequacy of analytical analyses, and depth to bedrock and/or soil fill conditions.	Initial Phase 3 data for subareas 5B, 5C, 3/6, and 7 were reviewed: > Subarea 5A - see Block 2 TM Tables 3A and 4A for status of uncollected and proposed soil samples, respectively. > Subarea 5B - see Block 1 TM Tables 3A and 4A for status of uncollected and proposed soil samples, respectively. > Subarea 5C - see Block 1 TM Tables 3B and 4B for status of uncollected and proposed soil samples, respectively. > Subarea 5D - see Block 2 TM Tables 3B and 4B for status of uncollected and proposed soil samples, respectively. > Subarea 3/6 - see Block 1 TM Tables 3C and 4C for status of uncollected and proposed soil samples, respectively. > Subarea 7 - none (all samples collected and no additional data gaps identified) > Subarea 8 - see Block 2 TM Tables 3C and 4C for status of uncollected and proposed soil samples, respectively. > NBZ - see Block 2 TM Tables 3D and 4D for status of uncollected and proposed soil samples, respectively.

Table 1
Go Back Tracker Status
Final Phase 3 Data Gap Analysis
(4 of 5)

Location / Action	Explanation	Status After First Round of Phase 3 Sampling
Subarea 5B		
PCBs at SCTI	Evaluate sporadic PCB detections (up to 41 ppb - 2.0x ISL) in the SCTI area after final Look-up Table values are established.	PCBs are detected above LUT values sporadically throughout the SCTI area. SCTI is within PRAs and PCBs will be listed as a COC and included by DOE in the confirmation sampling plan.
B4006/B4011 Demo Documentation	Follow up with Boeing for recent B4006/B4011 demolition documentation (feature removal logs, sample results) and evaluate for data gaps.	Completed. Post-demolition sampling described below: - Building 4006 post demo sampling includes 3 locations (removed dry well and storage wells). - Building 4011 post demo sampling includes 1 location where stained soil was observed.
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.	No action required. Samples to address the aerial dispersion pathway were added during initial Phase 3 data gaps, and existing sample density in Subarea 7 and the NBZ is sufficient for characterization.
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.	Reviewed boring logs for locations in vicinity of potential leach field and found no indication of leach field materials. The area is comprised of primarily fill described as silty sand with trace gravels that contained thin pockets of debris consisting of concrete, asphalt, glass, metal shards, drywall, charcoal, and/or brick.
Air dispersion from B4024	Sampling density north of Building 4024 will be evaluated for potential aerial dispersion during the Subarea 7 data gap analysis.	Post-Phase 3 sampling density appropriate for evaluating potential aerial dispersion.
Deep boring data near B4073	Review laboratory analytical data for two deep boring locations near Building 4073 (KEWB).	Sample results from two deep borings were below LUT values for all constituents.
Subarea 6		
Deep boring data near B4143	Review laboratory analytical data for deep boring locations near Building 4143 (SRE).	Completed. Exceedances of PAHs, PCBs, dioxins, metals (Pb, Hg), TPH, and perchlorate detected down to 27 feet bgs in three of the four deep borings; SRE reactor excavation area identified as a PRA.
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.	Morpholine detected in 4 of 336 samples in Subarea 5B at concentrations ranging from 25 to 160 ppb. No additional analysis warranted in Subarea 6.
SRE demo activities (2000) soil borrow source	Research soil borrow source location for SRE demolition activities performed in 2000.	Confirmed with Boeing that Area IV soil borrow area used as source for top cover soils; removed soils replaced back into excavation.
Subarea 3		
Recent Subarea 3 analytical results	Obtain analytical results for sampling performed in 2012 from NASA and evaluate for data gaps.	Subarea 3 is almost entirely within PRA or will be evaluated following demolition of the SCE substation. No action required for final data gap analysis.
Subarea 7		
Phase 1 Herbicides / Pesticides / PCBs	Verify revised data validation qualifiers and/or reporting limits resulting from 2011/2012 laboratory studies and correct Phase 1 data prior to final Phase 3 data evaluation.	Finalization of revised MRLs performed by CDM and reflected in DOE dataset; DTSC reviewing CDM TM. No action required for final data gap analysis as explained above regarding elevated MRLs.
Subarea 8		
B4009 Demo	Follow up with Boeing for upcoming B4009 demolition documentation (feature removal logs, sample results) and evaluate for data gaps.	Evaluation pending; to be discussed in the Data Summary Report.
FSDF Air Dispersion Sampling	Evaluate proposed air dispersion sampling results for FSDF (8_DG-521 and 8_DG-601) within the context of four 'future' air dispersion samples that will be collected west of the Area IV boundary and additional sampling that will be proposed in the NBZ subarea.	Evaluation pending; to be discussed in the Data Summary Report.
FSDF Soil Vapor Sampling	Evaluate need for periodic sampling of semi-permanent SV probe depending on initial Phase 3 data gap sampling results and remedial planning needs.	Temporary soil vapor probes will be sampled first at FSDF; need for sampling semi-permanent soil vapor probe to be determined after initial sampling completed.
B4100 Trench Air Dispersion Sampling	Evaluate proposed air dispersion sampling results for B4100 Trench (8_DG-585, 8_DG-588, 8_DG5-89, 8_DG-591, and 8_DG-592) within the context of additional sampling that will be proposed in the NBZ subarea.	Evaluation pending; to be discussed in the Data Summary Report.

Table 1
Go Back Tracker Status
Final Phase 3 Data Gap Analysis
(5 of 5)

Location / Action	Explanation	Status After First Round of Phase 3 Sampling
Subarea 5D		
B4055 Demo	Follow up with Boeing for upcoming B4055 demolition documentation (feature removal logs, sample results) and evaluate for data gaps. Prior to demo, review draft Subarea 5D Data Gap Tech Memo SAP tables for proposed soil and soil vapor locations within the B4055 post demolition footprint.	Demolition not completed. Sampling will be performed either post-demo or during remediation as part of confirmation sampling.
NBZ		
Data in drainages north of NASA operational areas in Area II	Review new data collected by NASA in NBZ north of Area II operational areas and evaluate for data gaps.	Data received from NASA and evaluated; it is assumed further characterization in these areas will be performed by NASA, if necessary.

Note: This table is a compiled list of action items and issues that were identified during the first round of Phase 3 subarea data gap analyses. Locations shaded grey indicate go back items that apply to all subareas in Area IV. The table includes the current status of the action items and identifies if the issue has been resolved or if further action is necessary.

Table 2
Data Gap Analysis Checklist - Subareas 5A, 5D, 8, and NBZ
Final Phase 3 Data Gap Analysis

Phase 3 Data Gap Information Source	Subarea 5A	5D	8	NBZ
Initial Phase 3 Implementation Review				
Uncollected Phase 3 Samples[1]	√	√	√	√
Proposed Analytical Suites Not Analyzed / Rejected Data	√	√	√	√
Proposed vs Actual Locations[2]	√	√	√	√
Refusal on Fill[3]	√	√	√	√
Review Targeted Location Findings[4]	√	√	√	√
Geophysical Survey Results	√	N/A	N/A	N/A
Building Demo Findings	√	N/A	N/A	N/A
Phase 3 Data Gap Tech Memo Tracking Tables				
Table A - Go Back Tracker	√	√	√	√
Elevated Reporting Limits	√	√	√	√
Sewer / Natural Gas / Water Distribution Pipelines	√	√	√	√
Potential Laboratory Contaminants	√	√	√	√
Perchlorate	√	√	√	√
EPA Radiological Data[5]	N/A	N/A	N/A	N/A
Aerial Dispersion from Area IV Sources	√	√	√	√
Deep Boring Data	√	N/A	N/A	N/A
Phase 1 Pesticides/Herbicides/PCBs	√	√	√	√
Table B - Building Feature Tracker	√	√	√	N/A
Table C - Tank Tracker	√	√	√	N/A
Table D - GW Tracker	√	√	√	N/A
Table E - GIS Tracker[6]	√	√	√	√
Table F - Field Tracker	√	√	√	√
Evaluation of Preliminary Remediation Areas				
Lateral and Vertical Extent Sufficiently Defined	√	√	√	√
Chemical Drivers Sufficiently Defined	√	√	√	√
Boundary Evaluation Complete (Contiguous and Emanating)	√	√	√	√

Key

√	Information source reviewed during final data gap evaluation; no further sampling is warranted.
√	Information source reviewed during final data gap evaluation; additional sampling is proposed based on review.
N/A	Information source not applicable for this subarea.

Notes

1. Some samples were not implemented since located near active transformers or utilities, within an environmentally sensitive area, within an area proposed for geophysical surveying at the time of sampling, or because the planned sampling type was a trench or test pit. The need for data at these locations to sufficiently characterize the lateral and vertical extent of the PRAs was evaluated.

2. The actual locations of some borings were different than proposed due to sampling constraints (e.g., thin soils, rock outcrops, vegetation, utilities), features observed in the field (e.g., actual drainage swale location or sediment collection areas within drainage), or GPS/human error. Actual locations were evaluated to confirm that data quality objectives were met.

3. Some locations had refusal on fill and deeper soil samples were not collected. The need for deeper data at these locations to sufficiently characterize the lateral and vertical extent of the PRAs was evaluated and confirmed that DQOs were met.

4. Data at specific targeted features (e.g., underground tanks, dry wells, drainage swales, surface water pathways, fill areas, etc.) was reviewed to confirm characterization completeness and no further sampling is warranted.

5. A separate radiological data gap evaluation and sampling effort will be performed to supplement EPA's radiological investigation with finding presented in the Phase 3 Data Summary Report. No action required for chemical final data gap SAPs.

6. GIS tracker has been updated based on field activities (e.g., demolition observations, geophysical surveys, and mapping of drainages). Updates will be completed prior to publication of Data Summary Report.

Table 3A
Status of Uncollected Subarea 5A Soil Sample Locations
Final Phase 3 Data Gap Analysis
(1 of 3)

Location ID	Area	Location Description	Sample Type	Depth (ft bgs)	Analytical Method														Rationale / Comments[1]	Rationale for Not Implementing[2]
					PAHs (EPA Method 8270C [SIM])	PCBs / PCTs (EPA Method 8082)	Dioxins/Furans (EPA Method 1613)	Metals (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)		
5A_DG-794	B4029	Northwest of Clearly Contaminated Area (Eastern Hummocky Area)	Soil Boring	0.5	X	X	X	X				X					X	X	Stepout to characterize area between two Clearly Contaminated Areas (Eastern Hummocky Area and 17th Street Pond); location also placed on historical dirt road. Collect samples at 5' intervals to bedrock with deepest sample just above bedrock; hold deeper sample pending shallower results, if collected.	Location not implemented as part of the first round of Phase 3 data gap sampling due to being within an environmentally sensitive area. Location is within a PRA footprint where chemical drivers and vertical extent are sufficiently defined.
				5	X	X	X	X				X					X	X		
5A_DG-796	B4029	West of Clearly Contaminated Area (Eastern Hummocky Area)	Soil Boring	0.5	X	X	X	X				X					X	X	Stepout for dioxins at CFBS1030; location also characterizes area between two Clearly Contaminated Areas (Eastern Hummocky Area and 17th Street Pond). Collect samples at 5' intervals to bedrock with deepest sample just above bedrock; hold deeper sample pending shallower results, if collected.	Location not implemented as part of the first round of Phase 3 data gap sampling due to being within an environmentally sensitive area. Location is within a PRA footprint where chemical drivers and vertical extent are sufficiently defined.
				5	X	X	X	X				X					X	X		
5A_DG-797	B4029	West of Clearly Contaminated Area (Eastern Hummocky Area)	Soil Boring	0.5	X	X	X	X				X					X	X	Stepout for dioxins at SL-272-SA5B and CFBS1030; location also characterizes area between two Clearly Contaminated Areas (Eastern Hummocky Area and 17th Street Pond). Collect samples at 5' intervals to bedrock with deepest sample just above bedrock; hold deeper sample pending shallower results, if collected.	Location not implemented as part of the first round of Phase 3 data gap sampling due to being within an environmentally sensitive area. Location is within a PRA footprint where chemical drivers and vertical extent are sufficiently defined.
				5	X	X	X	X				X					X	X		
5A_DG-798	B4029	West of Clearly Contaminated Area (Eastern Hummocky Area)	Soil Boring	0.5	X	X	X	X				X					X	X	Stepout to characterize area between two Clearly Contaminated Areas (Eastern Hummocky Area and 17th Street Pond). Collect samples at 5' intervals to bedrock with deepest sample just above bedrock; hold deeper sample pending shallower results, if collected.	Location not implemented as part of the first round of Phase 3 data gap sampling due to being within an environmentally sensitive area. Location is within a PRA footprint where chemical drivers and vertical extent are sufficiently defined.
				5	X	X	X	X				X					X	X		
5A_DG-799	B4029	Southwest of Clearly Contaminated Area (Eastern Hummocky Area)	Soil Boring / Trench	0.5	X	X	X	X				X					X	X	Location characterizes identified hummocky area adjacent to Clearly Contaminated Area (Eastern Hummocky Area) observed during site walk (May, 2012). Excavate exploratory trench to investigate hummocky area for potential pond dredge sediment and log depth of native soil. Collect one sample in sediment (if observed), one sample in native soil just below contact with sediment, and deepest sample just above bedrock (bedrock anticipated between 5' and 10').	Location not implemented as part of the first round of Phase 3 data gap sampling because the sampling type was a trench. Location is within a PRA footprint where chemical drivers and vertical extent are sufficiently defined.
				5	X	X	X	X				X					X	X		
				10	X	X	X	X				X					X	X		
5A_DG-800	B4029	Southwest of Clearly Contaminated Area (Eastern Hummocky Area)	Soil Boring / Trench	0.5	X	X	X	X				X					X	X	Same as 5A_DG-799.	Location not implemented as part of the first round of Phase 3 data gap sampling because the sampling type was a trench. Location is within a PRA footprint where chemical drivers and vertical extent are sufficiently defined.
				5	X	X	X	X				X					X	X		
				10	X	X	X	X				X					X	X		
5A_DG-801	B4029	Southwest of Clearly Contaminated Area (Eastern Hummocky Area)	Soil Boring / Trench	0.5	X	X	X	X				X					X	X	Same as 5A_DG-799.	Location not implemented as part of the first round of Phase 3 data gap sampling because the sampling type was a trench. Location is within a PRA footprint where chemical drivers and vertical extent are sufficiently defined.
				5	X	X	X	X				X					X	X		
				10	X	X	X	X				X					X	X		
5A_DG-802	B4029	Southwest of Clearly Contaminated Area (Eastern Hummocky Area)	Soil Boring / Trench	0.5	X	X	X	X				X					X	X	Same as 5A_DG-799.	Location not implemented as part of the first round of Phase 3 data gap sampling because the sampling type was a trench. Location is within a PRA footprint where chemical drivers and vertical extent are sufficiently defined.
				5	X	X	X	X				X					X	X		
				10	X	X	X	X				X					X	X		
5A_DG-803	B4029	Southwest of Clearly Contaminated Area (Eastern Hummocky Area)	Soil Boring	0.5	X	X	X	X				X					X	X	**Future Location.** Stepout for PCBs and TPH at P2TS48 and characterizes southern extent of hummocky area.	Location is not planned for sampling at this time since it was proposed to delineate lateral extent not associated within a migration pathway and does not evaluate contamination that is contiguous and emanating from Area IV.
				5	X	X	X	X				X					X	X		
				10	H	H	H	H				H					H	H		
5A_DG-804	B4029	Southwest of Clearly Contaminated Area (Eastern Hummocky Area)	Soil Boring / Trench	0.5	X	X	X	X				X					X	X	Same as 5A_DG-799.	Location not implemented as part of the first round of Phase 3 data gap sampling because the sampling type was a trench. Location is within a PRA footprint where chemical drivers and vertical extent are sufficiently defined.
				5	X	X	X	X				X					X	X		
				10	X	X	X	X				X					X	X		

Table 3A
Status of Uncollected Subarea 5A Soil Sample Locations
Final Phase 3 Data Gap Analysis
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Location ID	Area	Location Description	Sample Type	Depth (ft bgs)	Analytical Method														Rationale / Comments[1]	Rationale for Not Implementing[2]
					PAHs (EPA Method 8270C [SIM])	PCBs / PCTs (EPA Method 8082)	Dioxins/Furans (EPA Method 1613)	Metals (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)		
5A_DG-805	B4029	South of Clearly Contaminated Area (Eastern Hummocky Area)	Soil Boring	0.5	X	X	X	X				X					X	X	**Future Location.** Stepout to characterize southern extent of Clearly Contaminated Area (Eastern Hummocky Area).	Location is not planned for sampling at this time since it was proposed to delineate lateral extent not associated within a migration pathway and does not evaluate contamination that is contiguous and emanating from Area IV.
				5	X	X	X	X				X					X	X		
				10	H	H	H	H				H					H	H		
5A_DG-806	B4029	South of Clearly Contaminated Area (Eastern Hummocky Area)	Soil Boring	0.5	X	X	X	X				X					X	X	**Future Location.** Same as 5A_DG-805.	Location is not planned for sampling at this time since it was proposed to delineate lateral extent not associated within a migration pathway and does not evaluate contamination that is contiguous and emanating from Area IV.
				5	X	X	X	X				X					X	X		
				10	H	H	H	H				H					H	H		
5A_DG-807	B4029	Clearly Contaminated Area (Eastern Hummocky Area)	Soil Boring / Trench	0.5	X	X	X	X				X					X	X	Location targets Clearly Contaminated Area (Eastern Hummocky Area) to complete coverage / definition within extent. Excavate exploratory trench to investigate hummocky area for potential pond dredge sediment and log depth of native soil. Collect one sample in sediment (if observed), one sample in native soil just below contact with sediment, and deepest sample just above bedrock (bedrock anticipated between 5' and 10').	Location not implemented as part of the first round of Phase 3 data gap sampling because the sampling type was a trench. Location is within a PRA footprint where chemical drivers and vertical extent are sufficiently defined.
				5	X	X	X	X				X					X	X		
				10	X	X	X	X				X					X	X		
5A_DG-808	B4029	Northwest of Clearly Contaminated Area (Eastern Hummocky Area)	Soil Boring / Trench	0.5	X	X	X	X				X					X	X	Stepout to characterize northern extent of Clearly Contaminated Area (Eastern Hummocky Area); location also characterizes identified hummocky area observed during site walk (May, 2012). Excavate exploratory trench to investigate hummocky area for potential pond dredge sediment and log depth of native soil. Collect one sample in sediment (if observed), one sample in native soil just below contact with sediment, and deepest sample just above bedrock (bedrock anticipated between 5' and 10').	Location not implemented as part of the first round of Phase 3 data gap sampling because the sampling type was a trench. Location is within a PRA footprint where chemical drivers and vertical extent are sufficiently defined.
				5	X	X	X	X				X					X	X		
				10	X	X	X	X				X					X	X		
5A_DG-809	B4029	North of Clearly Contaminated Area (Eastern Hummocky Area)	Soil Boring	0.5	X	X	X	X				X					X	X	Stepout for dioxins at SL-041-SA5A and CFBS1029; location also characterizes area between two Clearly Contaminated Areas (Eastern Hummocky Area and 17th Street Pond). Collect samples at 5' intervals to bedrock with deepest sample just above bedrock; hold deeper sample pending shallower results, if collected.	Location not implemented as part of the first round of Phase 3 data gap sampling due to being within an environmentally sensitive area. Location is within a PRA footprint where chemical drivers and vertical extent are sufficiently defined.
				5	X	X	X	X				X					X	X		
5A_DG-810	B4029	Northwest of Clearly Contaminated Area (Eastern Hummocky Area)	Soil Boring / Trench	0.5	X	X	X	X				X					X	X	Same as 5AS_DG-332; also serves as a stepout for PCBs and metals (silver) at P2TS59.	Location not implemented as part of the first round of Phase 3 data gap sampling because the sampling type was a trench. Location is within a PRA footprint where chemical drivers and vertical extent are sufficiently defined.
				5	X	X	X	X				X					X	X		
				10	X	X	X	X				X					X	X		
5A_DG-812	B4029	Northeast of Clearly Contaminated Area (Eastern Hummocky Area)	Soil Boring / Trench	0.5	X	X	X	X				X					X	X	Same as 5AS_DG-332; also serves as stepout for dioxins at SL-049-SA5A. Shallow bedrock anticipated. Collect samples at 5' intervals to bedrock with deepest sample just above bedrock; hold deeper sample pending shallower results, if collected.	Location not implemented as part of the first round of Phase 3 data gap sampling because the sampling type was a trench. Location is within a PRA footprint where chemical drivers and vertical extent are sufficiently defined.
				5	X	X	X	X				X					X	X		
5A_DG-816	B4029	East of Clearly Contaminated Area (Eastern Hummocky Area)	Soil Boring	0.5	X	X	X	X				X					X	X	Location targets potential hummocky area and defines eastern extent of Clearly Contaminated Area (Eastern Hummocky Area). If pond dredge material / sediments observed in boring, collect one sample in sediment, one sample in native soil just below contact with sediment, and deepest sample just above bedrock (bedrock anticipated between 5' and 10').	Location not implemented as part of the first round of Phase 3 data gap sampling due to being within an environmentally sensitive area. Location is within a PRA footprint where chemical drivers and vertical extent are sufficiently defined.
				5	X	X	X	X				X					X	X		
				10	X	X	X	X				X					X	X		
5A_DG-817	B4029	East of Clearly Contaminated Area (Eastern Hummocky Area)	Soil Boring / Trench	0.5	X	X	X	X				X					X	X	Targets small mound observed during site walk (May, 2012). Excavate exploratory trench to investigate mound for potential pond dredge sediment and log depth of native soil. Collect one sample in sediment (if observed), one sample in native soil just below contact with sediment, and deepest sample just above bedrock (bedrock anticipated between 5' and 10').	Location not implemented as part of the first round of Phase 3 data gap sampling because the sampling type was a trench. Location is within a PRA footprint where chemical drivers and vertical extent are sufficiently defined.
				5	X	X	X	X				X					X	X		
				10	X	X	X	X				X					X	X		
5A_DG-818	B4029	East of Clearly Contaminated Area (Eastern Hummocky Area)	Soil Boring / Trench	0.5	X	X	X	X				X					X	X	Targets area of low-profile mounded soil observed during site walk (May, 2012). Excavate exploratory trench to investigate mound for potential pond dredge sediment and log depth of native soil. Collect one sample in sediment (if observed), one sample in native soil just below contact with sediment, and deepest sample just above bedrock (bedrock anticipated between 5' and 10').	Location not implemented as part of the first round of Phase 3 data gap sampling because the sampling type was a trench. Location is within a PRA footprint where chemical drivers and vertical extent are sufficiently defined.
				5	X	X	X	X				X					X	X		
				10	X	X	X	X				X					X	X		

Table 3A
Status of Uncollected Subarea 5A Soil Sample Locations
Final Phase 3 Data Gap Analysis
(3 of 3)

Location ID	Area	Location Description	Sample Type	Depth (ft bgs)	Analytical Method														Rationale / Comments[1]	Rationale for Not Implementing[2]
					PAHs (EPA Method 8270C [SIM])	PCBs / PCTs (EPA Method 8082)	Dioxins/Furans (EPA Method 1613)	Metals (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)		
5A_DG-820	B4029	Northeast of Clearly Contaminated Area (Eastern Hummocky Area)	Soil Boring / Trench	0.5	X	X	X	X				X					X	X	Same as 5A_DG-818.	Location not implemented as part of the first round of Phase 3 data gap sampling because the sampling type was a trench. Location is within a PRA footprint where chemical drivers and vertical extent are sufficiently defined.
				5	X	X	X	X				X					X	X		
				10	X	X	X	X				X					X	X		
5A_DG-821	B4029	Northeast of Clearly Contaminated Area (Eastern Hummocky Area)	Soil Boring / Trench	0.5	X	X	X	X				X					X	X	Targets hummocky area observed during site walk (May, 2012). Excavate exploratory trench to investigate hummocky area for potential pond dredge sediment and log depth of native soil. Collect one sample in sediment (if observed), one sample in native soil just below contact with sediment, and deepest sample just above bedrock (bedrock anticipated between 5' and 10').	Location not implemented as part of the first round of Phase 3 data gap sampling because the sampling type was a trench. Location is within a PRA footprint where chemical drivers and vertical extent are sufficiently defined.
				5	X	X	X	X				X					X	X		
				10	X	X	X	X				X					X	X		
5A_DG-856	B4029	Northwest of B4029 Near G Street	Soil Boring	0.5	X	X	X	X				X					X	X	Stepout for PAHs, dioxins, and metals (Pb, Zn) at SL-096-SA5A; location also downslope of culvert discharge at SL-096-SA5A. Collect samples at 5' intervals to bedrock with deepest sample just above bedrock; hold deeper sample pending shallower results.	Location not implemented as part of the first round of Phase 3 data gap sampling due to being within an environmentally sensitive area. Location is within a PRA footprint where chemical drivers and vertical extent are sufficiently defined.
				5	X	X	H	X				X					X	X		
				10	H	H	H	H				H					H	H		
5A_DG-857	B4029	Northwest of B4029 Near G Street	Soil Boring	0.5	X	X	X	X				X					X	X	Same as 5A_DG-856.	Location not implemented as part of the first round of Phase 3 data gap sampling due to being within an environmentally sensitive area. Location is within a PRA footprint where chemical drivers and vertical extent are sufficiently defined.
				5	X	X	H	X				X					X	X		
				10	H	H	H	H				H					H	H		

Footnotes
1. Rationale originally included in the Subarea 5A Data Gap Analysis Technical Memorandum (Attachment 1 in Addendum No. 4 to the Master Field Sampling Plan) that was submitted and approved by DTSC in August 2012. The rationale has not been modified and is included for reference.

2. Rationale is provided explaining why locations were not collected as part of the first round of Phase 3 data gap sampling (e.g., near active transformers or utilities, trenching/test pit locations that had not been implemented yet, pending geophysical survey results) and why implementation of these sample locations is no longer necessary to support remedial planning decisions.

Acronyms
bgs = below ground surface
Cr(VI) = hexavalent chromium
EPA = Environmental Protection Agency
ft = foot or feet
PAH = polyaromatic hydrocarbons
PCB = polychlorinated biphenyls
PCT = polychlorinated terphenyls
PRA = preliminary remediation area
RL = Reporting Limit
TPH = total petroleum hydrocarbons

Table 3B
Status of Uncollected Subarea 5D Soil Sample Locations
Final Phase 3 Data Gap Analysis
(1 of 1)

Location ID	Area	Location Description	Sample Type	Depth (ft bgs)	Analytical Method													Rationale / Comments[1]	Rationale for Not Implementing[2]
					PAHs (EPA Method 8270C [SIM])	PCBs / PCTs (EPA Method 8082)	Dioxins/Furans (EPA Method 1613)	Metals (EPA Methods 6010B/6010C /6020/6020A/7471A/7471B)	Fluoride (EPA Method 6020A)	Cr(VI) (EPA Method 7196A)	Perchlorate (EPA Method 6850/6860)	TPH (EPA Method 8015B)	Formaldehyde (EPA Method 8315A)	Pesticides (EPA Method 8081)	Herbicides (EPA Method 8151A)	pH (EPA Method 9045C)	Soil Moisture (ASTM D2216/ EPA Method 160.3)		
5D_DG-511	Pond Dredge	Western Portion of Pond Dredge Area	Test Pit / Soil Boring	0.5	X	X	X	X				X				X	X	Conduct exploratory test pit to investigate terrain conductivity anomaly. Collect 0.5 and 5 foot samples within test pit based on visual observations of fill, staining, debris, or other impacts. Collect sample targeting top of native soil if anomalies observed. Collect a separate soil boring to bedrock targeting the estimated area of the drop zone of depleted uranium slugs reportedly dropped in the 1960s identified in the EPA TM. The soil boring also targets a disturbed soil area and serves as a stepout for dioxins, PAHs, and TPH at SL-040-SA8N to the northwest. Bedrock anticipated >10 feet bgs (adjacent samples did not encounter bedrock). Analyze for TPH in 10-foot and 15-foot samples to stepout from TPH in 9-foot sample at SL-040-SA8N, place other analyses on hold pending shallow results.	Location not implemented as part of the first round of Phase 3 data gap sampling because the sampling type was a test pit. Location is within a PRA footprint where chemical drivers and vertical extent are sufficiently defined.
				5	X	X		X				X				X	X		
				10	H	H		H				X				H	X		
				15	H	H		H				X				H	X		
5D_DG-517	Pond Dredge	Northeastern Portion of Pond Dredge Area	Test Pit / Soil Boring	0.5	X	X	X	X		X	X	X		X	X	X	X	Conduct exploratory test pit to investigate terrain conductivity anomaly. Collect 0.5 and 5 foot samples within test pit based on visual observations of fill, staining, debris, or other impacts. Collect sample targeting top of native soil if anomalies observed. Collect a separate soil boring to bedrock to stepout for PAHs, phthalates, PCBs, TPH (deep), mercury, and silver at SL-198-SA5DN to the northwest, dioxins, PAHs, and perchlorate at SL-203-SA5DN to the west, phthalates and hexavalent chromium at SL-056-SA5DN to the northeast, PAHs and herbicides at SL-057-SA5DN to the southeast, dioxins, PAHs, phthalates, and pesticides at SL-196-SA5DN to the southwest, and dioxins, PAHs, phthalates, pesticides, and cadmium at SL-187-SA5DN to the south. Bedrock anticipated >10 feet bgs (adjacent samples did not encounter bedrock). Analyze for TPH in 10-foot and 15-foot samples to stepout from TPH in 9-foot sample at SL-198-SA5DN, place other analyses on hold pending shallow results.	Location not implemented as part of the first round of Phase 3 data gap sampling because the sampling type was a test pit. Location is within a PRA footprint where chemical drivers and vertical extent are sufficiently defined.
				5	X	X		X		X	X	X		X	X	X	X		
				10	H	H		H		H	H	X		H	H	H	X		
				15	H	H		H		H	H	X		H	H	H	X		
5D_DG-588	B4363/4353 Area	Southeast of B4353	Soil Boring	0.5	X	X	X	X				X		X		X	X	**Future Location.** Targets potential drainage along north side of historic dirt road observed in 1960 aerial photo. Collect and analyze samples at 5-foot intervals to bedrock with deepest sample collected just above bedrock to assess potential vertical migration to bedrock.	Location is not planned for sampling at this time since it was proposed to target a potential drainage feature; however, upslope sampling results are below LUT values, therefore location does not evaluate contamination that is contiguous and emanating from Area IV.
				5	X	X		X				X		X		X	X		
				10	X	X		X				X		X		X	X		

Footnotes

1. Rationale originally included in the Subarea 5D Data Gap Analysis Technical Memorandum (Attachment 1 in Addendum No. 8 to the Master Field Sampling Plan) that was submitted and approved by DTSC in August 2013. The rationale has not been modified and is included for reference.

2. Rationale is provided explaining why locations were not collected as part of the first round of Phase 3 data gap sampling (e.g., near active transformers or utilities, trenching/test pit locations that had not been implemented yet, pending geophysical survey results) and why implementation of these sample locations is no longer necessary to support remedial planning decisions.

Acronyms

bgs = below ground surface
Cr(VI) = hexavalent chromium
EPA = Environmental Protection Agency
ft = foot or feet
LUT = Look-Up Table
PAH = polyaromatic hydrocarbons
PCB = polychlorinated biphenyls
PCT = polychlorinated terphenyls
PRA = preliminary remediation area
TM = technical memorandum
TPH = total petroleum hydrocarbons

Table 3C
Status of Uncollected Subarea 8 Soil Sample Locations
Final Phase 3 Data Gap Analysis
(1 of 2)

Location ID	Area	Location Description	Sample Type	Depth (ft bgs)	Analytical Method																Rationale / Comments[1]	Rationale for Not Implementing[2]
					PAHs (EPA Method 8270C [SIM])	PCBs / PCTs (EPA Method 8082)	Dioxins/Furans (EPA Method 1613)	Metals (EPA Methods 6010B/6010C /6020/6020A/7471A/7471B)	CrVI (EPA Method 7196A)	Perchlorate (EPA Method 6850/6860)	TPH (EPA Method 8015B)	Pesticides (EPA Method 8081)	Herbicides (EPA Method 8151A)	Biphenyls (EPA Method 8270C)	Anions (Cyanides) (EPA Method 9012A)	Tetralin (EPA Method 8270C + TICs)	Inorganics (EPA Method 300.0)	VOC (EPA Method 8260)	pH (EPA Method 9045C)	Soil Moisture (ASTM D2216/ EPA Method 160.3)		
8_DG-533	ESADA	Northwest of ESADA	Test Pit/Soil Boring	0.5	X	X	X	X			X								X	X	Conduct exploratory test pit to investigate hummocky area identified during 2008 debris survey. Location of test pit will be based on field observation of hummocky terrain. If fill, staining, debris, or other impacts are observed, collect sample targeting top of native soil. Bedrock anticipated ~5 feet bgs. If deep soils encountered, sample and place on hold pending shallow results.	Location is one of three locations targeting a hummocky area that were not implemented as part of the first round of Phase 3 data gap sampling because the sampling type was a test pit. Hummocky area is within a PRA footprint and one of the test pits (8_DG-534) is proposed to complete characterization.
				5	X	X	X	X			X								X	X		
8_DG-535	ESADA	Northwest of ESADA	Test Pit/Soil Boring	0.5																	Vertical delineation of PAHs in surface sample at ESBS0005 and the deeper sample collected at 4.5 feet bgs sample had a limited analytical suite. Conduct exploratory test pit to investigate hummocky area identified during 2008 debris survey. Location of test pit will be based on field observation of hummocky terrain. If fill, staining, debris, or other impacts are observed, collect sample targeting top of native soil. Bedrock anticipated <10 feet bgs. Analyze 5-foot sample and place shallow and deep samples on hold pending results of 5-foot sample.	Location is one of three locations targeting a hummocky area that were not implemented as part of the first round of Phase 3 data gap sampling because the sampling type was a test pit. Hummocky area is within a PRA footprint and one of the test pits (8_DG-534) is proposed to complete characterization.
				5	X	X	X	X			X								X	X		
				10	H	H	H	H			H								H	H		
8_DG-544	ESADA	East of ESADA Former Pistol Range	Trench	0.5	X	X	X	X			X								X	X	Delineates northeastern extent of ESADA Pistol Range Clearly Contaminated Area. Also serves as a stepout for dioxins, PAHs, cadmium, and TPH at SL-028-SA8N to the north and targets terrain conductivity fill anomaly and disturbed soil area. Conduct exploratory trench to investigate the terrain conductivity fill anomaly and the extent of disturbed soil. If fill, staining, debris, or other impacts are observed, collect sample targeting top of native soil. Bedrock anticipated ~10 feet bgs. Collect 10-foot sample and place on hold pending shallow results.	Location not implemented as part of the first round of Phase 3 data gap sampling because the sampling type was a trench. Location is within a PRA footprint where chemical drivers and vertical extent are sufficiently defined.
				5	X	X	X	X			X								X	X		
				10	H	H	H	H			H								H	H		
8_DG-545	ESADA	South of Solar Concentrator Facility	Trench	0.5	X	X	X	X			X								X	X	Stepout for dioxins, PAHs, and TPH at SL-032-SA8N to the north. Also targets the southern boundary of the soil disturbance area. Conduct exploratory trench to investigate the extent of disturbed soil. If fill, staining, debris, or other impacts are observed, collect sample targeting top of native soil. Bedrock anticipated >10 feet bgs. Collect 10-foot sample and place on hold pending shallow results.	Location not implemented as part of the first round of Phase 3 data gap sampling because the sampling type was a trench. Location is within a PRA footprint where chemical drivers and vertical extent are sufficiently defined.
				5	X	X	X	X			X								X	X		
				10	H	H	H	H			H								H	H		
8_DG-546	B4009 Area	South of the Solar Concentrator Facility	Trench	0.5																	Conduct exploratory trench to investigate debris area identified during 2008 debris survey. Also targets terrain conductivity anomaly. Fill anticipated based on previous sampling in the area and historical aerial photographs. Excavate until top of native soils encountered. Bedrock anticipated >10 feet bgs. No samples proposed since area previously characterized; collect samples if warranted based on field observations.	Location not implemented as part of the first round of Phase 3 data gap sampling because the sampling type was a trench. Location is within a PRA footprint where chemical drivers and vertical extent are sufficiently defined.
				5																		
				10																		
8_DG-547	B4009 Area	Southwest of the Solar Concentrator Facility	Trench	0.5																	Conduct exploratory trench to investigate debris area identified during 2008 debris survey. Also targets geophysical point anomaly. Fill anticipated based on previous sampling in the area and historical aerial photographs. Excavate until top of native soils encountered. Bedrock anticipated >10 feet bgs. No samples proposed since area previously characterized; collect samples if warranted based on field observations.	Location not implemented as part of the first round of Phase 3 data gap sampling because the sampling type was a trench. Location is within a PRA footprint where chemical drivers and vertical extent are sufficiently defined.
				5																		
				10																		
8_DG-576A	B4009 Area	Substation #709 Southeast of B4009	Soil Boring	0.5		X														X	Two previous samples were composites of eight discrete locations each with ND results. Transformers in Area IV with previous ND results are being re-sampled with discrete samples. Re-collect samples at four discrete locations surrounding the transformer pad area and analyze each sample for PCBs. Location 8_DG-76B also serves as a stepout for dioxins at SL-001-SA5DN to the east. Based on proximity to former UT-3, collect samples at 5-foot intervals to bedrock with deepest sample collected just above bedrock. VOCs added due to proximity to potential groundwater impact location. Bedrock anticipated ~20 feet bgs. Analyze TPH in samples deeper than 5 feet to delineate lateral extent of impacts from former UST and deepest sample assesses potential lateral migration along bedrock, and place other analyses on hold pending shallow results.	Locations not implemented as part of the first round of Phase 3 data gap sampling due to the targeted transformer being active. Locations are within a PRA footprint where chemical drivers and vertical extent are sufficiently defined.
				3		H																
8_DG-576B	B4009 Area	Substation #709 Southeast of B4009	Soil Boring	0.5	X	X	X	X			X								X	X		
				3	X	X	X	X			X								X	X		
				10	H	H	H	H			X								H	X		
				15	H	H	H	H			X								H	X		
				20	H	H	H	H			X							X	H	X		
8_DG-576C	B4009 Area	Substation #709 Southeast of B4009	Soil Boring	0.5		X														X		
				3		H														H		
8_DG-576D	B4009 Area	Substation #709 Southeast of B4009	Soil Boring	0.5		X														X		
				3		H														H		
8_DG-576E	B4009 Area	Substation #709 Southeast of B4009	Soil Boring	0.5		X														X		
				3		H														H		
8_DG-576F	B4009 Area	Substation #709 Southeast of B4009	Soil Boring	0.5		X														X		
				3		H														H		

Table 3C
Status of Uncollected Subarea 8 Soil Sample Locations
Final Phase 3 Data Gap Analysis
(2 of 2)

Location ID	Area	Location Description	Sample Type	Depth (ft bgs)	Analytical Method																Rationale / Comments[1]	Rationale for Not Implementing[2]
					PAHs (EPA Method 8270C [SIM])	PCBs / PCTs (EPA Method 8082)	Dioxins/Furans (EPA Method 1613)	Metals (EPA Methods 6010B/6010C /6020/6020A/7471A/7471B)	CrVI (EPA Method 7196A)	Perchlorate (EPA Method 6850/6860)	TPH (EPA Method 8015B)	Pesticides (EPA Method 8081)	Herbicides (EPA Method 8151A)	Biphenyls (EPA Method 8270C)	Anions (Cyanides) (EPA Method 9012A)	Tetralin (EPA Method 8270C + TICs)	Inorganics (EPA Method 300.0)	VOC (EPA Method 8260)	pH (EPA Method 9045C)	Soil Moisture (ASTM D2216/ EPA Method 160.3)		
8_DG-577	B4009 Area	Northeast of B4009	Trench	0.5	X	X	X	X			X			X		X			X	X	Conduct exploratory trench to address uncertainty regarding location of a septic tank identified on a facility drawing. Previous geophysical surveys and soil borings did not find evidence of a septic tank in the location identified on the drawing. Also characterizes the operational area northeast of B4009 and the former location of the northern ISI storage trailer. If fill, staining, debris, or other impacts are observed, collect sample targeting top of native soil. Tetralin and biphenyls added to general characterization suite due to potential use in reactor operations. Bedrock anticipated <10 feet bgs. Collect and analyze deepest sample targeting soil just above bedrock since targeting a septic tank to assess potential vertical migration to bedrock.	Location not implemented as part of the first round of Phase 3 data gap sampling because the sampling type was a trench. Location is within a PRA footprint where chemical drivers and vertical extent are sufficiently defined.
				5	X	X	X	X			X			X		X			X	X		
				10	X	X	X	X			X			X		X			X	X		
8_DG-579	B4009 Area	Northeast of B4009	Trench	0.5	X	X	X	X			X			X		X			X	X	Conduct exploratory trench to confirm that UT-4 was removed. UT-4 reportedly removed and the vault filled with concrete. Concrete was encountered during prior attempts to sample the location of UT-4. If a concrete vault encountered, excavate along one side of the vault and collect a sample of native soil at a depth just below the bottom of the vault. Tetralin and biphenyls added to general characterization suite due to potential use in reactor operations. VOCs added due to proximity to potential groundwater impact location. Bedrock anticipated ~10 feet bgs. Collect and analyze deepest sample targeting soil just above bedrock since targeting a UST to assess potential vertical migration to bedrock.	Location not implemented as part of the first round of Phase 3 data gap sampling because the sampling type was a trench. Location is within a PRA footprint where chemical drivers and vertical extent are sufficiently defined.
				5	X	X	X	X			X			X		X			X	X		
				10	X	X	X	X			X			X		X		X	X	X		
8_DG-616	Hillslope South of ESADA	Northwestern Portion of Hillslope	Soil Boring	0.5				X											X	X	**Future Location.** Stepout for thallium at BNKD-1 to the northeast. Bedrock anticipated <10 feet bgs. If deep soils encountered, sample and place on hold pending shallow results.	Location is west of Area IV and is not within a migration pathway (i.e., drainage); therefore, does not evaluate if contamination is contiguous and emanating from Area IV.
				5				X											X	X		
				10				H											H	H		

Footnotes

1. Rationale originally included in the Subarea 8 Data Gap Analysis Technical Memorandum (Attachment 1 in Addendum No. 7 to the Master Field Sampling Plan) that was submitted and approved by DTSC in August 2013. The rationale has not been modified and is included for reference.

2. Rationale is provided explaining why locations were not collected as part of the first round of Phase 3 data gap sampling (e.g., near active transformers or utilities, trenching/test pit locations that had not been implemented yet, pending geophysical survey results) and why implementation of these sample locations is no longer necessary to support remedial planning decisions.

Acronyms

bgs = below ground surface
Cr(VI) = hexavalent chromium
EPA = Environmental Protection Agency
ESADA = Empire State Atomic Development Authority
ft = foot or feet
ND = not detected above reporting limit
PCB = polychlorinated biphenyls
PCB = polychlorinated biphenyls
PCT = polychlorinated terphenyls
PRA = preliminary remediation area
TIC = tentatively identified compound
TPH = total petroleum hydrocarbons
UST = underground storage tank
VOC = volatile organic compound

Table 3D
Status of Uncollected Northern Buffer Zone Soil Sample Locations
Final Phase 3 Data Gap Analysis
(1 of 1)

Location ID	Area	Location Description	Sample Type	Depth (ft bgs)	Analytical Method									Rationale / Comments[1]	Rationale for Not Implementing[2]
					PAHs (EPA Method 8270C [SIM])	PCBs / PCTs (EPA Method 8082)	Dioxins/Furans (EPA Method 1613)	Metals (EPA Methods 6010B/6010C /6020/6020A/7471A/7471B)	TPH (EPA Method 8015B)	Pesticides (EPA Method 8081)	Herbicides (EPA Method 8151A)	pH (EPA Method 9045C)	Soil Moisture (ASTM D2216/ EPA Method 160.3)		
NBZ_DG-536	NBZ-NW	North of NBZ-NW	Soil Boring	0.5					X				X	Location targets surface water pathway downslope from TPH exceedances at SL-032-NBZ, SL-033-NBZ, and SRBS1099. Bedrock anticipated <5 feet bgs. If deep soils encountered, sample and place on hold pending shallow results.	Location not implemented as part of the first round of Phase 3 data gap sampling because it is not accessible due to the steep terrain and associated health and safety concerns. Location is downslope from sample locations that exceed the LUT values only for TPH without silica gel cleanup prior to analysis, and two of these locations (NBZ_DG-568 and NBZ_DG-569) are part of the Phase 3 TPH re-analysis data gap evaluation (see Table 5). The need for sampling at an accessible location downslope of these TPH exceedances will be identified as part of the evaluation.
				5					X				X		

Footnotes

1. Rationale originally included in the Subarea 5C Data Gap Analysis Technical Memorandum (Attachment 1 in Addendum No. 1 to the Master Field Sampling Plan) that was submitted and approved by DTSC in April 2012. The rationale has not been modified and is included for reference.

2. Rationale is provided explaining why locations were not collected as part of the first round of Phase 3 data gap sampling (e.g., near active transformers or utilities, trenching/test pit locations that had not been implemented yet, pending geophysical survey results) and why implementation of these sample locations is no longer necessary to support remedial planning decisions.

Acronyms

bgs = below ground surface
EPA = Environmental Protection Agency
ft = foot or feet
LUT = Look-Up Table
NBZ = Northern Buffer Zone
PAH = polyaromatic hydrocarbons
PCB = polychlorinated biphenyls
PCT = polychlorinated terphenyls
TPH = total petroleum hydrocarbons

Table 4A
Subarea 5A Proposed Soil Sample Locations
Final Phase 3 Data Gap Analysis
(1 of 1)

Location ID[1]	Area	Location Description	Sample Type	Depth (ft. bgs)	Analytical Method														Rationale / Comments
					PAHs (EPA Method 8270C [SIM])	PCBs / PCTs (EPA Method 8082)	Dioxins/Furans (EPA Method 1613)	Metals (EPA Methods 6010B/6010C /6020/6020A/7471A/7471B)	Cr(VI) (EPA Method 7196A)	Energetics (EPA Method 8330A)	Perchlorate (EPA Method 6850/6860)	TPH with Silica Gel Cleanup (EPA Method 8015B/3630C)	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)	
5A_DG-587	SETF	Within Building 4023 Footprint	Soil Boring / Test Pit	0.5	X	X	X	X				X					X	X	Location targets AST with unknown contents (Unknown-AT-L9-3) and linear magnetometer anomaly; positioned within medium toned mounded material identified in EPA TM and fill of unknown origin observed in borings within B4023. Bedrock is anticipated ~10 feet bgs. **Collect deepest sample targeting soil just above bedrock.** Conduct adjacent test pit for linear magnetometer anomaly and adjust 5-foot sample to target feature (or sample pit as appropriate).
				5	X	X	X	X				X					X	X	
				10	X	X	X	X				X					X	X	
5A_DG-636	PDU Area	East of Building 4042	Soil Boring / Test Pit	0.5	X	X	X	X				X					X	X	Location targets geophysical anomaly; also characterizes operational area. Bedrock anticipated <10 feet bgs. **Collect deepest sample targeting soil just above bedrock.** Conduct adjacent test pit for geophysical anomaly. Adjust 5-foot sample to target feature (or sample pit as appropriate).
				5	X	X	X	X				X					X	X	
				10	X	X	X	X				X					X	X	
5A_DG-730	B4641 Area	Open Space West of Building 4453	Soil Boring / Test Pit	0.5	X	X	X	X				X					X	X	Location targets three point magnetometer anomalies and inline with interpreted drain remnant. Bedrock anticipated <10 feet bgs. **Collect deepest sample targeting soil just above bedrock.** Conduct adjacent test pit for three point magnetometer anomalies and interpreted drain remnant and adjust 5-foot sample to target feature (or sample pit as appropriate).
				5	X	X	X	X				X					X	X	
				10	X	X	X	X				X					X	X	
5A_DG-874	SETF	South of Building 4027	Soil Boring	0.5	X	X	X	X				X					X	X	**Final Data Gap Location.** Location targets water conveyance line and open storage identified in EPA TM and present in the 1960 aerial. Bedrock anticipated >10 feet bgs (adjacent samples did not encounter bedrock). **Collect deepest sample targeting soil just above bedrock.**
				5	X	X	X	X				X					X	X	
				10	X	X	X	X				X					X	X	
				15	X	X	X	X				X					X	X	
				20	X	X	X	X				X					X	X	
5A_DG-875	B4029	East of Open Storage Area Along G Street	Soil Boring	0.5	X	X	X	X				X					X	X	**Final Data Gap Location.** Location targets intersection of the sanitary sewer pipelines that run along the south side of G Street and the west side of 12th Street and natural gas pipeline that runs along the south side of G Street. Bedrock anticipated ~10 feet bgs. **Collect deepest sample targeting soil just above bedrock.**
				5	X	X	X	X				X					X	X	
				10	X	X	X	X				X					X	X	
5A_DG-876	B4029	East of Open Storage Area Along G Street	Soil Boring	0.5	X							X						X	**Final Data Gap Location.** Stepdown at 5A_DG-822 to evaluate depth of impacts. Analyze phthalates (EPA Method 8270 SIM), dioxins, and TPH based on LUT exceedances in the surface sample and in surrounding samples, and re-analyze surface sample for phthalates (potential laboratory contaminant) and TPH with silica gel cleanup to evaluate the potential inclusion of organic-derived hydrocarbons in the original result. Bedrock anticipated ~7 feet bgs. Collect and analyze samples at 5-foot intervals to bedrock beginning at 5 feet bgs. **Collect deepest sample targeting soil just above bedrock.**
				5	X		X					X						X	
				10	X		X					X						X	
5A_DG-877	B4029	West of SE Drum Yard	Soil Boring	0.5	X							X						X	**Final Data Gap Location.** Stepdown at 5A_DG-825 to evaluate depth of impacts. Analyze phthalates (EPA Method 8270 SIM), dioxins, and TPH based on LUT exceedances in the surface sample and in surrounding samples, and re-analyze surface sample for phthalates (potential laboratory contaminant) and TPH with silica gel cleanup to evaluate the potential inclusion of organic-derived hydrocarbons in the original result. Bedrock anticipated ~15 feet bgs. Collect and analyze samples at 5-foot intervals to bedrock beginning at 5 feet bgs. **Collect deepest sample targeting soil just above bedrock.**
				5	X		X					X						X	
				10	X		X					X						X	
				15	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.

Acronyms

AST = above-ground storage tank
bgs = below ground surface
Cr(VI) = hexavalent chromium
EPA = Environmental Protection Agency
ft. = foot or feet
LUT = Look-Up Table
PAH = polyaromatic hydrocarbons
PCB = polychlorinated biphenyls
PCT = polychlorinated terphenyls
TM = technical memorandum
TPH = total petroleum hydrocarbons

Table 4B
Subarea 5D Proposed Soil Sample Locations
Final Phase 3 Data Gap Analysis
(1 of 1)

Location ID[1]	Area	Location Description	Sample Type	Depth (ft. bgs)	Analytical Method													Rationale / Comments
					PAHs (EPA Method 8270C [SIM])	PCBs / PCTs (EPA Method 8082)	Dioxins/Furans (EPA Method 1613)	Metals (EPA Methods 6010B/6010C /6020/6020A/7471A/7471B)	Fluoride (EPA Method 6020A)	Cr(VI) (EPA Method 7196A)	Perchlorate (EPA Method 6850/6860)	TPH with Silica Gel Cleanup (EPA Method 8015B/3630C)	Formaldehyde (EPA Method 8315A)	Pesticides (EPA Method 8081)	Herbicides (EPA Method 8151A)	pH (EPA Method 9045C)	Soil Moisture (ASTM D2216/ EPA Method 160.3)	
5D_DG-584	B4363/4353 Area	East of B4353	Soil Boring	0.5	X	X	X	X				X		X		X	X	Targets drainage identified in the EPA TM. Locate drainage feature (e.g. rill, topographic low, etc.) and map with GPS prior to collection of samples. Also characterizes area downslope of the B4353 Leach Field and serves as a stepout for dioxins, PAHs, TPH, pesticides, and silver. Bedrock anticipated <10 feet bgs. **Collect deepest sample targeting soil just above bedrock.**
				5	X	X	X	X				X		X		X	X	
				10	X	X	X	X				X		X		X	X	
5D_DG-585	B4363/4353 Area	Southeast of B4353	Soil Boring	0.5	X	X	X	X				X	X	X		X	X	Targets one of the two drainages southeast of B4353. Locate drainage feature (e.g. rill, topographic low, etc.) and map with GPS prior to collection of samples. Also serves as a stepout for dioxins, PAHs, TPH, pesticides, formaldehyde, cadmium, mercury, and silver to the northwest. Bedrock anticipated <10 feet bgs. **Collect deepest sample targeting soil just above bedrock.**
				5	X	X	X	X				X	X	X		X	X	
				10	X	X	X	X				X	X	X		X	X	
5D_DG-586	B4363/4353 Area	Southeast of B4353	Soil Boring	0.5	X	X	X	X				X		X		X	X	Targets one of the two drainages southeast of B4353. Locate drainage feature (e.g. rill, topographic low, etc.) and map with GPS prior to collection of samples. Also serves as a stepout for dioxins, PAHs, and pesticides to the northwest. Bedrock anticipated <10 feet bgs. **Collect deepest sample targeting soil just above bedrock.**
				5	X	X	X	X				X		X		X	X	
				10	X	X	X	X				X		X		X	X	
5D_DG-610	Subarea 5D South	West of B4701 (Water Tank)	Soil Boring	0.5	X	X	X	X				X		X	X	X	X	**Final Data Gap Location.** Stepout for dioxins, PAHs, PCBs, herbicides, and pesticides detected above LUT values in samples collected from locations around the Water Tank. Target surface water flow pathway, if present. Bedrock anticipated <10 feet bgs. **Collect deepest sample targeting soil just above bedrock.**
				5	X	X	X	X				X		X	X	X	X	
				10	X	X	X	X				X		X	X	X	X	
5D_DG-611	Subarea 5D South	Southwest of B4701 (Water Tank)	Soil Boring	0.5	X	X	X	X				X		X	X	X	X	**Final Data Gap Location.** Same as 5D_DG-610.
				5	X	X	X	X				X		X	X	X	X	
				10	X	X	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.

Acronyms
bgs = below ground surface
Cr(VI) = hexavalent chromium
EPA = Environmental Protection Agency
ft. = foot or feet
GPS = global positioning system
LUT = Look-Up Table
PAH = polyaromatic hydrocarbons
PCB = polychlorinated biphenyls
PCT = polychlorinated terphenyls
TM = technical memorandum
TPH = total petroleum hydrocarbons

Table 4C
Subarea 8 Proposed Soil Sample Locations
Final Phase 3 Data Gap Analysis
(1 of 2)

Location ID[1]	Area	Location Description	Sample Type	Depth (ft. bgs)	Analytical Method																Rationale / Comments
					PAHs (EPA Method 8270C [SIM])	PCBs / PCTs (EPA Method 8082)	Dioxins/Furans (EPA Method 1613)	Metals (EPA Methods 6010B/6010C /6020/6020A/7471A/7471B)	CrVI) (EPA Method 7196A)	Perchlorate (EPA Method 6850/6860)	TPH with Silica Gel Cleanup (EPA Method 8015B/3630C)	Pesticides (EPA Method 8081)	Herbicides (EPA Method 8151A)	Biphenyls (EPA Method 8270C)	Anions (Cyanides) (EPA Method 9012A)	Tetralin (EPA Method 8270C + TICs)	Inorganics (EPA Method 300.0)	VOC (EPA Method 8260)	pH (EPA Method 9045C)	Soil Moisture (ASTM D2216/ EPA Method 160.3)	
8_DG-534	ESADA	Northwest of ESADA	Test Pit/Soil Boring	0.5	X	X	X	X			X								X	X	Conduct exploratory test pit to investigate hummocky area identified during 2008 debris survey. Location of test pit will be based on field observation of hummocky terrain. If fill, staining, debris, or other impacts are observed, collect sample targeting top of native soil. Bedrock anticipated ~5 feet bgs. If deep soils encountered, sample and place on hold pending shallow results.
				5	X	X	X	X			X								X	X	
8_DG-548	B4009 Area	West of the Solar Concentrator Facility	Trench	0.5	X	X	X	X			X								X	X	Conduct exploratory trench to investigate topographic low spot adjacent to the debris area identified during 2008 debris survey. Also targets terrain conductivity anomaly. Fill anticipated based on previous sampling in the area and historical aerial photographs. Excavate until top of native soils encountered. Bedrock anticipated >10 feet bgs. Collect and analyze samples at 5-foot intervals to bedrock beginning at 5 feet bgs. **Collect deepest sample targeting soil just above bedrock.**
				5	X	X	X	X			X								X	X	
				10	X	X	X	X			X								X	X	
8_DG-611	Hillslope South of ESADA	Southern Portion of Hillslope	Test Pit/Soil Boring	0.5	X	X	X	X			X								X	X	Characterizes hillslope southeast of the ESADA and targets debris area identified during the 2008 debris survey. Conduct exploratory test pit to investigate debris area. If fill, staining, debris, or other impacts are observed, collect sample targeting top of native soil. Bedrock anticipated <10 feet bgs. If deep soils encountered, sample and place on hold pending shallow results.
				5	X	X	X	X			X								X	X	
				10	H	H	H	H			H								H	H	
8_DG-617	Hillslope South of ESADA	Western Portion of Hillslope	Soil Boring	0.5				X	X										X	X	Targets mineralized area southwest of SL-005-SA8S and SL-007-SA8S to provide additional data to evaluate the potential the strontium detections above screening levels on the Subarea 8 Hillslope are related to the mineralization of geologic feature and are naturally occurring (e.g., associated as a trace element in the calcium carbonate). Location will be based on field observation of mineralization. Also serves as a stepout for hexavalent chromium at SL-007-SA8S. Samples will be analyzed for metals only, including hexavalent chromium. Bedrock anticipated <10 feet bgs. **Collect deepest sample targeting soil just above bedrock.**
				5				X	X										X	X	
				10				X	X										X	X	
8_DG-618	Hillslope South of ESADA	Southern Portion of Hillslope	Soil Boring	0.5				X	X										X	X	Targets mineralized area southwest of SL-001-SA8S to provide additional data to evaluate the potential the strontium detections above screening levels on the Subarea 8 Hillslope are related to the mineralization of geologic feature and are naturally occurring (e.g., associated as a trace element in the calcium carbonate). Location will be based on field observation of mineralization. Samples will be analyzed for metals, including hexavalent chromium. Bedrock anticipated <10 feet bgs. **Collect deepest sample targeting soil just above bedrock.**
				5				X	X										X	X	
				10				X	X										X	X	
8_DG-619	Hillslope South of ESADA	Western Portion of Hillslope	Soil Boring	0.5	X		X	X			X								X	X	Locations assess potential impacts from aerial dispersion related to burning and treatment activities at the former FSDF ponds. Located southwest of FSDF in the periodic 'Santa Ana' wind direction. Two locations (e.g., 8_DG-619 and 8_DG-621) target drainages to evaluate the potential for subsequent surface water transport of aerially deposited contaminants. Bedrock depth unknown. At 8_DG-620 and 8_DG-622, collect 10-foot sample and place on hold pending shallow results. **At 8_DG-620 and 8_DG-622, collect deepest sample targeting soil just above bedrock.**
				5	X		X	X			X								X	X	
				10	X		X	X			X								X	X	
8_DG-620	Hillslope South of ESADA	Western Portion of Hillslope	Soil Boring	0.5	X		X	X			X								X	X	
				5	X		X	X			X								X	X	
				10	H		H	H			H								H	H	
8_DG-621	Hillslope South of ESADA	Western Portion of Hillslope	Soil Boring	0.5	X		X	X			X								X	X	
				5	X		X	X			X								X	X	
				10	X		X	X			X								X	X	
8_DG-622	Hillslope South of ESADA	Western Portion of Hillslope	Soil Boring	0.5	X		X	X			X								X	X	
				5	X		X	X			X								X	X	
				10	H		H	H			H								H	H	
8_DG-623	Hillslope South of ESADA	Northwestern Portion of Hillslope	Soil Boring	0.5							X									X	**Final Data Gap Location.** Stepdown at 8_DG-601 to evaluate depth of impacts. Analyze for TPH based on LUT exceedances in surface sample and sample collected at 5 feet bgs (deeper samples were not analyzed), and re-analyze surface sample and 5-foot sample for TPH with silica gel cleanup to evaluate the potential inclusion of organic-derived hydrocarbons in the original result. Bedrock anticipated ~20 feet bgs. Collect samples at 5-foot intervals to bedrock and place samples collected deeper than 10 feet bgs on hold pending shallow results. **Collect deepest sample targeting soil just above bedrock.**
				5							X									X	
				10	X	X		X			X								X	X	
				15	H	H		H			H								H	H	
				20	H	H		H			H								H	H	

Table 4C
Subarea 8 Proposed Soil Sample Locations
Final Phase 3 Data Gap Analysis
(2 of 2)

Location ID[1]	Area	Location Description	Sample Type	Depth (ft. bgs)	Analytical Method																Rationale / Comments
					PAHs (EPA Method 8270C [SIM])	PCBs / PCTs (EPA Method 8082)	Dioxins/Furans (EPA Method 1613)	Metals (EPA Methods 6010B/6010C /6020/6020A/7471A/7471B)	CrtVI) (EPA Method 7196A)	Perchlorate (EPA Method 6850/6860)	TPH with Silica Gel Cleanup (EPA Method 8015B/3630C)	Pesticides (EPA Method 8081)	Herbicides (EPA Method 8151A)	Biphenyls (EPA Method 8270C)	Anions (Cyanides) (EPA Method 9012A)	Tetralin (EPA Method 8270C + TICs)	Inorganics (EPA Method 300.0)	VOC (EPA Method 8260)	pH (EPA Method 9045C)	Soil Moisture (ASTM D2216/ EPA Method 160.3)	
8_DG-624	B4009 Area	Northwest of B4009	Soil Boring	0.5							X									X	**Final Data Gap Location.** Location assesses potential air dispersion impacts related to burning activities at the B4100 Trench and is located northwest of the B4100 Trench in the prevailing wind direction. Location is one of three locations proposed that will assess this migration pathway (the others include 8_DG-625 and 8_DG-626). Additional sampling to address this pathway was also performed during Phase 3 sampling in Subarea 8 and the Northern Buffer Zone Subarea. Bedrock anticipated <10 feet bgs. **Collect deepest sample targeting soil just above bedrock.**
				5							X									X	
				10							X									X	
8_DG-625	B4009 Area	West of the B4056 Landfill	Soil Boring	0.5							X									X	**Final Data Gap Location.** Location assesses potential air dispersion impacts related to burning activities at the B4100 Trench and is located northwest of the B4100 Trench in the prevailing wind direction. Location is one of three locations proposed that will assess this migration pathway, the others include 8_DG-624 and 8_DG-626. Additional sampling to address this pathway was also performed during Phase 3 sampling in Subarea 8 and the Northern Buffer Zone Subarea. Bedrock anticipated <10 feet bgs. **Collect deepest sample targeting soil just above bedrock.**
				5							X									X	
				10							X									X	
8_DG-626	B4009 Area	West of the B4056 Landfill	Soil Boring	0.5							X									X	**Final Data Gap Location.** Location assesses potential air dispersion impacts related to burning activities at the B4100 Trench and is located northwest of the B4100 Trench in the prevailing wind direction. Location is one of three locations proposed that will assess this migration pathway, the others include 8_DG-624 and 8_DG-625. Additional sampling to address this pathway was also performed during Phase 3 sampling in Subarea 8 and the Northern Buffer Zone Subarea. Bedrock anticipated <10 feet bgs. **Collect deepest sample targeting soil just above bedrock.**
				5							X									X	
				10							X									X	
8_DG-627	Hillslope South of ESADA	Southern Portion of Hillslope	Soil Boring	0.5	X	X	X	X			X	X	X						X	X	**Final Data Gap Location.** Stepout for dioxins, PAHs, PCBs, herbicides, and pesticides detected above LUT values in samples collected from locations around the Water Tank. Bedrock anticipated <10 feet bgs. Collect deepest sample targeting soil just above bedrock.
				5	X	X	X	X			X	X	X						X	X	
				10	X	X	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.

Acronyms

bgs = below ground surface
Cr(VI) = hexavalent chromium
EPA = Environmental Protection Agency
ESADA = Empire State Atomic Development Authority
FSDF = Former Sodium Disposal Authority
ft. = foot or feet
LUT = Look-Up Table
PAH = polyaromatic hydrocarbons
PCB = polychlorinated biphenyls
PCT = polychlorinated terphenyls
TPH = total petroleum hydrocarbons
VOC = volatile organic compound

Table 4D
Northern Buffer Zone Proposed Soil Sample Locations
Final Phase 3 Data Gap Analysis
(1 of 1)

Location ID[1]	Area	Location Description	Sample Type	Depth (ft. bgs)	Analytical Method												Rationale / Comments
					PAHs (EPA Method 8270C [SIM])	PCBs / PCTs (EPA Method 8082)	Dioxins/Furans (EPA Method 1613)	Metals (EPA Methods 6010B/6010C /6020/6020A/7471A/7471B)	Selenium (EPA Method 6020)	Silver (EPA Method 6020)	TPH with Silica Gel Cleanup (EPA Method 8015B/3630C)	Pesticides (EPA Method 8081)	Herbicides (EPA Method 8151A)	VOC (EPA Method 8260)	pH (EPA Method 9045C)	Soil Moisture (ASTM D2216/ EPA Method 160.3)	
NBZ_DG-558	NBZ-NW	Eastern Portion of NBZ-NW	Soil Boring	0.5	X	H	X	H			X	X	X		H	X	Stepout for exceedances of TPH and herbicides at SL-021-NBZ and NBZ_DG-525, and dioxins, PAHs, and pesticides at SL-023-NBZ. PCBs and metals are initially placed on hold, with analysis occurring if TPH exceeds the LUT value to evaluate toxic constituents. Bedrock anticipated <5 feet bgs. If deep soils encountered, sample and place on hold pending shallow results.
				5	X	H	X	H			X	X	X		H	X	
NBZ_DG-559	NBZ-NW	Eastern Portion of NBZ-NW	Soil Boring	0.5	H	H	X	H	X	X	X		X		X	X	Stepout for exceedances of TPH and dioxins at SL-018-NBZ, TPH at U7BS0006, TPH and herbicides at NBZ_DG-556, Se and Ag at SL-113-SA7, TPH at 7_DG-553, and TPH and herbicides at SL-021-NBZ. PAHs, PCBs, and metals are initially placed on hold, with analysis occurring if TPH exceeds the LUT value to evaluate toxic constituents. Bedrock anticipated <5 feet bgs. If deep soils encountered, sample and place on hold pending shallow results.
				5	H	H	X	H	X	X	X		X		X	X	
NBZ_DG-560	NBZ-NW	North of NBZ-NW	Soil Boring	0.5	X	H		H			H			X	H	X	Stepout downdrainage from exceedance of PAHs at NBZ_DG-529 and evaluates exceedance of phthalates, acetone, and methylene chloride at BB-03-005. Samples on hold for TPH, PCBs, and metals pending the TPH re-analysis results using silica gel cleanup (EPA Method 3630) being performed at locations within Area IV and NBZ. Bedrock anticipated <5 feet bgs. **Collect deepest sample targeting soil just above bedrock.**
				5	X	H		H			H			X	H	X	
NBZ_DG-561	NBZ-NW	North of NBZ-NW	Soil Boring	0.5	X	H		H			H			X	H	X	Same as NBZ_DG-560.
				5	X	H		H			H			X	H	X	
NBZ_DG-562	NBZ-NE	North of NBZ-NE	Soil Boring	0.5	H	H	X	H			H	X			H	X	Stepout downdrainage from exceedances of dioxins and pesticides at NBZ_DG-540. Samples on hold for TPH, PAHs, PCBs, and metals pending the TPH re-analysis results using silica gel cleanup (EPA Method 3630) being performed at locations within Area IV and NBZ. Bedrock anticipated <5 feet bgs. **Collect deepest sample targeting soil just above bedrock.**
				5	H	H	X	H			H	X			H	X	
NBZ_DG-563	NBZ-NE	North of NBZ-NE	Soil Boring	0.5	H	H	X	H			H	X			H	X	Same as NBZ_DG-562.
				5	H	H	X	H			H	X			H	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' and 5' 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.

Acronyms

bgs = below ground surface
EPA = Environmental Protection Agency
ft. = foot or feet
NBZ = Northern Buffer Zone
PAH = polyaromatic hydrocarbons
LUT = Look-Up Table
PCB = polychlorinated biphenyls
PCT = polychlorinated terphenyls
SM = soil matrix
TPH = total petroleum hydrocarbons
VOC = volatile organic compound

Table 5
Proposed Soil Sample Locations for TPH Re-Analysis
Final Phase 3 Data Gap Analysis
(1 of 2)

Location ID[1]	Area	Location Description	Sample Type	Depth (ft. bgs)	Analytical Method									Rationale / Comments
					PAHs (EPA Method 8270C [SIM])	PCBs / PCTs (EPA Method 8082)	Dioxins/Furans (EPA Method 1613)	Metals (EPA Methods 6010B/6010C /6020/6020A/7471A/7471B)	TPH with Silica Gel Cleanup (EPA Method 8015B/3630C)	Pesticides (EPA Method 8081)	Herbicides (EPA Method 8151A)	pH (EPA Method 9045C)	Soil Moisture (ASTM D2216/ EPA Method 160.3)	
NBZ_DG-564	NBZ-NE	Western Portion of NBZ-NE	Soil Boring	0.5	X	X		X	X			X	X	One of 37 locations within Area IV and NBZ for TPH re-analysis to evaluate the potential inclusion of organic-derived hydrocarbons in the original result. The locations selected are generally outside of operational areas and have sample results that exceed the LUT values only for TPH without using silica gel cleanup prior to analysis. Samples will undergo silica gel cleanup prior to analysis to remove most of the polar biogenic organics. PAHs, PCBs, and metals are included to evaluate presence of other toxic constituents (excluded if previously analyzed at location and specific sample depth).
NBZ_DG-565	NBZ-NE	Western Portion of NBZ-NE	Soil Boring	0.5	X	X		X	X			X	X	Same as NBZ_DG-564.
NBZ_DG-566	NBZ-NE	Western Portion of NBZ-NE	Soil Boring	0.5		X		X	X			X	X	Same as NBZ_DG-564.
NBZ_DG-567	NBZ-NE	Northwestern Portion of NBZ-NE	Soil Boring	0.5	X	X		X	X			X	X	Same as NBZ_DG-564.
NBZ_DG-568	NBZ-NW	North of NBZ-NW	Soil Boring	0.5	X	X		X	X			X	X	Same as NBZ_DG-564.
NBZ_DG-569	NBZ-NW	Northeastern Portion of NBZ-NW	Soil Boring	0.5	X	X		X	X			X	X	Same as NBZ_DG-564.
NBZ_DG-570	NBZ-NW	Eastern Portion of NBZ-NW	Soil Boring	0.5	X	X		X	X			X	X	Same as NBZ_DG-564.
NBZ_DG-571	NBZ-NW	Central Portion of NBZ-NW	Soil Boring	0.5					X				X	Same as NBZ_DG-564.
				3.5					X				X	
NBZ_DG-572	NBZ-NW	Central Portion of NBZ-NW	Soil Boring	0.5					X				X	Same as NBZ_DG-564.
NBZ_DG-573	NBZ-NW	Central Portion of NBZ-NW	Soil Boring	0.5					X				X	Same as NBZ_DG-564.
NBZ_DG-574	NBZ-NW	North of NBZ-NW	Soil Boring	0.5		X		X	X			X	X	Same as NBZ_DG-564.
NBZ_DG-575	NBZ-NW	Western Portion of NBZ-NW	Soil Boring	0.5	X	X		X	X			X	X	Same as NBZ_DG-564.
NBZ_DG-576	NBZ-NW	Western Portion of NBZ-NW	Soil Boring	0.5		X			X				X	Same as NBZ_DG-564.
				3.5		X			X				X	
NBZ_DG-577	NBZ-NW	Southwestern Portion of NBZ-NW	Soil Boring	0.5					X				X	Same as NBZ_DG-564.
				5	X	X		X	X			X	X	
NBZ_DG-578	NBZ-NW	Southwestern Portion of NBZ-NW	Soil Boring	0.5	X	X		X	X			X	X	Same as NBZ_DG-564.
NBZ_DG-579	NBZ-NW	Southwest of NBZ-NW	Soil Boring	0.5	X	X		X	X			X	X	Same as NBZ_DG-564.
NBZ_DG-580	NBZ-NW	Southwest of NBZ-NW	Soil Boring	0.5	X	X		X	X			X	X	Same as NBZ_DG-564.
				4.5	X	X		X	X			X	X	
NBZ_DG-581	NBZ-NW	North of NBZ-NW	Soil Boring	0.5				X	X			X	X	Same as NBZ_DG-564.
				5				X	X			X	X	
				10	X	X		X	X			X	X	
NBZ_DG-582	NBZ-NW	North of NBZ-NW	Soil Boring	0.5		X			X				X	Same as NBZ_DG-564.
				3.0		X			X				X	
NBZ_DG-583	NBZ-NW	North of NBZ-NW	Soil Boring	0.5		X			X				X	Same as NBZ_DG-564.
NBZ_DG-584	NBZ-NW	North of NBZ-NW	Soil Boring	0.5		X			X				X	Same as NBZ_DG-564.
NBZ_DG-585	NBZ-NW	North of NBZ-NW	Soil Boring	0.5		X			X				X	Same as NBZ_DG-564.
NBZ_DG-586	NBZ-NW	North of NBZ-NW	Soil Boring	0.5		X			X				X	Same as NBZ_DG-564.

Table 5
Proposed Soil Sample Locations for TPH Re-Analysis
Final Phase 3 Data Gap Analysis
(2 of 2)

Location ID[1]	Area	Location Description	Sample Type	Depth (ft. bgs)	Analytical Method									Rationale / Comments
					PAHs (EPA Method 8270C [SIM])	PCBs / PCTs (EPA Method 8082)	Dioxins/Furans (EPA Method 1613)	Metals (EPA Methods 6010B/6010C /6020/6020A/7471A/7471B)	TPH with Silica Gel Cleanup (EPA Method 8015B/3630C)	Pesticides (EPA Method 8081)	Herbicides (EPA Method 8151A)	pH (EPA Method 9045C)	Soil Moisture (ASTM D2216/ EPA Method 160.3)	
5A_DG-878	B4029	East of Clearly Contaminated Area (Eastern Hummocky Area)	Soil Boring	0.5		X			X				X	Same as NBZ_DG-564.
				5	X	X		X	X			X	X	
				7.5	X	X		X	X			X	X	
5D_DG-612	Subarea 5D South	Northeast of B4701 (Water Tank)	Soil Boring	0.5					X				X	Same as NBZ_DG-564.
5D_DG-613	Subarea 5D South	Northeastern Portion of Hillslope	Soil Boring	0.5					X				X	Same as NBZ_DG-564.
5D_DG-614	B4363/4353 Area	South of B4353	Soil Boring	0.5					X				X	Same as NBZ_DG-564.
6_DG-691	SRE North	East of B4686	Soil Boring	0.5					X				X	Same as NBZ_DG-564.
6_DG-692	SRE North	Northeast of SRE Pond	Soil Boring	0.5					X				X	Same as NBZ_DG-564.
6_DG-693	Old Con Area	West of ESG Storage Yard	Soil Boring	0.5					X				X	Same as NBZ_DG-564.
6_DG-694	Subarea 6 South	Northeast Portion of Subarea 6 South	Soil Boring	0.5					X				X	Same as NBZ_DG-564.
6_DG-695	Subarea 6 South	Southwest Portion of Subarea 6 South	Soil Boring	0.5					X				X	Same as NBZ_DG-564.
8_DG-628	Hillslope South of ESADA	Northwestern Portion of Hillslope	Soil Boring	0.5					X				X	Same as NBZ_DG-564.
				5					X				X	
				10	X	X		X	X			X	X	
				15	X	X		X	X			X	X	
8_DG-629	FSDF	West of FSDF	Soil Boring	0.5					X				X	Same as NBZ_DG-564.
				3.0					X				X	
8_DG-630	Hillslope South of ESADA	Eastern Portion of Hillslope	Soil Boring	0.5					X				X	Same as NBZ_DG-564.
				5					X				X	
				8					X				X	
8_DG-631	B4009 Area	Southwest of B4009	Soil Boring	0.5					X				X	Same as NBZ_DG-564.
				5					X				X	
				10	X	X		X	X			X	X	
8_DG-632	B4009 Area	Southwest of B4056 Landfill	Soil Boring	0.5					X				X	Same as NBZ_DG-564.

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' and 5' 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.

Acronyms
bgs = below ground surface
EPA = Environmental Protection Agency
ESADA = Empire State Atomic Development Authority
ESG = Energy Systems Group
FSDF = Former Sodium Disposal Authority
ft. = foot or feet
LUT = Look-Up Table
NBZ - Northern Buffer Zone
PAH = polyaromatic hydrocarbons
PCB = polychlorinated biphenyls
PCT = polychlorinated terphenyls
SRE = Sodium Reactor Experiment
TPH = total petroleum hydrocarbons

FIGURES

Northern Buffer Zone

Northern Buffer Zone

Subarea 3

Subarea 7

Subarea 6

Subarea 5A

Subarea 5B

Subarea 8 North

Subarea 5C

Subarea 5D North

Subarea 8 South

Subarea 5D South

Area III

Area II

Area IV

Area III

Area III

Area II

ISI Storage

weather station

Shed

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
- Area IV HSA Subarea
- Existing Building or Structure
- Removed Building or Structure
- Ponds
- Excavated Area
- Backfilled Excavation Area
- Pipe
- Leach Field
- Drainage
- Lined Drainage
- Rock Outcrop
- Dirt Road
- A/C Paving
- Fence

The "Combined Analyte" Data Summary includes all chemicals listed in the DTSC Look-up Table (LUT) as well as other chemicals analyzed at the site. The maximum ratio to LUT value 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 ratio of detected concentration/LUT value was used; otherwise the maximum ratio of MRL/LUT value was used and the location was symbolized as ND. VOCs and TPH are not included in the "combined analyte" comparison since they are typically evaluated separately for characterization and remedial planning.

Legend

EPA Area IV Sewer Map Layer

SSFL Sewer Map Layers

- Sewer Cleanout
- Sewer Stations
- Sewer Repair Locations
- Sewer Manhole
- Sanitary Sewer

All Chemicals Detect

- <= 1x LUTV or ML MRL
- 1x - 2x LUTV or ML MRL
- 2x - 10x LUTV or ML MRL
- 10x - 100x LUTV or ML MRL
- > 100x

All Chemicals Non-Detect

- <= 1x LUTV or ML MRL
- 1x - 2x LUTV or ML MRL
- 2x - 10x LUTV or ML MRL
- 10x - 100x LUTV or ML MRL
- > 100x

Note: Two layers have been prepared showing sewer locations at the SSFL in Area IV, one by USEPA and the other by DOE. The two layers differ in some locations and are both shown for completeness.

Area IV Soil Sample Locations within 15 feet of Sewer System Features

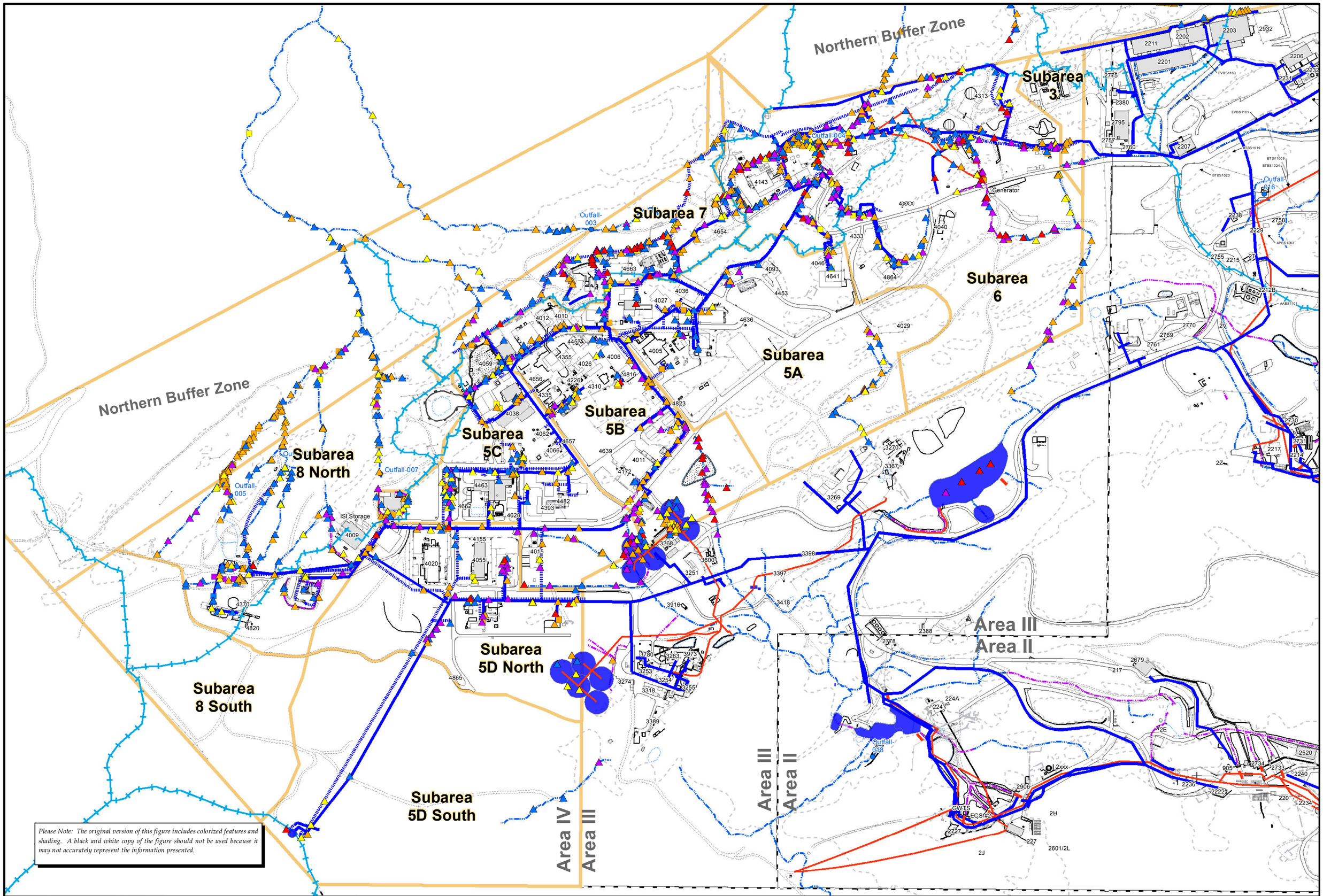
SANTA SUSANA FIELD LABORATORY

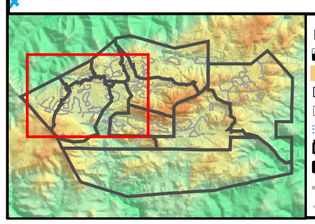
Path: T:\projects\rock3\Figures\HSA\HSA_Area1V_Soils within 15 Feet of Sewer.mxd

Date: 4/29/2014

0 360 720 Feet

FIGURE 1





Base Map Legend

- Administrative Area Boundary
- Area IV HSA Subarea
- Existing Building or Structure
- Removed Building or Structure
- Ponds
- Excavated Area
- Backfilled Excavation Area
- Pipe
- Leach Field
- Drainage
- Lined Drainage
- Surface Water Divide
- Rock Outcrop
- Dirt Road
- A/C Paving
- Fence
- NPDES Outfall

The "Combined Analyte" Data Summary includes all chemicals listed in the DTSC Look-up Table (LUT) as well as other chemicals analyzed at the site. The maximum ratio to LUT value 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 ratio of detected concentration/LUT value was used; otherwise the maximum ratio of MRL/LUT value was used and the location was symbolized as ND. VOCs and TPH are not included in the "combined analyte" comparison since they are typically evaluated separately for characterization and remedial planning.

Legend

- EPA Area IV Water Infrastructure Line Map Layer

SSFL Water Infrastructure Conveyance System Map Layers

- Spray Fields
- Fresh Process Water/Domestic Water Pipeline
- Reclaimed Water Inflow and Outflow
- Reclaimed Water Pipeline

Note: Two layers have been prepared showing water pipeline locations at the SSFL in Area IV, one by USEPA and the other by DOE. The two layers differ in some locations and are both shown for completeness.

All Chemicals Detect

- <= 1x LUTV or ML MRL
- 1x - 2x LUTV or ML MRL
- 2x - 10x LUTV or ML MRL
- 10x - 100x LUTV or ML MRL
- > 100x

All Chemicals ND

- <= 1x LUTV or ML MRL
- 1x - 2x LUTV or ML MRL
- 2x - 10x LUTV or ML MRL
- 10x - 100x LUTV or ML MRL
- > 100x

Area IV Soil Sample Locations within 15 feet of Water Conveyance Features

SANTA SUSANA FIELD LABORATORY

Path: T:\projects\rock3\Figures\HSA\HSA_Area1V_Soils within 15 Feet of Water.mxd

Date: 4/29/2014

0 360 720 Feet

N

FIGURE 2

Northern Buffer Zone

Northern Buffer Zone

Subarea 3

Subarea 7

Subarea 6

Subarea 5A

Subarea 5B

Subarea 8 North

Subarea 5C

Subarea 8 South

Subarea 5D North

Subarea 5D South

Area III

Area II

Area IV

Area III

Area III

Area II

ISI Storage

weather station

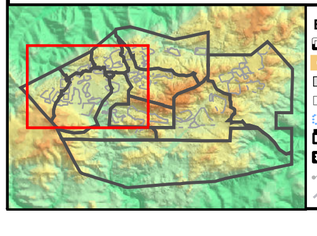
Shed

Pond

GWTS

ECS #2

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
- Area IV HSA Subarea
- Existing Building or Structure
- Removed Building or Structure
- Ponds
- Excavated Area
- Backfilled Excavation Area
- Pipe
- Leach Field
- Drainage
- Lined Drainage
- Rock Outcrop
- Dirt Road
- A/C Paving
- Fence

The "Combined Analyte" Data Summary includes all chemicals listed in the DTSC Look-up Table (LUT) as well as other chemicals analyzed at the site. The maximum ratio to LUT value 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 ratio of detected concentration/LUT value was used; otherwise the maximum ratio of MRL/LUT value was used and the location was symbolized as ND. VOCs and TPH are not included in the "combined analyte" comparison since they are typically evaluated separately for characterization and remedial planning.

Legend

- EPA Gas Line Map Layer
- SSFL Natural Gas Line Map Layer

Note: Two layers have been prepared showing gas pipeline locations at the SSFL in Area IV, one by USEPA and the other by DOE. The two layers differ in some locations and are both shown for completeness.

All Chemicals Detect	All Chemicals ND
<= 1x LUTV or ML MRL	<= 1x LUTV or ML MRL
1x - 2x LUTV or ML MRL	1x - 2x LUTV or ML MRL
2x - 10x LUTV or ML MRL	2x - 10x LUTV or ML MRL
10x - 100x LUTV or ML MRL	10x - 100x LUTV or ML MRL
> 100x	> 100x

Area IV Soil Sample Locations within 5 Feet of Natural Gas Pipelines

SANTA SUSANA FIELD LABORATORY

Path: T:\projects\rock3\Figures\HSA\HSA_Area1V_Soils within 5 Feet of Gas.mxd

Date: 4/29/2014

0 360 720 Feet

FIGURE 3

Subarea 7

Subarea 6

Subarea 5A

Subarea 5B

Area IV

Area III

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.

Preliminary Remediation Areas (PRAs) are locations where soil sample results exceed the Look-up Table (LUT) values. PRAs identified are considered preliminary because some sample data are still pending collection and/or validation, data evaluation is ongoing, and soil treatability studies are still in progress. Also, PRAs do not account for potential areas of sensitive habitat or cultural resources; these environmentally sensitive areas will be evaluated during remedial planning. PRAs will be finalized after Phase 3 sampling is completed

Base Map Legend

- Administrative Area Boundary
- Area IV HSA Subarea
- Clearly Contaminated Areas
- DOE AOC Preliminary Remediation Areas
- Existing Building or Structure
- Removed Building or Structure
- Excavated Area
- Backfilled Excavation Area
- Rock Outcrop
- Ponds
- Pipe
- Leach Field
- Drainage
- Concrete Lined Drainage
- Dirt Road
- A/C Paving
- Elevation Contour

Groundwater Wells

- Well

Trenches

- Not Planned
- Proposed

The "Combined Analyte" Data Summary includes all chemicals listed in the DTSC Look-up Table (LUT) as well as other chemicals analyzed at the site. The maximum ratio to LUT value 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 ratio of detected concentration/LUT value was used; otherwise the maximum ratio of MRL/LUT value was used and the location was symbolized as ND. VOCs and TPH are not included in the "combined analyte" comparison since they are typically evaluated separately for characterization and remedial planning.

TPH is represented by a color coded halo surrounding the combined analyte data symbol where analyzed. For locations where TPH was detected, the higher of the ratio of gasoline range TPH / LUT value or the sum of kerosene, diesel, and lubricant oil range TPH / LUT value was used; otherwise the higher of the ratio of gasoline range TPH MRL / LUT or sum of kerosene, diesel, and lubricant oil range TPH MRLs / LUT value was used and the location was symbolized as ND.

Proposed Area IV Data Gap Locations

- Add to Analytical Suite at Sample Location
- Future
- Re-Analysis Sample Location
- Other Targeted Sample Location
- Stepout/Stepdown Location
- Test Pit
- Tank Sample Location
- Post Demolition Sampling Area

Locations Not Planned for Implementation

- Add to Analytical Suite at Sample Location
- Future
- Re-Analysis Sample Location
- Other Targeted Sample Location
- Stepout/Stepdown Location
- Test Pit
- Tank Sample Location

Combined Detect / LUT Values

- <= 1x LUT Values
- 1x - 2x LUT Values
- 2x - 10x LUT Values
- 10x - 100x LUT Values
- > 100x LUT Values

Combined ND / LUT Values

- <= 1x LUT Values
- 1x - 2x LUT Values
- 2x - 10x LUT Values
- 10x - 100x LUT Values
- > 100x LUT Values

TPH Detect / LUT Values

- <= 1x LUT Values
- 1x - 2x LUT Values
- 2x - 10x LUT Values
- 10x - 100x LUT Values
- > 100x LUT Values

TPH ND/ LUT Values

- <= 1x LUT Values
- 1x - 2x LUT Values
- 2x - 10x LUT Values
- 10x - 100x LUT Values

Subarea 5A Final Phase 3 Data Gap Sampling Plan Proposed Soil Matrix Sampling Locations

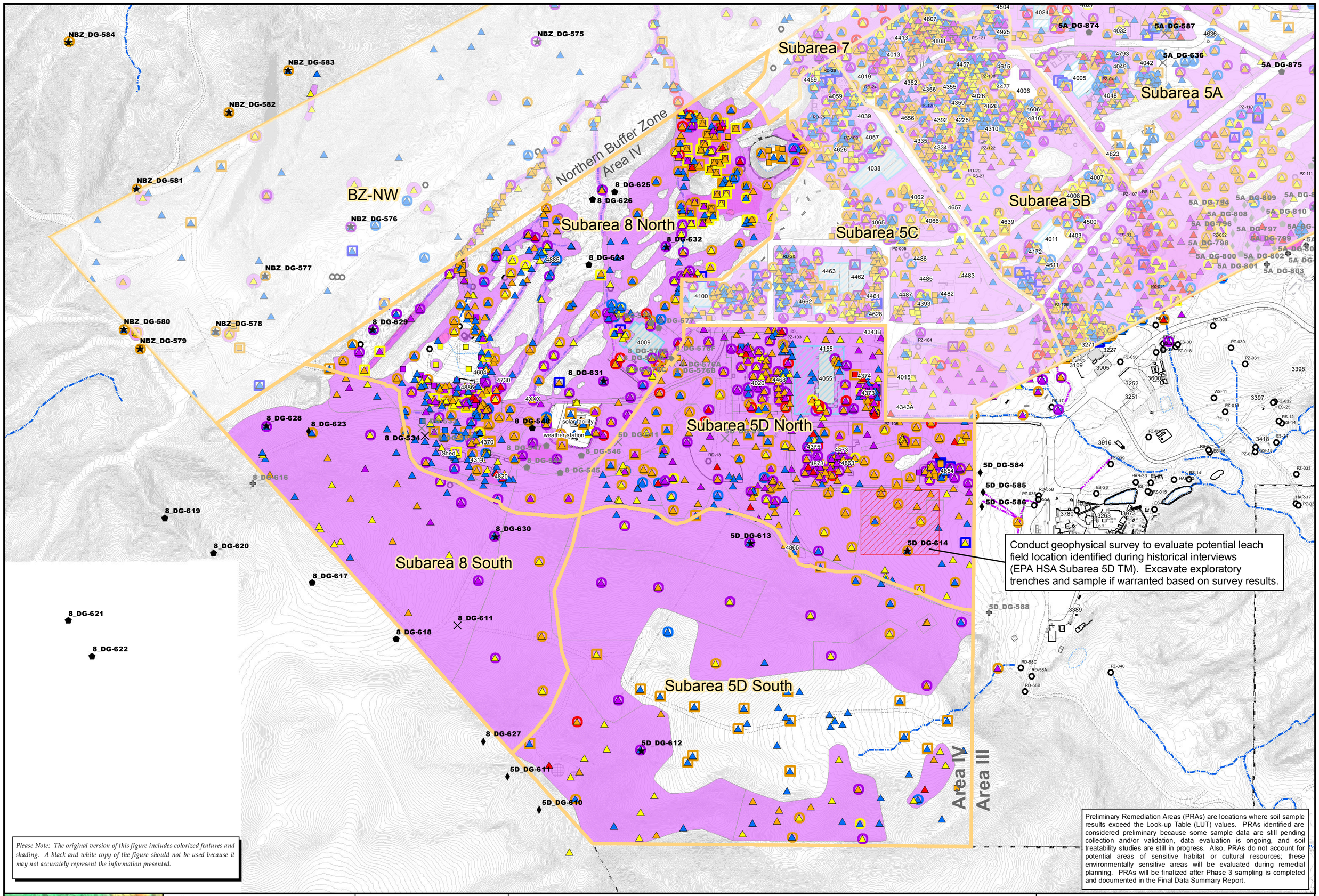
SANTA SUSANA FIELD LABORATORY

Path: T:\projects\rock3\HSA\Working\HSA_5A_SoilMatrix_Proposed.mxd

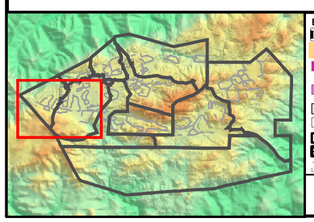
Date: 4/29/2014

0 110 220 Feet

FIGURE 4



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

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- Area IV HSA Subarea
- Clearly Contaminated Areas
- DOE AOC Preliminary Remediation Areas
- Existing Building or Structure
- Removed Building or Structure
- Excavated Area
- Backfilled Excavation Area
- Rock Outcrop
- Ponds
- Pipe
- Leach Field
- Drainage
- Concrete Lined Drainage
- Dirt Road
- A/C Paving
- Elevation Contour

Groundwater Wells: Well

Trenches: Not Planned / Proposed

The "Combined Analyte" Data Summary includes all chemicals listed in the DTSC Look-up Table (LUT) as well as other chemicals analyzed at the site. The maximum ratio to LUT value 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 ratio of detected concentration/LUT value was used; otherwise the maximum ratio of MRL/LUT value was used and the location was symbolized as ND. VOCs and TPH are not included in the "combined analyte" comparison since they are typically evaluated separately for characterization and remedial planning.

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Proposed Area IV Data Gap Locations

- Add to Analytical Suite at Sample Location
- Future
- Re-Analysis Sample Location
- Other Targeted Sample Location
- Stepout/Stepdown Location
- Test Pit
- Tank Sample Location
- Post Demolition Sampling Area
- Proposed Geophysical Survey Area

Locations Not Planned for Implementation

- Add to Analytical Suite at Sample Location
- Future
- Re-Analysis Sample Location
- Other Targeted Sample Location
- Stepout/Stepdown Location
- Test Pit
- Tank Sample Location

Combined Detect / LUT Values

- <= 1x LUT Values
- 1x - 2x LUT Values
- 2x - 10x LUT Values
- 10x - 100x LUT Values
- > 100x LUT Values

Combined ND / LUT Values

- <= 1x LUT Values
- 1x - 2x LUT Values
- 2x - 10x LUT Values
- 10x - 100x LUT Values
- > 100x LUT Values

TPH Detect / LUT Values

- <= 1x LUT Values
- 2x - 10x LUT Values
- > 100x LUT Values
- 1x - 2x LUT Values
- 10x - 100x LUT Values

TPH ND/ LUT Values

- <= 1x LUT Values
- 2x - 10x LUT Values
- 1x - 2x LUT Values
- 10x - 100x LUT Values

Subareas 5D and 8 Final Phase 3 Data Gap Sampling Plan Proposed Soil Matrix Sampling Locations

SANTA SUSANA FIELD LABORATORY

Path: T:\projects\rock3\HSA\Working\HSA_5Dand8_SoilMatrix_Proposed.mxd

Date: 4/29/2014

0 250 500 Feet

FIGURE 5

NBZ_DG-561
NBZ_DG-560
NBZ_DG-586
NBZ_DG-585
NBZ_DG-584
NBZ_DG-583
NBZ_DG-582
NBZ_DG-581
NBZ_DG-580
NBZ_DG-579
NBZ_DG-578
NBZ_DG-577
NBZ_DG-576
NBZ_DG-575
NBZ_DG-574
NBZ_DG-573
NBZ_DG-572
NBZ_DG-571
NBZ_DG-570
NBZ_DG-569
NBZ_DG-568
NBZ_DG-567
NBZ_DG-536
NBZ_DG-559
NBZ_DG-558
6_DG-691
5A_DG-730
5A_DG-874
5A_DG-587
5A_DG-636
5A_DG-875
5A_DG-876
5A_DG-877
5A_DG-857
5A_DG-856
5A_DG-821
5A_DG-820
5A_DG-818
5A_DG-878
5A_DG-812
6A_DG-809
5A_DG-794
5A_DG-808
5A_DG-810
5A_DG-816
5A_DG-786
5A_DG-797
5A_DG-807
5A_DG-799
5A_DG-804
5A_DG-798
5A_DG-800
5A_DG-802
5A_DG-801
5A_DG-805
5A_DG-803
8_DG-625
8_DG-626
8_DG-632
8_DG-624
8_DG-629
8_DG-628
8_DG-623
8_DG-533
8_DG-534
8_DG-548
8_DG-647
8_DG-631
8_DG-576E
8_DG-576F
8_DG-576C
8_DG-576D
8_DG-576A
8_DG-576B
8_DG-577
8_DG-578
5D_DG-514
5D_DG-517
4006
4816
4011
4015
BZ-NE
BZ-NW
Subarea 6
Subarea 7
Subarea 5A
Subarea 5B
Subarea 5C
Subarea 8 North
Subarea 5D North
Northern Buffer Zone
Area IV
Area IV
Area III

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Base Map Legend

- Administrative Area Boundary
- Area IV HSA Subarea
- Clearly Contaminated Areas
- DOE AOC Preliminary Remediation Areas
- NASA Preliminary Remediation Areas
- NASA Investigation Areas
- Existing Building or Structure
- Removed Building or Structure
- Excavated Area
- Backfilled Excavation Area
- Rock Outcrop
- Solvent Tank
- Petroleum Fuel/Oil Tank
- Hydrazine Tank
- Other Tanks
- Ponds
- Pipe
- Leach Field
- Drainage
- Concrete Lined Drainage
- Dirt Road
- A/C Paving
- Elevation Contour
- Well

The "Combined Analyte" Data Summary includes all chemicals listed in the DTSC Look-up Table (LUT) as well as other chemicals analyzed at the site. The maximum ratio to LUT value 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 ratio of detected concentration/LUT value was used; otherwise the maximum ratio of MRL/LUT value was used and the location was symbolized as ND. VOCs and TPH are not included in the "combined analyte" comparison since they are typically evaluated separately for characterization and remedial planning.

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Proposed Area IV Data Gap Locations

- Add to Analytical Suite at Sample Location
- Future
- Re-Analysis Sample Location
- Other Targeted Sample Location
- Stepout/Stepdown Location
- Test Pit
- Tank Sample Location
- Post Demolition Sampling Area

Trenches

Not Planned / Proposed

Locations Not Planned for Implementation

- Add to Analytical Suite at Sample Location
- Future
- Re-Analysis Sample Location
- Other Targeted Sample Location
- Stepout/Stepdown Location
- Test Pit
- Tank Sample Location

Combined Detect / LUT Values

- <= 1x LUT Values
- 1x - 2x LUT Values
- 2x - 10x LUT Values
- 10x - 100x LUT Values
- > 100x LUT Values

Combined ND / LUT Values

- <= 1x LUT Values
- 1x - 2x LUT Values
- 2x - 10x LUT Values
- 10x - 100x LUT Values
- > 100x LUT Values

TPH Detect / LUT Values

- <= 1x LUT Values
- 2x - 10x LUT Values
- > 100x LUT Values
- 1x - 2x LUT Values
- 10x - 100x LUT Values

TPH ND/ LUT Values

- <= 1x LUT Values
- 2x - 10x LUT Values
- 1x - 2x LUT Values
- 10x - 100x LUT Values

Northern Buffer Zone – Northwest
Final Phase 3 Data Gap Sampling Plan
Proposed Soil Matrix Sampling Locations
SANTA SUSANA FIELD LABORATORY

Path: T:\projects\rock3\HSA\Working\Subarea NBZ\DOE Block 2 NBZW.mxd

Date: 4/29/2014

0 300 600 Feet

FIGURE 6

NBZ_DG-563

NBZ_DG-562

BZ-NE

NBZ_DG-564

NBZ_DG-565

NBZ_DG-566

NBZ_DG-567

6_DG-692

6_DG-691

6_DG-693

Subarea 6

Subarea 3

Area IV

Area III

Area II

Northern Buffer Zone Area II

Investigation Planned of Northern Drainage by Others (pending)

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NASA PRAs and investigation areas shown are based on the information presented in the NASA's Field Sampling Plan-6. NASA's development of PRAs is an ongoing process, and therefore there are locations adjacent to and outside the NASA PRAs that exceed LUT values and are not included in DOE PRAs.

Base Map Legend

- Administrative Area Boundary
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- NASA Preliminary Remediation Areas
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The "Combined Analyte" Data Summary includes all chemicals listed in the DTSC Look-up Table (LUT) as well as other chemicals analyzed at the site. The maximum ratio to LUT value 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 ratio of detected concentration/LUT value was used; otherwise the maximum ratio of MRL/LUT value was used and the location was symbolized as ND. VOCs and TPH are not included in the "combined analyte" comparison since they are typically evaluated separately for characterization and remedial planning.

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Proposed Area IV Data Gap Locations

- Add to Analytical Suite at Sample Location
- Future
- Re-Analysis Sample Location
- Other Targeted Sample Location
- Stepout/Stepdown Location
- Test Pit
- Tank Sample Location
- Post Demolition Sampling Area

Trenches

Not Planned / Proposed

Locations Not Planned for Implementation

- Add to Analytical Suite at Sample Location
- Future
- Re-Analysis Sample Location
- Other Targeted Sample Location
- Stepout/Stepdown Location
- Test Pit
- Tank Sample Location

Combined Detect / LUT Values

- <= 1x LUT Values
- 1x - 2x LUT Values
- 2x - 10x LUT Values
- 10x - 100x LUT Values
- > 100x LUT Values

Combined ND / LUT Values

- <= 1x LUT Values
- 1x - 2x LUT Values
- 2x - 10x LUT Values
- 10x - 100x LUT Values
- > 100x LUT Values

TPH Detect / LUT Values

- <= 1x LUT Values
- 1x - 2x LUT Values
- 2x - 10x LUT Values
- 10x - 100x LUT Values
- > 100x LUT Values

TPH ND/ LUT Values

- <= 1x LUT Values
- 1x - 2x LUT Values
- 2x - 10x LUT Values
- 10x - 100x LUT Values

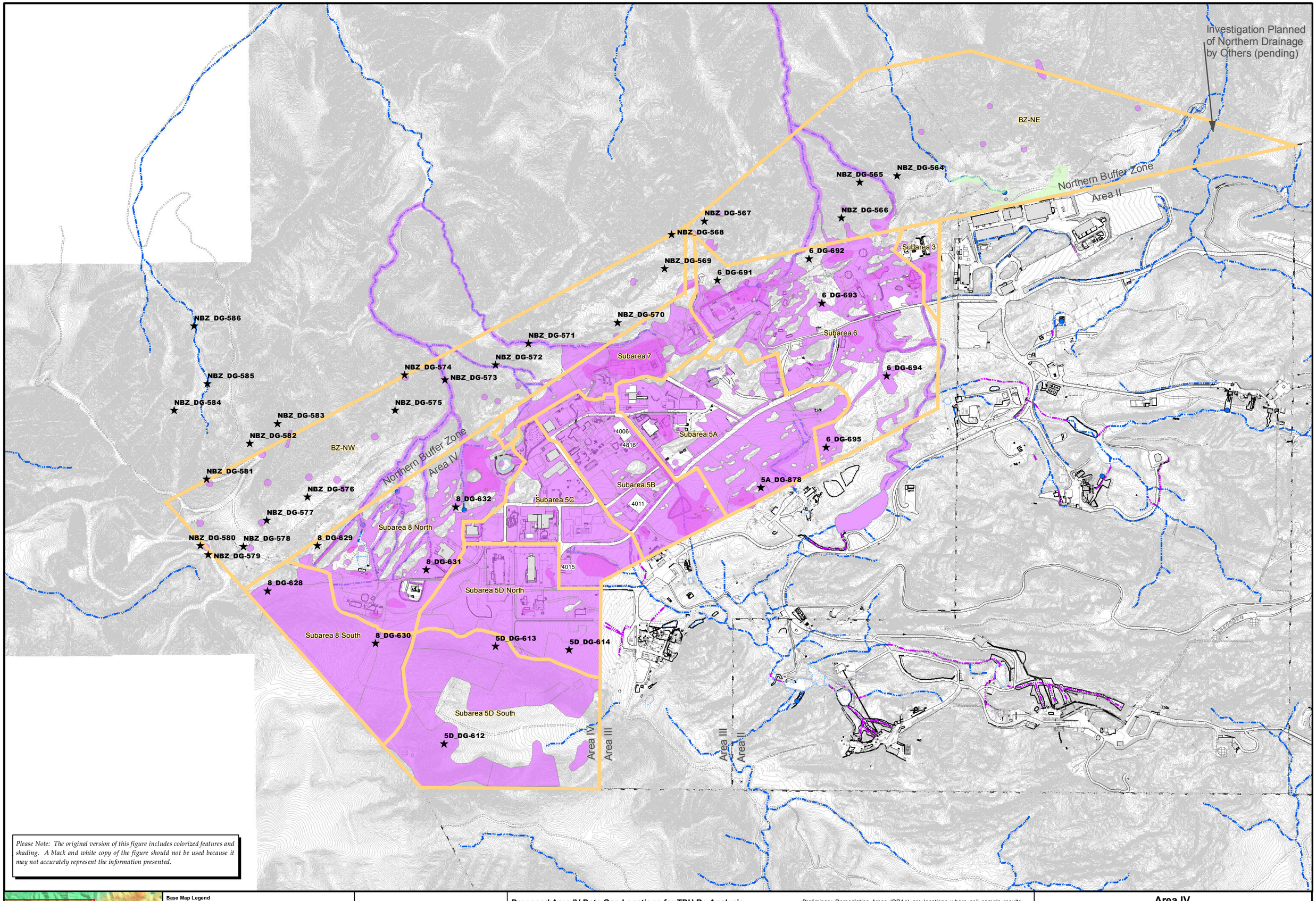
Northern Buffer Zone – Northeast
Final Phase 3 Data Gap Sampling Plan
Proposed Soil Matrix Sampling Locations
SANTA SUSANA FIELD LABORATORY

Path: T:\projects\rock3\HSA\Working\Subarea NBZ\DOE Block 2 NBZE.mxd

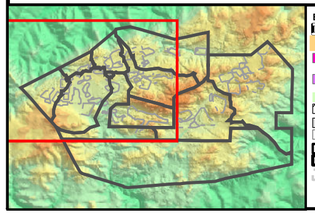
Date: 5/5/2014

0 250 500 Feet

FIGURE 7



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

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- Hydrazine Tank
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- Concrete Lined Drainage
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- Elevation Contour

Proposed Area IV Data Gap Locations for TPH Re-Analysis

★ Re-Analysis Sample Location

Preliminary Remediation Areas (PRAs) are locations where soil sample results exceed the Look-up Table (LUT) values. PRAs identified are considered preliminary because some sample data are still pending collection and/or validation, data evaluation is ongoing, and soil treatability studies are still in progress. Also, PRAs do not account for potential areas of sensitive habitat or cultural resources; these environmentally sensitive areas will be evaluated during remedial planning. PRAs will be finalized after Phase 3 sampling is completed and documented in the Final Data Summary Report.

NASA PRAs and investigation areas shown are based on the information presented in the NASA's Field Sampling Plan-6. NASA's development of PRAs is an ongoing process, and therefore there are locations adjacent to and outside the NASA PRAs that exceed LUT values and are not included in DOE PRAs.

Area IV
Phase 3 Proposed Soil Matrix Sampling Locations for TPH Re-Analysis

SANTA SUSANA FIELD LABORATORY

Path: T:\projects\rock3\HSA\Working\Subarea NBZ\DOE Block 2 All-C.mxd

Date: 5/5/2014

0 530 1,060 Feet

FIGURE 8

ATTACHMENTS

DTSC Chemical Look-Up Table for DOE and NASA at SSFL
June 2013

Chemical Constituent	Units	Look-Up Table Value	Basis
Alcohols - EPA Method 8015B			
Ethanol	mg/kg	0.7	BG MRL
Methanol	mg/kg	0.7	BG MRL
Anions - EPA Methods 300.0 / 9056A			
Fluoride	mg/kg	10.2	BTV
Nitrate	mg/kg	22.3	BTV
Cyanide - EPA Method 9012A			
Cyanide	mg/kg	0.6	BG MRL
Dioxin-Furans - EPA Method 1613B			
1,2,3,4,6,7,8-HpCDD	pg/g	see note[1]	---
1,2,3,4,6,7,8-HpCDF	pg/g	see note[1]	---
1,2,3,4,7,8,9-HpCDF	pg/g	see note[1]	---
1,2,3,4,7,8-HxCDD	pg/g	see note[1]	---
1,2,3,4,7,8-HxCDF	pg/g	see note[1]	---
1,2,3,6,7,8-HxCDD	pg/g	see note[1]	---
1,2,3,6,7,8-HxCDF	pg/g	see note[1]	---
1,2,3,7,8,9-HxCDD	pg/g	see note[1]	---
1,2,3,7,8,9-HxCDF	pg/g	see note[1]	---
1,2,3,7,8-PeCDD	pg/g	see note[1]	---
1,2,3,7,8-PeCDF	pg/g	see note[1]	---
2,3,4,6,7,8-HxCDF	pg/g	see note[1]	---
2,3,4,7,8-PeCDF	pg/g	see note[1]	---
2,3,7,8-TCDD	pg/g	see note[1]	---
2,3,7,8-TCDF	pg/g	see note[1]	---
OCDD	pg/g	see note[1]	---
OCDF	pg/g	see note[1]	---
2,3,7,8-TCDD TEQ			
2,3,7,8-TCDD TEQ[1]	pg/g	0.912 (see note[1])	BTV-TEQ
Energetics - EPA Method 8330			
RDX	µg/kg	300	M-L MRL
Formaldehyde - EPA Method 8315A			
Formaldehyde	µg/kg	1,870	BG MRL

DTSC Chemical Look-Up Table for DOE NASA at SSFL

June 2013

Chemical Constituent	Units	Look-Up Table Value	Basis
Herbicides - EPA Method 8151A			
2,4,5-T	µg/kg	1.2	BTV
2,4,5-TP	µg/kg	0.63	BTV
2,4-D	µg/kg	5.8	BTV
2,4-DB	µg/kg	2.4	BG MRL
2,4-DP (Dichloroprop)	µg/kg	2.4	BTV
Dalapon	µg/kg	12.5	BG MRL
Dicamba	µg/kg	1.3	BTV
Dinoseb	µg/kg	3.3	BG MRL
MCPA	µg/kg	761	BTV
MCPP (Mecoprop)	µg/kg	377	BTV
Pentachlorophenol	µg/kg	170	M-L MRL
Metals - EPA Methods 6010B/6020A			
Aluminum	mg/kg	58,600	BTV
Antimony	mg/kg	0.86	BTV
Arsenic	mg/kg	46	BTV
Barium	mg/kg	371	BTV
Beryllium	mg/kg	2.2	BTV
Boron	mg/kg	34	BTV
Cadmium	mg/kg	0.7	BTV
Chromium	mg/kg	94	BTV
Cobalt	mg/kg	44	BTV
Copper	mg/kg	119	BTV
Lead	mg/kg	49	BTV
Lithium	mg/kg	91	BTV
Manganese	mg/kg	1,120	BTV
Molybdenum	mg/kg	3.2	BTV
Nickel	mg/kg	132	BTV
Potassium	mg/kg	14,400	BTV
Selenium	mg/kg	1	BTV
Silver	mg/kg	0.2	BTV
Sodium	mg/kg	1,780	BTV
Strontium	mg/kg	163	BTV
Thallium	mg/kg	1.2	BTV
Vanadium	mg/kg	175	BTV
Zinc	mg/kg	215	BTV
Zirconium	mg/kg	19	BTV
Hexavalent Chromium - EPA Methods 7199/7196A			
Hexavalent Chromium	mg/kg	2	BTV
Mercury - EPA Methods 7471A/7470A			
Mercury	mg/kg	0.13	BG MRL
Methyl Mercury - EPA Method 1630 (Mod)			
Methyl Mercury	µg/kg	0.05	M-L MRL

DTSC Chemical Look-Up Table for DOE NASA at SSFL

June 2013

Chemical Constituent	Units	Look-Up Table Value	Basis
PCBs / PCTs - EPA Method 8082			
Aroclor 1016	µg/kg	17	M-L MRL
Aroclor 1221	µg/kg	33	M-L MRL
Aroclor 1232	µg/kg	17	M-L MRL
Aroclor 1262	µg/kg	33	M-L MRL
Aroclor 1254	µg/kg	17	M-L MRL
Aroclor 1260	µg/kg	17	M-L MRL
Aroclor 1268	µg/kg	33	M-L MRL
Aroclor 1242	µg/kg	17	M-L MRL
Aroclor 1248	µg/kg	17	M-L MRL
Aroclor 5432	µg/kg	50	M-L MRL
Aroclor 5442	µg/kg	50	M-L MRL
Aroclor 5460	µg/kg	50	M-L MRL
Perchlorate - EPA Methods 6850/6860			
Perchlorate	µg/kg	1.63	BTV
Pesticides - EPA Method 8081A			
Aldrin	µg/kg	0.24	BG MRL
Alpha-BHC	µg/kg	0.24	BG MRL
Beta-BHC	µg/kg	0.23	BTV
Chlordane	µg/kg	7	BTV
Delta-BHC	µg/kg	0.22	BTV
Dieldrin	µg/kg	0.48	BG MRL
Endosulfan I	µg/kg	0.24	BG MRL
Endosulfan II	µg/kg	0.48	BG MRL
Endosulfan Sulfate	µg/kg	0.48	BG MRL
Endrin	µg/kg	0.48	BG MRL
Endrin Aldehyde	µg/kg	0.7	BTV
Endrin Ketone	µg/kg	0.7	BTV
Gamma-BHC - Lindane	µg/kg	0.24	BG MRL
Heptachlor	µg/kg	0.24	BG MRL
Heptachlor Epoxide	µg/kg	0.24	BG MRL
Methoxychlor	µg/kg	2.4	BG MRL
Mirex	µg/kg	0.5	BTV
p,p-DDD	µg/kg	0.48	BG MRL
p,p-DDE	µg/kg	8.6	BTV
p,p-DDT	µg/kg	13	BTV
Toxaphene	µg/kg	8.8	BG MRL

DTSC Chemical Look-Up Table for DOE NASA at SSFL

June 2013

Chemical Constituent	Units	Look-Up Table Value	Basis
Semi-Volatiles (SVOCs)/PAHs - EPA Method 8270C(SIM)			
Acenaphthylene	µg/kg	2.5	BG MRL
Anthracene	µg/kg	2.5	BG MRL
Benzo(a)anthracene	µg/kg	see note [2]	---
Benzo(a)pyrene	µg/kg	see note [2]	---
Benzo(b)fluoranthene	µg/kg	see note [2]	---
Benzo(g,h,i)perylene	µg/kg	2.5	BG MRL
Benzo(k)fluoranthene	µg/kg	see note [2]	---
Bis(2-Ethylhexyl)phthalate	µg/kg	61	BTV
Butylbenzylphthalate	µg/kg	100	BTV
Chrysene	µg/kg	see note [2]	---
Dibenz(a,h)anthracene	µg/kg	see note [2]	---
Diethyl phthalate	µg/kg	27	BG MRL
Dimethyl phthalate	µg/kg	27	BG MRL
Di-n-butylphthalate	µg/kg	27	BG MRL
Di-n-octylphthalate	µg/kg	27	BG MRL
Fluoranthene	µg/kg	5.2	BTV
Fluorene	µg/kg	3.8	BTV
Indeno(1,2,3-cd)pyrene	µg/kg	see note [2]	---
Naphthalene	µg/kg	3.6	BTV
Phenanthrene	µg/kg	3.9	BTV
Pyrene	µg/kg	5.6	BTV
1-Methyl naphthalene	µg/kg	2.5	BG MRL
2-Methylnaphthalene	µg/kg	2.5	BG MRL
Acenaphthene	µg/kg	2.5	BG MRL
Benzo(a)pyrene Equivalent			
Benzo(a)pyrene TEQ[2]	µg/kg	4.47 (see note[2])	BTV-TEQ
Other SVOCs			
Benzoic Acid - EPA 8270	µg/kg	660	M-L MRL
N-Nitrosodimethylamine - 8270C(SIM)	µg/kg	10	M-L MRL
Phenol - EPA 8270	µg/kg	170	M-L MRL
TPH - EPA Method 8015			
TPH EFH (C15-C20)[3]	mg/kg	5 (see note[3])	M-L MRL
Terphenyls - EPA Method 8015			
o-Terphenyl	mg/kg	7	M-L MRL

DTSC Chemical Look-Up Table for DOE NASA at SSFL

June 2013

Chemical Constituent	Units	Look-Up Table Value	Basis
VOCs - EPA Method 8260			
1,1-Dichloroethene	µg/kg	5	M-L MRL
1,4-Dioxane - EPA 8260 (SIM)	µg/kg	10	M-L MRL
2-Hexanone	µg/kg	10	M-L MRL
Acetone	µg/kg	20	M-L MRL
Benzene	µg/kg	5	M-L MRL
cis-1,2-Dichloroethene	µg/kg	5	M-L MRL
Ethylbenzene	µg/kg	5	M-L MRL
Hexachlorobutadiene	µg/kg	5	M-L MRL
Methylene chloride	µg/kg	10	M-L MRL
Tetrachloroethene	µg/kg	5	M-L MRL
Toluene	µg/kg	5	M-L MRL
Trichloroethene	µg/kg	5	M-L MRL
Vinyl chloride	µg/kg	5	M-L MRL

Notes:

mg/kg: milligrams per kilogram (parts per million)
µg/kg: micrograms per kilogram (parts per billion)
pg/g: picograms per gram (parts per trillion)
BTV: Background threshold value
BG-MRL: Background method reporting limit
M-L MRL: Multi-Lab method reporting limit
PAH: Polyaromatic hydrocarbon
PCB: Polychlorinated biphenyl
PCT: Polychlorinated terphenyl
RDX: Research Department Explosive
SIM: Selective ion monitoring
SVOC: Semi-volatile organic compound
TEQ: Toxicity equivalency
TPH EFH: Total petroleum hydrocarbon - extractable fuel hydrocarbon
VOC: Volatile organic compound

[1] DTSC applied the World Health Organization's 2,3,7,8-TCDD toxicity equivalence approach for dixoin-furans. To evaluate 2,3,7,8-TCDD equivalence, dixoin-furans need to meet respective background study MRLs.

[2] Benzo(a)pyrene equivalence developed based on sum of carcinogenic PAHs. In order to evaluate Benzo(a)pyrene equivalence, carcinogenic PAHs need to meet respective background study MRLs.

[3] For locations where TPH is the sole contaminant, a cleanup strategy will be considered based on the findings of soil treatability study.