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

Drainage Sediment Sampling in Area III

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

Prepared by: _____ 6/12/2012
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Introduction

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

- locating and verifying sampling points
- surface soil/sediment sampling techniques
- sample handling and shipping
- analytical, quality control, and data review
- instrument calibration and maintenance

The AOC between DTSC and DOE, signed on December 6, 2010, is a legally binding order that describes the characterization of soils/sediments in Area IV and Northern Buffer Zone (NBZ) of SSFL. The AOC also further directs that characterization of soil and sediment chemical contamination contiguous to or emanating from Area IV or NBZ shall be performed. This addendum has been developed to be compliant with the AOC for surface soils/sediments in drainages that flow from Area IV into Area III.

The AOC addresses three phases of chemical soil sampling. Phase 1 was co-located soil sampling with USEPA during which USEPA identified sample locations, conducted the sampling, and provided CDM with sample material for chemical analyses. Phase 1 was completed in April 2012. Phase 2 was co-located random sampling with USEPA in the Northern Buffer Zone; also completed during April 2012.

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

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

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

Purpose of FSP Addendum

This FSP Addendum addresses Phase 3 sampling in Area III. This sampling was originally planned to be completed under Phase 1 of the AOC, with EPA's contractor HydroGeologic, Inc. (HGL) performing the sample collection. EPA subsequently deferred sampling in Area III and has elected to co-locate sampling with DOE. The sample locations identified in this plan will be sampled by DOE's contractor, CDM Smith, with soil/sediment material provided to HGL for radionuclide characterization.

In addition, several of the drainage locations proposed to be sampled under this Addendum were identified as "future" sampling locations in the *Subarea 5C Phase 3 Data Gap Analysis Technical Memorandum, Santa Susana Field Laboratory, Ventura County, California* (MWH 2012a) and the *Subarea 5B Phase 3 Data Gap Analysis Technical Memorandum, Santa Susana Field Laboratory, Ventura County, California* (MWH 2012b[1]). Based on the data gap recommendations, DOE has determined that the sampling of drainages in Area III will be performed under Phase 3 of the AOC. Figure 1 of this FSP Addendum illustrates the proposed drainage sample locations and Table 1 provides the sampling rationale for each location.

For the samples collected from the drainages, only the top 6-inches of surface soil/sediment will be collected. CDM Smith will be responsible for all aspects of the soil/sediment sampling described in this Addendum. This includes location of each sampling point (Figure 1) in the field using a Global Positioning System (GPS) instrument. Where necessary, the mapped sample location will be adjusted in the field so that the targeted drainage feature is sampled. All final GPS sample location coordinates will be provided to the Geographic Information System (GIS) managers so that the GIS database can be updated.

CDM Smith will be responsible for the physical collection of all samples, sample container preparation, sample handling and documentation, sample shipment,

[1] MWH Americas prepared both Data Gap Analysis documents 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 these documents.

laboratory coordination, chemical analyses of the samples, and chemical data review, per the procedures and controls specified in the Master Field Sampling Plan. HGL will provide CDM Smith with radionuclide sampling containers and will specify the required volume. CDM Smith will be responsible for filling HGL's containers. Soil/sediment samples collected by CDM Smith will be analyzed for chemical analytes as identified in Table 1. The chemical analyses by location were identified through the data gap investigation process. Analytical methods and quality control criteria to be used are stipulated in Table 8-3 (Quality Control Objectives for Analytical Methods) of the QAPP (CDM Smith 2012c) and Table 6-1 (Analytical Methods, Containers, Preservatives, and Holding Times) of the Master FSP (CDM Smith 2012a).

Field Locating Sediment Sample Locations

CDM Smith will be responsible for determining the precise position of sediment 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 assessed as to the presence of cultural and biological resources for their protection.

Drainage Sediment Sampling

Sediment samples for chemical analysis will be collected at each drainage location as proposed in Table 1 and in accordance with SSFL SOP 2. CDM Smith will also collect samples to be analyzed for radionuclides at the direction of the HGL geologist who will accompany CDM Smith in the field while the samples are collected. HGL will provide their own sample containers (to be filled by CDM Smith's geologist) and advise the CDM Smith geologist of the volume of material needed at each sample location. The samples for HGL will be collected by CDM Smith in accordance with HGL's sampling procedure (from *Field Sampling Plan for Soil Sampling, Area IV Radiological Study, Santa Susana Field Laboratory, Ventura County, California* [HGL 2010]). The sampling for both chemicals and radionuclides will be performed as follows:

- Drainage surface soil samples for polycyclic aromatic hydrocarbons (PAHs), polychlorinated biphenyls (PCBs) and triphenyls (PCTs) will be collected using a slide hammer sampler lined with a stainless steel sleeve.

- For the collection of non-volatile chemical drainage surface soil samples and to be consistent with EPA sampling methods for radionuclides, the soil/sediment samples will be collected using a stainless steel shovel or spade to retrieve a discrete sample from the 0 to 6 inch-bgs interval. Before the surface soil sample is collected, the top layer of organic material containing the seed bed will be set aside (if present). After sampling activities are completed the seed bed will be returned its original position.

- The sample area will be prepared by removing leaves, grass, and surface debris. Soil will be collected from a circle approximately 12-inches in diameter to a depth of 6 inches bgs ensuring the edges are vertical to provide a representative sample. The removed soil will be placed in a stainless steel bowl for homogenization removing any debris, wood, or materials greater than 0.25 inches in size. For metals, perchlorate and dioxin analyses, the soil/sediment sample will be transferred to glass jars. For radionuclide analyses, the homogenized soil will be transferred to two (half filled) 1-gallon re-sealable plastic bags provided by HGL. If additional sample material is required to fill both bags the diameter of the excavation will be expanded and the entire sample will be re-homogenized.

- Samples for tritium and carbon-14 analysis will be collected in one 4-ounce jar. The objective of this sampling is to collect a minimally disturbed soil sample that minimizes the potential for loss from volatilization. A stainless steel trowel will be used to expose fresh soil at the edges of the original excavation. The sample jar will be positioned at the bottom of the excavation and the trowel will be used to scrape the newly exposed soil directly into the jar.

Collecting Sediment Samples from Silvernale Pond

Sample locations DG-4 through DG-7 are located in Silvernale Pond. The sampling will be performed from a rowboat and an Ekman or Ponar dredge used to collect each sample as follows:

- Lower the sampler at a controlled descent of approximately one foot per second until the sampler reaches the bottom as indicated by a slackening of the cable. Send the messenger down the cable to trip the doors of the sampler. Slowly retrieve the sampler and raise it at a controlled speed. When the sampler is at the water surface, attach a tag line to steady and pull the sampler back into the boat;

- Open and tie back any vent flaps on the sampler and carefully siphon off any overlying water over the side of the boat;

- Visually inspect the sample for acceptability (e.g., determine if an undisturbed surface layer is evident, the overlying water is not excessively turbid, and adequate penetration is achieved); if the sample is not acceptable, discard it and collect another sample from an adjacent location;

- Open the dredge and transfer the sediment into a stainless steel bowl. Continue to collect additional sediment until sufficient material has been obtained. Thoroughly mix sediment to obtain a homogeneous sample, and then transfer to the appropriate sample containers. Remove nonrepresentative materials such as twigs or debris from the sediment before collecting the sample.

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

For any locations where PID instrument readings remain above measured background readings, there is an odor, or the soil appears to be stained with hydrocarbons, samples will be collected at the sample depth interval and analyzed for VOCs, 1,4-dioxane, and total petroleum hydrocarbons-gasoline range organics (TPH-GRO) using Encore samplers, in addition to the target analytes specified in Table 1. 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 s contacts 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. Photographic documentation of sampling activities will be performed per 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.

Schedule

Sampling activities under this FSP Addendum will be initiated the week of July 16, 2012 with the locating and staking of proposed sample locations on July 16 and actual sampling starting on July 17. It is anticipated that all 16 drainage locations will be sampled in two days.

References

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

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

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

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

HGL. 2010. *Field Sampling Plan for Soil Sampling, Area IV Radiological Study, Santa Susana Field Laboratory, Ventura County, California.* October.

MWH. 2012a. *Subarea 5C Phase 3 Data Gap Analysis Technical Memorandum Santa Susana Field Laboratory, Ventura County, California.* April.

MWH. 2012b. *Subarea 5B Phase 3 Data Gap Analysis Technical Memorandum Santa Susana Field Laboratory, Ventura County, California.* May.

FIGURE 1

Co-Located Sediment Sampling Locations in Drainages Leading from Area IV

Base Map Legend

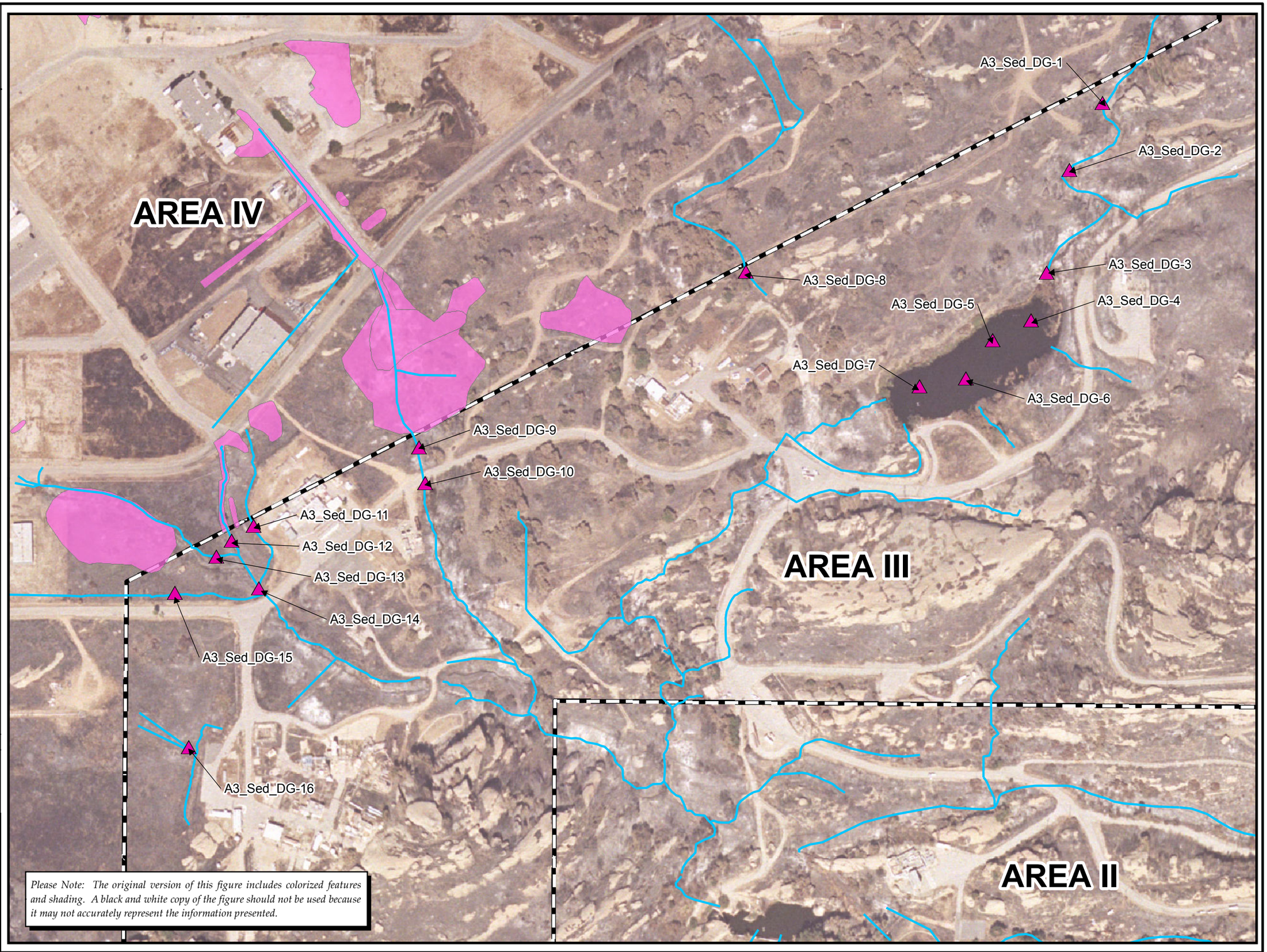
- Sediment Sampling Location
- Drainage Pathways
- Administrative Area Boundary
- Clearly Contaminated Areas

Date Prepared: 6/11/2012

Path: T:\projects\rock3\HSA\Working\EPA_Sediment_Sampling_11x17.mxd

1 inch = 250 feet

0 250 500 Feet



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

SANTA SUSANA FIELD LABORATORY

FIGURE 1

TABLE 1

Table 1
Proposed Surface Soil and Sediment Sample Locations in Area III

Location ID	Location Description	Technical Justification	Chemical Analytes
A3_Sed_DG-1	Northeast portion of Area III, north of Silvernale pond	Receives surface water runoff from the Old Conservation and New Conservation Yards and the SRE Pond in Subarea 6 of Area IV.	PAHs, PCBs/PCTs, dioxins, metals, TPH-EFH, terphenyls
A3_Sed_DG-2	Northeast portion of Area III, north of Silvernale pond	Receives surface water runoff from the Old Conservation and New Conservation Yards and the SRE Pond in Subarea 6 of Area IV.	PAHs, PCBs/PCTs, dioxins, metals, TPH-EFH, terphenyls
A3_Sed_DG-3	Northeast portion of Area III, north of Silvernale pond	Receives surface water runoff from the Old Conservation and New Conservation Yards and the SRE Pond in Subarea 6 of Area IV.	PAHs, PCBs/PCTs, dioxins, metals, TPH-EFH, terphenyls
A3_Sed_DG-4	Within Silvernale pond	Receives surface water runoff from the Old Conservation and New Conservation Yards and the SRE Pond in Subarea 6 of Area IV.	PAHs, PCBs/PCTs, dioxins, metals, TPH-EFH, terphenyls
A3_Sed_DG-5	Within Silvernale pond	Receives surface water runoff from the Old Conservation and New Conservation Yards and the SRE Pond in Subarea 6 of Area IV.	PAHs, PCBs/PCTs, dioxins, metals, TPH-EFH, terphenyls
A3_Sed_DG-6	Within Silvernale pond	Receives surface water runoff from the Old Conservation and New Conservation Yards and the SRE Pond in Subarea 6 of Area IV.	PAHs, PCBs/PCTs, dioxins, metals, TPH-EFH, terphenyls
A3_Sed_DG-7	Within Silvernale pond	Receives surface water runoff from the Old Conservation and New Conservation Yards and the SRE Pond in Subarea 6 of Area IV.	PAHs, PCBs/PCTs, dioxins, metals, TPH-EFH, terphenyls
A3_Sed_DG-8	North central portion of Area III, northwest of Silvernale pond on drainage exiting the south central portion of Subarea 5A	Receives surface water runoff from operational areas in eastern portion of Area IV.	PAHs, PCBs/PCTs, dioxins, metals, TPH-EFH, terphenyls
A3_Sed_DG-9	West central portion of Area III. Drainage exiting the south central portion of Subarea 5B.	Receives surface water runoff from Area IV Subarea 5B, through 17th Street Pond. This location adjacent to 5B_DG-798 identified in Table 3 of Subarea 5B Phase 3 Data Gap Analysis for future collection.	PAHs, PCBs/PCTs, dioxins, metals, TPH-EFH, terphenyls, perchlorate
A3_Sed_DG-10	South of location A3_Sed_DG-9.	Receives surface water runoff from Area IV Subarea 5B, through 17th Street Pond. This location adjacent to 5B_DG-798 identified in Table 3 of Subarea 5B Phase 3 Data Gap Analysis for future collection.	PAHs, PCBs/PCTs, dioxins, metals, TPH-EFH, terphenyls, perchlorate
A3_Sed_DG-11	Northwestern portion of Area III. Drainage exiting the south central portion of Subarea 5B.	Receives surface water runoff originating from PDU and Building 4006 area in Subareas 5B and 5C of Area IV.	PAHs, PCBs/PCTs, dioxins, metals, TPH-EFH, terphenyls, perchlorate
A3_Sed_DG-12	Northwestern portion of Area III. Drainage exiting southeast portion of Subarea 5C.	Receives surface water runoff from most of Area IV Subareas 5B and 5C. This location identified in Table 3 of Subarea 5C Phase 3 Data Gap Analysis as 5C_DG-749 for future collection.	PAHs, PCBs/PCTs, dioxins, metals, TPH-EFH, terphenyls, perchlorate
A3_Sed_DG-13	Northwestern portion of Area III. Drainage originating north of Building 4015, and exiting the southeastern portion of Subarea 5C.	Receives surface water runoff from Area IV Subarea 5C only. This location identified in Table 3 of Subarea 5C Phase 3 Data Gap Analysis as 5C_DG-748 for future collection.	PAHs, PCBs/PCTs, dioxins, metals, TPH-EFH, terphenyls, perchlorate
A3_Sed_DG-14	Northwestern portion of Area III.	Receives surface water runoff from the four drainages on which locations A3_Sed_DG-11, -12, -13, and -15 are located. This location is slightly updrainage of 5C_DG-511 identified in Table 3 of Subarea 5C Phase 3 Data Gap Analysis for future collection.	PAHs, PCBs/PCTs, dioxins, metals, TPH-EFH, terphenyls, perchlorate
A3_Sed_DG-15	Northwestern corner of Area III.	Receives surface water runoff from Area IV Subarea 5C only. This location identified in Table 3 of Subarea 5C Phase 3 Data Gap Analysis as 5C_DG-753 for future collection.	PAHs, PCBs/PCTs, dioxins, metals, TPH-EFH, terphenyls, perchlorate
A3_Sed_DG-16	Western portion of Area II.	Receives surface water runoff from areas of surface disturbance and possible container storage in Area IV Subarea 5D.	PAHs, PCBs/PCTs, dioxins, metals, TPH-EFH, terphenyls

NOTES:

Metals include mercury

PAHs = polycyclic aromatic hydrocarbons

PCBs/PCTs = polycyclic biphenyls/polycyclic triphenyls

PDU = Process Development Unit

SRE = Sodium Reactor Experiment

TPH-EFH = total petroleum hydrocarbons-extractable fuel hydrocarbons