Work Plan for Chemical Data Gap Investigation Phase 3 Soil Chemical Sampling at Area IV, Santa Susana Field Laboratory Ventura County, California

Prepared for:

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

Prepared by:

CDM Federal Programs Corporation
555 17th Street, Suite 1200
Denver, Colorado 80202

Prepared under:

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

April 2012

Work Plan for Chemical Data Gap Investigation Phase 3 Soil Chemical Sampling at Area IV Santa Susana Field Laboratory Ventura County, California

Contract DE-AM09-05SR22404
CDM Smith Task Order DE-AT30-08CC60021/ET17

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:
Mike Hoffman, P.G.
CDM Smith
Project Geologist

REGISTERED GEOLOGIST
MICHAEL J. HOFFMAN
REGISTERED GEOLOGIST
NO. 7735
STATE OF CALIFORNIA

4/11/2012
Date

Approved by:
John Wondolleck
CDM Smith
Project Manager

4/11/2012
Date

Concurrence by:
Jo Nell Mullins
CDM Smith
QA Coordinator

4/11/2012
Date

Concurrence by:
Shawn Oliveira, CIH, CSP
CDM Smith
Health and Safety Manager

4/11/2012
Date

Concurrence by:
Dee Warren
CDM Smith
Program Manager

4/11/2012
Date

Table of Contents

Appendices

List of Tables

List of Figures

Acronyms and Abbreviations

AHA	activity hazard analysis
AOC	Administrative Order on Consent for Remedial Action
BaP	benzo(a)pyrene
BHC	benzene hexachloride
Boeing	The Boeing Company
CAR	corrective action request
CAS	Chemical Abstracts Service
CDM Smith	CDM Federal Programs Corporation
CFR	Code of Federal Regulations
D&D	decontamination and decommissioning
DDD	dichlorodiphenyl dichloroethane
DDE	dichlorodiphenyl dichloroethylene
DDT	dichlorodiphenyl trichloroethane
DOE	United States Department of Energy
DQI	data quality indicator
DQO	data quality objective
DTSC	California Department of Toxic Substances Control
EDB	ethylene dibromide
EDD	electronic data deliverable
EFH	Extractable Fuel Hydrocarbon
EPA	United States Environmental Protection Agency
ETEC	Energy Technology Engineering Center
FTL	field team leader
GIS	geographic information system
H&S	health and safety
HASP	Health and Safety Plan
HAZWOPER	Hazardous Waste Operations and Emergency Response
HGL	Hydrogeologic, Inc.
HpCDD	heptachlorodibenzo-p-dioxin
HpCDF	heptachlorodibenzofuran
HSA	Historic Site Assessment
HxCDD	hexachlorodibenzo-p-dioxin
HxCDF	hexachlorodibenzofuran
ISL	Interim Screening Level
ISMS	Integrated Safety Management System
Master FSP	Master Field Sampling Plan
MCPA	2-methyl-4-chlorophenoxyacetic acid
MCPP	methylchlorophenoxypropionic acid
MDL	Method Detection Limit
MEK	methyl ethyl ketone (2-butanone)
MIBK	methyl isobutyl ketone (4-methyl-2-pentanone)
MTBE	methyl tert-butyl ether
MWH	MWH Americas
NASA	National Aeronautics and Space Administration
NBZ	Northern Buffer Zone
NDMA	N-nitrosodimethylamine
OCDD	octachlorodibenzo-p-dioxin
OCDF	octachlorodibenzofuran
PAH	Polynuclear Aromatic Hydrocarbons
PCB	Polychlorinated Biphenyls
PCT	Polychlorinated Terphenyls

PeCDD	pentachlorodibenzo-p-dioxin
PeCDF	pentachlorodibenzofuran
PEF	Potency Equivalency Factor
PETN	pentaerythritol tetranitrate
PM	project manager
PQM	project quality management
QA	quality assurance
QAPP	quality assurance project plan
QC	quality control
QIP	quality implementation procedure
RCRA	Resource Conservation and Recovery Act
RFI	RCRA Facility Investigation
RL	reporting limit
SIM	Selective Ion Monitoring
SVOC	Semi-Volatile Organic Compounds
SOP	standard operating procedure
SRAIP	Soil Remedial Action Implementation Plan
SSFL	Santa Susana Field Laboratory
SSHO	Site Safety Health Officer
TCDD	tetrachlorodibenzo-p-dioxin
TCDF	tetrachlorodibenzofuran
TEF	Toxic Equivalency Factor
TEQ	Toxicity Equivalent
TIC	tentatively identified compound
VOC	Volatile Organic Compound
WSHP	Worker Safety and Health Program

Section 1

Work Plan Purpose

1.1 Overview

The California Department of Toxic Substances Control (DTSC) and the United States Department of Energy (DOE) entered into an Administrative Order on Consent for Remedial Action (AOC; Docket No. HSA-CO 10/11-037) on December 6, 2010. The AOC describes three chemical investigation activities to be completed with Area IV and the Northern Buffer Zone (NBZ) at the Santa Susana Field Laboratory (SSFL):

- Phase 1, Co-Located Samples
- Phase 2, Co-Located Samples from Random Locations
- Phase 3, Chemical Data Gap Investigation

Phase 1 Co-Located Samples investigation consisted of chemical analysis of soil at locations where the United States Environmental Protection Agency (EPA) collected radiological analysis samples. The Phase 1 investigation has been completed. Phase 2 random sampling will also involve collection of soil samples with EPA at locations identified by EPA. Because Phase 2 is a continuation of co-located soil chemical sampling, the Phase 2 sampling will be governed by a Field Sampling Plan Addendum to the Co-Located Soil Chemical Sampling Program. Phase 3 sampling under the chemical data gap investigation is the focus of this Chemical Data Gap Investigation Work Plan (Work Plan).

This Work Plan addresses the methodologies being implemented to complete the Phase 3, Chemical Data Gap Investigation for Area IV and the NBZ of the SSFL (the primary study area for the Phase 3 investigation). The specific objective of the Chemical Data Gap Investigation is to identify the nature and extent (vertical and lateral) of contamination for cleanup remedy evaluation. As required in the AOC, the Work Plan shall have three components used for the completion of the soil chemical characterization of Area IV: (1) Field Sampling Plan, hereafter referred to as the Master Field Sampling Plan (Master FSP); (2) Quality Assurance Project Plan (QAPP); and (3) Worker Safety and Health Program (WSHP) which includes the Site Specific Health and Safety Plan.

The AOC also provides an allowance for DOE to propose and/or modify any methods, or initiate new activities for which no Master FSP, QAPP, WSHP, or other necessary procedures/plans have been established. In this case, DOE shall prepare an addendum to the approved plan(s) for DTSC review and approval prior to modifying the method or initiating new activities.

CDM Federal Programs Corporation (CDM Smith) has been contracted by DOE to conduct a variety of environmental support activities assisting in the closure of DOE's Energy Technology Engineering Center (ETEC) at SSFL. These activities include, but are not limited to, providing community participation support; reviewing historical documents needed to understand the environmental uses at ETEC; conducting biological and cultural resource surveys; preparing an Environmental Impact Statement; sampling environmental media (soil, water, air, biological, etc.); and characterizing building material waste, as necessary, to describe the impacts of the final decontamination and decommissioning (D&D) and demolition of ETEC. CDM Smith's scope does not include the operation, management, D&D, or demolition of any structures related to ETEC.

To accomplish the work, CDM Smith has developed this Work Plan to comply with AOC and to govern work to be performed by CDM Smith, and subcontractors on behalf of CDM Smith, under contract number DE-AM09-05SR22404 with the DOE, for environmental planning and support activities within Area IV and the NBZ. The Work Plan describes CDM Smith's methods for complying with DOE's contractual requirements as well as other appropriate regulation/guidance pertaining to this work.

The purpose of the Work Plan is to provide an over-arching or umbrella document for the contract that describes CDM Smith's approach, methodologies, and hierarchy of project plans and supporting documents that contain activity-specific information and methodology.

Figure 1-1 shows CDM Smith's hierarchy of documents that will be described in this Work Plan.

1.2 AOC Data Gap Investigation Elements

In accordance with the AOC (Docket No. **HSA-CO 10/11 – 037**), the Phase 3, Chemical Data Gap Investigation shall have the following components:

- Schedule for Chemical Data Gap Investigation – no later than 30 days after completion of the Radiological Investigation Activities, the Phase 1: Co-Located Samples and the Phase 2: Co-Located Samples from Random Locations, DOE shall submit to DTSC a schedule for the completion of a Chemical Data Gap Investigation.
- Scoping for Chemical Data Gap Investigation – Prior to submittal of a Work Plan, DOE and DTSC shall meet to determine the scope of the Chemical Data Gap Investigation.
- Work Plan for Chemical Data Gap Investigation – DOE shall prepare and submit to DTSC for review and approval this detailed Work Plan. The Work Plan shall include Master FSP, QAPP, and WSHP.
- Implementation of Chemical Data Gap Investigation – Upon DTSC's approval, DOE shall implement the approved Work Plan.
- Addendum to Work Plan for Chemical Data Gap Investigation – If DOE proposes to modify any methods or initiates new activities for which no Master FSP, QAPP, WSHP, or other necessary procedures/plans have been established, DOE shall prepare an addendum to the approved plan(s) for DTSC review and approval prior to modifying the method or initiating new activities.

This Work Plan has been prepared to meet the requirements of the AOC and, specifically, provide a means for additional soil chemical data collection to support the Soil Remedial Action Implementation Plan (SRAIP). The SRAIP will serve as the soil cleanup remedy evaluation document that will describe where and how much soil will require cleanup.

The Chemical Data Gap Investigation includes evaluation of data needs for extent of soil contamination determination, soil to groundwater pathway assessment, and for soil gas characterization. This Work Plan only addresses the additional soil characterization requirements. Additional or supplemental work plans will be developed that will describe necessary groundwater investigations or soil gas sampling identified as data gaps under the overall data gap investigation.

1.3 Work Plan Organization

This Work Plan includes the following sections:

- **Section 1 Purpose** – Summarizes the purpose and scope of the Work Plan
- **Section 2 Background** – Summarizes the site location, previous radiological and chemical investigations, and data gap identification process
- **Section 3 Project Organization** – Identifies the roles of all entities engaged in this project
- **Section 4 Scope** – Provides general requirements for management, quality, safety, and data
- **Section 5 Project Plans** – Provides specific requirements for Master FSP, QAPP, and WSHP
- **Section 6 Documentation, Records, and Reporting** – Describes requirements and procedures for documenting all aspects of sample collection, custody, and analytical reporting
- **Section 7 Schedule** – Provides general schedule for implementation of the Work Plan
- **Section 8 References**

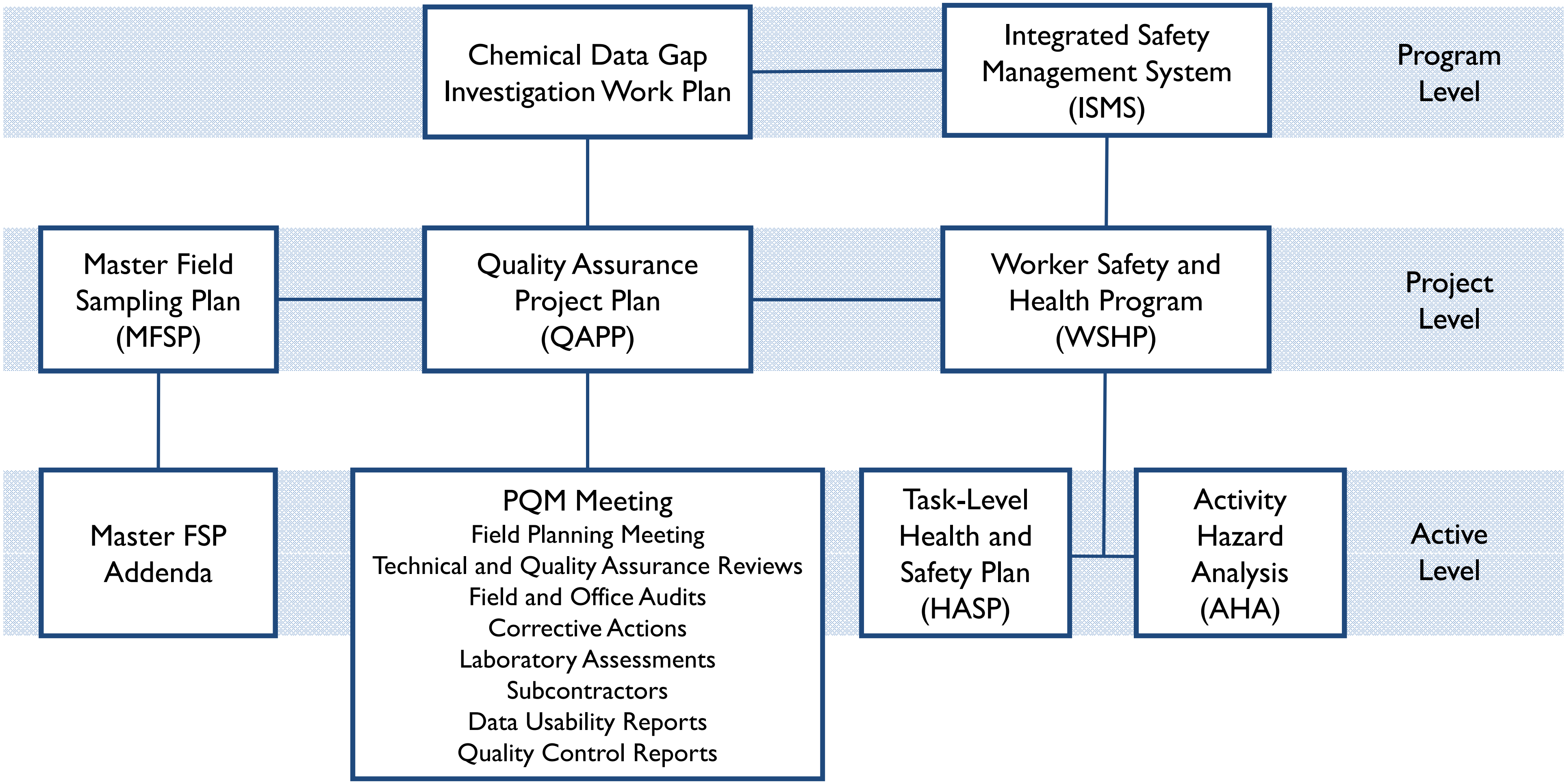


Figure 1-1
CDM Smith's Hierarchy of Documents

Section 2

Background

2.1 Site Location and Description

The SSFL is located in southeastern Ventura County, California, and has an area of approximately 2,850 acres near Simi Valley (Figure 2-1). The SSFL is separated into four administrative areas (Figure 2-2) and subareas (Figure 2-3). The Boeing Company (Boeing) owns most of Area I, except for 42 acres that are owned by the federal government and administered by the National Aeronautics and Space Administration (NASA). Area II is also owned by the federal government and administered by NASA. The NASA portions are operated by Boeing. Boeing owns and operates Areas III and IV. The SSFL facility includes, within Area IV, a specific operational area that was dedicated to the development and testing of components used in metallic sodium systems that was a part of the federal government's ETEC. Areas I, II, and III were used by predecessors of Boeing, NASA, and the Department of Defense for rocket engine and laser testing. Environmental contamination resulting from activities in Areas I, II, and III is the responsibility of Boeing and NASA and is not part of the scope of the sampling effort that is guided by this Work Plan. DOE was and remains responsible for operation of the ETEC located in Area IV.

From the mid-1950s until the mid-1990s, DOE and its predecessor agencies were engaged in or sponsored nuclear operations including the development, fabrication, disassembly, and examination of nuclear reactors, reactor fuel, and other radioactive materials. Associated experiments included large-scale liquid sodium metal testing for fast breeder reactor components. Nuclear operations at ETEC included 10 nuclear research reactors, seven critical facilities, the Hot Laboratory, the Nuclear Materials Development Facility, the Radioactive Materials Handling Facility, and various test and radioactive material storage areas. In addition to the handling and processing of radioactive materials, these DOE facilities also used non-radioactive chemicals, a variety of specialty metals, and other hazardous materials (e.g., polychlorinated biphenyls [PCBs], solvents, and lead-based paints) in their operations.

All nuclear research in Area IV was terminated in 1988 when DOE shifted its focus at SSFL from research to D&D. D&D of the sodium test facilities started in 1996, when DOE determined that the entire ETEC facility was surplus to its mission. At that time, DOE began formal closure of its facilities in Area IV and began cleanup activities in preparation for return of the property to Boeing. DOE discontinued decontamination and demolition of the remaining facilities in 2008, but has continued surveillance, maintenance, monitoring, and investigation activities. This includes prior investigation of soil and groundwater, as required under the DTSC Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI) and the EPA radiological investigation.

2.2 Scope of Data Gap Investigation Process

The origin of the SSFL Area IV Chemical Data Gap Investigation is the AOC signed by DOE and DTSC. The AOC requires a chemical data gap investigation to identify locations within Area IV, the NBZ, or contiguous areas where additional chemical investigation is necessary. Per the AOC (Section 2.5.3.2):

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

This section of the Work Plan describes the data evaluation process that will be used to identify data gaps, including where the gaps exist and the chemical types (chemical analyses) needed to address the data gap. Data gaps exist where more information is needed for DTSC and DOE to make remedial planning decisions, (i.e., whether soil contamination exists, and if so, to what extent). The basis of the investigation will be derived from EPA's seven-step data quality objective (DQO) process that presents a systematic approach to address chemical sampling needs, address existing data gaps, and obtain environmental data and information required for future remedial planning. The DQOs are the framework for the investigation described in this Work Plan and are outlined in Section 4.0 of the Master FSP (Appendix A).

2.2.1 Data Gap Investigation Process

The data gap investigation process described in this section of the Work Plan will be iterative. During the first steps of the gap investigation, data will be compared with the interim screening levels (ISLs) developed for evaluating available data (see Table 2-1). The ISLs were developed jointly by DTSC and DOE and reflect the 2005 background soil concentrations for metals and dioxins, and analytical method reporting limits for chemicals not having a background value. In the future, background values will be updated based on the ongoing DTSC soil chemical background study and evaluation of the precision and accuracy requirements for method reporting limits. Ultimately all data collected, including EPA radionuclide data, will be evaluated based on the final soil cleanup values (soil look-up table values) per the AOC. Therefore, a final data gap analysis may be required incorporating data collected under this Work Plan, all prior chemical data, and EPA radionuclide results.

The data gap investigation addressed in this Work Plan will include the available results from EPA's radiological investigation activities (e.g., gamma surveys, geophysical surveys area photograph interpretations), prior RFI results, the Phase 1 co-located sample results, and historical information on activities within Area IV.

---

[1] According to the AOC, the Phase 2 random sampling is to be conducted with EPA. EPA has identified its plans for random sampling within the NBZ. DOE and DTSC will use the results from Phase 2 sampling within the NBZ to assess any additional sampling for that area.

Table 2-1 Area IV Soil Interim Screening Levels for Chemical Data Gap Investigation			
Chemicals	**Interim Screening Level**	**Chemicals**	**Interim Screening Level**
Volatile Organic Compounds (VOCs) by EPA 8260B (µg/kg)			
1,1,1,2-Tetrachloroethane	**5**	Chlorobenzene	**5**
1,1,1-Trichloroethane	**5**	Chloroethane	**5.37**
1,1,2,2-Tetrachloroethane	**5**	Chloroform	**5**
1,1,2-Trichloro-1,2,2-trifluoroethane	**5.37**	Chloromethane	**5.37**
1,1,2-Trichloroethane	**5**	Chlorotrifluoroethylene	**5.37**
1,1-Dichloroethane	**5**	cis-1,2-Dichloroethene	**5**
1,1-Dichloroethene	**5**	cis-1,3-Dichloropropene	**5**
1,1-Dichloropropene	**5**	Di isopropyl ether	**5**
1,2,3-Trichlorobenzene	**20**	Dibromochloromethane	**5**
1,2,3-Trichloropropane	**5**	Dibromomethane	**5**
1,2,4-Trichlorobenzene	**20**	Dichlorobenzenes	**10**
1,2,4-Trimethylbenzene	**20**	Dichlorodifluoromethane	**5.37**
1,2-Dibromo-3-chloropropane	**20**	Ethyl tertiary butyl ether	**5**
1,2-Dibromoethane (EDB)	**20**	Ethylbenzene	**5**
1,2-Dichlorobenzene	**5**	Hexachlorobutadiene	**20**
1,2-Dichloroethane	**5**	Isopropylbenzene	**20**
1,2-Dichloropropane	**5**	m, p-Xylene	**5.37**
1,3,5-Trimethylbenzene	**20**	m+p Cresol	**320**
1,3-Dichlorobenzene	**5**	Methylene chloride	**10**
1,3-Dichloropropane	**5**	Methyl-tert-butyl-ether (MTBE)	**5.37**
1,3-Dichloropropene	**2**	n-Butylbenzene	**20**
1,4-Dichlorobenzene	**5**	n-Propylbenzene	**20**
1,4-Dioxane	**13**	o-Xylene	**5**
1-Chlorohexane	**2**	p-Isopropyltoluene	**20**
2,2-Dichloropropane	**5**	sec-Butylbenzene	**20**
2-Butanone (MEK)	**20**	Styrene	**5**
2-Chloro-1,1,1-trifluoroethane	**5.37**	tert-Butylbenzene	**20**
2-Chloroethyl vinyl ether	**53.7**	Tertiary amyl methyl ether	**5**
2-Chlorotoluene	**20**	Tertiary butyl alcohol	**5**
2-Hexanone	**20**	Tetrachloroethene	**5**
4-Chlorotoluene	**20**	Toluene	**5**
4-Methyl-2-pentanone (MIBK)	**20**	Total 1,2-Dichloroethene	**5**
Acetone	**20**	trans-1,2-Dichloroethene	**5**
Benzene	**5**	trans-1,3-Dichloropropene	**5**
Bromobenzene	**5.37**	Trichloroethene	**5**
Bromochloromethane	**5.37**	Trichlorofluoromethane	**5.37**
Bromodichloromethane	**5**	Trichlorotrifluorethane	**5**
Bromoform	**5.37**	Vinyl acetate	**5**
Bromomethane	**5.37**	Vinyl chloride	**5**
Carbon disulfide	**5**	Xylenes, Total	**5**
Carbon tetrachloride	**5**		
Semi-Volatile Organic Compounds (SVOCs) by Method 8270C (µg/kg)			
1,2,3,4-Tetrahydronaphthalene (Tetralin)[1]	**167**	Azobenzene	**5**
1,2-Diphenylhydrazine/Azobenzene	**338**	Benzidine	**3,700**
2,4,5-Trichlorophenol	**338**	Benzo(e)pyrene	**1.96**
2,4,6-Trichlorophenol	**338**	Benzoic acid	**851**
2,4-Dichlorophenol	**338**	Benzyl alcohol	**550**
2,4-Dimethylphenol	**338**	Biphenyl	**5**
2,4-Dinitrophenol	**2,200**	bis(2-Chloroethoxy)methane	**338**
2,6-Dichlorophenol	**250**	Bis(2-chloroethyl)ether	**338**
2-butoxyethanol (Dowanol EB)[1]	**167**	Bis(2-chloroisopropyl)ether	**338**

Table 2-1 Area IV Soil Interim Screening Levels for Chemical Data Gap Investigation			
Chemicals	**Interim Screening Level**	**Chemicals**	**Interim Screening Level**
2-Chloronaphthalene	**338**	bis(2-Ethylhexyl) phthalate	**360**
2-Chlorophenol	**338**	Butyl benzyl phthalate	**338**
2-Methylphenol	**338**	Carbazole	**180**
2-Nitroaniline	**338**	Dibenzofuran	**338**
2-Nitrophenol	**338**	Diethyl phthalate	**338**
2-phenoxyethanol (Dowanol EP)[1]	**167**	Dimethyl phthalate	**335**
3,3-Dichlorobenzidine	**851**	Di-n-butyl phthalate	**338**
3,5-Dimethylphenol	**180**	Di-n-octyl phthalate	**338**
3-Nitroaniline	**338**	Diphenylamine	**5**
4,6-Dinitro-2-methylphenol	**677**	Hexachlorobenzene	**338**
4-Bromophenyl-phenylether	**338**	Hexachlorocyclopentadiene	**851**
4-Chloro-3-methylphenol	**338**	Hexachloroethane	**338**
4-Chloroaniline	**338**	Isophorone	**338**
4-Chlorophenyl-phenylether	**338**	n-Nitroso-di-n-propylamine	**338**
4-Methylphenol	**338**	n-Nitrosodiphenylamine	**180**
4-Nitroaniline	**851**	n-Nitrosodiphenylamine as Diphenylamine	**338**
4-Nitrophenol	**851**	Pentachlorophenol	**851**
Acrolein	**100**	Perylene	**1.96**
Acrylonitrile	**100**	Phenol	**338**
Aniline	**550**	Pyridine	**170**
Polynuclear Aromatic Hydrocarbons (PAHs) by EPA 8270CSIM (µg/kg)			
1-Methyl naphthalene	**21.1**	Chrysene	**21.3**
2-Methylnaphthalene	**21.1**	Dibenzo(a,h)anthracene	**20**
Acenaphthene	**21.1**	Fluoranthene	**20.5**
Acenaphthylene	**21.1**	Fluorene	**21.1**
Anthracene	**21.1**	Indeno(1,2,3-cd)pyrene	**21.3**
Benzo(a)anthracene	**19.9**	Naphthalene	**21.1**
Benzo(a)pyrene	**21.1**	Phenanthrene	**21.1**
Benzo(b)fluoranthene	**21.1**	Pyrene	**20.2**
Benzo(ghi)perylene	**21.1**	Benzo(a)pyrene [BaP] TEQ[2]	**21.1**
Benzo(k)fluoranthene	**20.4**		
NDMA by EPA 8270C SIM (µg/kg)		**NDMA by EPA 1625 (µg/kg)**	
n-Nitrosodimethylamine	**25**	n-Nitrosodimethylamine	**0.037**
Perchlorate by EPA 314.1 (µg/kg)		**Perchlorate EPA by 6850 (µg/kg)**	
Perchlorate (soil)	**30**	Perchlorate	**5.5**
Perchlorate (as 1:1 water extraction/leachate)[3]	**4**		
Metals by EPA 6010B and 6020A (mg/kg)			
Aluminum	**20,000**	Manganese	**495**
Antimony	**8.7**	Mercury	**0.09**
Arsenic	**15**	Molybdenum	**5.3**
Barium	**140**	Nickel	**29**
Beryllium	**1.1**	Phosphorus	**10**
Boron	**9.7**	Potassium	**6,400**
Cadmium	**1**	Selenium	**0.655**
Calcium	**20**	Silver	**0.79**
Chromium	**36.8**	Sodium	**110**
Chromium VI	**3.2**	Strontium	**0.495**
Cobalt	**21**	Thallium	**0.46**
Copper	**29**	Tin	**10.9**
Iron	**28,000**	Titanium	**0.995**
Lead	**34**	Vanadium	**62**

Table 2-1 Area IV Soil Interim Screening Levels for Chemical Data Gap Investigation			
Chemicals	**Interim Screening Level**	**Chemicals**	**Interim Screening Level**
Lithium	**37**	Zinc	**110**
Magnesium	**10**	Zirconium	**8.6**
Anions by EPA 300.0/9056A (mg/kg)			
Ammonia	**5**	Nitrate-NO3	**1.5**
Bromide	**5**	Nitrite-NO2	**5**
Chloride	**5**	Phosphate	**21**
Fluoride	**6.7**	Sulfate	**5.2**
Cyanide by EPA 9012B (mg/kg)		**pH by EPA 9045D (ph Units)**	
Cyanide	**0.55**	pH	**8.86**
Formaldehyde by EPA 8315A (mg/kg)			
Formaldehyde	**1.7**		
Polychlorinated Biphenyls (PCBs) and Polychlorinated Terphenyls (PCTs) by EPA 8082A (µg/kg)			
Aroclor 1016 (PCB mixture)	**20.5**	PCB 156 (congener)	**0.05**
Aroclor 1221 (PCB mixture)	**20.5**	PCB 157 (congener)	**0.05**
Aroclor 1232 (PCB mixture)	**20.5**	PCB 167 (congener)	**0.05**
Aroclor 1242 (PCB mixture)	**20.5**	PCB 169 (congener)	**0.05**
Aroclor 1248 (PCB mixture)	**20.5**	PCB 170 (congener)	**0.05**
Aroclor 1254 (PCB mixture)	**20.5**	PCB 18 (congener)	**0.05**
Aroclor 1260 (PCB mixture)	**20.5**	PCB 180 (congener)	**0.05**
Aroclor 1262 (PCB mixture)	**7.7**	PCB 187 (congener)	**0.05**
Aroclor 1268 (PCB mixture)	**7.7**	PCB 189 (congener)	**0.05**
Aroclor 5432 (PCT mixture)	**51.6**	PCB 195 (congener)	**0.12**
Aroclor 5442 (PCT mixture)	**51.6**	PCB 206 (congener)	**0.1**
Aroclor 5460 (PCT mixture)	**77**	PCB 28 (congener)	**0.05**
PCB 105 (congener)	**0.1**	PCB 44 (congener)	**0.05**
PCB 114 (congener)	**0.05**	PCB 52 (congener)	**0.05**
PCB 118 (congener)	**0.05**	PCB 66 (congener)	**0.05**
PCB 123 (congener)	**0.05**	PCB 77 (congener)	**0.05**
PCB 126 (congener)	**0.05**	PCB 8 (congener)	**0.01**
PCB 128 (congener)	**0.05**	PCB 81 (congener)	**0.05**
PCB 138 (congener)	**0.05**	PCB 90/101 (congener)[4]	**nv**
PCB 153 (congener)	**0.05**	Polychlorinated biphenyls	**50**
Energetics by EPA EPA 8330A (µg/kg)			
1,3,5-Trinitrobenzene	**400**	3-Nitrotoluene	**400**
1,3-Dinitrobenzene	**400**	4-Amino-2,6-dinitrotoluene	**400**
2,4,6-Trinitrotoluene	**400**	4-Nitrotoluene	**400**
2,4-diamino-6-nitrotoluene	**400**	HMX	**410**
2,4-Dinitrotoluene	**400**	Nitrobenzene	**400**
2,6-diamino-4-nitrotoluene	**400**	Nitroglycerin	**3,300**
2,6-Dinitrotoluene	**400**	PETN	**3,300**
2-Amino-4,6-dinitrotoluene	**400**	RDX	**400**
2-Nitrotoluene	**400**	Tetryl	**400**
Pesticides by EPA 8081B (µg/kg)			
4,4'-DDD	**5.13**	Endosulfan sulfate	**5.13**
4,4'-DDE	**5.13**	Endrin	**5.13**
4,4'-DDT	**5.13**	Endrin aldehyde	**5.13**
a-Chlordane	**5**	Endrin ketone	**5.13**
Aldrin	**5.13**	gamma-BHC	**10.5**
alpha-BHC	**5.13**	gamma-Chlordane	**5**
beta-BHC	**5.13**	Heptachlor	**5.13**
Chlordane	**11.3**	Heptachlor epoxide	**5.13**
delta-BHC	**10.5**	Mirex	**0.77**

Table 2-1 Area IV Soil Interim Screening Levels for Chemical Data Gap Investigation			
Chemicals	**Interim Screening Level**	**Chemicals**	**Interim Screening Level**
Dieldrin	**5.13**	p,p'-Methoxychlor	**5.13**
Endosulfan I	**5.13**	Toxaphene	**68.8**
Endosulfan II	**10.5**		
Herbicides by EPA 8151A (μg/kg)			
2,4,5-T	**25**	Dichlorprop	**81.1**
2,4,5-Trichlorophenoxypropionic acid	**81.1**	Dinoseb	**25**
2,4-Dichlorophenoxyacetic Acid (2,4-D)	**25**	Iodomethane	**10**
2,4-Dichlorophenoxybutyric acid	**83.7**	MCPA	**8,110**
Dalapon	**50.7**	MCPP	**8,110**
Dicamba	**40.6**		
Dioxins/Furans by EPA 1613B (ng/kg)			
1,2,3,4,6,7,8-HpCDD	**13**	2,3,7,8-TCDD	**0.5**
1,2,3,4,6,7,8-HpCDF	**2.5**	2,3,7,8-TCDF	**1.8**
1,2,3,4,7,8,9-HpCDF	**0.19**	OCDD	**140**
1,2,3,4,7,8-HxCDD	**0.34**	OCDF	**8.1**
1,2,3,4,7,8-HxCDF	**0.73**	TCDD TEQ[5]	**0.87**
1,2,3,6,7,8-HxCDD	**0.95**	Total HpCDD	**4.9**
1,2,3,6,7,8-HxCDF	**0.3**	Total HpCDF	**4.9**
1,2,3,7,8,9-HxCDD	**1.1**	Total HxCDD	**4.9**
1,2,3,7,8,9-HxCDF	**0.43**	Total HxCDF	**4.9**
1,2,3,7,8-PeCDD	**0.18**	Total PeCDD	**4.9**
1,2,3,7,8-PeCDF	**0.59**	Total PeCDF	**4.9**
2,3,4,6,7,8-HxCDF	**0.45**	Total TCDD	**0.99**
2,3,4,7,8-PeCDF	**0.64**	Total TCDF	**0.97**
Total Petroleum Hydrocarbons (TPH) by EPA 8015B (mg/kg)			
Gasoline (C4-C12)	**1**	EFH(C15-C20)	**5.09**
EFH(C8-C11)	**5.05**	EFH(C21-C30)	**5.09**
EFH(C12-C14)	**5.05**	Oil (C30-C40)	**1.4**
Glycols by EPA 8015B (mg/kg)		**Terphenyls by EPA 8015B (mg/kg)**	
Diethylene Glycol	**25**	o-Terphenyl	**3.9**
Ethylene Glycol	**25**	m-Terphenyl	**3.9**
Propylene Glycol	**25**	p-Terphenyl	**3.9**
Triethylene glycol	**25**		
Alcohols by EPA 8015B (mg/kg)		**Hydrazine Compounds by EPA 8315A(μg/kg)**	
Ethanol	**6.21**	Hydrazine	**2.2**
Isopropanol	**0.55**	Monomethyl hydrazine	**5.3**
Methanol	**0.55**	Unsymetrical Dimethyl Hydrazine	**5.3**
Asbestos by EPA 600/R-93/116 (percent)			
Chrysotile	**1**	Anthophyllite	**1**
Amosite	**1**	Tremolite	**1**
Crocidolite	**1**	Actinolite	**1**
Organic Metals NOAA Status and Trends (mg/kg)			
Tributyl tin	**1.57**		
Organic Lead	**0.3**		
Methyl Mercury	**0.12**		

Table 2-1 Area IV Soil Interim Screening Levels for Chemical Data Gap Investigation

Chemicals	Interim Screening Level	Chemicals	Interim Screening Level

Notes:

1 Tentatively Identified Compounds (TICs) not included in data presentations for Data Screening Technical Memoranda, with the exception of 1,2,3,4- Tetrahydronaphthalene ("tetralin"), 2-butoxyethanol (Dowanol EB), and 2-phenoxyethanol (Dowanol EP) since these are known site-related chemicals. By definition, TICs have no associated RL.

2 Benzo(a)pyrene [BaP] TEQ: PAHs will be screened using BaP TEQs, calculated using Cal/EPA Cancer Potency Equivalency Factors (PEFs) (DTSC HERO HHRA note Number :4, June 2011) . These are calculated results and, therefore, will have no associated RL source. The BaP ISL was selected as the BaP TEQ ISL.

3 RFI perchlorate samples were analyzed using USEPA Method 314 as 1:1 soil weight to water volume leachate; results are equivalent to ppb and can be reported in either µg/kg or µg/L. Typically the lab reports perchlorate leachates in wet units (µg/L), but for consistency in the table they are presented here as µg/kg.

4 PCB Congener PCB 90/101 was analyzed and reported only once in historical Area IV Data. The result was a detect of 22 µg/kg, with no associated RL reported; therefore this congener has no ISL value (nv).

5 TCDD TEQ: Dioxin toxicity equivalents (TEQs) are calculated using 2005 World Health Organization (WHO) toxic equivalency factors (TEFs) and non-detect (ND) = 0. These values are formula-driven (calculated results) from the "Interim" Background Comparison Values for Dioxins.

Abbreviations:

BaP = Benzo(a)Pyrene
BHC = Benzene hexachloride
CAS = Chemical Abstracts Service
DDD = Dichlorodiphenyl dichloroethane
DDE = Dichlorodiphenyl dichloroethylene
DDT = dichlorodiphenyl trichloroethane
DTSC = California Department of Toxic Substances Control
EDB = Ethylene dibromide
EFH = Extractable Fuel Hydrocarbons
EPA = Environmental Protection Agency
HpCDD = Heptachlorodibenzo-p-dioxin
HpCDF = Heptachlorodibenzofuran
HxCDD = Hexachlorodibenzo-p-dioxin
HxCDF = Hexachlorodibenzofuran
MCPA = 2-methyl-4-chlorophenoxyacetic acid
MCPP = methylchlorophenoxypropionic acid
MDL = Method Detection Limit
MEK = Methyl Ethyl Keytone
MIBK = Methyl Isobutyl Keytone
MTBE = Methyl tert-butyl ether
NDMA = N-Nitrosodimethylamine
OCDD = Octachlorodibenzo-p-dioxin
OCDF = Octachlorodibenzofuran
PAH = Polynuclear Aromatic Hydrocarbons
PCB = Polychlorinated Biphenyls
PCT = Polychlorinated Terphenyls
PeCDD = Pentachlorodibenzo-p-dioxin
PeCDF = Pentachlorodibenzofuran
PETN = Pentaerythritol tetranitrate
QAPP = Quality Assurance Project Plan
RFI = RCRA Facility Investigation
RL = Reporting Limit
SIM = Selective Ion Monitoring
SVOC = Semi-Volatile Organic Compounds
TCDD = Tetrachlorodibenzo-p-dioxin
TCDF = Tetrachlorodibenzofuran
TEF = Toxic Equivalency Factor
TEQ = Toxicity equivalent
TIC = Tentatively Identified Compound
TPH = Total Petroleum Hydrocarbons
VOC = Volatile Organic Compounds
WHO = World Health Organization
na = not analyzed
nc = not calculated
nv = no value
µg/kg = micrograms per kilogram = ppb
mg/kg = milligrams per kilogram
µg/L = milligrams per liter

The data gap investigation will use three types of evaluation where additional information is needed for remedial planning:

1. Comparing existing soil sampling results to ISL criteria to identify additional sample locations needed to define the extent of contamination (based on criteria exceedance) and/or gradients in chemical concentrations away from a potential source.

2. Evaluating migration pathways to ensure that samples are collected where contamination may have migrated via natural or anthropogenic processes.

3. Evaluating historical documents and site survey information to identify potential release areas that may not have been adequately characterized.

MWH Americas (MWH), under a separate agreement with DOE, will be responsible for conducting the data gap investigation per the AOC and identifying where additional soil, soil contamination that could impact groundwater, and soil gas data will be necessary to complete site characterization. MWH will be using a computer-based geographic information system (GIS) with soil matrix and soil vapor chemical analytical database as the primary tool for conducting the data gap study. The GIS incorporates data files for all soil chemical data collected under the RFI and co-located sampling programs. The GIS also includes historic aerial photographs, building locations and features, operational history, buried utilities, topography, drainage patterns and use areas such as storage or disposal locations. All of this information will be reviewed and used in combination to identify data needs (which reflect the "data gaps"). The data evaluation steps to be implemented by MWH are discussed below.

1. Comparison of Previous Sampling Data to Screening Criteria

To determine future chemical sampling needs (to be implemented under this Work Plan) the data gap analysis will involve the comparison of validated soil chemistry results with ISL criteria. The ISLs reflect either existing soil background concentrations for metals and dioxins (produced in 2005)[2] or analytical method reporting limits for chemicals that do not have 2005 background concentrations. Table 2-1 lists the ISL values currently being used for the gap analysis.

This comparison will be conducted to answer several questions:

- Are the data adequate to define the extent of soil contamination (i.e., What is the areal extent? How deep does contamination go?)

- Where are additional data needed to address areal and depth extent?

- What types of chemical data are needed at each location?

The soil chemical results within the GIS database are "filterable" meaning each individual soil chemical result can be selectively evaluated or results can be collectively reviewed for each prior sample point. To perform the chemical data gap analysis the soil results will be compared with the ISL values using the GIS for all chemicals analyzed at each sample location. A computer algorithm will be

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

used to compare soil chemical result with their respective ISLs and the GIS will be used to display the result using a color-coded system to display the soil concentration relative to the ISL value. For example, soil concentrations that are at or below the ISL value will be displayed as a blue dot. Locations where the soil concentration exceeds the ISL will be displayed in yellow, magenta, or red colors, depending on the degree of exceedence of the ISL value. Locations with significant exceedances of ISL values have been identified as soil "clearly contaminated areas." These are areas most likely requiring remediation based on the degree of exceedance. The locations are shown in Figure 2-4.

The data gap evaluation will include review of sampling results for combined chemicals, individual chemical groups (e.g., VOCs, PAHs, and PCBs), and individual chemicals (e.g., barium and perchlorate). Sampling results in the database will be checked using a computer algorithm to determine which chemicals are above ISLs, their depth of occurrence, and which chemicals are co-located. This allows for effective planning allowing for step-out sample locations and analytical suites to be optimized assessing the extent and/or distribution of chemicals that exceed their respective ISLs. In some cases, where chemical concentrations may only slightly exceed ISL values, Phase 3 step-out sampling will not be proposed in this Work Plan, but will be subject to an additional data gap review once the final AOC look-up table values are made available.

Computer plots of the ISL identify where contamination exists that may warrant further sampling or where contamination exists with adequate characterization that can support cleanup decisions. A review of the distribution of contamination along with other lines of evidence (discussed in the following text) will be used to identify where additional sampling is needed. The analytical parameters that will be sampled for during the data gap field investigation will be based both on what the prior data have indicated as chemicals of concern for the location and the review of the lines of evidence.

2. Evaluation of Migration Pathways

Migration pathways will be evaluated to answer several questions:

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

The topographic data in the GIS will be used to identify surface water pathways from potential contamination sources. Prior data for those pathways will be evaluated as to adequacy for addressing contaminant migration. If additional data are needed, an outcome of the data gap investigation will be the location and chemical analyses for the migration pathways.

The data gap analysis will also be coordinated with the DTSC/DOE groundwater teams to address outstanding groundwater investigation program data needs. The soil and sediment sampling data needs to address surface water flow, groundwater, and air dispersion migration threats will be proposed in the field sampling plan addenda to this Work Plan.

3. Historic and Site Survey Information Reviews

To ensure that sampling under this Work Plan will address all potential sources of contamination not covered by prior studies, the Chemical Data Gap Investigation will use historic information that has been digitally incorporated into the GIS database. Historical and site survey information will be used to answer two questions:

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

A checklist has been developed that will be reviewed along with the chemical data to ensure that features not covered by RFI or Phase 1 sampling are addressed. The checklist includes the results of the Historic Site Assessment (HSA) conducted by Sapere (2005) and the recent HSA completed by EPA (Hydrogeologic, Inc. [HGL] 2012). The "lines of evidence" reviewed as part of the checklist are provided in Table 2-2.

Site information includes various site features or survey information that will be displayed using a common coordinate system (similar to latitude and longitude). Tanks, buildings, leach fields, geophysical surveys, historical aerial photos, storage areas, debris/disposal areas, identified chemical use areas, and surface water flow paths are examples of site information/features used to identify potential data gaps and proposed sampling locations. Site information will be shown as layers in a GIS that can be displayed individually or combined with sampling results. The site information features, compiled from historical documents, aerial photo review, and site surveys are evaluated using existing data to assess characterization completeness, and propose additional sampling if warranted.

In addition to site historical use or survey information, soil boring and trench log information will be used to inspect for anomalous soil conditions (e.g., debris, staining, and bedrock depth) since unique soil characteristics may also guide proposed sampling intervals. For example, the data gap investigation may recommend sampling within and below stained horizons since these horizons likely reflect contamination zones.

Using the three evaluation components above, a systematic process will be used during data gap analysis to ensure available information from multiple sources is considered during data gap review. Thus, combining data gap recommendations from the three evaluation components (Data Screening Evaluations, Migration Pathway Evaluations, and Historical Document/Site Survey Reviews) adequate analysis and documentation will be available for DTSC to review the recommendations for Phase 3 chemical sampling.

The outcome of the data gap investigation process will be the identification of sampling requirements for Phase 3. This outcome will include rationale for Phase 3 samples, their locations, depths, and proposed analytical suites. The outcome will identify locations for subsurface investigation using backhoe trenches/pits and geophysical means. The outcome will also include updates to the GIS database relative to site feature details. In addition, the outcome will include identification of potential future sampling needs either for adjacent locations to the area under current evaluation or future sampling needs based on the outcome of the proposed sampling results.

Table 2-2 Phase 3 Lines of Evidence Data Gap Checklist[1]

INFORMATION SOURCE	
GIS Base Layers	**Aerial Photo Review**
Tanks (and Site Wide Tank Inventory Table)	Historical aerial photographs from 17 years (1953 – 2005)
Transformers	
Structures	**EPA Layers**
Sumps	Gamma Scan
Vaults	Potential Gamma Anomalies (PGRAY)
Pipes	Tank Points
Undefined features	HSA Line Layer (HSA linear features)
Chemical Use Areas (RFI)	HSA Photo Layer (HSA aerial photo review features)
Streams/Ditches	Historical Use Data (chem. Use, storage, leach fields, releases, interviews, etc.)
Leachfields	Area IV Conduit (pipelines)
Storage Yard Areas	Geophysical Survey (EM, GPR, TC)
Roads	
Soil Disturbance (Vegetation clearance, excavation, grading, etc.)	**Other[3]**
	Existing Building Feature Documentation – process info reviewed
Migration Pathways	Building Feature Documentation – deep feature info reviewed
Surface Water	Groundwater Impacts/Potential Inputs to Groundwater Evaluated[4]
Aerial Dispersion	Site-wide Tank Inventory Table for un-located tanks (viewed with Tanks from basemap layer)
Subsurface Soil	EPA Area IV Radiological Sampling Results[5]
	Uncollected EPA Phase 1 Sample Locations[6]
Statewide Infrastructure	
IWW – spray fields	
Natural Gas Pipelines (site-wide approach also in progress)	
Sewer (site-wide approach also in progress)	

Notes:

1 Data gap evaluations performed over smaller footprints within each subarea. This checklist used within each evaluation area to provide systematic approach to identify data gaps.

2 Evaluation of air dispersion migration pathways performed using existing sampling results, or proposing additional sampling as warranted along predominant wind directions (NW-SE), and/or in adjacent drainages.

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

5 EPA radiological sampling results summaries included as part of chemical data gap evaluation process; validated data from EPA will be reviewed when available.

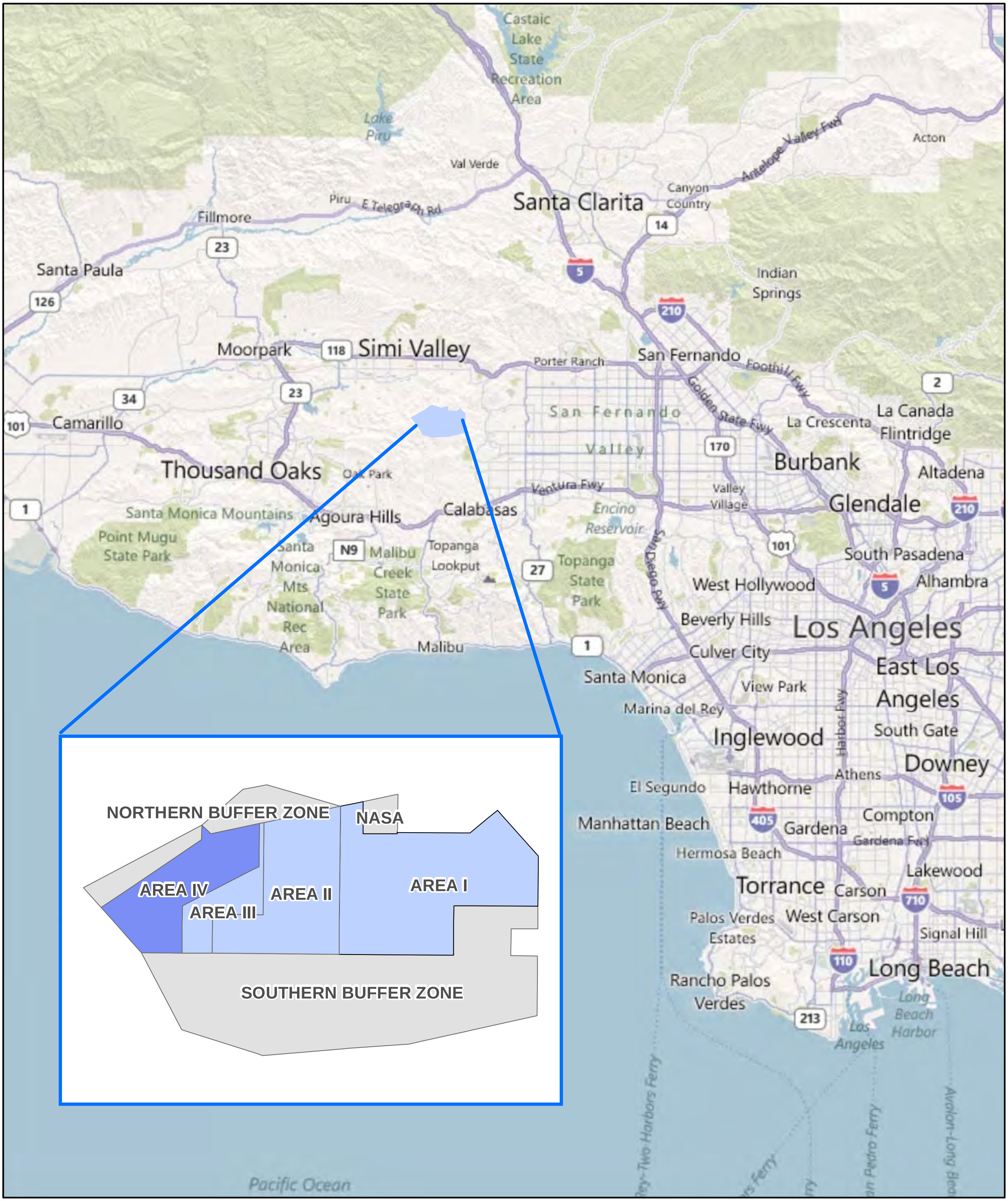
6 Proposed Phase 1 sampling locations where no radiological sample was collected by EPA (due to refusal, safety concerns, etc.) are being evaluated to determine if a chemical data gap still exists, with additional sampling proposed in Phase 3 if a gap is identified.

2.2.2 Data Gap Investigation Reporting

Two documents will be the outcome of the Chemical Data Gap Investigation. The first document will be a Technical Memorandum by each subarea. The Technical Memorandum will summarize the outcome of the data gap process and provide a table with sampling recommendations and rationale, with a figure showing the location of the Phase 3 samples. The Technical Memoranda will identify new sample locations as "step-out" samples where the edge of a defined contaminated area is not known and the new “step-out” sample will be used to demonstrate lateral extent. The new samples can also be "step-down" samples where contamination is observed on the surface but the depth (vertical) extent needs to be defined; or, the sample locations may be targeted at new features of concern that have not been subject to prior sampling; or, a sample may be targeted for analysis of a specific constituent to fulfill analytical data gaps.

The second document will be a Field Sampling Plan Addendum. The Addendum will be tiered from this Work Plan and will address the specifics for sampling within each subarea. Because the data gap evaluations will be segmented based on the HSA subareas developed by EPA, six separate FSP Addenda are anticipated. These include an addenda for HSA Subareas 5C, 5B, 5A, 3/6 (and adjacent NBZ), 7 (and adjacent NBZ), and 5D/8 (and adjacent NBZ).

The results in the data gap investigations will be provided to DTSC and the community in separate FSP Addenda. The FSP Addenda will not be implemented until after approval is received from DTSC.

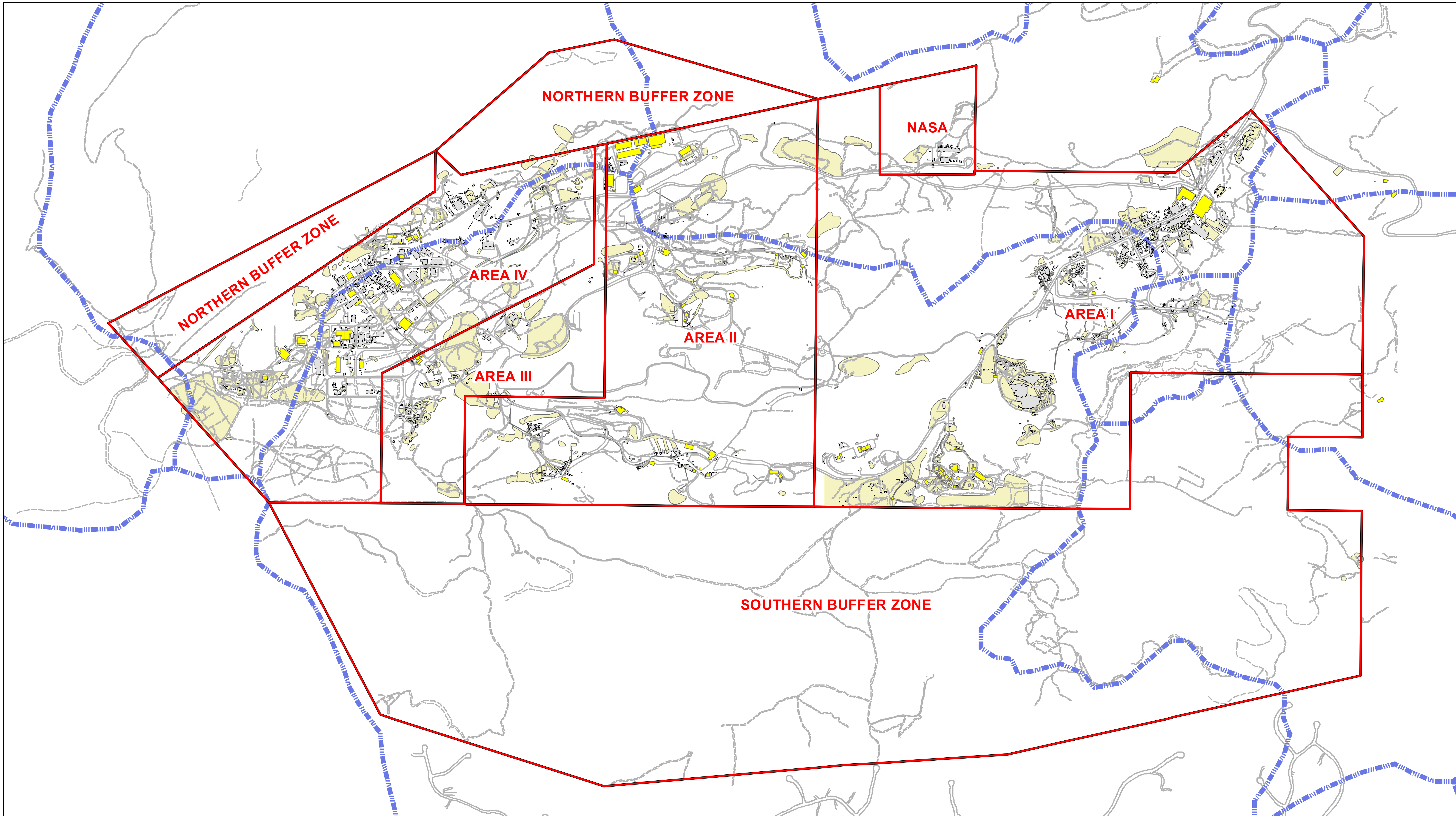


Santa Susana
Ventura County, California
Figure 2-1

Santa Susana Field Laboratory Location

0 1 2 4 6 8 Miles

CDM Smith



Legend

DrainageDivide

Roads

Dirt Road

Paved Road

Site Area

Chemical Use Area

Building - Existing as of May 2011

Removed Building

Note: GIS Layers provided by Boeing.

N

Santa Susana Field Laboratory Layout

0 500 1,000 2,000 Feet

Santa Susana
Ventura County, California
Figure 2-2

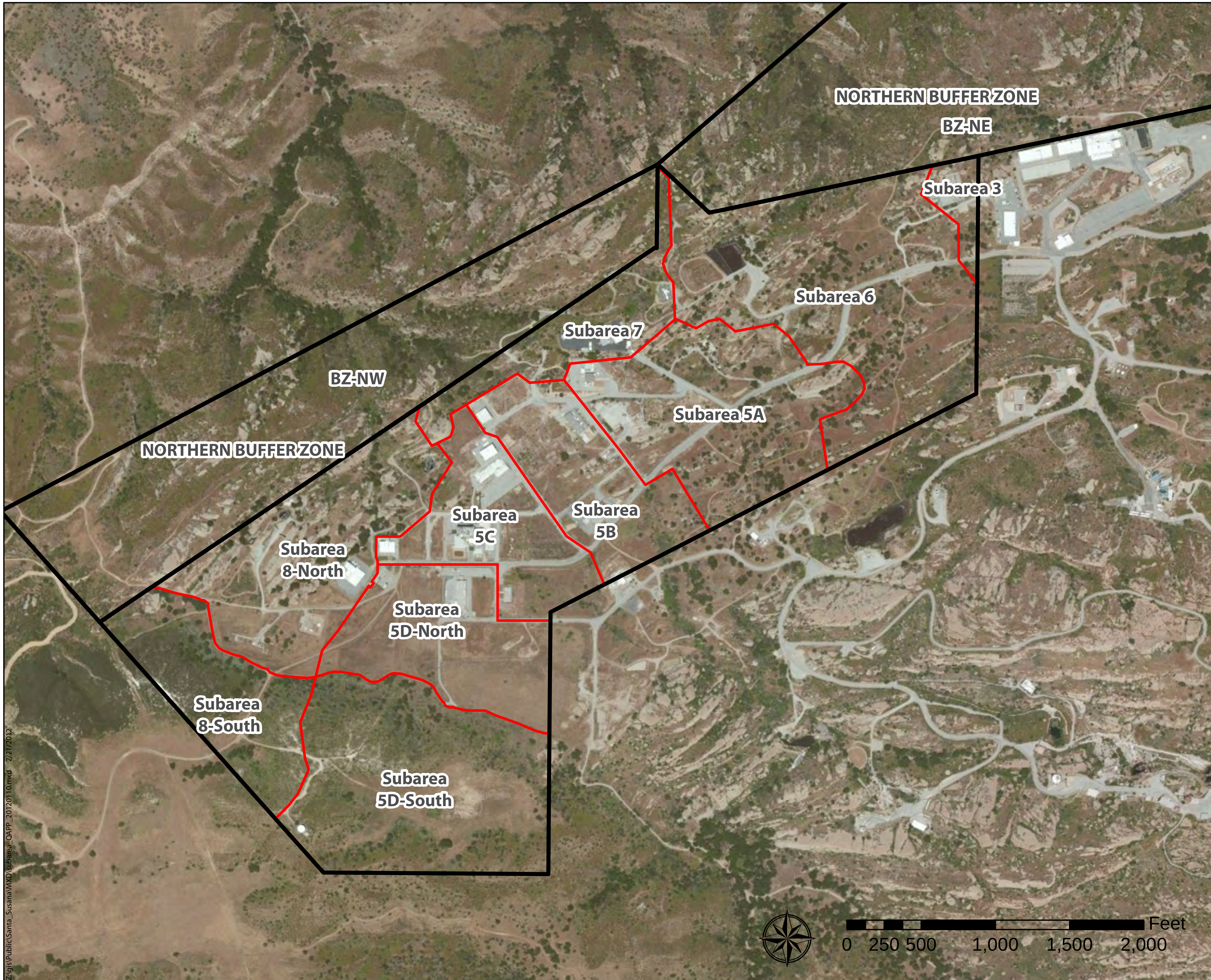
CDM Smith

thompsonjl Z:\gis\Public\Santa_Susana\MXD\SSFL_Layout.mxd 4/11/2012

Santa Susana Field Laboratory Site
Ventura County, California

Figure 2-3
Area IV and Northern Buffer Zone Subarea Designation
Santa Susana Field Laboratory

EPA Region 9



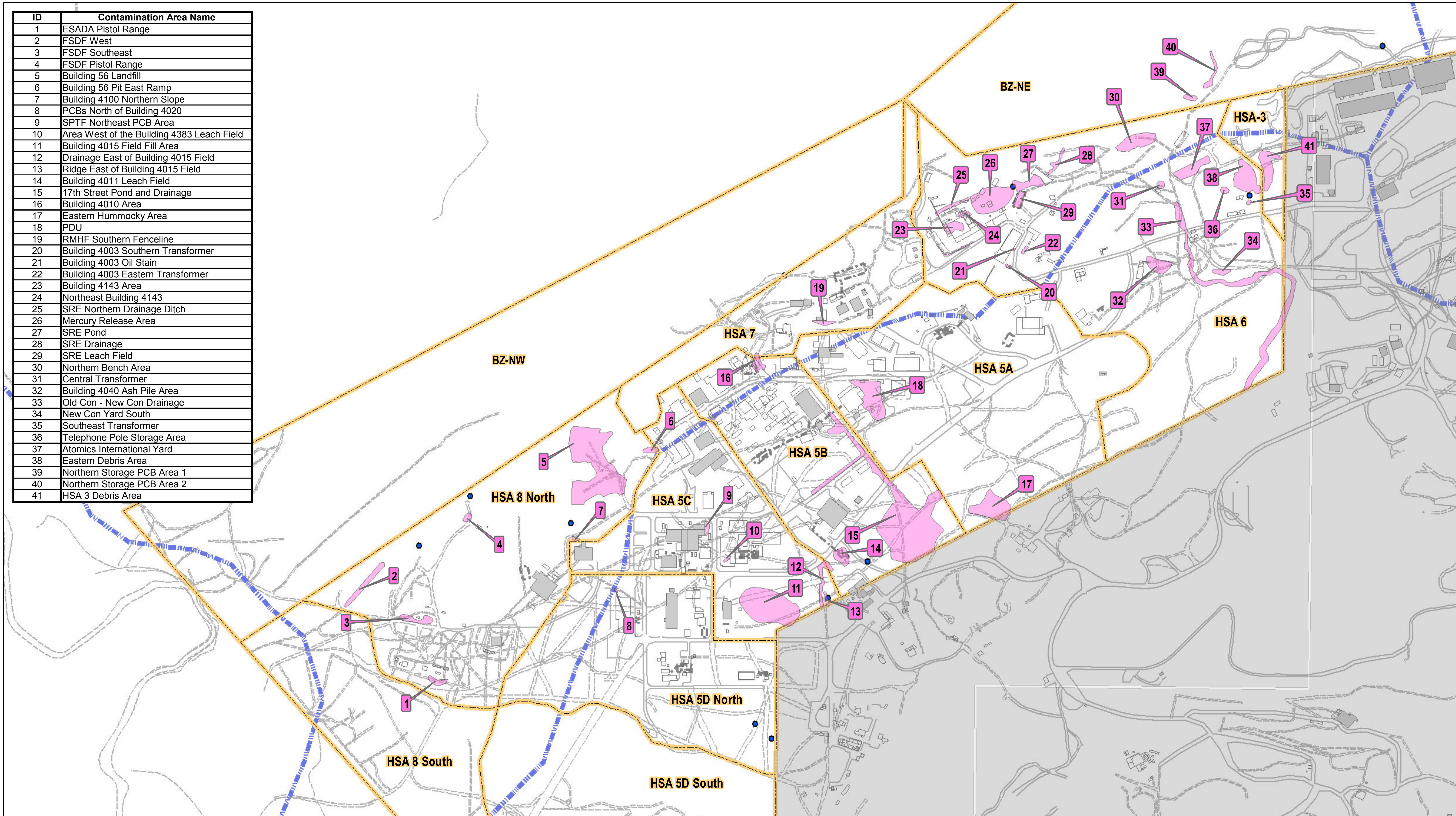
Legend

Subarea
Area IV & Northern Buffer Zones

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

CDM Smith

ID	Contamination Area Name
1	ESADA Pistol Range
2	FSDF West
3	FSDF Southeast
4	FSDF Pistol Range
5	Building 56 Landfill
6	Building 56 Pit East Ramp
7	Building 4100 Northern Slope
8	PCBs North of Building 4020
9	SPTF Northeast PCB Area
10	Area West of the Building 4383 Leach Field
11	Building 4015 Field Fill Area
12	Drainage East of Building 4015 Field
13	Ridge East of Building 4015 Field
14	Building 4011 Leach Field
15	17th Street Pond and Drainage
16	Building 4010 Area
17	Eastern Hummocky Area
18	PDU
19	RMHF Southern Fenceline
20	Building 4003 Southern Transformer
21	Building 4003 Oil Stain
22	Building 4003 Eastern Transformer
23	Building 4143 Area
24	Northeast Building 4143
25	SRE Northern Drainage Ditch
26	Mercury Release Area
27	SRE Pond
28	SRE Drainage
29	SRE Leach Field
30	Northern Bench Area
31	Central Transformer
32	Building 4040 Ash Pile Area
33	Old Con - New Con Drainage
34	New Con Yard South
35	Southeast Transformer
36	Telephone Pole Storage Area
37	Atomics International Yard
38	Eastern Debris Area
39	Northern Storage PCB Area 1
40	Northern Storage PCB Area 2
41	HSA 3 Debris Area



N

Existing Building - May 2011
Removed Building
Area IV Identified Chemical Contamination Area
HSA Boundary

Roads
Dirt Road
Paved Road
Leachfield
Surface Water Divide
NPDES Outfall

Note: GIS Layers provided by Boeing.

Area IV Identified Contamination Areas

0 250 500 1,000 Feet

Santa Susana
Ventura County, California
Figure 2-4

CDM Smith

thompsonjl Z:\gis\Public\Santa_Susana\MXD\AreaIV\SSFL_Layout_AreaIV_20120305.mxd 4/11/2012

Section 3
Project Organization

The roles of all entities engaged in this effort are summarized below.

3.1 Department of Energy

DOE is the lead federal agency with ultimate responsibility for the investigation and cleanup of Area IV. DOE is funding the Chemical Data Gap Investigation.

3.2 Department of Toxic Substances Control

DTSC is the agency with overall responsibility for ensuring that investigation and cleanup is performed in accordance with state regulations and the AOC. DTSC will have responsibility for oversight of field work, analytical laboratory acceptance, review of analytical results, and decisions related to cleanup of all of SSFL, including Area IV.

3.3 United States Environmental Protection Agency

Under an agreement with DOE, EPA is conducting the radiological background and Area IV/North Buffer Zone) radionuclide characterization studies. Because CDM Smith will be collecting soil samples for the Chemical Data Gap Investigation at the same area as EPA's work, EPA will be consulted throughout both investigations to increase sample collection efficiencies and provide opportunities for EPA to collect co-located samples, if deemed appropriate.

3.4 CDM Smith

CDM Smith is the DOE contractor responsible for obtaining soil samples, ensuring sample labels are correct, chain-of-custody paperwork is complete, analytical services are procured, samples are properly prepared and shipped to the laboratories, laboratory performance is monitored, all laboratory data reports are reviewed for completeness, and that the analytical results are validated independently. CDM Smith will also prepare a data report presenting the findings of the Chemical Data Gap Investigation effort.

3.5 Subcontractors

Subcontractors will be used to complement the technical team and provide specialty services. CDM Smith will procure a drilling firm, expertise in cultural and natural resource protection, analytical laboratories, and independent data validators. Procurement of these subcontractors is concurrent to preparation of this Work Plan. The Work Plan and project plans will be amended to include this information, when available.

3.6 Community

Community involvement will be solicited throughout this Chemical Data Gap Investigation. The community will have opportunities to review sampling procedures, sampling locations, this Work Plan and other project plans, analytical method reporting limits proposed by the subcontract laboratories, and the results of this sampling effort.

Section 4

Scope

4.1 CDM Smith Management

CDM Smith's management and organizational structure for this program reflects our philosophy of:

- Implementing short, direct lines of communication with minimal layering of management.
- Empowering CDM Smith's key personnel and other management staff with sufficient authority to organize and execute their assigned responsibilities.

The program structure includes a project team and a separate quality control (QC) team. The project team consists of the management control structure, technical personnel, and subcontractors. The QC team functions independently from the project team to provide quality oversight of project implementation and review of project deliverables. The program organization and lines of communication are shown on Figure 4-1.

The project team is responsible for the coordination, preparation, execution, and supervision of work performed for each milestone. This includes all field investigation activities, subcontractor oversight, sample collection, data management, and technical reporting. Technical and support staff including engineers, scientists, technicians, and clerical personnel compose the project team. The roles and responsibilities of key personnel are presented below.

Program Manager – CDM Smith's Program Manager is the focal point of program accountability and direction and is the primary point of contact with DOE. The Program Manager has direct lines of communications, authority, control, and oversight of the entire program. The Program Manager is responsible for:

- Directing the program in compliance with all contract and technical requirements.
- Securing and monitoring CDM Smith's resources, including personnel, equipment, and materials.
- Ensuring safe, high quality performance in conformance with established budgets and schedules.

Project Manager (PM) – CDM Smith's PM will interface directly with DOE and is responsible for the quality, timeliness, and financial management of the work. The PM position is central to CDM Smith achieving control over all aspects of the project performance including cost, schedule, safety, and quality. The PM reports on a direct line to the Program Manager and has both the responsibility and necessary authority for the project performance. The PM has immediate and direct access to all project resources, and is positioned to delegate authority to the proper levels to achieve performance efficiency.

Field Team Leader (FTL) – The FTL under direction of PM and Lead Geologist, has full authority and control over all aspects of field performance, integrating all labor, equipment, and materials. The FTL's responsibility is executing site activities in strict accordance with approved project plans, while ensuring that the field work is performed in strict adherence to the safety and quality requirements.

Sample Coordinator – The sample coordinator is an integral field team member and is responsible for coordinating with the subcontract laboratory on analytical requirements, turnaround times for the results, managing chain-of-custody, and packing and shipping all project samples. The sample coordinator will review the quality of laboratory data packages in accordance with the requirements in the contract.

Contract Support – CDM Smith organization includes a group of personnel who constitute a contract support group that reports to the Program Manager. By retaining the direct reporting linkage between the Contract Support Group and the Program Manager, CDM Smith ensures that the Program Manager is aware of potential cost, schedule, and resource issues.

Subcontractor – CDM Smith subcontractors will be utilized for a specific project role and bound by a contract delineating scope, budget, and schedule. Subcontractors are required to understand and comply with CDM Smith's quality assurance (QA)/QC program. The program outlines QA/QC activities that must be implemented during work activities and provides for CDM Smith's independent QA oversight of a subcontractor, thereby ensuring the QC activities are occurring. The PM will work closely with all subcontractors to establish clear and open lines of communication, to ensure that work requirements are clear, and to monitor the performance of work and deliverables as they progress - not just the final product. All subcontractors' work will be governed by CDM Smith subcontracts that specify the work to be performed.

4.2 Quality

4.2.1 CDM Smith QA Program

CDM Smith has implemented a fully documented QA Program encompassing all services, including studies, investigations, remedial design, and construction activities. This program meets requirements of ISO 9001 – Quality Management and Quality System Elements. The rigorous structure of this QA Program ensures deliverables of high quality that meet DOE needs and schedule, and promotes continuous improvement.

The QC team is responsible for implementation of the QC and QA conditions of the Work Plan and contract quality requirements to ensure a high level of quality is maintained throughout all stages of the project. The QC team will independently review each deliverable and will approve or disapprove the project deliverables. Key roles that comprise the QC team, along with a description of their responsibilities, are presented below.

Corporate Quality Assurance Director – The Corporate Quality Assurance Director (QA Director) is responsible for the implementation of CDM Smith's quality program. The QA Director leads a QA team consisting of two regional QA Specialists and QA Coordinators in each CDM Smith office, and is responsible for training these QA personnel and approving the QA auditors list.

Quality Assurance Coordinator – The QA Coordinator is responsible for planning QA audits for this project and ensuring early identification and immediate correction of noncompliant and potentially noncompliant activities. The QA Coordinator is also responsible for completing an internal system audit of project files, participating in field planning meetings, assigning the appropriate QA auditors, and ensuring QA and technical reviews of project deliverables are conducted, as required.

Field and Office Auditors – Approved QA auditors will be selected from CDM Smith's auditor list to conduct field audits and system audit of the project files. The QA Coordinator will coordinate the work of these auditors; the QA Director will review and approve audit reports, and ensure any noted deficiencies are addressed.

Technical and Quality Assurance Reviewers – A technical review committee consisting of four senior technical staff members from different, but relevant disciplines will be responsible for review of major milestone deliverables. Other deliverables with technical content will receive standard independent technical review in accordance with CDM Smith's QA Manual. The review process will check the document for content, technical accuracy, accomplishment of project objectives, grammar, and clarity of presentation.

Technical reviewer(s) will be independent reviewers not involved in document preparation. The PM will select a reviewer with appropriate technical qualifications from either CDM Smith's Current Technical Reviewers List or the Contract Review Plan, as appropriate. Technical reviewers have tentatively been identified for the various written deliverables, although, the reviewers are subject to change based on logistical considerations. The PM will schedule in advance with reviewers to ensure an appropriate amount of time is provided for the reviews. Trained and CDM Smith-approved QA reviewers will also review applicable project documents to ensure the quality-related components of the project are discussed, project objectives are appropriately identified, and any deviations from the planning documents are presented. Work plans, field plans, technical standard operating procedures (SOPs), procurement documents, and measurement reports require both technical and QA review in accordance with CDM Smith's QA Manual.

Project Quality Management (PQM) Meeting – A requirement of CDM Smith's QA program is to conduct an initial PQM meeting to discuss the scope and objectives of the project with project team members, and possibly subcontractors. The PQM meeting for Phase 3 soil sampling was held at SSFL February 7 and 8. At this meeting, team members discussed project objectives and developed critical success factors. Participants included DOE, DTSC, Boeing as the land owner, and CDM Smith and CDM Smith subcontractors. Processes, activities, and tasks necessary to meet critical success factors were discussed and responsibilities assigned. Project technical requirements were identified. PQM meetings may also be conducted on an as-needed basis, in advance of selected project milestones, or at the request of DOE.

Project Meetings – CDM Smith will conduct meetings with DOE and DTSC team members on a regular basis as well as on an as-needed basis, as befits a team project approach. This includes meetings to discuss the process of second-tiered plans and/or a preview of field investigation results that will be presented in a technical report.

Field Planning Meeting – Prior to initiating field work, a Field Planning Meeting will be held with DOE, DTSC, and Boeing to assess and facilitate field team readiness. The Field Planning Meeting will be documented using a Field Planning Meeting form. The PM is responsible for organizing and leading the Field Planning Meeting, and for responding to or correcting any deficiencies identified during the meeting prior to the initiation of field work. The QA Coordinator or an alternate QA Coordinator will attend this meeting or review the agenda and provide comments.

Meeting and Conference Calls – Once field work begins, routine conference calls will be held amongst DOE, DTSC, analytical laboratory (as appropriate), and key CDM Smith project personnel. The routine calls will be scheduled by the PM and will continue through the submittal of the draft report.

Discussions will address planned and completed field activities, schedule and budget updates, upcoming deliverables, and any issues to be resolved by project team members. DOE may request an ad-hoc meeting or conference call via the PM at any time.

During field work, the FTL will lead morning site meetings to discuss the planned activities and goals for the day. These meetings will be concurrent with the tailgate health and safety meeting led by the Site Safety Health Officer (SSHO).

Corrective Actions – If deficiencies are noted during the field program, corrective action will be taken in accordance with the contract quality implementation procedure (QIP) and CDM Smith's QA Manual. All CDM Smith employees are responsible for identifying and reporting quality problems and correcting problems within their authority as soon as possible. If a noncompliant situation is noted in the field or office audit, the PM will correct the deficiency as soon as possible and will then notify the auditor that the deficiency has been resolved. The deficiency and its resolution are documented in the audit report, in project logbooks, and in the monthly report, as applicable.

Quality Control Reports to Management – Monthly progress reports will be provided to DOE to summarize work completed, budget expended, and provide an updated project schedule. In addition to this, weekly quality control reports will be completed and submitted to the DOE at the conclusion of each week of field activities.

4.2.2 Planned Project Assessments

System assessments are qualitative reviews of different aspects of project work (e.g., field audits and office audits) to check on the use of appropriate QC measures, implementation of project plans, and the functioning of the QA system. Determinations for project assessments will be performed under the direction of the CDM Smith QA Director, who reports directly to the CDM Smith president. Quality Plan, as defined in the CDM Smith QA Manual, defines CDM Smith's corporate assessments procedures and requirements.

4.2.2.1 Field Assessments

At the start of field work, the PM or FTL will conduct a Field Sampling Technical Systems Assessment. This qualitative self-assessment will audit the equipment, facilities, personnel, training, procedures, record-keeping, and data management aspects of the field work to ensure conformance with the Work Plan and project plans. The PM or FTL is responsible for conducting the Field Sampling Technical Self-Assessment, reporting the results of the assessment in the field logbook, and responding to or correcting any deficiencies identified during the assessment prior to the start of field work.

A minimum of one field audit will be conducted on CDM Smith work and subcontractor work activities by an authorized CDM Smith technical staff independent of the activities audited. Auditors for field activities and laboratory operations require technical expertise specific to the activity audited and must be authorized by the CDM Smith QA Director. The PM and/or FTL are responsible for responding to and correcting any identified field audit findings. The QA Coordinator is responsible for monitoring the effectiveness of the implemented corrective action. The responsibilities and procedures for planning, conducting, and closing-out audits are further specified in CDM Smith's QA Manual.

DOE and DTSC staff will have the opportunity to review site activities and verify that the procedures described in planning documents such as the Work Plan and project plans are being followed.

4.2.2.2 Office Assessments

At least one office audit will be conducted at the office where the project files reside. The audit will include checking on the use of quality measures specified in the QIP, QAPP, parts of the Work Plan, and other project plans. The office audit will involve an examination of the project documents and records.

4.2.2.3 Laboratory Assessments

Performance assessments are quantitative checks on the quality of a measurement system (e.g., proficiency testing) and will be scheduled for this project.

CDM Smith chemists will perform a formal review of laboratory activities, i.e., sample logging, recording, handling, preparation, and analytical procedures the first week of sampling to verify that the procedures described in planning documents such as the Work Plan and project plans are being followed. If the CDM Smith chemist(s) observe deviations from the planning documents, a formal performance assessment will be performed within one week.

4.2.3 Assessments Findings and Response Actions

Any conditions or problems identified during routine activities or through assessments that may impair the quality of work will be addressed through either rapid corrective response actions or formal corrective action processes. All response actions will be implemented on a case-by-case basis to correct quality problems.

Field audit findings are provided by the auditor to the PM and/or FTL on the day of the audit through a post-audit debrief. Field audits are further documented via an audit report. Within 15 working days of the audit, the auditor will prepare a draft audit report for review by the QA Director. The QA Director will approve and distribute the audit report within 30 working days of the audit. If there are any unresolved deficiencies, the auditor, through a corrective action request, will request the audited party to take corrective action. Specific procedures for issuing and following up on corrective actions are presented in CDM Smith's QA Manual. The timeframe for response to the corrective action request is typically 15 to 30 days from the date of the corrective action notice. The QA Director is the individual responsible for receiving and approving the corrective action response.

Minor rapid response actions taken in the field immediately (within 24 hours) to correct a quality problem will be documented in the field logbook and verbally reported to the CDM Smith PM.

Major rapid response actions taken in the field may require notification (within 24 hours) and approval by the DOE PM, DTSC PM, CDM Smith QA Coordinator, and CDM Smith PM prior to implementation. Such actions may include revising procedures in the field or retesting.

Minor or major quality problems that cannot be corrected quickly through rapid routine procedures require implementation of a corrective action request (CAR) form. The CAR will be initiated by the person identifying the problem and forwarded to the CDM Smith QA Coordinator within 48 hours of identifying the problem. In consultation with the CDM Smith QA Director, the CDM Smith QA Coordinator will be responsible for investigating and following up on the quality problem; the timeframe for response will be determined by the CDM Smith QA Coordinator based on the specific quality problem.

The DOE PM will approve any major response actions in writing.

4.2.4 Laboratory Oversight and QC Program

CDM Smith will use a DTSC-approved subcontractor laboratory to analyze project samples. All samples will be submitted to a laboratory that has been certified by the State of California through the Environmental Laboratory Accreditation Program or National Environmental Laboratory Accreditation Program for the methods that California certifies.

The laboratory will follow the quality plans discussed in the Master FSP. CDM Smith will evaluate and qualify laboratory data. All data validation will be conducted in accordance with *EPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review* (EPA 2004), *EPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review* (EPA 2008), and *EPA Contract Laboratory Program national Functional Guidelines for Chlorinated Dioxin/Furan Data Review* (EPA 2005). Data packages will be reviewed as they are received from the laboratory to expedite preparation of the report and to provide analytical feedback to the field. A data usability report will be produced to document the evaluation and will be included as an appendix to the report.

The laboratory is required to submit a QA plan that details quality requirements and procedures that apply to laboratory operations. The laboratory may be audited by CDM Smith QA staff to ensure the laboratory QA plan is followed.

Acceptability criteria and methods to determine if data acceptability criteria are met are defined through EPA's DQO process. This is a well defined, seven-step process that establishes the objectives for the project and limits of acceptability. Data quality indicators (DQIs) are a related set of quantitative and qualitative parameters by which the data can be measured to determine acceptability. The project DQOs and DQIs are developed as part of the Master FSP.

The laboratory will report the analytical data to CDM Smith in both hardcopy and electronic format. CDM Smith will verify the electronic submittals are consistent with the data reported on the hardcopy reports. This review will be conducted before use of the data for report preparation.

Field QC samples will be submitted with the project samples to evaluate field and laboratory accuracy and precision. These samples will include field duplicates, trip blanks, field blanks, temperature blanks, and matrix spike/matrix spike duplicates. The QC samples, the frequency at which they will be collected, and the acceptance criteria will be detailed in the QAPP. QC samples will be analyzed in the same manner as the investigative samples.

4.2.5 Quality Control of Subcontractors

Subcontractors will be procured in accordance with CDM Smith QA Manual and applicable government regulations to provide drilling and sampling services, including a direct push technology unit and excavation services for soil sampling at within Area IV and the NBZ. Subcontractors will also be procured for cultural resource monitoring and surveys. An offsite laboratory will be subcontracted for sample analyses, and investigation-derived waste disposal will also be procured. Subcontractor activities are described in detail in the Master FSP. CDM Smith personnel (including field geologist, SSHO, and FTL) will provide 100 percent oversight of subcontractor activities to ensure their performance is in accordance with the applicable subcontractor scope of work, the Master FSP, and applicable health and safety requirements. At least one of these CDM Smith personnel will be working with assigned subcontractor personnel to complete the required work and ensure all activities are performed in accordance with applicable project documents. Each CDM Smith team member will possess a copy of the final Master FSP for quick reference, as needed, and will document field activities in a field logbook to be maintained in the project file. The CDM Smith FTL will be responsible for subcontractor oversight during mobilization and demobilization. The FTL will ensure work areas are clean and site conditions are restored to acceptable levels upon demobilization.

4.3 Safety

CDM Smith's safety requirements apply to all employees and subcontractors involved in CDM Smith-controlled operations. Planning and performing work in accordance with these established controls is designed to protect workers, the public, and the environment. CDM Smith's documents: Corporate Health and Safety Manual, SSFL Integrated Safety Management System (ISMS) description, WSHP, task-level Health and Safety Plans (HASPs), and Activity Hazard Analyses (AHAs) provide the basis for integrating safety controls and requirements during task order operations at SSFL.

1. <u>CDM Smith Health and Safety Manual</u>: Affirms company's health and safety philosophy and principals, specific elements discussion (employee health surveillance, health and safety (H&S) education and training, employee exposure assessment) and implementation of the program.

2. <u>CDM Smith SSFL ISMS:</u> Corporate level declaration of program for site.

3. <u>CDM Smith SSFL WSHP:</u> Functions as overall Health and Safety Plan for SSFL activities.

4. <u>Task-Level HASPs:</u> Only developed if necessary to supplement the WSHP for individual tasks.

5. <u>AHAs:</u> Functions at the task level. Task-specific and developed to identify and control task-specific hazards.

All CDM Smith operations at SSFL are to be performed in a manner consistent with these established processes.

The SSHO is organizationally situated with communications linkages to the PM and provides effective and efficient oversight for field activities. As shown on the Figure 1-1, the H&S Director reports independently from project operations to the corporate level of the CDM Smith organization. The independence of this reporting line ensures that the site H&S Director can perform oversight and regulatory enforcement roles without having their authorities compromised by project operational/production pressures.

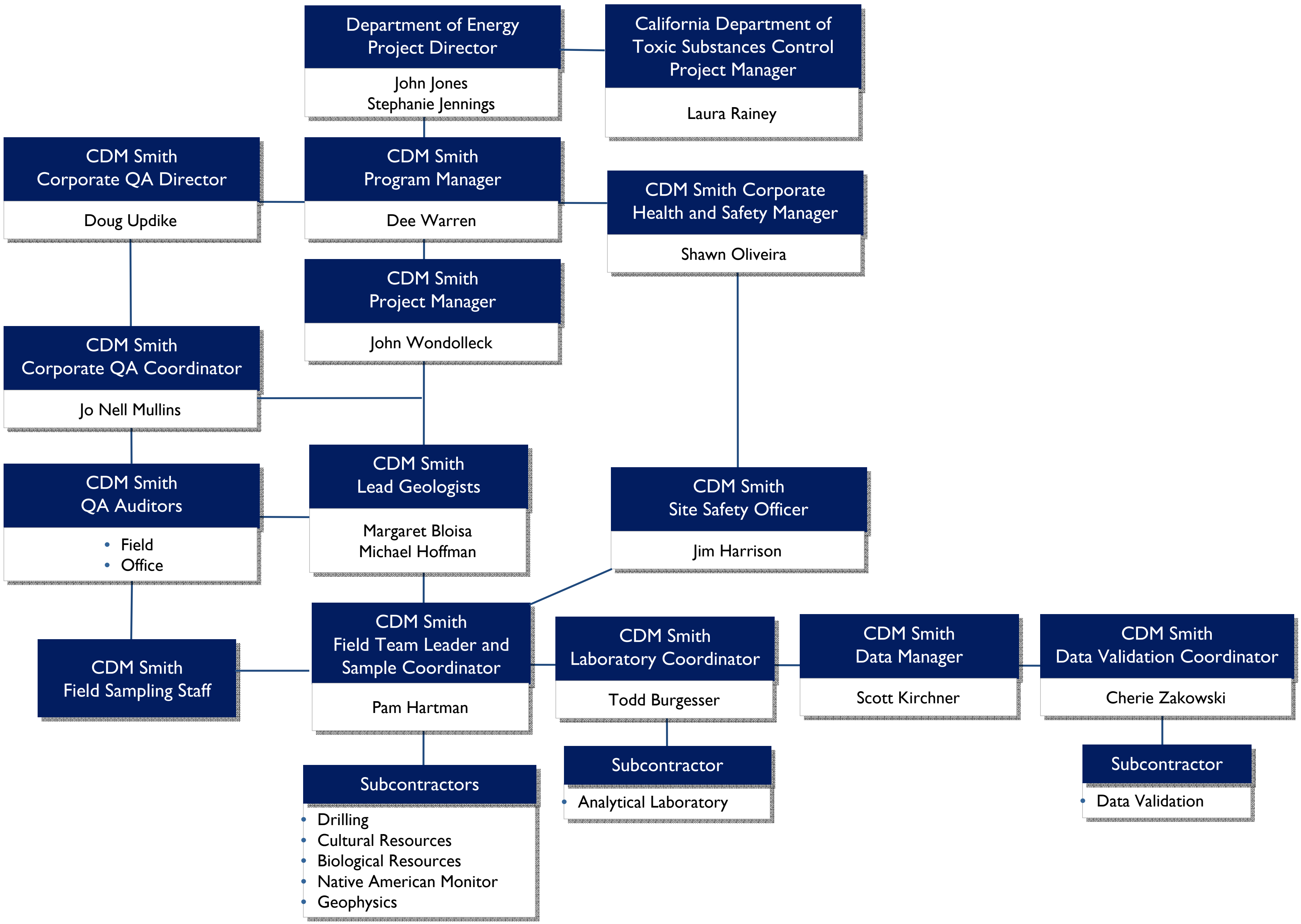
4.4 Data Management

The data management processes and quality control steps for this project are illustrated in Figure 4-2. Data management activities will be performed by a Data Management Specialist who will use a GIS database and standard industry spreadsheet software programs to manage all data related to the sampling program. The Data Management Specialist is responsible for coordinating the entry of data from the laboratory into a usable format for report preparation (e.g., tables, graphics, and spreadsheets). The key support role is additionally responsible for reviewing the electronic deliverable to ensure consistency with the hardcopy data reports. As hardcopy and electronic data deliverables are received, the reported results will be cross-checked and verified for accuracy. The Data Management Specialist will provide the QC check on 100 percent of the data. Validated data will be submitted for incorporation into the SSFL database system. Data from this system are periodically provided to DTSC for its review and usage.

In Phase 3, CDM Smith is responsible for managing field data including sample descriptions and sample coordinates. CDM Smith will use the EPA's Scribe database to manage field data and create chains-of-custody. The field data will then be loaded into the CDM Smith's database. The laboratory will provide electronic data deliverables (EDDs) for use in the Automated Data Review process. After the data have been validated, the validation subcontractor will export an EDD containing validation qualifiers. The validated data will be integrated with the field data for reporting purposes and to verify all lab results have been received and loaded into the CDM Smith's database.

The laboratory will also produce a second EDD in a format directly compatible with CDM Smith's data management system. CDM Smith will load these data into the CDM Smith unvalidated database to support preliminary data evaluation. All data reported out of the unvalidated database will be identified as "Preliminary Data To Be Used With Caution" to distinguish this data from the validated or final database.

CDM Smiths uses an EQuIS 5.6 database to manage the SSFL data. The EQuIS database is password-protected. Data is loaded by data mangers and the database is maintained by a database administrator. The CDM Smith field staff, validator, and data management team will review that data for quality and completeness using the data quality review checklist. Once the data have passed the quality review they will be available for analysis and transfer to Boeing project database. CDM Smith will be responsible for verifying that data loaded into the Boeing database are accurate and complete.

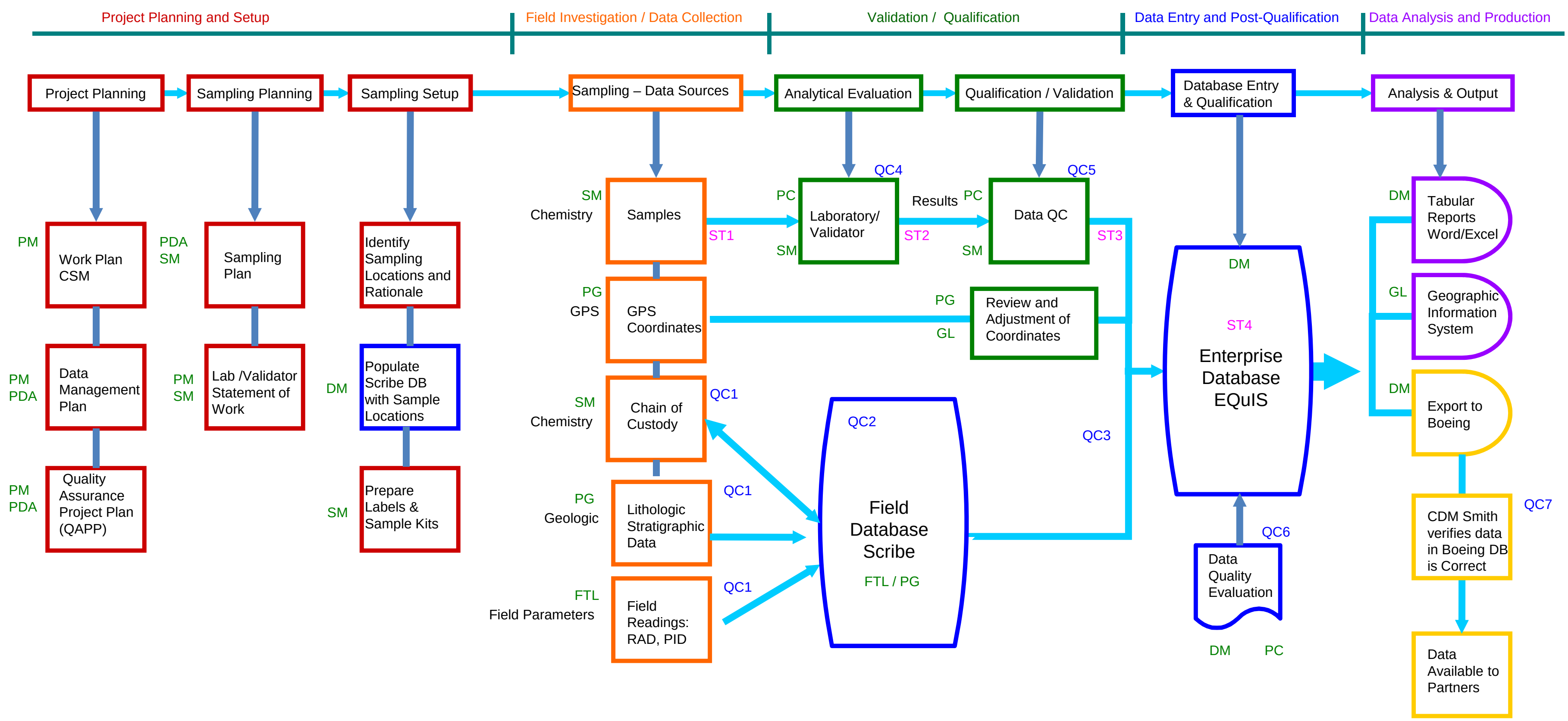


Santa Susana Field Laboratory
Phase 3 Chemical Sampling Work Plan

Figure 4-1
Organizational Chart

Figure 4-2

Area IV SSFL Data Flow Diagram



<u>Phases of Data Quality Assurance / Quality Control (QC)</u>

QC1 - QC field data in Scribe by comparing to Field Data Sheets. (SM)
QC2 - Compare planned sampling to actual. (SM)
QC3 - Verify all samples received by lab. (PC & SM)
QC4 - Confirm EDD matches hardcopy (full validation packages). (PC)
QC5 - System validation during loading process. (DM)
QC6 - Post data load evaluation. (DM)
QC7 - Verify data in Boeing database is correct. (DM)

<u>Phases of Sample Tracking (SM)</u>

ST1 - Samples collected and sent to lab.
ST2 - Results (EDD) received from lab.
ST3 - Qualified results received by SM.
ST4 - Qualified results loaded into database.

<u>Roles</u>

PM – Project Manager
PDA – Project Data Administrator
SM – Sample Manager
DM – Database Manager
PC – Project Chemist
GL – GIS Development Lead
PG – Project Geologist
FTL – Field Team Leader

Section 5

Project Plans

5.1 Phase 3 Master Field Sampling Plan

A Master FSP for the Phase 3 investigation of Area IV and the NBZ has been developed by CDM Smith. In accordance with the AOC, the Chemical Data Gap Investigation Field Sampling Plan shall include the following components (information presented in the parenthesis denotes location in the Master FSP):

- Sampling objectives, including a brief description of data gaps and how the field sampling plan is to address these gaps (see Master FSP, Section 4, and 5.1)(1)
- Sample locations, including a map showing these locations and proposed sampling frequency (see Master FSP, Section 5.1)(1)
- Sample designation or numbering system (see Master FSP, Section 6.2)
- Detailed specification of sampling equipment and procedures (see Master FSP, Section 5.2, and 6.3)
- Sampling handling and analysis including preservation methods, shipping requirements and holding times (see Master FSP, Section 6.4, 6.5, and 6.6)
- Management plan for wastes generated (see Master FSP, Section 6.9)

(1) As allowed in the Administrative Order on Consent for Remedial Action (Docket No. HSA CO 10/11 - 037), if DOE proposes to modify any methods and/or initiate new activities for which no Field Sampling Plan, Quality Assurance Project Plan, Health and Safety Plan or other necessary procedures/plans have been established, DOE shall prepare an addendum to the approved plan(s) for DTSC review and approval prior to modifying the method or initiating new activities.

The Master FSP contains as an attachment SOPs that will govern collection, management and recording of field samples, and the management and maintenance of field instruments. The SOPs included in the Master FSP include:

- SSFL SOP 1 – Procedures for Locating and Clearing Phase 3 Samples
- SSFL SOP 2 – Surface Soil Sampling
- SSFL SOP 3 – Subsurface Soil Sampling with Hand Auger
- SSFL SOP 4 – Direct Push Technology Sampling
- SSFL SOP 5 – Backhoe Trenching/Test Pits for Sample Collection
- SSFL SOP 6 – Field Measurement of Total Organic Vapors
- SSFL SOP 7 – Field Measurement of Residual Radiation
- SSFL SOP 8 – Field Data Collection Documents, Content, and Control
- SSFL SOP 9 – Lithologic Logging
- SSFL SOP 10 – Sample Custody
- SSFL SOP 11 – Packaging and Shipping of Environmental Samples
- SSFL SOP 12 – Field Equipment Decontamination

- SSFL SOP 13 – Guide to Handling Investigation-Derived Waste
- SSFL SOP 14 – Geophysical Survey
- SSFL SOP 15 – Photographic Documentation of Field Activities
- SSFL SOP 16 – Control of Measurement and Test Equipment
- SSFL SOP 17 – Laboratory Homogenization of Phase 3 Soil Samples
- SSFL SOP 18 – Clean Sample Method Procedure for Methyl Mercury and Organotin Analyses

The Master FSP has been developed to be a single, encompassing project plan. However, due to complexities of the Investigations and evaluation of the data by others, a single Master FSP is not possible. As such, FSP addenda's will be used denote sample rationale, location, and sample frequency when required.

5.2 Quality Assurance Project Plan

A QAPP has been developed by CDM Smith for the Phase 3 soil investigation. The QAPP has been designed in accordance with CDM Smith's QA Manual and Guidance for the Data Quality Objectives Process (EPA 2006). In accordance with the AOC, the Chemical Data Gap Investigation QAPP shall include the following components (information presented in the parenthesis denotes location in the QAPP):

1. Project organization and responsibilities with respect to sampling and analysis (see QAPP, Section 2).

2. Quality assurance objectives for measurement including accuracy, precision, and method detection limits (see QAPP, Section 3).

3. Sampling procedures (see QAPP, Section 5).

4. Sample custody procedures and documentation (see QAPP, Section 6).

5. Field and laboratory calibration procedures (see QAPP, Section 7).

6. Analytical procedures (see QAPP, Section 8).

7. Laboratory to be used must be certified to Health and Safety Code Section 25198 (see QAPP, Section 2.3).

8. Specific routine procedures used to assess data (precision, accuracy, and completeness) and response actions (see QAPP, Section 9).

9. Reporting procedure for measurement of system performance and data quality (see QAPP, Section 13).

10. Data management, data reduction, validation, and reporting. Information shall be accessible to downloading to DTSC's computer system (see QAPP, Section 9).

11. Internal quality control (see QAPP, Section 10).

5.3 Health and Safety Plan

In accordance with the AOC, the Chemical Data Gap Investigation Site-specific Health and Safety Plan shall be prepared in accordance with federal regulations (29 [CFR 1910.120) and state regulations (Title 8 CCR Section 5192). This plan should include, at a minimum, the following elements:

- Site Background/History/Work Plan (see WSHP, Section 1)
- Key Personnel and Responsibilities (see WSHP, Section 3)
- Job Hazard Analysis/Summary (see WSHP, Section 4)
- Employee Training (see WSHP, Section 8)
- Personal Protection (see WSHP, Section 7.20)
- Medical Surveillance (see WSHP, Section 4.3)
- Air Surveillance (see WSHP, Section 7.7)
- Site Control (see WSHP, Section 7.1)
- Decontamination (see WSHP, Section 7.7)
- Contingency Planning (see WSHP, Section 5.1)
- Confined Space Operations (see WSHP, Section 7.12)
- Spill Containment (see WSHP, Section 7.22)
- Sanitation (see WSHP, Section 7.24)
- Illumination (see WSHP, Section 7.23)
- Other applicable requirements based on the work to be performed

The CDM Smith SSFL WSHP applies to work performed under contract with DOE by CDM Smith, and its subcontractors for environmental planning and support activities at the SSFL. The WSHP describes CDM Smith's methods for complying with the requirements in 10 CFR Part 851, Worker Safety and Health Program, Subpart C, Specific Program Requirements. The WSHP includes the regulations and standards specifically required by 10 CFR 851, and is to be used in conjunction with CDM Smith's Corporate H&S Program and ISMS Description as an overall H&S management approach to SSFL activities. The WSHP includes:

- Purpose and Scope
- ISMS Overview
- Rights and Responsibilities
- Hazard Identification and Assessment
- Hazard Prevention and Abatement
- Safety and Health Standards
- Functional Areas
- Training and Information
- Recordkeeping and Reporting
- References

When hazards are identified and analyzed, controls are developed to mitigate the hazards. The controls, documented in any task-level HASP or AHA for work at SSFL, are based on agreed-upon applicable standards and requirements. Controls and required training specific to hazards are identified and documented in the HASP and AHA forms. The H&S director will review and approve the HASP and AHA forms. If, during the implementation of the work, new hazards are identified the HASP or AHA will be modified to address the new hazard.

All CDM Smith field personnel and subcontractor field personnel engaged in intrusive activities (i.e., soil sampling within exclusion zones) will be required to demonstrate successful completion of health and safety training prescribed by 29 CFR 1910.120 also known as Hazardous Waste Operations and Emergency Response (HAZWOPER) regulations. All CDM Smith field personnel and subcontractor field personnel engaged in intrusive activities have completed the 40 hours of HAZWOPER instruction as well as completing the 8-hours of refresher training on a yearly basis.

Section 6

Documentation, Records, and Reporting

6.1 Documentation and Records

The following is a summary of documents to be maintained for this project:

- Contract/Work Plan/Administrative Record.
- Field Logbooks and Field Forms - A permanently bound and consecutively paginated field logbook or field forms will be maintained daily by the field team, which provide for recording pertinent site activities and investigation information.
- Equipment Testing, Inspection, and Maintenance – CDM Smith will maintain a record of all testing, inspection, and maintenance activities in the field log book.
- Calibration Records – CDM Smith will maintain calibration records of all field and laboratory instruments used during the investigation.
- Inspection and Acceptance of Supplies and Consumables – CDM Smith will maintain all inspection/acceptance forms used to ensure that supplies and consumables are in satisfactory condition and free of defects.
- Photographs - Photographs will be taken at each sample location to visually document field activities and site features before, during, and after fieldwork occurs. Digital photographs will be submitted to the electronic project files.
- Chain-of-Custody and Laboratory Data Deliverables – CDM Smith will submit all samples to the laboratory under proper chain-of-custody. The laboratory will submit an analytical data report to CDM Smith. The data report will contain a case narrative that briefly describes the numbers of samples, the analyses, and noteworthy analytical difficulties or QA/QC issues associated with the submitted samples. The data report will include signed chain-of-custody forms, cooler receipt forms, analytical data, a QC summary, raw data, and an electronic copy of the data in a format compatible with the established SSFL data management system. The data package will also include all QC sample results, all information required to independently verify sample results and associated calculations (i.e., percent recovery and relative percent difference).
- Laboratory Data Reviews - The data validation process consists of two steps to be completed. The first step consists of determining compliance with methods, procedures, and contract requirements for sampling and analysis. The second step of the data validation process consists of comparing information collected with measurement performance criteria presented in the Work Plan and project plans and data validation guidance.
- Reports/Deliverables - Data reports include technical memoranda, letters, and complete technical reports that transmit data and information. All data reports generated for DOE are managed in accordance with CDM Smith's Document Control procedures as described in the CDM Smith QA Manual. The data reports will undergo both technical and QA reviews by

reviewers who are independent of the of the data report and have the appropriate qualifications.

- Audit Reports – CDM Smith will maintain all system assessments/audits that are qualitative reviews of different aspects of project work (e.g., field audits and office audits) to check on the use of appropriate QC measures and the functioning of the QA system.

To guard against loss of data as a result of damage or disappearance of logbooks, completed pages shall be periodically photocopied (weekly, at a minimum) and forwarded to the field or project office. Other field records shall be photocopied and submitted regularly and as promptly as possible to the office. When possible, electronic media such as disks and tapes should be copied and forwarded to the project office.

CDM Smith's administrative staff has the responsibility for maintenance of the document control system for the project. This system includes a document inventory procedure and a filing system. Project personnel will be responsible for project documents in their possession while working on a particular task.

Electronic copies of project deliverables, including graphics, will be routinely backed up and archived. Final reports will be submitted to DOE on compact disks in Microsoft Word, Microsoft Excel for certain tables, and GIS for figures.

Hard copies and electronic copies of the laboratory data report on compact disks will be archived by CDM Smith at offsite storage for a minimum of 10 years per the AOC and will be made available to the regulatory agencies upon request by DOE. DOE will maintain hard copies and electronic files per federal requirements. The analytical results and environmental data will be submitted to the established SSFL data management system using the semicolon-delimited text file submittal requirements specified in the extended EDD specification within 30 days of receiving all data validation reports.

6.2 Reporting

During active months of the project, CDM Smith will schedule, at a minimum, weekly phone calls with the DOE and DTSC PMs to provide a verbal status report identifying activities performed, significant conversations, planned activities, and an updated schedule.

QA reports will be provided to management when significant quality problems are encountered. Field staff will note quality problems on field data sheets. The CDM Smith PM will inform the CDM Smith QA Coordinator upon encountering quality issues that cannot be immediately corrected. Monthly QA reports will be submitted to CDM Smith's QA Director by the CDM Smith QA Coordinator. These reports will be provided to DOE upon request of the DOE PM.

Any technical report containing measurement data (prepared by CDM Smith) will contain a QA section that will discuss adherence to governing documents, extent to which DQOs were met, deviations from the Work Plan and project plans, data precision and accuracy goals achievement, and changes, if any, to the governing documents. It will also provide a summary of QA activities performed as well as a description of quality problems encountered and corrective actions implemented. QA reports and CARs will be included in the measurement report as appropriate.

Section 7

Schedule

7.1 Schedule Reporting and Updates

CDM Smith will use Microsoft Project to develop a project schedule that includes a critical path and progress tracking for the Investigation. A summary of the schedule is provided in Table 7-1. A detailed schedule for the Investigation will be provided to DTSC as a separate deliverable from this Work Plan. The schedule will be updated and revised as needed.

Table 7-1 Overview Schedule for Phase 3 Soil Sampling Area IV SSFL – Key Target Dates

Activity	HSA 5C	HSA 5B	HSA 5A	HSA 3/ 6/NBZ	HSA 7/NBZ	HSA 5D/ 8/NBZ
Phase 1 Data From CDM to MWH for Gap Analysis	2011	2011	2011	1/16 – 3/2	3/19	4/3
MWH Conducts Data Gap Analysis	2/8	3/12	4/27	6/4	7/16	8/27
MWH provides sampling recommendations to DTSC via GIS	2/8	3/19	4/30	6/12	7/23	9/3
DTSC completes initial review of sampling rationale and location recommendations	2/10	3/30	5/11	6/22	8/3	9/14
MWH provides revised Sample Location Map and Sampling Rationale Table to DOE	2/12	4/2	5/14	6/25	8/6	9/17
DOE Provides Draft Field Sampling Plan Addendum to DTSC	2/17	4/18	5/21	7/2	8/13	9/24
DTSC/DOE Community Presentation of Phase 3 Sampling Recommendations	2/22	4/25	6/6	7/11	8/22	10/3
MWH provides final Sampling Location Map and Rationale Table to DOE	3/26	4/30	6/8	7/13	8/24	10/5
DOE provides Draft Final Field Sampling Plan Addendum to DTSC	3/28	5/4	6/15	7/20	8/31	10/12
DTSC Approval of Field Sampling Plan Addendum	4/9	5/11	6/22	7/27	9/7	10/19
Start Phase 3 Sampling	4/11	5/14	6/25	7/30	9/10	10/23
Phase 3 Data Review	4/27-7/4	6/8 – 9/14	7/30 – 10/15	9/3 -11/25	10/18 – 1/4	12/1 – 2/22/13
Draft Phase 3 Data Report	9/1	10/15	12/1	1/4/13	2/28/13	3/31/13

Section 8

References

CDM Federal Programs Corporation (CDM). 2007. *Quality Assurance Manual, Revision 11*. March.

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

Sapere. 2005. Historic Site Assessment of Area IV SSFL.

State of California, Environmental Protection Agency, Department of Toxic Substances Control. 2010. Administrative Order on Consent for Remedial Action. Santa Susana Field Laboratory Simi Hills, Ventura County, California. The United States Department of Energy (Respondent). Docket No. HSA-CO 10/11 – 037.

United States Environmental Protection Agency (EPA). 2008. *EPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review*. EPA-540-R-08-01. June.

________. 2006. *Guidance for the Data Quality Objectives Process, EPA QA/G-4*. Final. EPA/600/R-96/055. August.

________. 2005. *EPA Contract Laboratory Program National Functional Guidelines for Chlorinated Dioxin/Furan Data Review*. EPA-540-R-05-001. September.

________. 2004. *EPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review*. EPA 540-R-04-004. October.

________. 1997. *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods*, SW-846, Third Edition (as updated by revisions I, II, IIA, IIB, III, IIIA, IIIB, IVA, and IVB). July.