Report

Field Implementation Plan for RFI Group 5 Santa Susana Field Laboratory, Ventura County, California

Prepared for:

The Boeing Company

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CH2MHILL

Contents

Section Page

Field Implementation Plan, Group 5, Santa Susana Field Laboratory, Ventura County, California....1
Scope of Work....1
Pre-Field Investigation Activities....2
Sample Collection....3
Decontamination....5
Waste Management....5
Sample Management....6
Field Documentation....6
Health and Safety....6
Field Staff....8
Field Equipment and Supplies....8
Communication....8
Schedule....9
Costs....11
References....11

Tables

1 Field Staff and Vehicle Information
2 Field Equipment and Supplies

Figures

1 Buffer Zones, Group 5
2 Decision Tree for Addressing Changes in Field Conditions at Group 5 RFI Sites
3 Step-Out and Step-Down Soil Vapor Sampling Sequence for Group 5 RFI Sites
4 Step-Out and Step-Down Soil Sampling Sequence for Group 5 RFI Sites
5 Field Implementation Schedule

Appendices

A Standard Operating Procedures
B Boeing Pre-Field Checklist
C Health and Safety Dashboard Card
D Cost Estimate

Acronyms

B100	Building 100 Trench
BC	background concentration
Boeing LF	Boeing Area IV Leach Fields
Compound A	Compound A Facility
DOE	Department of Energy
DOE LF1	DOE Leach Fields 1
DOE LF2	DOE Leach Fields 2
DOE LF3	DOE Leach Fields 3
ECL	Engineering Chemistry Laboratory
EEL	Environmental Effects Laboratory
FIP	Field Implementation Plan
GPS	Global Positioning System
Group 5 SAP	*Sampling and Analysis Plan for RFI Group 5, Santa Susana Field Laboratory, Ventura County, California* (CH2M HILL, 2008)
HMSA	Hazardous Materials Storage Area
HSP	Health and Safety Plan
ID	location identification number
IDW	investigation-derived waste
JHA	job hazard analysis
LPO	loss prevention observation
Metals Clarifier	Building 65 Metals Clarifier
MS/MSD	matrix spike/matrix spike duplicate
OSHA	Occupational Health and Safety Administration
PCB	polychlorinated biphenyl
PDU	Coal Gasification Process Development Unit
PID	photo ionization detector
Pond Dredge	Pond Dredge Area
PPE	personal protective equipment

PTSP	Pre-Task Safety Plan
QA/QC	quality assurance/quality control
QAPP	Quality Assurance Project Plan
RBSL	risk-based screening level
RCRA	Resource Conservation and Recovery Act
RFI	Resource Conservation and Recovery Act Facility Investigation
RIHL	Rockwell International Hot Laboratory
SE Drum	Southeast Drum Storage Yard
SHEA	Safety, Health, and Environmental Affairs
SNAP	Systems for Nuclear Auxiliary Power
SOP	Standard Operating Procedures
SSFL	Santa Susana Field Laboratory
STL-IV	Systems Test Laboratory IV
STL-IV Explosive Bunkers	Boeing - Unaffiliated Features
STP Pond	Sewage Treatment Plant
TPH-gas	total petroleum hydrocarbons as gasoline

Field Implementation Plan, Group 5
Santa Susana Field Laboratory, Ventura County, California

This document presents the Field Implementation Plan (FIP) for the Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI) sites and other unaffiliated features in Group 5, Santa Susana Field Laboratory (SSFL) in Ventura County, California. The purpose of this report is to document how the field investigation proposed in the *Sampling and Analysis Plan for RFI Group 5, Santa Susana Field Laboratory, Ventura County, California* (Group 5 SAP) (CH2M HILL, 2008) will be implemented. This FIP also includes details regarding the schedule and costs for implementing the Group 5 SAP.

Group 5 consists of the following Boeing and Department of Energy (DOE) sites:

Boeing Group 5 Sites

- Boeing Area IV Leach Fields (Boeing LF)
- Compound A Facility (Compound A)
- Engineering Chemistry Laboratory (ECL)
- Environmental Effects Laboratory (EEL)
- Pond Dredge Area (Pond Dredge)
- Coal Gasification Process Development Unit (PDU)
- Sewage Treatment Plant (STP Pond)
- Southeast Drum Storage Yard (SE Drum)
- Systems Test Laboratory IV (STL-IV)
- Unaffiliated Features (Boeing - STL-IV Explosive Bunkers)

DOE Group 5 Sites

- Building 65 Metals Clarifier (Metals Clarifier)
- Building 100 Trench (B100)
- DOE Leach Fields 1 (DOE LF1)
- DOE Leach Fields 2 (DOE LF2)
- DOE Leach Fields 3 (DOE LF3)
- Hazardous Materials Storage Area (HMSA)
- Rockwell International Hot Laboratory (RIHL)
- Systems for Nuclear Auxiliary Power (SNAP)
- Unaffiliated Features (DOE)

The locations of the Group 5 RFI Sites and Unaffiliated Features are shown in Figure 1.

Scope of Work

As described in the Group 5 SAP, soil and soil vapor samples will be collected from 17 RFI sites and other unaffiliated features in Group 5. The field investigation will be implemented in accordance with the Standard Operating Procedures (SOPs) provided in Appendix A.

The SOPs include:

- SOP 1 - Utility Clearance
- SOP 2 – Surveying of Soil and Soil Vapor Borings
- SOP 3 - Surface Geophysics
- SOP 4 - Soil Vapor Sampling
- SOP 5 - Split-Spoon or Geoprobe Soil Sampling
- SOP 6 - Soil Boring Drilling and Abandonment
- SOP 7 - Surface/Hand-Auger Sampling
- SOP 8 – VOC Soil Sampling
- SOP 9 - Borehole and Trench Sampling and Logging
- SOP 10 – Direct-push and Hydropunch Groundwater Sample Collection
- SOP 11 - Quality Control Sampling
- SOP 12 - Decontamination of Personnel and Equipment
- SOP 13 - Investigation-Derived Waste Management
- SOP 14 - Packaging and Shipping Procedures
- SOP 15 - Chain-of-Custody Procedures
- SOP 16 - Documentation and Records

Pre-Field Investigation Activities

The Boeing Pre-Field Checklist has been completed in preparation for the Group 5 field investigation. The Pre-Field Checklist is provided in Appendix B. CH2M HILL will coordinate with Boeing and DOE to obtain appropriate Boeing and DOE permits and to secure access to all sampling locations prior to the start of all field activities.

Initially, CH2M HILL will coordinate with Boeing to mobilize field equipment to SSFL and set up a field office, equipment storage facility, and staging area for the fieldwork at a location designated by Boeing. Prior to conducting any fieldwork, the Field Lead will conduct an orientation meeting with each crew to familiarize all personnel with site communication, health and safety requirements, and other logistical issues relevant to the scope of work for each field crew. This orientation meeting is scheduled for February 27, 2008. Field staff who will be accessing the site on a routine basis will obtain a non-employee secure badge. Field staff who will be visiting the site on an occasional basis will obtain a 1-day visitor badge. Table 1 presents the level-of-access clearance granted by Boeing for the field staff scheduled to perform the Group 5 field investigation.

CH2M HILL will perform site reconnaissance at the Group 5 sites to help plan and optimize fieldwork execution and to identify and mark sensitive habitat areas and other site features that may affect fieldwork. The site reconnaissance will include inspecting the inside of existing buildings for drains, sumps or other suspect areas, and samples may be added or sampling locations may be shifted to investigate these areas, pending discussion with Boeing or DOE. Prior to conducting any sampling activities, all sample locations will be staked using wooden stakes and surveyed in accordance with SOP 2, Surveying of Soil and Soil Vapor Borings. The sampling location identification number (ID) will be indicated on

wooden stakes. For samples located beneath concrete pads, the sample will be marked with spray paint on the concrete pad, labeled with the sample ID, and noted in the sample location inventory as requiring concrete coring. After sampling locations have been staked, the locations where subsurface sampling is planned will be cleared of utilities in accordance with SOPs 1 and 3 (Utility Clearance and Surface Geophysics). An area of approximately 10 feet by 10 feet around each sampling location will be cleared by USA Dig Alert and ULS Services Corporation. Any utilities or subsurface anomalies located during the utility clearance will be marked on the ground. If the sampling location must be changed due to subsurface obstructions identified during the utility clearance or at the time of sampling, or due to sampling rig refusal, the new location will be placed as close as possible to the original location and surveyed using a Global Positioning System (GPS) at the time of sampling.

Sample Collection

Following staking and utility clearance, borings will be advanced to collect subsurface samples using a direct-push rig in accordance with SOP 5. The field investigation will be based on sampling by medium according to the following general sequential approach:

1. Shallow soil vapor samples will be collected to screen for volatile organic compounds (VOCs) and to allow sufficient time for soil vapor equilibration in soil vapor probes, laboratory analysis, assessment of the need to collect and analyze soil samples for VOCs, and step-out sample decision making.

2. Shallow direct-push soil samples will be collected to a depth of 10 feet to assess human health and ecological risk. In general, shallow soil samples will be collected first in areas of previously reported risk-based screening level (RBSL) exceedances to allow sufficient time for laboratory analysis, step-out and step-down sample decision making, and one or more step-out and/or step-down sample collection events, as required.

3. Deeper soil samples will be collected below a depth of 10 feet in areas of elevated constituent concentrations in soil vapor and soil to assess the threat to groundwater.

4. As appropriate, temporary groundwater samples may be collected in deep soil borings to assess groundwater impacts.

In the event that field conditions (for example, soil thickness) at a planned sampling location are substantially different than planned, Figure 2 presents a decision tree that outlines the decision-making protocol for addressing changes to the planned sampling approach. As indicated in Figure 2, if refusal is encountered above the target sampling depth with the direct-push rig, a hollow-stem auger drill rig may be mobilized to the location, pending discussion with Boeing and DOE, and the remaining samples at that location will be collected at depth in accordance with SOP 6, Soil Boring Drilling and Abandonment. If refusal above the target sampling depth is encountered with either the drill rig or the direct-push rig, in the event a drill rig is not used, a sample will be collected from the deepest interval possible if the refusal depth is less than or equal to 2 feet above the target depth.

A hand auger will be used to collect soil samples at locations that are inaccessible to a direct-push or drill rig. As an alternative and if appropriate, an all-terrain, limited-access, direct-push rig can also be mobilized to the site for inaccessible sampling locations, pending

discussion with Boeing and DOE. For selected sites, such as DOE Leach Fields 1, Pond Dredge, and Building 100 Trench, a backhoe or excavator will be used for sampling. Trenches will be advanced, sampled, and logged in accordance with SOP 9, Borehole and Trench Sampling and Logging.

Soil vapor sampling will be performed in accordance with SOP 4, Soil Vapor Sampling, prior to collecting soil samples to screen for the presence of VOCs. Soil samples will be collected in accordance with SOPs 5, 7, and 8, Split-Spoon or Geoprobe Soil Sampling, Surface/Hand-Auger Sampling, and VOC Soil Sampling, respectively. In addition to the samples proposed for collection in the Group 5 SAP, quality control samples will be collected in accordance with SOP 11, Quality Control Sampling. The lithology of the boreholes and trenches will be logged in accordance with SOP 9, Borehole and Trench Sampling and Logging.

Based on the results of the sampling proposed in the Group 5 SAP, additional step-out sampling may be required to define the lateral and/or vertical extents of contamination at each RFI site and unaffiliated feature. Step-out sampling locations for sample concentrations that exceed RBSLs or background concentrations (BCs) will be selected according to the criteria described in Table 3 of the Group 5 SAP. A consistent approach to selecting future step-out sampling locations will be applied based on professional judgment and careful consideration of the following specific step-out criteria:

- Step-out approximately 50 feet for soil vapor samples containing VOC concentrations greater than the RBSLs.
- Step-out approximately 50 feet for soil samples containing mobile constituents (for example, VOCs or total petroleum hydrocarbons as gasoline [TPH-gas]) with concentrations greater than 10 times the RBSLs.
- Step-out approximately 20 feet for soil samples containing mobile constituents with concentrations between the RBSL and 10 times the RBSL.
- Step-out approximately 20 feet for soil samples containing less mobile constituents (for example, polychlorinated biphenyls [PCBs], metals, and heavy hydrocarbon-range hydrocarbons) with concentrations greater than RBSLs or BCs.
- Evaluate step-out locations for the presence of nearby proposed sampling locations for other chemical use areas and/or RFI Sites within step-out distance. If such nearby proposed sampling locations exist, coordinate sampling activities so that all target analytes and sampling depths for areas and/or sites are addressed at one location.
- Field check proposed step-out locations relative to site drainage patterns, surface slope, and topography, and use professional judgment to increase or decrease step-out distances and directions accordingly.
- For linear features such as pipelines and drainages, step-out initially along the alignment of the feature and evaluate the sampling results for the highest constituent concentrations. Step-out perpendicular to the alignment of the feature in areas with the highest concentrations, based on professional judgment and the step-out criteria described above.

- Field check proposed step-out locations relative to buildings, rock outcrops, above and below ground utilities, or other obstacles within the proposed step-out distance and adjust step-out distance and direction accordingly.
- For screening assessment samples where no previous sampling was conducted, step out in four directions. For buildings with known footprints, step-outs will be to the approximate former building footprint or concrete slab edges.

Step-down sampling locations will be selected based on professional judgment and careful consideration of the following specific step-down criteria:

- Results of soil vapor and shallow soil samples from the upper 10 feet
- Sample concentration trends with depth (for example, increasing with depth)
- Threat-to-groundwater-based risk concentrations

Figures 3 and 4 illustrate the sequence and timing of the steps for identifying and collecting step-out and step-down soil vapor and soil samples, respectively. If additional step-out sampling is required, proposed additional sampling locations will be hand marked on the appropriate color-coded site map(s) from the SAP and provided to the Field Leader for field checking of accessibility. Planned step-out and step-down sampling will be discussed during weekly teleconference meetings with Boeing and DOE prior to collecting additional samples (see Communication Section).

Additional quality assurance/quality control (QA/QC) samples, including field duplicates (10 percent frequency), matrix spike/matrix spike duplicate (MS/MSD) (5 percent frequency), and equipment rinsate samples or blanks (1 per day per equipment type), will be collected in accordance with SOP 11, Quality Control Sampling.

Decontamination

Following all sampling, equipment will be decontaminated in accordance with SOP 12, Decontamination of Personnel and Equipment. Decontamination water will be obtained from an onsite location designated by Boeing. Waste decontamination water will be contained in 5-gallon buckets during field activities. After the field day has concluded, decontamination water will be transferred to containers provided by Boeing at Building 4011 for DOE sites and at Building 3260 for Boeing sites for processing and disposal by Boeing, as designated by the Boeing Waste Disposal Specialist.

Waste Management

CH2M HILL will notify the Boeing Waste Disposal Specialist prior to fieldwork to plan and coordinate waste management activities. Investigation-derived waste (IDW) will include stained or odorous soil cuttings from drilling and soil sampling activities contained in 5-gallon buckets, decontamination water contained in 5-gallon buckets, disposable personal protective equipment (PPE), and other disposable field supplies and will be managed in accordance with SOP 13, Investigation-Derived Waste Management. IDW will be transported to the onsite IDW storage locations designated by Boeing for temporary storage in containers provided by Boeing. IDW generated from DOE sites will be stored at Building 4011. IDW generated from Boeing sites will be stored at Building 3260. CH2M HILL

understands that waste container labeling, waste profile sampling, radiation screening, and transportation offsite for disposal will be provided by Boeing, as appropriate in accordance with Boeing waste management procedures.

Sample Management

Samples will be tracked electronically using the SMART tool developed by CH2M HILL. Sample coordinators will assist the Field Lead with documenting, tracking, packaging, and shipping samples under chain-of-custody procedures in accordance with SOP 14, Packaging and Shipping Procedures, and SOP 15, Chain-of-Custody Procedures. In accordance with the Boeing radiation clearance policy, samples collected from RFI sites with debris areas and disposal locations, such as the Pond Dredge Area and Building 100 Trench, will be screened for radioactivity by the onsite Radiation Health Physicist prior to shipment. In the event a sample exceeds the radioactivity criteria for sample shipment, the Radiation Health Physicist and Field Lead will coordinate with Boeing and DOE regarding the handling of the sample.

Samples will be labeled, and placed on ice in a cooler that is lined with a plastic bag to prevent leakage. Coolers for the sample will contain a liquid temperature blank sample.

Samples will be shipped via Federal Express overnight delivery service to offsite laboratories for analysis. The nearest drop-off facility accepts packages for east coast delivery until 6:00 pm and is located at:

Federal Express
21300 Vanowen Street
Canoga Park, CA 91303

Field Documentation

Field activities will be documented in accordance with SOP 16, Documentation and Records, and will include the following:

- Photographs of sampling locations and activities
- Boring logs and trench logs, prepared in accordance with SOP 9, Borehole and Trench Sampling and Logging
- Field logs chronologically documenting such things as arrival and departure times for sampling crews, site activities, site conditions, and observations, and sketch maps of sampling locations and local conditions.
- Field notebooks containing field forms such as instrument calibration records, boring logs, and photo logs
- Annotated SAP figures denoting drainage patterns, inaccessible areas, and other features

Health and Safety

Prior to performing any work at the SSFL site, all CH2M HILL and subcontractor field personnel will participate in a Boeing Field Safety Meeting conducted by Boeing's Health

and Safety Coordinator to provide orientation to the SSFL site, information on hazardous conditions, and what to do in case of an emergency. The CH2M HILL Field Lead or designee will be the Safety Coordinator for the CH2M HILL project work and will confirm and document that all field personnel have attended the Boeing Field Safety Meeting prior to working at the SSFL site. Subcontractor field personnel will provide copies of their Occupational Health and Safety Administration (OSHA) training and medical monitoring records to the CH2M HILL Safety Manager for approval prior to performing work at the SSFL site. The Safety Coordinator will maintain copies of the training and medical monitoring records in a file onsite.

Daily tailgate meetings will be conducted onsite with all project personnel prior to the start of activities to discuss field crew activities for the day and to conduct a safety meeting. The purpose of the safety meeting is to review the hazards posed and the required health and safety procedures/job hazard analyses (JHAs) that apply for each day's project activities, in accordance with the Health and Safety Plan (HSP) (CH2M HILL, 2007). At the start of each day's activities, the CH2M HILL Safety Coordinator or designee will complete the Pre-Task Safety Plan (PTSP) provided in the HSP with input from the field crews during the daily safety meeting.

Each field vehicle will be required to have a CH2M HILL Health and Safety Dashboard Card placed visibly on the dashboard at all times while onsite. The Dashboard Card, intended to serve as the Boeing Emergency Notification Card specified in the Boeing Pre-Field Checklist, contains key safety contact information, procedures, and a map to the nearest hospital. A copy of a Dashboard Card is provided in Appendix C.

Each field sampling crew will conduct air monitoring during sampling activities using a photo ionization detector (PID). A dust monitor will be used to monitor airborne dust during trenching activities, as described in the HSP. The PID and dust monitor will be calibrated on a daily basis according to the manufacturer's procedures, as described in the HSP and documented in the field notebook.

Field personnel will be required to wear Modified Level D PPE during sampling, decontamination, and waste management activities. Modified Level D PPE includes cotton coveralls or uncoated Tyvek, steel-toe chemical resistant or leather work boots, inner surgical-style nitrile gloves, outer chemical-resistant nitrile gloves, safety glasses, hardhat, and ear protection with the ability to upgrade if necessary, as described in the HSP and as determined in the field by the CH2M HILL Safety Coordinator. CH2M HILL will provide PPE for CH2M HILL employees. Subcontractor personnel and visitors to the SSFL site are expected to provide their own PPE.

CH2M HILL understands that Boeing's radiation clearance policy requires that sample locations located within Area IV be cleared for radioactivity prior to sampling. Sampling locations within Area IV will be prescreened for radioactivity by an onsite Radiation Health Physicist as part of the sample location staking/marking and utility clearance activities, prior to sampling. In addition, samples collected from RFI sites with debris areas and disposal locations, such as the Pond Dredge Area and Building 100 Trench, will be screened for radioactivity by the onsite Radiation Health Physicist.

The CH2M HILL Safety Coordinator will conduct loss prevention observations (LPOs) for specific work tasks or operations by comparing the actual work process to established safe work procedures identified in the HSP and JHAs. LPOs are a tool used by the CH2M HILL Safety Coordinator to provide positive reinforcement for work practices performed correctly, while eliminating deviations from safe work practices that could result in a loss. The LPOs will be performed and documented as described in the HSP.

Field Staff

The personnel who will be assisting with the field investigation in Group 5 are listed in Table 1. All personnel are U.S. citizens or permanent residents of the U.S. and have satisfied the necessary health and safety requirements. Unless indicated otherwise, all personnel have at least 3 years of relevant field experience. Each sampling crew will include at least one person with a California professional registration/certification in accordance with Boeing's administrative requirements. Table 1 also provides information on the dimensions and type of field vehicles to be used by field personnel during the field investigation in Group 5. CH2M HILL will communicate with Boeing if additional or different field staff, beyond those identified in Table 1, are needed to support the Group 5 field investigation.

Field Equipment and Supplies

Field equipment and supplies that will be provided by CH2M HILL and/or its subcontractors are listed in Table 2, along with equipment and supplies that Boeing has offered to provide. For any digital camera equipment, Boeing requires CH2M HILL to provide the camera brand, its serial number, and the name of the person who possesses the appropriate SSFL security badge and is designated to use the camera. The camera information will be included on that person's security badge. CH2M HILL understands that Boeing will provide shared office space with electrical power, wireless internet network access, and a limited amount of office furniture in Boeing's Safety, Health, and Environmental Affairs (SHEA) Building 436.

Communication

Prior to initiating sample collection activities each day, a tailgate meeting will be conducted by the CH2M HILL Field Lead and will be attended by all field sampling crew members to discuss each crew's sampling activities for the day. Any issues with equipment, site access, changes in field conditions, or other items affecting field implementation will be brought to the attention of the Field Lead so that the issues can be resolved in a timely manner. Health and Safety will also be a key discussion topic for the tailgate meetings, as discussed previously under Health and Safety. During this meeting, the Field Lead will confirm that each field sampling crew has a copy of the SAP, HSP, Health and Safety Dashboard Card, Quality Assurance Project Plan (QAPP), instrument calibration records, and this FIP. In addition, each sampling crew will promptly notify the Field Lead of problems if any arise during the day. Crew members will also check in with the Field Lead at the end of each workday prior to leaving the site to report any issues or challenges with the sampling efforts so that plans can be made to resolve them quickly.

Field crews will be able to communicate with Boeing using approximately three two-way radios provided by Boeing. Separate two-way radios provided by CH2M HILL and cellular telephones will be used for communication among field sampling crews and CH2M HILL personnel to coordinate field activities and for health and safety purposes.

CH2M HILL will collaborate with Boeing and DOE on a routine basis to provide Boeing and DOE with updates on the progress of field investigation activities and to discuss the need for step-out and step-down sampling. This information will be shared during weekly teleconference meetings with Boeing and DOE (scheduled for Fridays at 9AM) to discuss proposed step-out samples based on analytical data from the Group 5 field investigation. CH2M HILL will also coordinate directly with Boeing's Technical, Permit, and Waste Disposal Specialists as needed during field investigation activities.

Schedule

The proposed schedule for implementation of the fieldwork is provided in Figure 5. The fieldwork schedule is based on the following assumptions as categorized below:

Presampling Activities

- Sampling locations will be surveyed by the field crews using a submeter accuracy Global Positioning System with submeter accuracy during marking and staking the sampling locations.
- Utility clearance of 30 sample locations per day by one utility clearance crew. CH2M HILL understands that Boeing will not require a CH2M HILL escort for utility clearance crews.

Sampling Strategy

- Soil vapor sampling for screening purposes will be conducted at the beginning of the sampling program, to the extent practical, to allow for changes to the sampling program, such as elimination of soil VOC sampling if no VOCs are detected in soil vapor.
- Sites with widespread RBSL/BC exceedances that may require step-out sampling, such as PDU, ECL, EEL, Compound A, and STL IV, have been scheduled relatively early in the field program to allow time for additional sampling later in the field program.
- Four field sampling crews, each equipped with a direct-push rig, will collect the samples scoped in the SAP, and additional step-out samples as required. If necessary to meet schedule constraints and depending on the number of step-out samples required, one or two additional sampling crews can be mobilized to the site, pending discussion with Boeing.

Numbers of Samples and Locations

Numbers of samples for each RFI site and unaffiliated area are consistent with the Group 5 SAP (CH2M HILL, 2008), and only these samples are specifically included in the schedule, separated into Boeing and DOE sample totals below, as appropriate. Step-out samples are not specifically included in the schedule and are designated below as "unscheduled." The numbers of step-out samples provided are based on an assumption that an additional 50

percent of the number of scheduled samples will require collection as step-out samples to define the lateral and vertical extents of contaminations. Step-out samples will be incorporated into the field program as needed using the unallocated time currently shown at the end of the schedule and/or additional field crews if necessary.

- Total Number of Scheduled Sampling Locations = 609
  - Boeing soil vapor sampling locations = 84
  - Boeing soil sampling locations = 282
  - DOE soil vapor sampling locations = 73
  - DOE soil sampling locations = 170
- Total Number of Scheduled Environmental Samples (excluding step-outs) = 1,576
  - Boeing scheduled soil vapor samples = 165
  - Boeing scheduled soil samples = 833
  - DOE scheduled soil vapor samples = 146
  - DOE scheduled soil samples = 432
- Total Number of Environmental Samples (including unscheduled step-outs) = 2,365
  - Boeing scheduled plus unscheduled step-out soil vapor samples = 248
  - Boeing scheduled plus unscheduled step-out soil samples = 1,250
  - DOE scheduled plus unscheduled step-out soil vapor samples = 219
  - DOE scheduled plus unscheduled step-out soil samples = 648
- Additional QA/QC samples will be collected in accordance with SOP 11, including field duplicates (10 percent frequency), MS/MSD (5 percent frequency), and Equipment Rinsate Blanks (1 per day per equipment type). The time for collecting these additional samples is included in the sampling rate.

Fieldwork Duration

- Total duration of 10 weeks (46 field days), beginning the week of March 3, 2008, and ending the week of May 5, 2008
- Duration of Field Days = 10 hours

Sampling and Analysis Rates

- Average sampling rate of 15 samples per day per field sampling crew
- Soil vapor probes will be allowed to equilibrate for a minimum of 1 or 2 days prior to collecting soil vapor samples
- Two mobile laboratories onsite, each capable of analyzing 12 soil vapor samples per day, for a total of 24 samples per day.
- Mobile laboratory turnaround time for soil vapor samples will be 1 day, after receipt of sample by the laboratory.
- Offsite laboratory turnaround time for soil samples will be 10 days, after receipt of the sample by the laboratory.

Costs

The estimated costs for implementing the Group 5 fieldwork are provided in Appendix D in separate cost estimate tables for Boeing and DOE sites. In addition, separate cost tables are provided for combined fieldwork and laboratory costs and laboratory costs excluding hold samples. The costs are based on the assumptions provided above for the schedule and as shown in the cost estimate tables.

References

CH2M HILL. 2008. *Sampling and Analysis Plan for RFI Group 5, Santa Susana Field Laboratory, Ventura County, California.* February 22.

CH2M HILL. 2007. *Final Health and Safety Plan, Resource Conservation and Recovery Act Facility Investigation Reporting, Santa Susana Field Laboratory*. August 16.

Tables

Table 1
Field Staff and Vehicle Information
Boeing Santa Susana Field Laboratory

Field Task/Role	Firm Name	Contact Information	Field Personnel	Vehicle Types and Dimensions	Level of Boeing SSFL Site Access Clearance
Field Lead Contractor	**CH2M HILL** 3 Hutton Centre Drive Suite 200 Santa Ana, CA 92707	**Field Manager** Alexa Stamets, P.E. (714) 435-6302 – office (530) 949-7753- cell Alexa.stamets@ch2m.com	**Field Lead and Safety Coordinator** Liz Bryant, P.G. (805) 371-7817 x25 – office (714) 697-9028 – cell Elizabeth.Bryant@ch2m.com	TBD	Escort
			Alternate Field Lead Randy Dean, P.G. (805) 371-7817 x24 – office (805) 907-6432 - cell Randy.dean@ch2m.com		Non-Employee SecureBadge
			Field Sample Coordinators (<3 years experience) Kate O'Connor (714) 435-6022 – office (678) 787-9723 – cell Kate.O'Connor@ch2m.com	TBD	Non-Employee SecureBadge
			Vladimir Carino (714) 435-6017 – office (619) 632-3402 – cell Vladimir.carino@ch2m.com	TBD	Non-Employee SecureBadge
Field Sampling Subcontractor	**Jacob & Hefner Associates, Inc.** 15375 Barranca Parkway, Suite J-101 Irvine, CA 92618 Office: (949) 453-1045 Fax: (949) 453-1047	Ed Battle 949-453-1045 – office 949-453-1045 – cell ebattle@jacobandhefner.com	Jeff Wokurka, P.G. John Parkes, P.E. Rob Gibberson		Non-Employee SecureBadge

Table 1
Field Staff and Vehicle Information
Boeing Santa Susana Field Laboratory

Field Task/Role	Firm Name	Contact Information	Field Personnel	Vehicle Types and Dimensions	Level of Boeing SSFL Site Access Clearance
Field Sampling Subcontractor	**Envirosolve** 28215 Agoura Road, Suite 200 Agoura Hills, CA 91301 818-889-0900	George Gardner george.gardner@sagecon.com Ralph Schmitt. P.E. (818) 652-8316 – cell (818) 889-6973 – fax rjschmitt@envirosolve.com	Matt Baumgardner, P.E. Chris Nevison Paul Chang, P.G. Scott Taranova Nathan Severs Adam Goldenberg	F150 truck per crew approximate dimensions: TBD	Non-Employee SecureBadge
Soil Vapor Sampling, Direct-Push Soil Sampling, Drilling, and Concrete Coring Subcontractor	**HydroGeoSpectrum** Need Address	Raphe Pavlick (310) 823-6661 – office (310) 210-4446 - cell hydrogeospectrum@aol.com	Alex Smith Tom Morris Andy Schmidt Allen Fiddler	TBD	Non-Employee SecureBadge
Soil Vapor Sampling, Direct-Push Soil Sampling, Drilling, and Concrete Coring Subcontractor	**StrongArm** 13562 Pumice Street Norwalk, CA 90650	Darren Zuidema (800) 701-0769 – office (562) 787-3161 – cell	Frank Rodriguez Eric Herrera Ken Lauerman Ganzalo Perez Roshawn Dollars	Truck-mounted GeoProbe approximate dimensions: length-12', height-10', width-8' Track-mounted GeoProbe approximate dimensions: length-8', height-13', width-5'	Non-Employee SecureBadge
Backhoe/Excavator Rental, Operator, and Trenching Subcontractor	**B.L. Hall Equipment Rental** 310 West Evergreen Avenue Monrovia, CA 91016	Dan Hall Barbara Hall (626) 256-3220 – office (626) 945-2170 – cell blhallinc@verizon.net	Steve Huggett Ben Cisneros Paul Isler Ralph Hall Daniel Hall	TBD	Non-Employee SecureBadge

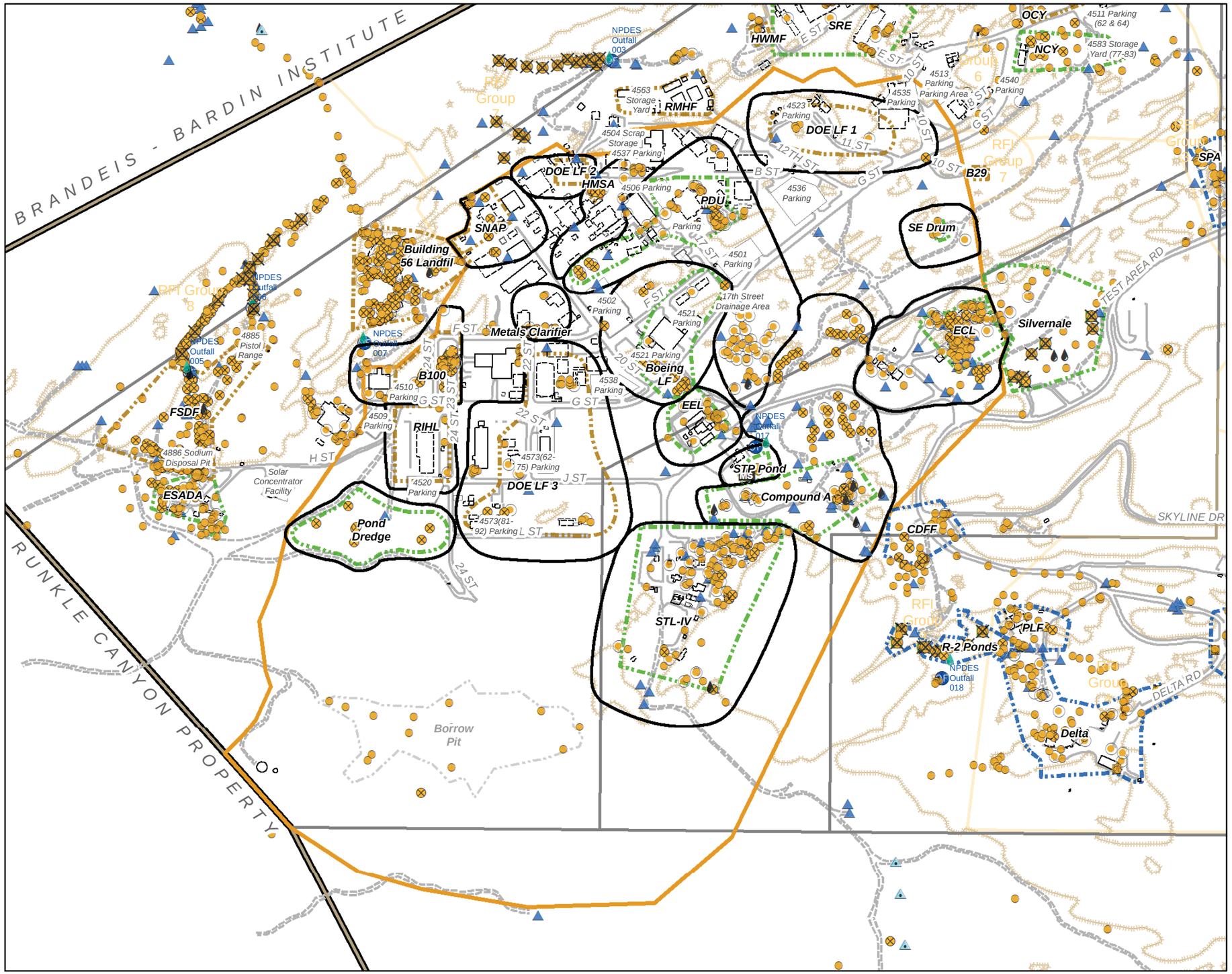
Table 1
Field Staff and Vehicle Information
Boeing Santa Susana Field Laboratory

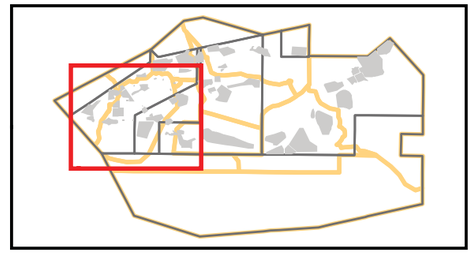
Field Task/Role	Firm Name	Contact Information	Field Personnel	Vehicle Types and Dimensions	Level of Boeing SSFL Site Access Clearance
Underground Utility Locating Subcontractor	**ULS Services Corporation** 9061 Calle del Verde St Santee, CA 92071	Chris Reimer (800) 528-8206 – office (619) 750-6939 – cell ulsmb@worldnet.att.net Mike Benedict (800) 528-8206 – office (858) 368-6783 – cell mbenedict@ulsservices.com	Chris Reimer David Leptich	Chevy Express Van 1500 approximate dimensions: length-16 to 18', height 6'8", width-6 to 7' Ford Ranger approximate dimensions: length-14 to 15', height-5.5', width-5 to 6'	Non-Employee Daily Badge, Needs Escort
Land Surveying Subcontractor	**Sage Consultants** 1978 Ventura Boulevard Camarillo, CA 93010	Robert Littell (805) 482-6088 – office	Robert Littell George Gardner	2000 ¾ ton GMC truck approximate dimensions: length-19', height-6', width-6.5' 2001 Ford Ranger approximate dimensions: length-17', height-5.5', width-6'	Non-Employee Daily Badge, Needs Escort
On-Site Mobile Analytical Laboratory Subcontractor	**Centrum Analytical Laboratories, Inc. (Centrum)** 1401 Research Park Drive, Suite 100 Riverside, CA 92507	Mark Horan (951) 779-0310 – office m.horan@centrum-labs.com	John Tangeman	Ford E Super Duty Conversion Van approximate dimensions: length-24', height 11.5', width 8'	Non-Employee SecureBadge
Off-Site Analytical Laboratory Subcontractor	**GEL Laboratories** 2040 Savage Rd Charleston, SC 29407	Joanne Harley (510) 232-8894 Joanne.harley@gel.com	Not Applicable	Not Applicable	Not Applicable
Off-Site Analytical Laboratory Subcontractor	**Lancaster Laboratories** 2425 New Holland Pike Lancaster, PA 17605-2425	Liz Leonhardt (717) 656-2300 eleonhardt@lancasterlabs.com	Not Applicable	Not Applicable	Not Applicable
Off-Site Analytical Laboratory Subcontractor	**TestAmerica (STL)** 4955 Yarrow St Arvada, CO 80002	Mike Phillips (303) 736-0157 Michael.Phillips@testamericainc.com	Not Applicable	Not Applicable	Not Applicable

Table 2
Field Equipment and Supplies
Group 5 RFI Sites
Boeing Santa Susana Facility

Field Equipment	Field Supplies
Field Global Positioning System (GPS) with sub-meter accuracy	Stainless steel sleeves and end caps
Two-way radios for internal CH2M HILL/subcontractor communication	Teflon liners for end caps
Two-way radios for CH2M HILL/Boeing communication (supplied by Boeing)	Wooden stakes
Cellular telephones	Spray paint
Hand augers	Caution tape/flagging
Drive/slide hammer samplers	Ziplock bags
Digital cameras	Trash bags
Sample coolers	Packing tape
Freezer for storing ice	Strapping tape
Dust monitor	Duct tape
Photo ionization detector (PID)	Instrument calibration gasses
Laptop computers	Nitrile gloves
Computer printer/scanner/copier/fax machine	Work gloves
Snake gaiters	Ear plugs
First aid kits	Computer paper
Bloodborne pathogen kits	Tyvek suits
Eyewash kits	Drinking water
Fire extinguishers	Pens, pencils, erasers, etc.
5-gallon buckets with lids	Paper clips
Filing cabinet	Binder clips
CH2M HILL signs for site vehicles	White out
Dashboard cards	Rubber bands
Small refrigerator for food	Indelible Sharpie pens
Office furniture (to be supplied by Boeing, as available)	File folders
Trash containers	Hanging folders
Heavy duty stapler and staples	Federal Express pre-printed shipping labels and supplies
Three-ringed binders	Alconox/Liquinox
Scissors	Deionized water
Tool kit	Paper towels
Permanently bound field log books	Sample labels
Hard hats	
Safety Glasses	
Steel-toed boots	
Respirators with appropriate cartridges as specified in Health and Safety Plan	

Figures





RFI Site Buffer

Basemap Legend

Transformer Poles	Building - Existing	RFI Site - Boeing
Tank - UST	Building - Removed	RFI Site - DOE
Tank - AST	Building - Not Yet Determined	RFI Site - NASA
Tank - Not Yet Determined	Transformer - Existing	RFI Site Buffer
Excavation	Transformer - Removed	RFI Group Boundary
Leachfield	Transformer - Not Yet Determined	Administrative Area
Pipe		Property Boundary
Drainage	Soil	Groundwater
Road - Asphalt	Soil - Composite	Groundwater - Lysimeter
Roads - Dirt	Soil - Sediment	Groundwater - Spring
Rocks	Soil - Surface	Water - Artificial
Streams	Air - Soil Vapor	Water - Discharge
Pond	Air	Water - Surface
Water - Surface (Seep)		
B Biological		
MO Other		
MS Sump		

Buffer Zones Group 5

Date: February 11, 2008

WORKING DRAFT

1 inch equals 500 feet

0 500 1,000 Feet

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SANTA SUSANA FIELD LABORATORY

CH2MHILL

Figure 1

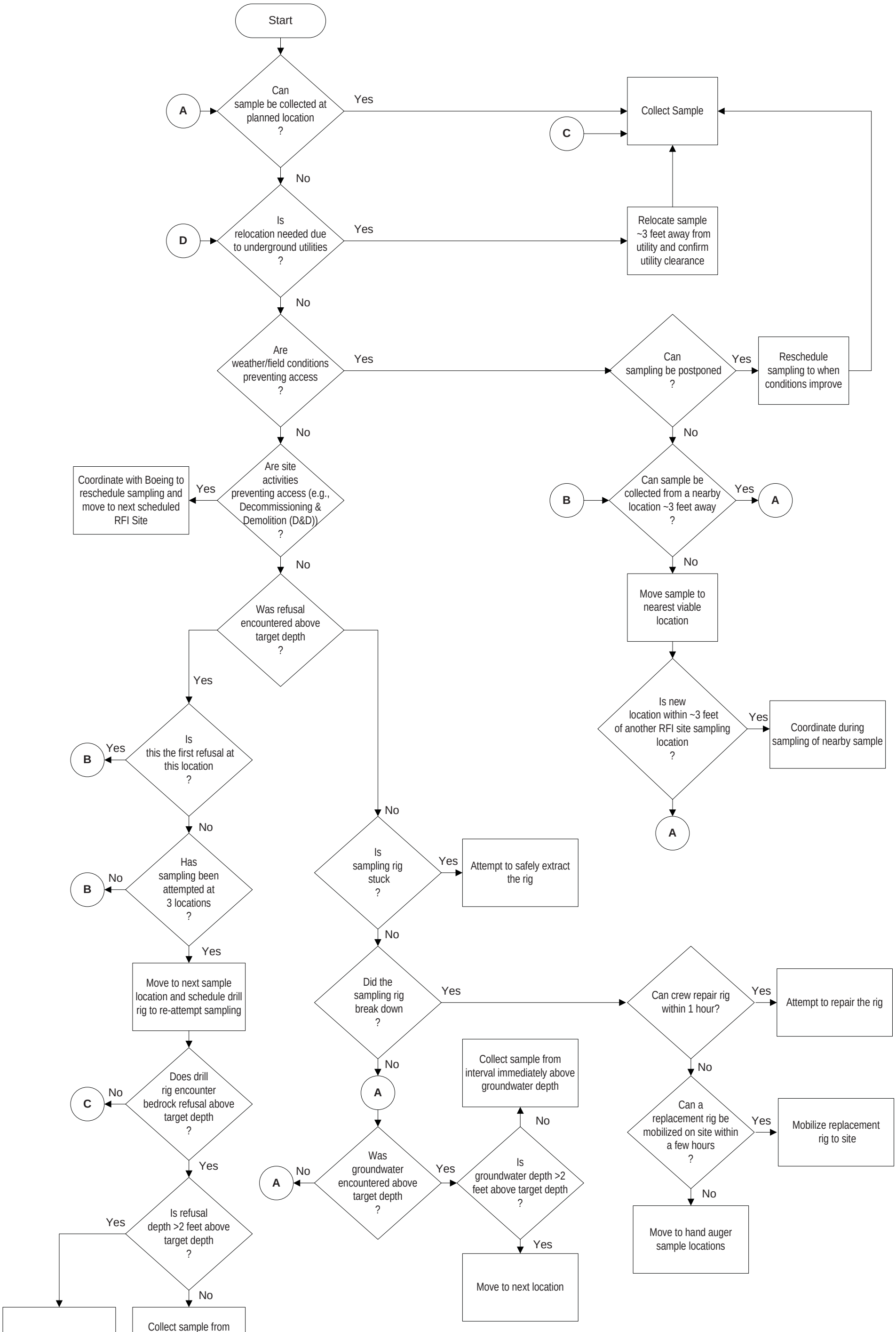

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Figure 2
Decision Tree for Addressing Changes to Field Conditions at Group 5 RFI Sites
Boeing Santa Susana Field Laboratory

ES012008011SCO362070.FP.3A.05.BO Field_DecisionTree.vsd 2/08

Schedule

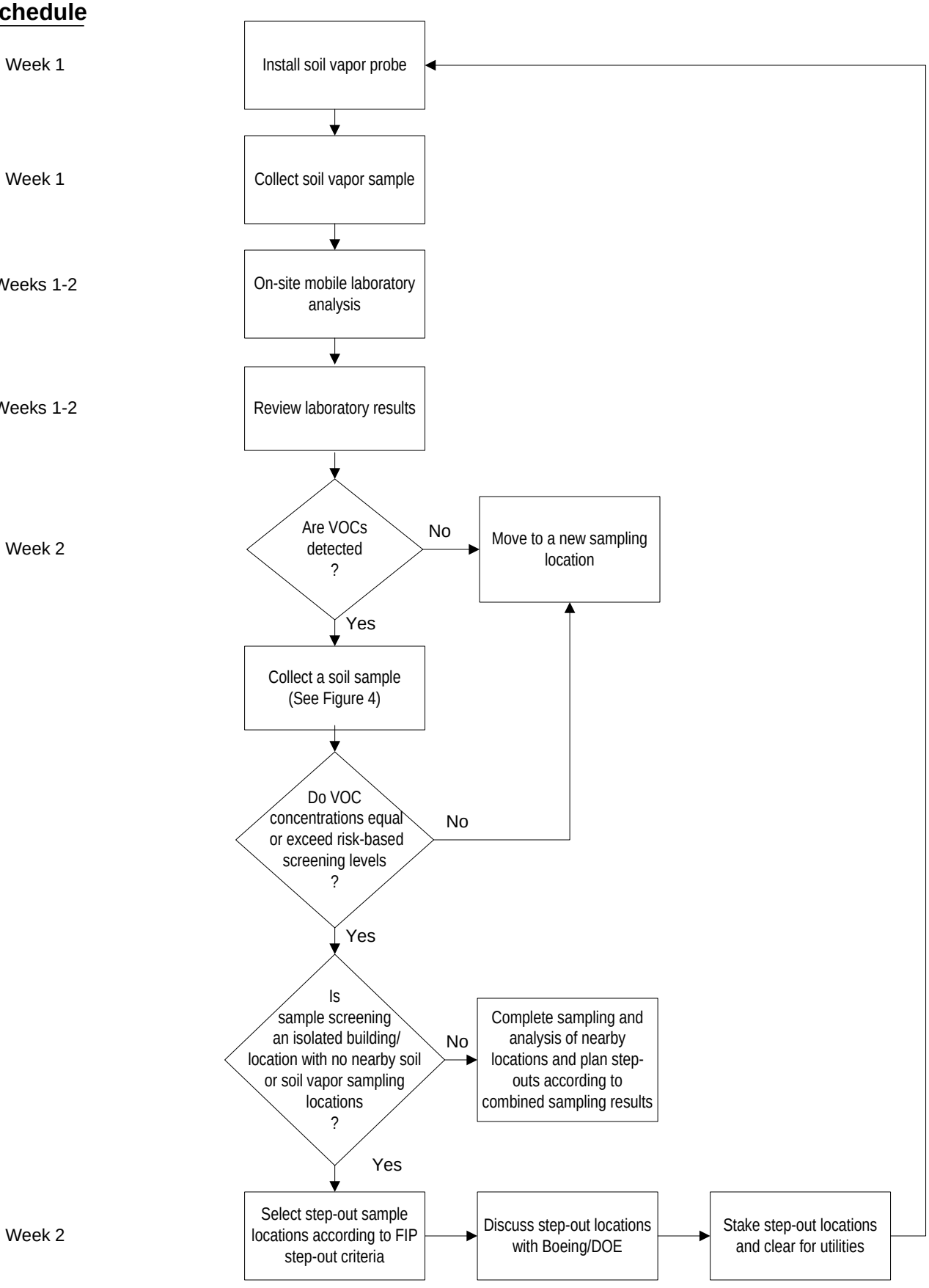


Figure 3
Step-Out Soil Vapor Sampling Sequence for Group 5 RFI Sites
Boeing Santa Susana Field Laboratory

Schedule

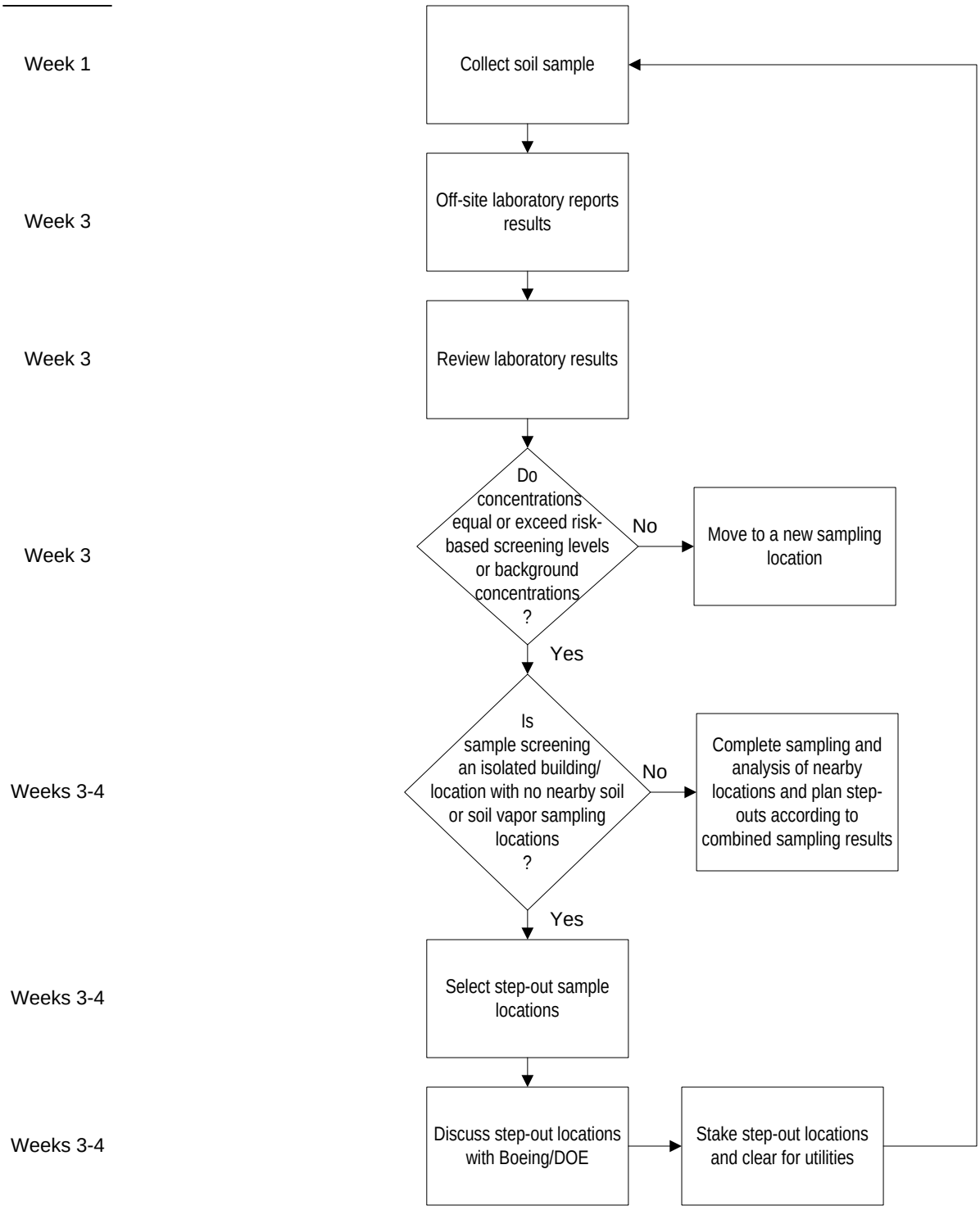


Figure 4
Step-Out Soil Sampling Sequence for Group 5 RFI Sites
Boeing Santa Susana Field Laboratory

Figure 5
Field Implementation Schedule
Field Implementation Plan, Group 5, Santa Susan Field Laboratory

WORKING DRAFT

									Work to begin the week of										
Site to be sampled	**# of sample locations**	**# of soil samples**	**# of soil vapor samples**	**# of days needed for utility clearance**	**# of days needed for soil probe installation**	**# of crew days needed for soil sampling**	**# of days needed for soil vapor sampling**	**Comments**	**25-Feb**	**3-Mar**	**10-Mar**	**17-Mar**	**24-Mar**	**31-Mar**	**7-Apr**	**14-Apr**	**21-Apr**	**28-Apr**	**5-May**
Kick off meeting with Subs									X										
Stake and GPS sample locations, utility clearance, mob equipment, general field prep								First day will be staking locations, utility clearance will begin a day after staking.		X									
Mobilization of drilling equipment										X	X								
Mobilization of mobile lab												X							
HMSA	28	46	24	0.9	1.6	3.1	2.4			Utility clearance - 1 day	A - 2 days (SV) Centrum A - 2.5 days B - 3.5 days								
DOE LF2	20	41	6	0.7	0.4	2.7	0.6				Utility clearance - 0.5 days A - 0.5 days (SV) Centrum B - 1 day B - 1.5 days	B - 1.5 days							
PDU	88	195	36	2.9	2.4	13.0	3.6	17 St drainage will probably have to be hand augured due to the area being well vegetated. Bldg 4024 has not been rad cleared so sample in northern portion of the site near 4024 may need to be sampled at a later time.		Utility clearance - 3 d	A - 2.5 days (SV)	C, D - 5 days B - 3 days Centrum A - 2.5 days Centrum B - 1 day							
EEL	35	86	12	1.2	0.8	5.7	1.2	This site is active. Will need to coordinate with Boeing to see when the best time will be to sample this site.			Utility clearance - 1 d	A - 1 day (SV) Centrum B - 1.5 days	C,D - 3 days						
Compound A Facility	46	110	20	1.5	1.3	7.3	2.0	Samples located near and at the debris area may have rig access issues. Samples located on the southeastern portion of the site are in steep areas with vegetation and poison oak. A rig probably won't be able to access CFBS1021 through CFBS1024 because of an above ground pipe.			Utility clearance - 1.5	A - 1.5 days (SV) Centrum A - 2 days	B - 2.5 days C,D - 2 days	B - 1 day					
STL IV	88	190	48	2.9	3.2	12.7	4.8	Site will be undergoing D&D.			Utility clearance - 2 d	Utility clearance - 0.9 days A - 2.5 days (SV) Centrum B - 2.5 days	A - 1 day (SV) Centrum A - 1 day Centrum B - 1.5 days	C,D - 5 days B - 3 days					
STL IV Explosive Bunkers	3	9	0	0.1	0.0	0.6	0.0					Utility clearance - 0.1 days		B - 0.6 days					
ECL	50	91	35	1.7	2.3	6.1	3.5	Samples south of the RFI site boundary are located in a steep, well vegetated (with possible poison oak) area.				Utility clearance - 2 days	B - 2.4 days (SV) Centrum A - 3.5 days		C,D - 3 days				
SE Drum Storage	4	9	2	0.1	0.1	0.6	0.2					Utility clearance - 0.5 days	B - 0.1 days (SV) Centrum A - 0.5 days		B - 0.6 days				
Unaffiliated - Bldgs 4356, 4361, 4656	8	18	4	0.3	0.3	1.2	0.4						A - 0.3 days (SV) Centrum B - 0.4 days		B - 1.2 days				
Unaffiliated - Bldg 4037 and UT-19	3	3	4	0.1	0.3	0.2	0.4	Probably will need to hand auger since guardrail is blocking only access to the site.					A - 0.3 days (SV) Centrum B - 0.4 days		B - 0.2 days				
Unaffiliated - Bldg 4625	2	3	2	0.1	0.1	0.2	0.2	Bldg 4024 has not been rad cleared					A - 0.1 days (SV) Centrum B - 0.2 days		B - 0.2 days				
SNAP	25	39	20	0.8	1.3	2.6	2.0					Utility clearance - 1 d	A - 1.3 days (SV) Centrum B - 2 days		B - 2.6 days				
Bldg 65 MC	16	30	10	0.5	0.7	2.0	1.0					Utility clearance - 0.5 days	A - 1 day (SV)	Centrum A - 1 day	A- 2 days				
DOE LF3	51	84	26	1.7	1.7	5.6	2.6	One GW sample					Utility clearance - 2 days A - 1 day (SV)	A - 0.5 days (SV) Centrum B - 2.4 days	A - 3 days C - 2 days	A - 0.5 days			
Unaffiliated area at and around Bldg 4463	18	31	10	0.6	0.7	2.1	1.0						Utility clearance - 0.5	A - 0.7 days (SV) Centrum A - 1 day	D - 2 days				
Hot Lab	30	55	20	1.0	1.3	3.7	2.0						Utility clearance - 1 d	A - 1.3 days (SV) Centrum A - 2 days		B - 4 days			

Figure 5
Field Implementation Schedule
Field Implementation Plan, Group 5, Santa Susan Field Laboratory

WORKING DRAFT

									Work to begin the week of										
Site to be sampled	**# of sample locations**	**# of soil samples**	**# of soil vapor samples**	**# of days needed for utility clearance**	**# of days needed for soil probe installation**	**# of crew days needed for soil sampling**	**# of days needed for soil vapor sampling**	**Comments**	**25-Feb**	**3-Mar**	**10-Mar**	**17-Mar**	**24-Mar**	**31-Mar**	**7-Apr**	**14-Apr**	**21-Apr**	**28-Apr**	**5-May**
STP Pond	17	48	4	0.6	0.3	3.2	0.4	Most of the locations will need to be hand augured because of steep terrain/vegetation/possible poison oak and pipes in the way for access.					Utility clearance - 0.5	A - 0.3 days (SV) Centrum B - 0.5 days		D - 0.5 days			
Boeing LF	19	39	8	0.6	0.5	2.6	0.8	Will need to obtain Boeing's permission to access site since most of it is fenced.					Utility clearance - 0.5	A - 0.5 days (SV) Centrum B - 1 day		C - 3 days			
Pond Dredge	16	56	0	0.5	0.0	3.7	0.0	Trenching involved at this site.					Utility clearance - 0.5 days			D - 4 days			
DOE LF 1	25	47	16	0.8	1.1	3.1	1.6	This site requires a permit to enter. Trenching involved at this site.						Utility clearance - 1 day A - 1.1 days (SV) Centrum A - 1 day Centrum B - 1 day		C - 2 days B - 1 day			
Bldg 100 Trench	17	35	4	0.6	0.3	2.3	0.4	BHBS1003, BHBS1004, BHBS1006, BHBS1007, BHSV1000, BHSV1001 may be hard to access. Trenching involved at this site. Bldg 100 has not been rad cleared.						Utility clearance - 0.6 days A - 0.3 days (SV)	Centrum A - 0.4 days	A - 2.5 days			
Step-out locations														Utility clearance - 3.5 days	Utility clearance - 5 d	A - 2 days (SV)	A - 3.5 days (SV) Centrum A and B - 5 days B - 4 days C,D - 5 days	A,B,C,D - 5 days	A,B,C,D - 5 days
Totals	609	1265	311	20.3	20.7	84.3	31.1	**Assumptions made:**									**Notes:**		

Total number of Scheduled Boeing	366	833	165
Total number of Scheduled DOE	243	432	146
Boeing Totals including step-out	549	1250	248
DOE Totals including step-out	365	648	219

1. One utility clearance crew will be available and can clear 30 locations per day

2. Sampling crews can collected 15 samples per crew per day

3. Centrum (mobile lab for soil vapor) can analyze 10 soil vapor samples a day.

4. Number of step-outs are not included in the schedule but will be scheduled for the last weeks of field work as shown in the schedule.

SV = soil vapor

Appendix A
Standard Operating Procedures

Appendix B
Boeing Pre-Field Checklist

Boeing Pre-field Checklist

This pre-field activities checklist has been prepared to facilitate compliance with work plans, protocols, permits, and procedures.

Boeing Project Name:	Santa Susana Field Laboratory, Group 5 RFI
Field Activity:	Soil and soil vapor sampling
Planned Start Date:	March 2008
Planned Completion Date:	May 2008

Contact Information:

Consultant/Contractor

Project Manager	Jill Bensen, Project Manager, CH2M HILL, (916) 717-0564
Project Engineer	Alexa Stamets, Field Manager, CH2M HILL, (714) 435-6302
Chief Field Engineer/Technician	Elizabeth Bryant, Field Lead, CH2M HILL, (714) 697-9028
Health & Safety Officer:	Rick Cavil, Health and Safety Manager, CH2M HILL, (408) 896-0140
Other	Randy Dean, Project Geologist, CH2M HILL

Boeing

Project Manager	Adam Boettner, Remediation Team Project Manager, (818) 466-8724
Technical Specialist	Adam Boettner, Remediation Team Alternate Coordinator, (818) 466-8724
Facility Contact	Dan Trippeda, Remediation Team Coordinator, (818) 466-8977
Permits Contact	Bob Mako, Health and Safety, (818) 466-8735
Waste Disposal Specialist	Tom Venable, Waste Management, (818) 466-8779
Legal:	N/A
Other:	Phil Rutherford, Radiation Health and Safety

Subcontractors (as applicable)

No. 1	Mark Horan, Centrum, Lab Manager, (951) 779-0310
No. 2	Ralph Schmitt, Envirosolve, (818) 889-0090
No. 3	Bob Littell, Sage Consultants, (805) 482-6088
No. 4	Chris Reimer, ULS, (800) 528-8206

No. 5	Raphe Pavlick, HydroGeoSpectrum, (310) 823-6661
No. 6	Ed Battle, Jacob Hefner & Associates, (949) 453-1045
No. 7	Darren Zuidema, Strongarm, (800) 701-0769

Property Owners (as applicable)

No. 1	N/A
No. 2	N/A

Work Plans

- Work Plan prepared for work? Yes
- Name of Work Plan & Date Draft Sampling and Analysis Plan for RFI Group 5, Santa Susana Field Laboratory, Ventura County, California (Draft SAP), CH2M HILL, January 29, 2008.
- Was Work Plan Submitted to a regulatory Agency for approval? No
- Was approval received? Date? N/A
- Is Work Plan latest version? Final SAP will be completed/submitted to Boeing/DOE prior to the start of field activities.
- Were there any amendments? No.
- Does Work Plan contain contingency plan (scope for potential unknowns)? No. However, contingency samples are addressed in the Field Implementation Plan.
- Implementation Plan required? Yes
- Implementation Plan completed? Date? Yes. Draft FIP is attached.
- Quality Assurance Plan required? Yes.
- Quality Assurance completed? Date? Yes (Submitted with Draft SAP on January 29, 2008).
- Type of work to be performed Soil, soil vapor, and groundwater RFI sampling in Group 5

Technical/Site-Specific

- Has constructability review been completed? If yes provide date No
- Confirm contractors have sufficient experience (e.g. min. 5 years experience) Yes
- Have work locations been marked? No (these locations will be marked prior to the start of field activities)
- Are there any obstacles to performing work? TBD
- If yes-method to clear obstacles? N/A
- Is traffic control necessary to perform the work? No
- If yes-is there a Traffic Control Plan? N/A
- Has an on-site review been conducted to confirm conditions for necessary scope of work? No, but will be performed prior to initiating field work
- Is a decision tree available if conditions do not meet original plan? Yes (included in FIP).

- Are shop drawings required?, if yes expected completion date No
- Have field reporting documentation requirements been identified? Yes
- Will any locations be surveyed? If so, does the surveyor have the correct coordinate system and datum for the site that is consistent with EDMS? Yes, using GPS with sub-meter accuracy

Health & Safety

- Health & Safety Plan Submitted to Agency? No, not required
- Health & Safety Plan reviewed by Field Team? Yes
- Standard Work Practices Form been distributed to Field Team? Yes
- Traffic Control Plan (if applicable) reviewed by Field Team? N/A
- Emergency and Incident Reporting Procedures ("Dash Card") with contact and emergency numbers prepared and posted on Boeing EDMS portal? Yes
- Proper PPE on Site? Yes
- Extra PPE for Visitors? Yes
- Visitor Site Access and PPE requirements. The Visitor must contact Boeing or CH2M HILL one week prior to visiting the site and must be a U.S. citizen. The visitor must be escorted by Boeing or a CH2M HILL employee who has SSFL escort privileges. PPE requirements will be the same PPE as the field crews.
- Have OSHA certificates and currency been confirmed for workers? No, but will be prior to starting field work
- Have workers received proper safety trainings specific to their tasks (e.g., excavation, confined space, etc.)? No, but will be prior to starting field work
- Any Excavations including trench work? Trenches will be advanced as part of site characterization activities. Samples will be collected from the trenches by backhoe. No one will be entering the trenches. As discussed with Boeing, an excavation plan is not needed for the trenches.
  - If yes, has excavation plan been prepared and reviewed? No, not required as indicated by Boeing
    - Does plan include geotechnical calculations/considerations? N/A
    - By whom? N/A Third Party & Registered? N/A
  - Completed any site-specific pre-excavation checklist? N/A
  - Is there a backfill plan with import soil and geotechnical plans? Trenches will be backfilled using the same material that was excavated from the trench.
  - Contingency for a larger/deeper excavation? No.
- Health & Safety Officer Rick Cavil, CH2M HILL Health and Safety Manager
- Perform subcontractor equipment safety audit prior to work start (guards, safety switches, General equipment condition)
- Is hazard notification required, if yes list date completed? No, but hazards will be conveyed to workers during daily Pre-Task Safety Meetings
- Pre-Field Tailgate Meetings:
  ☒ Worker Safety

☒ Equipment Safety
☒ Traffic Safety

- Vehicular Safety
  ☒ Heavy Equipment
  ☐ Large truck traffic during soil import/export
- Daily Tailgate/Safety Briefings
  - Proper monitoring equipment with proper calibration chemicals available? Yes
  - Safety Zones established and how maintained?
    Yes, work area near roadways will be coned off.
  - All Field Staff have Boeing Emergency Notification Card on their person? Yes
  - Have OSHA Case Rates of subcontractors been checked? Are they satisfactory for the planned work? Yes

Utilities

- Have utilities been researched? No. Utility surveys will be performed (by USA and ULS) before commencing field investigation activities.
- Are utility plans available? Some utility plans are available.
- Have utility plans been reviewed for work conflicts? No, but may be consulted if necessary. Presence of subsurface utilities will be determined by USA and ULS Services Corporation.
  If yes, what plans? N/A
- Has site been field-checked for utilities? Sites will be field-checked for the presence of utilities prior to the start of field activities.
- For Active facilities has "Site Specific Utility Form" been completed? No, not required as indicated by Boeing
- Has DigSafe/DigAlert been notified? Confirmation #: No, but will be prior to conducting independent utility locating; Confirmation # TBD
- Has independent utility locator service been completed? Yes. (ULS)
- Any overhead utility present that may interfere with work? TBD
- If yes, can work be moved? TBD
- Will hand-augering be conducted (triangular)? Hand augering will only be performed in areas that are not accessible by a direct push rig. To what depth? Varies.
- Is any utility lock-out/tag-out needed? No
- If water or electricity is required, is it available at the site? N/A
- Other N/A

Legal

- Confirm with Boeing Project Manager that legal issues are in order to perform field work. Yes. No legal issues for Group 5
- Do Proposition 65 notifications need to be posted at the site? No
- Are certificates of insurance in place for each subcontractor for offsite work? Yes, except for HydroGeoSpectrum.

Access Agreements

- Confirm with Boeing Project Manager if access agreements are needed. Yes, no access agreements are needed.
- Are special pre-work notifications required by the access agreements? N/A
- Who is the on-Site contact/telephone number for work to be performed? Elizabeth Bryant, Project Hydrogeologist, CH2M HILL,714-697-9028
- Are copies of access agreements needed on site? N/A
- Do special work conditions need to be maintained per the access agreement? N/A
- Are there special work hours per the access agreement? N/A
- Are traffic plans or traffic control necessary for work? N/A
- Has traffic control pan been distributed to drivers? N/A
- Has the Property Owner (if applicable) been notified of, and provided approval for, planned activities and scheduling? N/A
- If yes-contact name and date of approval N/A
- Other N/A

Notifications

- Has Boeing Project Manager been notified of the work start date/time? Yes, work hours will be from approximately 6:00 am to 5:30 pm
- Has Boeing Technical Specialist been notified of the work start date/time? Yes, work hours will be from approximately 6:00 am to 5:30 pm
- Has Boeing Permit Specialist been notified of the work start date/time? Yes, work hours will be from approximately 6:00 am to 5:30 pm
- Has Boeing Waste Disposal Specialist been notified of the work start date/time? Yes, work hours will be from approximately 6:00 am to 5:30 pm
- Is Regulatory Agency (ies) notification required? Yes
  - Lead Agency DTSC
  - Support Agency N/A
  - Local Agency N/A
  - Other: N/A
- If yes-what advance notice is required? Yes, Boeing will notify DTSC one week prior to field work commencing
- Have Agencies been notified? No, but they will be When One week prior to field work commencing How Letter
- Has laboratory data validation/data management company (CH2MHill) been notified of incoming samples using the Lab Task Order (LTO) form? Yes
- Has Property Owner (if applicable) been notified of the work start date/time (for Boeing Facilities use Boeing SSG Service Bulletin)? No, but will be if required by Boeing When? TBD How? TBD

Permits/Regulatory Agencies/Licenses

- Lead Regulatory Agency/Contact DTSC/Laura Rainey
- Additional Regulatory Agencies: (*Check all that apply*)
  ☐ Air Quality Agency [Agency/Name/Title/Telephone #]

- ☐ County Health Department [Agency/Name/Title/Telephone #]
- ☐ City Health Department [Agency/Name/Title/Telephone #]
- ☐ City Building Department [Agency/Name/Title/Telephone #]

- Are permits required for work? (*Check all that apply*)
  - ☐ Drilling Permit
  - ☐ WDR/Waste Discharge Permit
  - ☐ Excavation Permit
  - ☐ Rule 1166 Mitigation Plan/Permit
  - ☐ Grading Permit
  - ☐ City Business License
  - ☐ Facility Hot Work (torches, cutting, grinding)
  - ☐ Other [Describe]
- Has Boeing Permit Specialist reviewed and approved the permits for performing the work (Fire, Security, Fire Protection Engineer, etc.)? No Boeing permits needed except for Restricted Access permit, which Allen Amico has reviewed and approved
- Are pre-work notifications required for permits (i.e. for injections on WDR permits)? No
- If yes, which permits and how much advance notice N/A
- Are there any conditions in the permit that could stop work? No
- If yes, what are the conditions? N/A
- Do mitigation measures exist if these conditions occur? N/A
- What licenses are required to do work? N/A
- Have contractor licenses been verified Yes, but drillers licenses haven't been verified and will be prior to beginning drilling work.

Waste Management

- Is it possible that hazardous waste will be generated? Yes
- If so, what EPA ID # will be used for handling the waste? Boeing will manage the waste
- Who will sign the waste manifest and have they been notified? Yes, Pat, Boeing's Waste Manager
- Type(s) of waste to be generated Decontamination water, soil, and disposable personal protective equipment
- Anticipated Volume to be generated Decontamination water approximately 60 gallons a day. Soil volume can not be determined at this time since only stained and odorous soil will be disposed.
- How will each type of waste be stored?
  - Water During the field day, the water will be stored in 5-gallon buckets. At the end of the field day, the water will be transferred to a Boeing provided container.
  - Soil During the field day, the soil will be stored in 5-gallon buckets. At the end of the field day, the water will be transferred to a Boeing provided container.
  - PPE Large trash bag
  - Other N/A
- Profile Testing Decision Tree available? No, Boeing is responsible for waste

- Has Boeing Waste Specialist been notified? Yes, Pat, Boeing's Waste Manager
- Has Boeing waste contractor been contacted to confirm contract is in place (if applicable) within 2 weeks in advance of field work? N/A Boeing is responsible for waste
- Have proper containers been coordinated through Boeing Waste Specialist? Yes
- If not-why? N/A
- Have proper waste container labels and labeling procedures been obtained from the Boeing Waste Specialist? No, but Boeing's Contractor Coordinator will provide the labels. 5-gallon buckets will be provided by either CH2M HILL's subcontractors or CH2M HILL. Boeing will provide other waste containers to temporarily store wastes received from buckets until disposal is arranged by Boeing.
- How will waste be profiled? Boeing will profile the waste
- Is waste going to a Boeing-approved facility? Boeing is responsible for the waste disposal
- Have on-site storage times been confirmed? Yes
- Any special waste handling/disposal needs? No
- Is fill soil being imported? If so, has it been selected and pre-screened for acceptance? No
- Confirm good housekeeping practices will be conducted at the site. Yes

Portal/EDMS

- Have Sample/Object Numbers/Names been obtained from CH2MHILL? Yes
- Have labs been informed of EDMS requirements such as Turn around times and detection limits using the Lab Task Order Form (LTO) (Copy inside of Boeing's laboratory statement of work)? Yes
- If the laboratory is new to the Boeing EDMS process, has an EDMS training session with the Data Management Company (CH2MHill) been set up? N/A If yes, when? N/A
- Has the laboratory reviewed and signed the latest Boeing Laboratory Statement of Work? (copy on the portal) Yes
- Will electronic data for boring logs and well completion logs be collected and submitted? Yes If no, has this been approved by the Boeing Project Manager and communicated to the Management Company (CH2MHill)? N/A
- Will environmental objects be surveyed? Yes If yes, follow the requirements of the latest Boeing Survey SOP (copy on portal)
- Will data verification and validation be performed? Yes If yes, follow the requirements on the latest Boeing Data Verification and Validation Specification (copy on portal) and confirm the Tier of Validation to be performed with the Boeing Project Manager, the Data Validator, and the laboratory (for delivery of the correct QC Raw Data Package).
- Will boring and well construction logs be created? Yes If yes, CH2M Hill can provide templates in the Boeing gINT software, provided you submit the required data.

- Does the data need to be accessible on the EDMS portal in a period shorter than 1-week after receipt of the laboratory EDD? Yes If yes, contact CH2M Hill for expedited upload arrangements.

Schedule & Resources

- Does the project require a Staffing/Resources Plan? Yes
- Expected duration of field work 3/3/08 through 5/9/08
- Contingency plan if work goes longer No, but if necessary additional field work will be overlapped with other RFI site work
- Construction schedule prepared to identify key milestones and contingencies? Yes

Financial

- Has Boeing approved work order for work? No, but field work will not commence until work order is approved by Boeing
- Is there a signed contract confirmed to be in place? Yes
- Is there a potential for scope/cost changes? Yes
- If yes-is change-order process established with Boeing Project Manager? Yes

Lessons Learned

- Have the PM and key personnel reviewed Boeing Lesson Learned memos to ensure that we don't make the same mistakes twice No, but memos will be reviewed if provided by Boeing

Person Filling out Checklist: Alexa Stamets, Field Manager, 2/21/08
Elizabeth Bryant, Field Lead, 2/21/08

Reviewed and Approved by: [Name, Title, & Date]
Boeing Representative

Appendix C
Health and Safety Dashboard Card

CH2MHILL

CH2M HILL STANDARD WORK PRACTICES AT BOEING SSFL

- **HEALTH AND SAFETY IS OUR NUMBER ONE PRIORTIY**
- **SAFETY AND REGULATORY COMPLIANCE IS OUR TOP PRIORITY AND I MUST TAKE THE NECESSARY STEPS TO PROVIDE THIS SERVICE**
- **I AM RESPONSIBLE AND I HAVE THE AUTHORITY TO STOP WORK AT ANY TIME IF SAFETY AND REGULATORY REQUIREMENTS ARE NOT BEING MET**
- ***REGULATORY* COMPLIANCE IS MANDATORY** – No work will begin and/or all work will immediately stop unless **BOTH** of the following are checked off:

  ☐ Yes, I am in compliance with all regulatory health and safety requirements.
  ☐ Yes, I am in compliance with all facility health and safety requirements.

- **BEFORE STARTING WORK PERFORM THE FOLLOWING**:

  IF YOU ARE UNSURE OF SAFETY PRACTICES FOR THE PARTICULAR WORK INVOLVED – GET CLARIFICATION PRIOR TO STARTING WORK

  ☐ Complete and Review Site Specific Health and Safety Plan.
  ☐ Obtain MSDS Sheets for chemicals to be brought on site.
  ☐ Review SHEA Flysheet RF034.
  ☐ Complete Pre-field Checklist.
  ☐ Complete and submit Project Impact Form.
  ☐ If there is a need to work in restricted areas, review and follow the "restricted access area procedures" in the CH2M HILL H&S Plan.
  ☐ Notify Underground Service Alert and Boeing Utilities before performing any invasive work.
  ☐ Obtain necessary monitoring equipment for the conditions anticipated and verify that it is properly functioning.
  ☐ Perform Health and Safety "Tail Gate Meeting" and fill out form.
  ☐ Calibrate monitoring equipment and log calibration in calibration log book.
  ☐ Review scope of work documents, permits, and other related items.
  ☐ Obtain correct Personal Protective Equipment (PPE) for the work to be performed and the chemicals anticipated to be present.

- When utilizing **subcontractors**:
  ☐ Review site "Incident Reporting Procedures".
  ☐ Discuss all likely hazards and known chemicals of potential concern.
  ☐ Discuss the scope of work, work area and site restrictions.
  ☐ Perform "Tail Gate Safety Meeting" with subcontractors.

Hospital Evacuation Routes and contact numbers are presented on the back side of this Dash Card

CH2MHILL

EMERGENCY AND INCIDENT REPORTING PROCEDURES

EMERGENCY PHONE NUMBER ONSITE DIAL (818) 466-8911
EMERGENCY PHONE NUMBER OFFSITE DIAL 911

EMERGENCY OR INCIDENT REPORTING:
All incidents and regulatory inspections must be reported immediately

***Emergency** definition: An uncontrolled situation, a major or life threatening injury, a fire, or any event that requires immediate assistance from the Fire Department*

***Incident** definition**:** Any event, condition, or action (including near misses) that affects the safety of personnel, does not follow rules and guidelines for work implementation and regulatory compliance onsite. **Examples of Incidents**: Spilled liquid in an uncontrolled environment, Working without correct/completed permit in place. Performing hot works without a "Hot Works Permit" etc.*

1. Respond to the incident and get it under control.
2. Once the incident is under control, contact the following **BOTH** by e-mail and telephone.
   When leaving messages and sending emails, include the following:
   Date and Time: The date and time the incident occurred
   Location: Where the incident occurred, i.e.; Boeing Santa Susana Facility
   Description: Describe individuals involved, what happened and what it may affect
3. After the incident is under control document in writing and with photographs the sequence of events, locations, date, time, conditions at the time of the incident, people involved and that responded to the incident, and the probable cause of the incident.

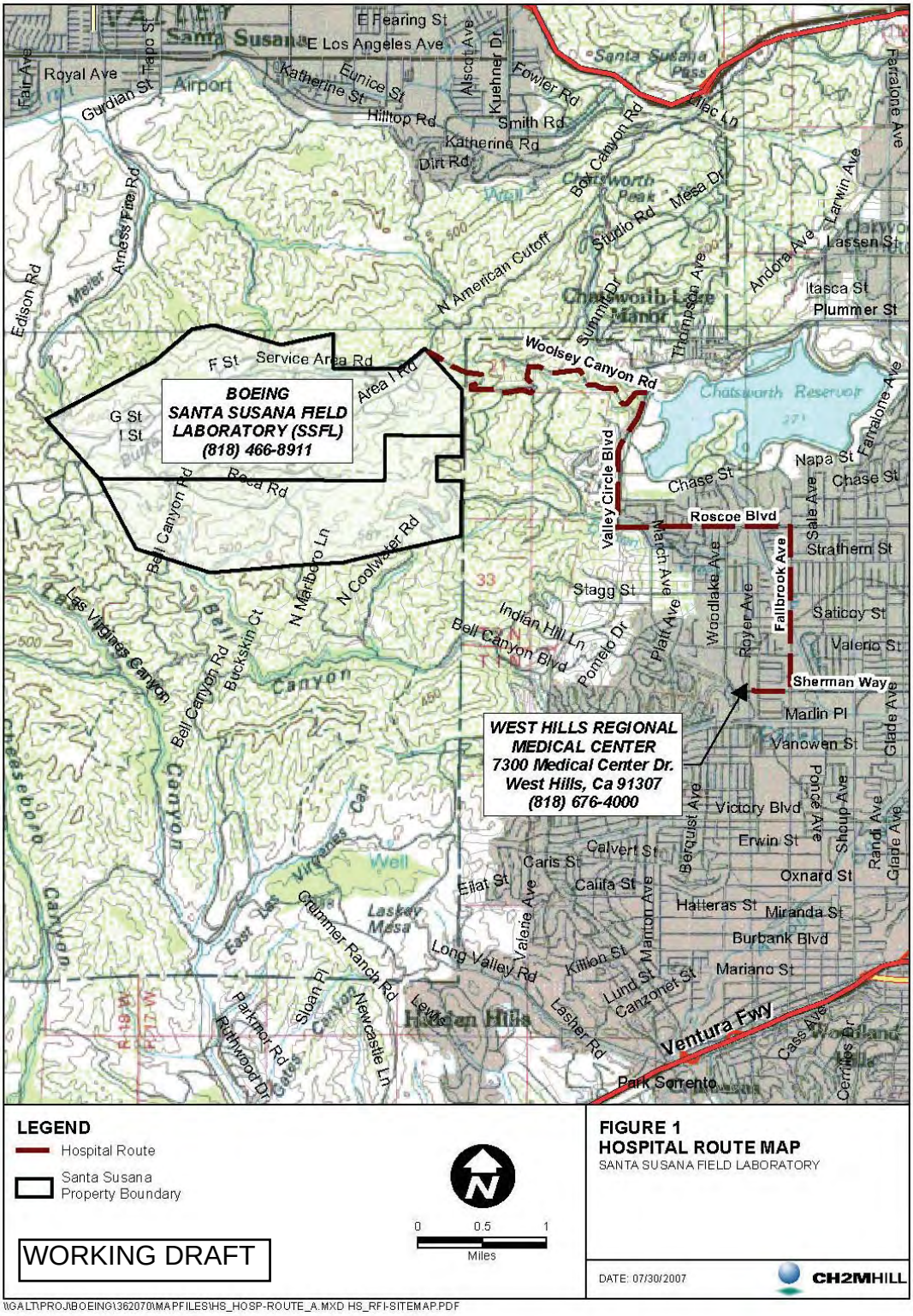
Name	Title	E-mail	Phone Number
Art Lenox	Remediation Team PM	arthur.j.lenox@boeing.com	Work (818) 466-8795 Cell (818) 312-2798
Adam Boettner	Remediation Team Alternate Coordinator	adam.r.boettner@boeing.com	Work (818) 466-8724 Cell (818) 324-3684
Dan Trippeda	Remediation Team Coordinator	daniel.m.trippeda@boeing.com	Work (818) 466-8977 Pager (818) 595-6141
Bob Mako	Health & Safety	robert.r.mako@boeing.com	Work (818) 466-8735
Phil Rutherford	Radiation H&S	philip.d.rutherford@boeing.com	
Tom Venable	Waste Management	thomas.c.venable@boeing.com	Work (818) 466-8779
Jill Bensen	CH2M HILL PM	Jill.Bensen@ch2m.com	Cell (916) 717-0564
Liz Bryant	Field Lead & Site Safety Coord.	Elizabeth.bryant@ch2m.com	Work: (805) 371-7817 Cell: (714) 697-9028
Alexa Stamets	CH2M HILL Field Manager	Alexa.stamets@ch2m.com	Work: (714) 435-6302 Cell: (530) 949-7753
Rick Cavil	CH2M HILL H&S Mgr.	Rick.cavil@ch2m.com	Cell: (408) 896-0140

Directions to Hospital

Include written directions here, and attach or post a highlighted map if needed.

1) Travel downhill on Woolsey Canyon Road
2) Turn right on Valley Circle Blvd.
3) Turn left on Roscoe Blvd.
4) Turn right on Fallbrook Ave.
5) Turn right on Sherman Way/Medical Center Drive to reach West Hills Regional Medical Center.

See attached map for hospital route illustration.



Appendix D
Cost Estimate

Table D-1

GROUP 5- BOEING FIELDWORK AND LABORATORY COST ESTIMATE SUMMARY

Basis of Estimate

1)	Number of Soil Samples Planned (incl. holds, and contingency for stepouts)	1,250
2)	Number of Soil Vapor Samples Planned (with contingency for stepouts)	248
3)	Assumed number of total locations (for staking, geophysical and GPS survey)	549
4)	Average Sample Production Rate (per 2-Person Crew per Day)	15
5)	Location Survey and Geophysical Survey Rate (average # of locations per day)	30
6)	Number of Field Days for Soil Sampling	29
7)	Number of Field Crews for Soil Sampling	3
8)	Number of Field Days for Soil-gas Sampling	25
9)	Number of Field Crews for Soil-gas Sampling	1
10)	Number of Field Crews for Staking/Surveying	1
11)	Number of Drill Rigs Needed	4
12)	Number of Mobile Labs Needed	1-2

Contingencies	
For Stepout Sampling =	**50%**
Analytical QA/QC % =	**30%**
Analytical Work on stepouts and HOLDs =	**50%**

No.	Task	Description	Activity Type	Quantity	Average Unit Rate	Units	Cost	Notes
1	Site Reconaissance	Pre-survey of sampling locations to plan and optimize fieldwork execution, mark sensitive habitat, etc.	Field	3	$ 2,572	per day	$ 7,716	
2	Field Mobilization and Office Setup	Set-up office space and ensure field work related equipment are available	Field	1	$ 2,572	per day	$ 2,572	
3	Sample location staking and surveying	Locating, staking, and GPS survey of all sampling locations	Field	19	$ 2,572	per day	$ 48,868	Staking and GPS survey will begin 1-week prior to field sampling and will occur simultaneously but ahead of field sampling. This task will be performed by 1 CH2M HILL staff and 1 JHA staff.
4	Geophysical clearance	Utility clearance of all sampling locations	Field	19	$ 1,178	per day	$ 22,379	Geophysical clearance will begin 1-week prior to field sampling and will occur simultaneously but ahead of field sampling
5	Field work implementation	Labor costs for Sample collection and field data collection	Field	29	$ 10,802	per day	$ 313,258	Assumes 3 field crews will be needed to oversee direct push drilling and/or perform hand augering at locations inaccessible to direct push rigs. The costs also include up to 3 CH2M HILL staff: 1 FTL and 2 staff for field support and for sample management.
6	Field Work Direct Push Drilling & Oversight	Direct push drill provided by HGS and StrongArm	Field	87	$ 1,575	per day/per rig	$ 137,025	Field rates are based on average of HGS and StrongArm. Assumes that 3 rigs will be needed for entire duration of fieldwork and are available. No limited access rigs are assumed.
7	Trenching or Backhoe Sampling	Sampling by using a backhoe or trenching to study debris areas.	Field	1	$ 23,646	LS	$ 23,646	Assumed that one backhoe will be used for trenching and/or sampling for 10 days
8	Field Work Soil-Gas sampling & Oversight	Soil gas probe installation and sampling by HGS	Field	25	$ 3,545	per day/per rig	$ 88,625	Sampling needs to occur within 25 days; assumes 1-2 drill rigs (separate from the ones used for soil sampling) will be used to install probes. One JHA crew will oversee soil-gas sampling efforts
9	Mobile Lab	Soil gas analysis by Centrum Labs	Field	25	$ 2,352	per day/per lab	$ 58,800	Sampling needs to occur within 25 days; assumes 2 mobile labs will be used.
10	Fixed Lab	Analytical soil sampling costs	Field	1	$ 906,802	LS	$ 906,802	* See breakdown of analysis and associated costs in Table 2. Assumes 30% contingency for QC samples and 50% contingency for analysis of holds and stepouts.
11	Land Surveying	Land surveying by Sage Consultants. (maybe needed for any features identified during fieldwork)	Field	2	$ 2,310	per day	$ 4,620	Land surveying is not anticipated during fieldwork; however, some surveying effort is earmarked as a contingency
12	Rad. Control Technician Oversight (for rad. controlled areas)	RCTs are required to screen soil samples in Area IV.	Field	19	$ 1,575	per day	$ 29,925	None required for Group 5-Boeing Areas
13	Miscellaneous Subcontractor Costs	Miscellaneous expenses include a) Concrete coring, b) SSFL-related training, c) Meeting Attendance, and d) Other unforeseen sundry costs from subcontractors	Field	1	$ 15,750	LS	$ 15,750	Accounts for miscellaneous expenses anticipated from field subcontractors
14	Miscellaneous Expenses not included in Daily Rate	Miscellaneous field expenses include : a) SS sleeves (6" x 2" dia) with end caps for soil samples , b) Two-way Radios, c) GPS rental, d) Dust monitor, e) Cameras, f) printer/ scanner/ copier/ fax, etc.	Field	1	$ 21,000	LS	$ 21,000	Accounts for miscellaneous expenses related to field work implementaton that are not included in daily field rates.
					Total Cost		**$ 1,680,986**	

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Total Field work costs excluding Analytical	$ 774,184

Assumptions

1) Laboratory costs do not include costs for rush turn-around-times. However, these costs can be covered under the 50% contingency.
2) Costs for Encore samplers, etc. are not included. However, these costs can be covered under the 50% contingency
3) Analytical costs are based on past unit rates provided by Boeing. The revised unit rates have not been finalized yet and is not included in this WAS.

TABLE D-2

Group 5 Boeing - Lab Analytical Cost for Samples Excluding Holds

RFI Site Name	Analytical Method/Cost															Total
	TPH (ext.) (EPA 8015B)	VOCs (Full) (EPA 8260B)	VOCs (Soil Vapor) (TO-15)	PAHs (EPA 8270C SIM-Short)	SVOCs (EPA 8270C +TICS)	Metals (EPA 6010B/ EPA 6020)	pH (EPA 9045)	PCBs (EPA 8082)	Energetics (EPA 8330)	Hydrazine (EPA 8315A)	Perchlorate (EPA 6850)	Dioxins (EPA 1613B)	Inorganics (EPA 300.0)	Soil Grain Size Analysis (ASTM D422)	Chromium VI (EPA 7196A)	
	$66.50	$192.50	$0.00	$320.00	$301.00	$149.80	$12.75	$112.00	$557.50	$1,190.00	$337.00	$747.50	$102.00	$50.00	$51.00	
Boeing Area IV Leach Fields RFI Site	$ 732	$ 578	$ -	$ 4,800	$ -	$ 2,097	$ 89	$ 336	$ -	$ 2,380	$ -	$ -	$ -	$ -	$ -	**$ 11,011**
Compound A Facility RFI Site	$ 3,458	$ 6,545	$ -	$ -	$ 15,652	$ 9,887	$ 446	$ 2,128	$ 15,610	$ -	$ 2,696	$ 27,658	$ 2,040	$ -	$ -	**$ 86,120**
Engineering Chemistry Laboratory RFI Site	$ 798	$ 5,775	$ -	$ 2,880	$ 4,214	$ 6,441	$ 319	$ 224	$ 2,230	$ 19,040	$ 4,044	$ -	$ 816	$ 150	$ -	**$ 46,931**
Environmental Effects Laboratory RFI Site	$ 2,195	$ 6,930	$ -	$ 7,680	$ 602	$ 5,692	$ 370	$ 224	$ -	$ -	$ -	$ -	$ 2,550	$ -	$ -	**$ 26,243**
STP RFI Site	$ 1,330	$ 3,850	$ -	$ 640	$ -	$ 3,595	$ 191	$ -	$ 6,690	$ 1,190	$ 4,044	$ -	$ 2,040	$ -	$ -	**$ 23,570**
SE Drum Yard RFI Site	$ 399	$ 1,733	$ -	$ 1,920	$ -	$ 899	$ 38	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	**$ 4,989**
STL-IV RFI Site	$ 4,655	$ 18,865	$ -	$ 4,480	$ 1,505	$ 13,931	$ 650	$ 224	$ 1,115	$ 15,470	$ 674	$ 2,243	$ 4,998	$ -	$ -	**$ 68,810**
Pond Dredge RFI Site	$ 1,862	$ 6,160	$ -	$ 10,240	$ -	$ 4,194	$ 204	$ 224	$ 17,840	$ 1,190	$ 10,784	$ 23,920	$ 3,264	$ -	$ -	**$ 79,882**
PDU RFI Site	$ 4,921	$ 7,893	$ -	$ 24,960	$ 10,836	$ 18,126	$ 803	$ 8,288	$ 2,230	$ 4,760	$ -	$ -	$ 5,916	$ -	$ 1,224	**$ 89,957**
STL-IV Explosive Bunkers (Unaffiliated Feature) Unaffiliated	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 3,345	$ -	$ 2,022	$ -	$ -	$ -	$ -	**$ 5,367**
Total	**$ 20,349**	**$ 58,328**	**$ -**	**$ 57,600**	**$ 32,809**	**$ 64,863**	**$ 3,111**	**$ 11,648**	**$ 49,060**	**$ 44,030**	**$ 24,264**	**$ 53,820**	**$ 21,624**	**$ 150**	**$ 1,224**	**$ 442,880**

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Notes:

1) Laboratory costs do not include costs for rush turn-around-times. However, these costs can be covered under the 50% contingency.

2) Costs for Encore samplers, etc. are not included. However, these costs can be covered under the 50% contingency

3) Analytical costs are based on past unit rates provided by Boeing. The revised unit rates have not been finalized yet and is not included in this WAS.

Table D-3

GROUP 5- DOE FIELDWORK AND LABORATORY COST ESTIMATE SUMMARY

Basis of Estimate

1)	Number of Soil Samples Planned (incl. holds, and contingency for stepouts)	648
2)	Number of Soil Vapor Samples Planned (with contingency for stepouts)	219
3)	Assumed number of total locations (for staking, geophysical and GPS survey)	365
4)	Average Sample Production Rate (per 2-Person Crew per Day)	15
5)	Location Survey and Geophysical Survey Rate (average # of locations per day)	30
6)	Number of Field Days for Soil Sampling	12
7)	Number of Field Crews for Soil Sampling	4
8)	Number of Field Days for Soil-gas Sampling	22
9)	Number of Field Crews for Soil-gas Sampling	1
10)	Number of Field Crews for Staking/Surveying	1
11)	Number of Drill Rigs Needed	4
12)	Number of Mobile Labs Needed	1-2

Contingencies	
For Stepout Sampling =	**50%**
Analytical QA/QC % =	**30%**
Analytical Work on stepouts and HOLDs =	**50%**

No.	Task	Description	Activity Type	Quantity	Average Unit Rate	Units	Cost	Notes
1	Site Reconaissance	Pre-survey of sampling locations to plan and optimize fieldwork execution, mark sensitive habitat, etc.	Field	2	$ 2,572	per day	$ 5,144	
2	Field Mobilization and Office Setup	Set-up office space and ensure field work related equipment are available	Field	1	$ 2,572	per day	$ 2,572	
3	Sample location staking and surveying	Locating, staking, and GPS survey of all sampling locations	Field	13	$ 2,572	per day	$ 33,436	Staking and GPS survey will begin 1-week prior to field sampling and will occur simultaneously but ahead of field sampling. This task will be performed by 1 CH2M HILL staff and 1 JHA staff.
4	Geophysical clearance	Utility clearance of all sampling locations	Field	13	$ 1,178	per day	$ 15,312	Geophysical clearance will begin 1-week prior to field sampling and will occur simultaneously but ahead of field sampling
5	Field work implementation	Labor costs for Sample collection and field data collection	Field	12	$ 12,982	per day	$ 155,784	Assumes 3 field crews will be needed to oversee direct push drilling and/or perform hand augering at locations inaccessible to direct push rigs. The costs also include up to 3 CH2M HILL staff: 1 FTL and 2 staff for field support and for sample management.
6	Field Work Direct Push Drilling & Oversight	Direct push drill provided by HGS and StrongArm	Field	36	$ 1,575	per day/per rig	$ 56,700	Field rates are based on average of HGS and StrongArm. Assumes that 3 rigs will be needed for entire duration of fieldwork and are available. No limited access rigs are assumed.
7	Trenching or Backhoe Sampling	Sampling by using a backhoe or trenching to study debris areas.	Field	1	$ 23,646	LS	$ 23,646	Assumed that one backhoe will be used for trenching and/or sampling for 10 days
8	Field Work Soil-Gas sampling & Oversight	Soil gas probe installation and sampling by HGS	Field	22	$ 3,545	per day/per rig	$ 77,990	Sampling needs to occur within 25 days; assumes 1-2 drill rigs (separate from the ones used for soil sampling) will be used to install probes. One JHA crew will oversee soil-gas sampling efforts
9	Mobile Lab	Soil gas analysis by Centrum Labs	Field	22	$ 2,352	per day/per lab	$ 51,744	Sampling needs to occur within 25 days; assumes 2 mobile labs will be used.
10	Fixed Lab	Analytical soil sampling costs	Field	1	$ 299,356	LS	$ 299,356	* See breakdown of analysis and associated costs in Table 2. Assumes 30% contingency for QC samples and 50% contingency for analysis of holds and stepouts.
11	Land Surveying	Land surveying by Sage Consultants. (maybe needed for any features identified during fieldwork)	Field	2	$ 2,310	per day	$ 4,620	Land surveying is not anticipated during fieldwork; however, some surveying effort is earmarked as a contingency
12	Rad. Control Technician Oversight (for rad. controlled areas)	RCTs are required to screen soil samples in Area IV.	Field	13	$ 1,575	per day	$ 20,475	None required for Group 5-Boeing Areas
13	Miscellaneous Subcontractor Costs	Miscellaneous expenses include a) Concrete coring, b) SSFL-related training, c) Meeting Attendance, and d) Other unforeseen sundry costs from subcontractors	Field	1	$ 15,750	LS	$ 15,750	Accounts for miscellaneous expenses anticipated from field subcontractors
14	Miscellaneous Expenses not included in Daily Rate	Miscellaneous field expenses include : a) SS sleeves (6" x 2" dia) with end caps for soil samples , b) Two-way Radios, c) GPS rental, d) Dust monitor, e) Cameras, f) printer/ scanner/ copier/ fax, etc.	Field	1	$ 15,750	LS	$ 15,750	Accounts for miscellaneous expenses related to field work implementaton that are not included in daily field rates.
						Total Cost	**$ 778,279**	

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Total Field work costs excluding Analytical	$ 478,923

Assumptions

1) Laboratory costs do not include costs for rush turn-around-times. However, these costs can be covered under the 50% contingency.
2) Costs for Encore samplers, etc. are not included. However, these costs can be covered under the 50% contingency
3) Analytical costs are based on past unit rates provided by Boeing. The revised unit rates have not been finalized yet and is not included in this WAS.

TABLE D-4
Group 5 DOE - Lab Analytical Cost for Samples Excluding Holds

RFI Site Name	Analytical Method/Cost															Total
	TPH (ext.) (EPA 8015B)	VOCs (Full) (EPA 8260B)	VOCs (Soil Vapor) (TO-15)	PAHs (EPA 8270C SIM Short)	SVOCs (EPA 8270C +TICS)	Metals (EPA 6010B/ EPA 6020)	pH (EPA 9045)	PCBs (EPA 8082)	Energetics (EPA 8330)	Hydrazine/ Formaldehyde (EPA 8315A)	Perchlorate (EPA 6850)	Dioxins (EPA 1613B)	Inorganics (EPA 300.0)	Mercury (EPA 7196A)	Chromium VI (EPA 7196A)	
	$66.50	$192.50		$320.00	$301.00	$149.80	$12.75	$112.00	$557.50	$1,190.00	$337.00	$747.50	$102.00	$21.00	$51.00	
Building 100 Trench RFI Site	$ 399	$ -	$ -	$ 1,920	$ -	$ 2,996	$ 115	$ -	$ -	$ -	$ -	$ 2,990	$ 204	$ -	$ -	**$ 8,624**
Building 65 Metals Laboratory Clarifier RFI Site	$ 532	$ 1,155	$ -	$ 3,200	$ -	$ 1,198	$ 51	$ -	$ -	$ -	$ -	$ -	$ -	$ 189	$ -	**$ 6,325**
DOE Leach Field 1 RFI Site	$ 1,596	$ 578	$ -	$ 7,680	$ -	$ 3,595	$ 153	$ 224	$ -	$ -	$ -	$ -	$ 816	$ 84	$ 306	**$ 15,032**
DOE Leach Field 2 RFI Site	$ 798	$ 1,155	$ -	$ 3,200	$ 2,408	$ 2,696	$ 115	$ 560	$ -	$ 9,520	$ -	$ -	$ -	$ -	$ -	**$ 20,452**
DOE Leach Field 3 RFI Site	$ 2,128	$ 385	$ -	$ 8,960	$ -	$ 6,142	$ 255	$ 896	$ 4,460	$ -	$ 4,044	$ -	$ -	$ 168	$ -	**$ 27,438**
HMSA RFI Site	$ 1,596	$ 3,850	$ -	$ 7,040	$ -	$ 4,194	$ 179	$ 112	$ -	$ -	$ 674	$ -	$ 408	$ -	$ -	**$ 18,053**
SNAP RFI Site	$ 1,330	$ 3,850	$ -	$ 4,480	$ -	$ 3,296	$ 191	$ 672	$ -	$ -	$ -	$ -	$ -	$ -	$ -	**$ 13,819**
Rockwell International Hot Lab RFI Site	$ 532	$ 4,235	$ -	$ 2,560	$ -	$ 3,146	$ 179	$ 112	$ -	$ -	$ -	$ -	$ -	$ -	$ -	**$ 10,763**
DOE Unaffiliated Features	$ 1,729	$ 578	$ -	$ 8,320	$ 602	$ 3,895	$ 179	$ 672	$ -	$ 9,520	$ -	$ -	$ 204	$ -	$ -	**$ 25,698**
Total	**$ 10,707**	**$ 15,978**	**$ -**	**$ 47,680**	**$ 3,311**	**$ 31,308**	**$ 1,428**	**$ 3,360**	**$ 5,018**	**$ 20,230**	**$ 5,055**	**$ 3,738**	**$ 1,734**	**$ 462**	**$ 357**	**$ 146,204**

WORKING DRAFT

Notes:

1) Laboratory costs do not include costs for rush turn-around-times. However, these costs can be covered under the 50% contingency.

2) Costs for Encore samplers, etc. are not included. However, these costs can be covered under the 50% contingency

3) Analytical costs are based on past unit rates provided by Boeing. The revised unit rates have not been finalized yet and is not included in this WAS.