

**APPENDIX B**

**WASTE CERTIFICATIONS**

## Appendix B – Waste Certifications

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11. ISRA 009, Area II, AP/STP-1B, -1C-1, -1C-2 and -1E-2, Soil Sampling for Radionuclides, Waste Certification, Revision 1. September 27, 2012.
12. ISRA 009, Area II, AP/STP-1C-1 (Non-Hazardous, Radionuclides > LUT), Soil Sampling for Radionuclides and Waste Certification. March 12, 2013.
13. ISRA 009 – AP/STP-1E-1. Soil Sampling for Radionuclides. Results and Statistical Analysis. Waste Certification. August 23, 2010.
14. ISRA 009 – AP/STP-1E-3. Soil Sampling for Radionuclides. Results and Statistical Analysis. Waste Certification. August 23, 2010.

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15. Waste Characterization: In-Situ Soil Located at ISRA Area II Planned Excavation ELV-1C Northeast.
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19. ISRA 009, Area II, ELV-1C (Non-Hazardous, Radionuclides < LUT), Soil Sampling for Radionuclides and Waste Certification, Revision 2. April 2, 2013.
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21. ISRA 009, Area II, ELV-1C (California Hazardous, Radionuclides < LUT), Soil Sampling for Radionuclides and Waste Certification, Revision 1. April 2, 2013.
22. ISRA 009, Area II, ELV-1C (California Hazardous, Radionuclides > LUT), Soil Sampling for Radionuclides and Waste Certification, Revision 1. April 2, 2013.
23. ISRA 009, Area II, ELV-1D (F-Listed, Radionuclides < LUT), Soil Sampling for Radionuclides and Waste Certification, Revision 2. July 28, 2013.
24. ISRA 009, Area II, ELV-1D (F-Listed, Radionuclides > LUT), Soil Sampling for Radionuclides and Waste Certification, Revision 3. November 12, 2013.

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26. Waste Characterization: In-Situ Soil Located at ISRA Area I Planned Excavation IEL-3.
27. ISRA 009 – IEL-2. Soil Sampling for Radionuclides. Results and Statistical Analysis. Waste Certification. May 14, 2010.
28. Boeing ISRA IEL-3, Area I, Soil Sampling for Radionuclides, Waste Certification, Revision 8. September 4, 2013.

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33. ISRA 009, Area II, LOX (All Chem., Radionuclides < LUT), Soil Sampling for Radionuclides and Waste Certification, Revision 1. June 6, 2013.
34. ISRA 009, Area II, LOX (Non-Hazardous, Radionuclides > LUT), Soil Sampling for Radionuclides and Waste Certification, Revision 1. June 6, 2013.
35. ISRA 009, Area II, LOX Debris Pile (Radionuclides < LUT), Soil Sampling for Radionuclides and Waste Certification. August 15, 2013.
36. NASA ISRA LOX Area, Area I, Radiological Release Survey and Waste Certification. August 22, 2013.
37. NASA ISRA LOX Area, Metal Debris - Phase 2, Area I, Radiological Release Survey and Waste Certification. September 5, 2013.
38. Area I NASA, ISRA LOX-1B-3 Pipe - Container 126888, Radiological Release Survey and Waste Certification. November 14, 2013.

## **WASTE CHARACTERIZATION: IN-SITU SOIL LOCATED AT AREA II ISRA OUTFALL 009 PLANNED EXCAVATION AP/STP-1B**

### **Introduction**

This report presents supporting detailed information for the July 28, 2010 in-situ characterization sampling of prospective soil wastes from planned SSFL Area II ISRA excavations in the vicinity of the former Area II incinerator.

### **Background**

In-situ characterization was performed for soil destined to be excavated from designated locations in SSFL Area II in accordance with the ISRA Workplan. A step-by-step approach was followed to accomplish characterization of the soil prior to excavation. The first step was to review available information regarding historical area usage and existing analytical data from past soil sampling in or near planned excavation sites. The objective was to identify all substances potentially impacting the soil in each planned excavation footprint to the degree that hazardous waste regulatory thresholds would be exceeded.

The next step was to develop and implement a random sampling plan for each of the planned excavation footprints. The collected soil samples were analyzed by a state certified laboratory and the results evaluated to determine whether any of the identified substances were present at concentrations requiring further investigation. In addition, the initial random sampling results were evaluated to determine the statistical adequacy of the data provided for waste characterization based on the guidelines presented in U.S. EPA SW-846. Soil was characterized non-hazardous when analyte concentrations among the samples exhibited a reasonably small variance and there was satisfactory margin between the mean of the samples and applicable regulatory thresholds. Otherwise, additional samples would be collected and subjected to analysis, or in lieu of further testing, the soil was summarily characterized as hazardous. Statistical analyses described in SW-846 are performed as necessary to determine minimum sample point requirements and the upper confidence levels of analytical results.

The review of historical information and existing analytical data relevant to planned excavation AP/STP-1B was based partly on the Group 2 RFI results. Evaluation of these data and other sources of relevant information, including recent sampling conducted specifically for ISRA, suggested that Regulated Metals (CAM17), Volatile Organic Compounds (VOC), Polychlorinated Biphenyls (PCB), and Petroleum Hydrocarbons should be addressed in the AP/STP-1B excavation footprint. A random sampling plan was developed for collection of ten (10) samples from the planned excavation footprint, taking into account the relatively small area to be excavated. The samples were analyzed for CAM 17 metals, VOCs, PCBs, and Petroleum Hydrocarbons. All samples were collected, contained, and handled according to field practice requirements in SW-846.

### **Results**

Analytical results for the planned excavation area at AP/STP-1B are presented in Test America report ITG2543 issued on 8/4/10. Regulated Metals were below 10-Times their respective California Soluble Threshold Limit Concentration (STLC) threshold in eight of the samples, but in the two remaining samples, elevated concentrations of Chromium were detected at 140 parts per million (ppm) and 60 ppm. Leachate tests, the California Waste Extraction Test (WET) and the RCRA Toxicity Characteristic Leaching Procedure (TCLP), were performed as required on the samples with elevated Chromium. There was no Chromium detected in the TCLP leachate.

WET results for Chromium yielded concentrations of 0.93 mg/L and 1.2 mg/L, which are below the STLC hazardous waste limit of 5 mg/L.

VOCs were detected, with Trichloroethylene (TCE) observed in four samples exhibiting concentrations of 0.00060 ppm, 0.0013 ppm, 0.0019 ppm, and 0.0022 ppm. The TCE was not detected in any of the other samples, despite the satisfactorily low analytical Method Detection Limits (range 0.00038 ppm - 0.0091 ppm). Furthermore, no historical records have been found suggesting any kind of solvent related activities in the area using TCE, and the very low concentrations detected in the samples are consistent with soil vapor migration, volatilization of a groundwater contaminant, or other manifestation of an unknown source. For these reasons, the soils excavated from AP/STP-1B are not being characterized as "F-Listed" wastes.

No PCBs were detected. However, low-level Petroleum Hydrocarbons were detected, with the concentration of detected C10-C40 fraction hydrocarbons ranging between 7.2 ppm and 150 ppm. These concentrations do not present waste disposal issues.

### **Determination**

According to analytical results and generator knowledge, the soil in the planned excavation footprint of SSFL Area II AP/STP-1B:

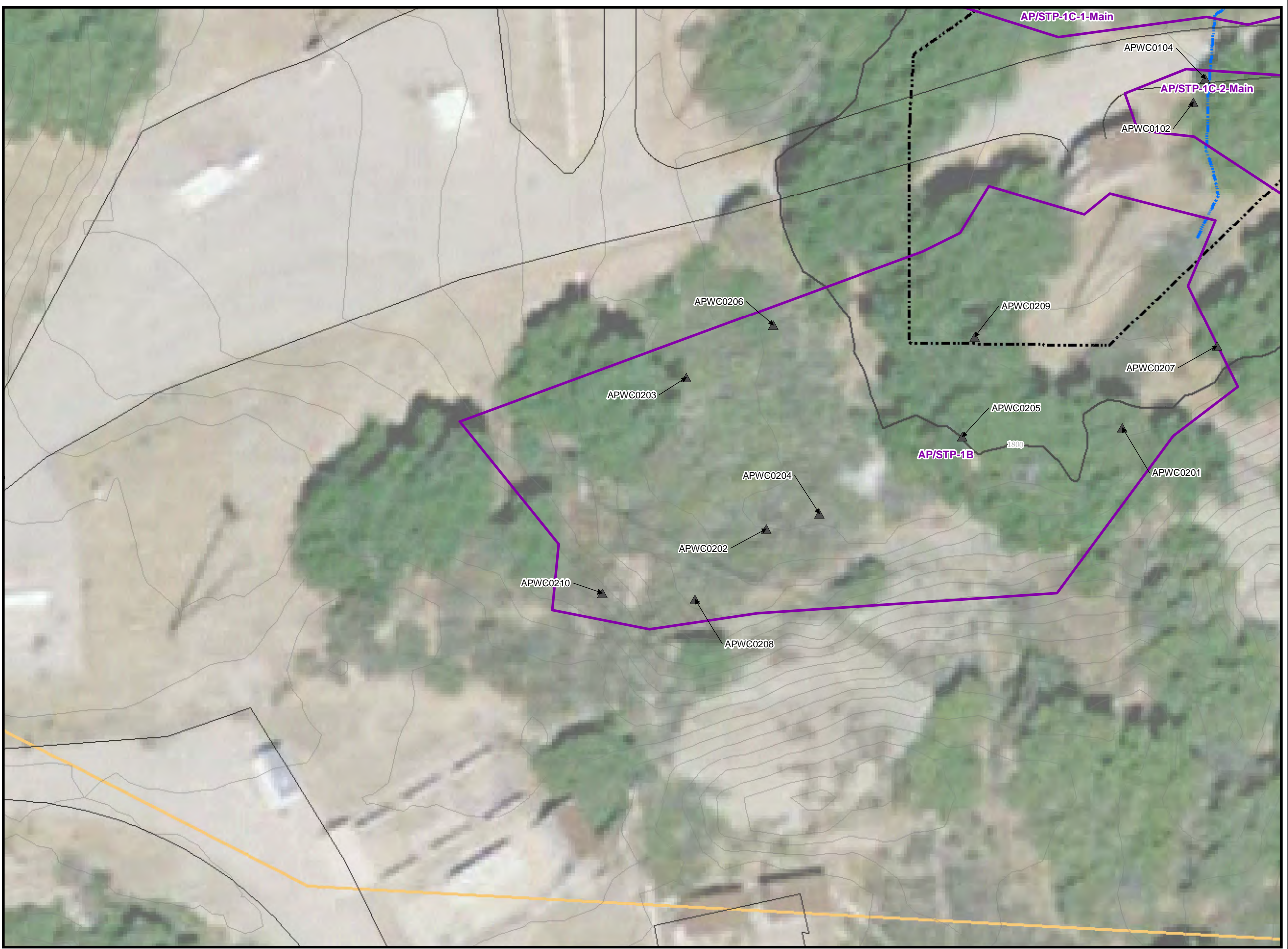
- Is Not a Listed Waste (analytical results and generator knowledge)
- Is Not ignitable (generator knowledge)
- Is Not corrosive (generator knowledge)
- Is Not reactive (generator knowledge)
- Is Not toxic (analytical results and generator knowledge)
  - Is Not Extremely or Acutely Hazardous Waste
  - Does not exceed any RCRA or Title 22 characteristic thresholds
  - Is Not subject to the Prop. 65 listing if it is applied to 22 CCR 66261.24(a)(7)
  - Is Not subject to Title 22 Appendix X list
  - Is Not known by experience or testing to pose a hazard to human health or environment because of its carcinogenicity, acute toxicity, chronic toxicity, bio-accumulative properties, or persistence in the environment.

**The soil in AP/STP-1B is NON-HAZARDOUS.**

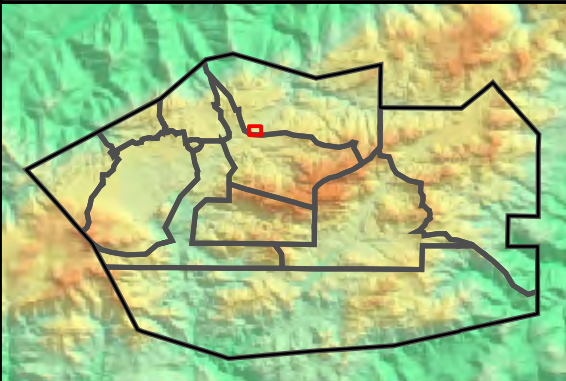
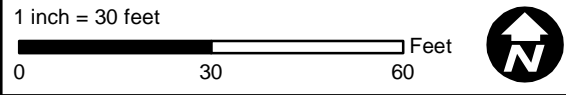
**Outfall 009**  
**Sample Locations for AP/STP - 1B**

- Base Map Legend**
- Administrative Area Boundary
  - RFI Site Boundary
  - Report Group Boundary
  - NPDES Outfall
  - Dirt Road
  - A/C Paving
  - Drainage
  - Non Jurisdictional Surface Water Pathway
  - Surface Water Divide
  - Elevation Contour

- Figure Legend**
- Waste Characterization Sample



Document: ISRA\_Plots\_SP\_RD47\_SampleLocations\_060710.mxd Date: Jun 22, 2010



SANTA SUSANA FIELD LABORATORY

FIGURE X

**INTERIM SOURCE REMOVAL ACTION (ISRA) - OUTFALL 009**

**WASTE CHARACTERIZATION SAMPLE RESULTS – AP/STP-1B  
THE BOEING COMPANY  
SANTA SUSANA FIELD LABORATORY**

							Object Name:	APWC0201	APWC0202	APWC0203	APWC0204	APWC0205	APWC0206	APWC0207
							Sample Name:	APWC0201S001	APWC0202S001	APWC0203S001	APWC0204S001	APWC0205S001	APWC0206S001	APWC0207S001
							Collection Date:	7/28/2010	7/28/2010	7/28/2010	7/28/2010	7/28/2010	7/28/2010	7/28/2010
							Sample Depth (feet):	0.5 - 1.0	0.5 - 1.0	0.5 - 1.0	0.5 - 1.0	0.5 - 1.0	0.5 - 1.0	0.5 - 1.0
ANALYTE	UNITS	TTLIC	WET Leachate Testing Trigger <sup>a</sup>	TCLP Leachate Testing Trigger <sup>b</sup>	STLC	TCLP	RESULT <sup>c</sup>	RESULT <sup>c</sup>	RESULT <sup>c</sup>	RESULT <sup>c</sup>	RESULT <sup>c</sup>	RESULT <sup>c</sup>	RESULT <sup>c</sup>	
<b>METALS</b>														
Antimony	mg/kg	500	150	--	--	--	1.1 J	1.4 J	1.3 J	1.5 J	1.1 J	1.5 J	1.5 J	
Arsenic	mg/kg	500	50	100	--	--	4.1	6.6	4.4	9.0	4.8	4.4	4.6	
Barium	mg/kg	10,000	1,000	2,000	--	--	160	91	83	81	400	93	260	
Beryllium	mg/kg	75	7.5	--	--	--	0.49	0.53	0.44 J	0.61	0.45 J	0.52	0.52	
Cadmium	mg/kg	100	10	20	--	--	<0.20	0.54	<0.20	<0.20	0.21 J	<0.20	0.20 J	
Chromium	mg/kg	500	50	100	--	--	20	31	17	25	60	21	21	
Chromium, WET	mg/L	--	--	--	5	--	--	--	--	--	0.93	--	--	
Chromium, TCLP	mg/L	--	--	--	--	5	--	--	--	--	--	--	--	
Cobalt	mg/kg	8,000	800	--	--	--	4.8	5.5	4.4	5.9	4.2	5.0	5.0	
Copper	mg/kg	2,500	250	--	--	--	11	17	9.4	13	11	18	15	
Lead	mg/kg	1,000	50	100	--	--	11	33	7.0	11	12	12	20	
Mercury	mg/kg	20	2	4	--	--	0.017 J	0.032	0.014 J	0.016 J	0.052	<0.012	0.042	
Molybdenum	mg/kg	3,500	3,500	--	--	--	0.78 J	0.93 J	0.83 J	0.69 J	0.95 J	0.86 J	0.94 J	
Nickel	mg/kg	2,000	200	--	--	--	13	17	10	15	12	13	13	
Selenium	mg/kg	100	10	20	--	--	<0.99	<1	<1	<1	<0.99	<1	<1	
Silver	mg/kg	500	50	100	--	--	8.6	1.9	<0.8	<0.8	32	<0.8	19	
Thallium	mg/kg	700	70	--	--	--	<0.79	<0.8	<0.8	<0.8	<0.79	<0.8	<0.8	
Vanadium	mg/kg	2,400	240	--	--	--	33	36	32	36	30	36	34	
Zinc	mg/kg	5,000	2,500	--	--	--	80 B	120 B	48 B	66 B	97 B	77 B	100 B	
<b>PCBs</b>														
Aroclor 1016	ug/kg	50,000	50,000	--	--	--	<50 {<12}	<5000 {<1200}	<50 {<12}	<50 {<12}	<50 {<12}	<50 {<12}	<50 {<12}	
Aroclor 1221	ug/kg	50,000	50,000	--	--	--	<50 {<12}	<5000 {<1200}	<50 {<12}	<50 {<12}	<50 {<12}	<50 {<12}	<50 {<12}	
Aroclor 1232	ug/kg	50,000	50,000	--	--	--	<50 {<12}	<5000 {<1200}	<50 {<12}	<50 {<12}	<50 {<12}	<50 {<12}	<50 {<12}	
Aroclor 1242	ug/kg	50,000	50,000	--	--	--	<50 {<12}	<5000 {<1200}	<50 {<12}	<50 {<12}	<50 {<12}	<50 {<12}	<50 {<12}	
Aroclor 1248	ug/kg	50,000	50,000	--	--	--	<50 {<12}	<5000 {<1200}	<50 {<12}	<50 {<12}	<50 {<12}	<50 {<12}	<50 {<12}	
Aroclor 1254	ug/kg	50,000	50,000	--	--	--	<50 {<12}	<5000 {<1200}	<50 {<12}	<50 {<12}	<50 {<12}	<50 {<12}	<50 {<12}	
Aroclor 1260	ug/kg	50,000	50,000	--	--	--	<50 {<12}	<5000 {<1200}	<50 {<12}	<50 {<12}	<50 {<12}	<50 {<12}	<50 {<12}	
<b>TPH</b>														
Gasoline Range Organics (C6-C12)	mg/kg	--	--	--	--	--	<0.15 {<0.39}	<0.14 {<0.38}	<0.17 {<0.44}	<0.15 {<0.41}	<0.15 {<0.39}	<0.14 {<0.37}	<0.14 {<0.37}	
EFH (C10 - C24)	mg/kg	--	--	--	--	--	<3.3 {<2.3}	18	<6.6 {<4.7}	14	<10 {<7.0}	12	2.7 J	
EFH (C10 - C40)	mg/kg	--	--	--	--	--	8.2	62	7.2	48	24	84	23	
EFH (C25 - C40)	mg/kg	--	--	--	--	--	6.5	43	<6.6 {<4.7}	34	19	72	20	
<b>VOCs</b>														
1,1,1,2-Tetrachloroethane	ug/kg	--	--	--	--	--	<1.9 {<0.54}	<1.9 {<0.54}	<1.9 {<0.54}	<1.9 {<0.54}	<2.0 {<0.57}	<2.0 {<0.57}	<2.0 {<0.57}	
1,1,1-Trichloroethane	ug/kg	--	--	--	--	--	<0.94 {<0.66}	<0.95 {<0.66}	<0.94 {<0.66}	<0.95 {<0.67}	<1.0 {<0.70}	<0.99 {<0.69}	<1.0 {<0.70}	



**INTERIM SOURCE REMOVAL ACTION (ISRA) - OUTFALL 009**

**WASTE CHARACTERIZATION SAMPLE RESULTS – AP/STP-1B  
THE BOEING COMPANY  
SANTA SUSANA FIELD LABORATORY**

							Object Name:	APWC0201	APWC0202	APWC0203	APWC0204	APWC0205	APWC0206	APWC0207
							Sample Name:	APWC0201S001	APWC0202S001	APWC0203S001	APWC0204S001	APWC0205S001	APWC0206S001	APWC0207S001
							Collection Date:	7/28/2010	7/28/2010	7/28/2010	7/28/2010	7/28/2010	7/28/2010	7/28/2010
							Sample Depth (feet):	0.5 - 1.0	0.5 - 1.0	0.5 - 1.0	0.5 - 1.0	0.5 - 1.0	0.5 - 1.0	0.5 - 1.0
ANALYTE	UNITS	TTLIC	WET Leachate Testing Trigger <sup>a</sup>	TCLP Leachate Testing Trigger <sup>b</sup>	STLC	TCLP	RESULT <sup>c</sup>	RESULT <sup>c</sup>	RESULT <sup>c</sup>	RESULT <sup>c</sup>	RESULT <sup>c</sup>	RESULT <sup>c</sup>	RESULT <sup>c</sup>	
1,1,2,2-Tetrachloroethane	ug/kg	--	--	--	--	--	<1.9 {<0.81}	<1.9 {<0.81}	<1.9 {<0.81}	<1.9 {<0.82}	<2.0 {<0.86}	<2.0 {<0.85}	<2.0 {<0.86}	
1,1,2-Trichloroethane	ug/kg	--	--	--	--	--	<0.94 {<0.82}	<0.95 {<0.82}	<0.94 {<0.82}	<0.95 {<0.83}	<1.0 {<0.87}	<0.99 {<0.86}	<1.0 {<0.87}	
1,1-Dichloroethane	ug/kg	--	--	--	--	--	<0.94 {<0.47}	<0.95 {<0.47}	<0.94 {<0.47}	<0.95 {<0.48}	<1.0 {<0.50}	<0.99 {<0.50}	<1.0 {<0.50}	
1,1-Dichloroethene	ug/kg	--	--	14,000	--	--	<1.9 {<0.56}	<1.9 {<0.57}	<1.9 {<0.56}	<1.9 {<0.57}	<2.0 {<0.60}	<2.0 {<0.60}	<2.0 {<0.60}	
1,1-Dichloropropene	ug/kg	--	--	--	--	--	<0.94 {<0.38}	<0.95 {<0.38}	<0.94 {<0.38}	<0.95 {<0.38}	<1.0 {<0.40}	<0.99 {<0.40}	<1.0 {<0.40}	
1,2,3-Trichlorobenzene	ug/kg	--	--	--	--	--	<1.9 {<0.94}	<1.9 {<0.95}	<1.9 {<0.94}	<1.9 {<0.95}	<2.0 {<1.0}	<2.0 {<0.99}	<2.0 {<1.0}	
1,2,3-Trichloropropane	ug/kg	--	--	--	--	--	<1.9 {<0.94}	<1.9 {<0.95}	<1.9 {<0.94}	<1.9 {<0.95}	<2.0 {<1.0}	<2.0 {<0.99}	<2.0 {<1.0}	
1,2,4-Trichlorobenzene	ug/kg	--	--	--	--	--	<1.9 {<0.94}	<1.9 {<0.95}	<1.9 {<0.94}	<1.9 {<0.95}	<2.0 {<1.0}	<2.0 {<0.99}	<2.0 {<1.0}	
1,2,4-Trimethylbenzene	ug/kg	--	--	--	--	--	<0.94 {<0.73}	<0.95 {<0.74}	<0.94 {<0.73}	<0.95 {<0.74}	<1.0 {<0.78}	<0.99 {<0.77}	<1.0 {<0.78}	
1,2-Dibromo-3-chloropropane	ug/kg	--	--	--	--	--	<9.4 {<1.4}	<9.5 {<1.4}	<9.4 {<1.4}	<9.5 {<1.4}	<10 {<1.5}	<9.9 {<1.5}	<10 {<1.5}	
1,2-Dibromoethane (EDB)	ug/kg	--	--	--	--	--	<0.94 {<0.75}	<0.95 {<0.76}	<0.94 {<0.75}	<0.95 {<0.76}	<1.0 {<0.80}	<0.99 {<0.79}	<1.0 {<0.80}	
1,2-Dichlorobenzene	ug/kg	--	--	--	--	--	<0.94 {<0.89}	<0.95 {<0.90}	<0.94 {<0.89}	<0.95 {<0.90}	<1.0 {<0.95}	<0.99 {<0.94}	<1.0 {<0.95}	
1,2-Dichloroethane	ug/kg	--	--	10,000	--	--	<0.94 {<0.75}	<0.95 {<0.76}	<0.94 {<0.75}	<0.95 {<0.76}	<1.0 {<0.80}	<0.99 {<0.79}	<1.0 {<0.80}	
1,2-Dichloropropane	ug/kg	--	--	--	--	--	<0.94 {<0.75}	<0.95 {<0.76}	<0.94 {<0.75}	<0.95 {<0.76}	<1.0 {<0.80}	<0.99 {<0.79}	<1.0 {<0.80}	
1,3,5-Trimethylbenzene	ug/kg	--	--	--	--	--	<0.94 {<0.59}	<0.95 {<0.60}	<0.94 {<0.59}	<0.95 {<0.60}	<1.0 {<0.63}	<0.99 {<0.62}	<1.0 {<0.63}	
1,3-Dichlorobenzene	ug/kg	--	--	--	--	--	<0.94 {<0.79}	<0.95 {<0.80}	<0.94 {<0.79}	<0.95 {<0.80}	<1.0 {<0.84}	<0.99 {<0.83}	<1.0 {<0.84}	
1,3-Dichloropropane	ug/kg	--	--	--	--	--	<0.94 {<0.59}	<0.95 {<0.60}	<0.94 {<0.59}	<0.95 {<0.60}	<1.0 {<0.63}	<0.99 {<0.62}	<1.0 {<0.63}	
1,4-Dichlorobenzene	ug/kg	--	--	--	--	--	<0.94 {<0.88}	<0.95 {<0.89}	<0.94 {<0.88}	<0.95 {<0.90}	<1.0 {<0.94}	<0.99 {<0.93}	<1.0 {<0.94}	
2,2-Dichloropropane	ug/kg	--	--	--	--	--	<0.94 {<0.56}	<0.95 {<0.57}	<0.94 {<0.56}	<0.95 {<0.57}	<1.0 {<0.60}	<0.99 {<0.60}	<1.0 {<0.60}	
2-Butanone (MEK)	ug/kg	--	--	4,000,000	--	--	<9.4 {<5.6}	<9.5 {<5.7}	<9.4 {<5.6}	<9.5 {<5.7}	<10 {<6.0}	<9.9 {<6.0}	<10 {<6.0}	
2-Chlorotoluene	ug/kg	--	--	--	--	--	<1.9 {<0.82}	<1.9 {<0.82}	<1.9 {<0.82}	<1.9 {<0.83}	<2.0 {<0.87}	<2.0 {<0.86}	<2.0 {<0.87}	
2-Hexanone	ug/kg	--	--	--	--	--	<9.4 {<8.6}	<9.5 {<8.6}	<9.4 {<8.6}	<9.5 {<8.7}	<10 {<9.1}	<9.9 {<9.0}	<10 {<9.1}	
4-Chlorotoluene	ug/kg	--	--	--	--	--	<1.9 {<0.70}	<1.9 {<0.70}	<1.9 {<0.70}	<1.9 {<0.70}	<2.0 {<0.74}	<2.0 {<0.73}	<2.0 {<0.74}	
4-Methyl-2-pentanone (MIBK)	ug/kg	--	--	--	--	--	<4.7 {<4.2}	<4.7 {<4.3}	<4.7 {<4.2}	<4.8 {<4.3}	<5.0 {<4.5}	<5.0 {<4.5}	<5.0 {<4.5}	
Acetone	ug/kg	--	--	--	--	--	<9.4 {<7.5}	<9.5 {<7.6}	<9.4 {<7.5}	<9.5 {<7.6}	<10 {<8.0}	<9.9 {<7.9}	<10 {<8.0}	
Benzene	ug/kg	--	--	10,000	--	--	<0.94 {<0.47}	<0.95 {<0.47}	<0.94 {<0.47}	<0.95 {<0.48}	<1.0 {<0.50}	<0.99 {<0.50}	<1.0 {<0.50}	
Bromobenzene	ug/kg	--	--	--	--	--	<1.9 {<0.79}	<1.9 {<0.80}	<1.9 {<0.79}	<1.9 {<0.80}	<2.0 {<0.84}	<2.0 {<0.83}	<2.0 {<0.84}	
Bromochloromethane	ug/kg	--	--	--	--	--	<1.9 {<0.85}	<1.9 {<0.85}	<1.9 {<0.85}	<1.9 {<0.86}	<2.0 {<0.90}	<2.0 {<0.89}	<2.0 {<0.90}	
Bromodichloromethane	ug/kg	--	--	--	--	--	<0.94 {<0.47}	<0.95 {<0.47}	<0.94 {<0.47}	<0.95 {<0.48}	<1.0 {<0.50}	<0.99 {<0.50}	<1.0 {<0.50}	
Bromoform	ug/kg	--	--	--	--	--	<1.9 {<0.75}	<1.9 {<0.76}	<1.9 {<0.75}	<1.9 {<0.76}	<2.0 {<0.80}	<2.0 {<0.79}	<2.0 {<0.80}	
Bromomethane	ug/kg	--	--	--	--	--	<1.9 {<0.86}	<1.9 {<0.87}	<1.9 {<0.86}	<1.9 {<0.88}	<2.0 {<0.92}	<2.0 {<0.91}	<2.0 {<0.92}	
Carbon Disulfide	ug/kg	--	--	--	--	--	<4.7 {<0.91}	<4.7 {<0.92}	<4.7 {<0.91}	<4.8 {<0.92}	<5.0 {<0.97}	<5.0 {<0.96}	<5.0 {<0.97}	
Carbon tetrachloride	ug/kg	--	--	10,000	--	--	<1.9 {<0.47}	<1.9 {<0.47}	<1.9 {<0.47}	<1.9 {<0.48}	<2.0 {<0.50}	<2.0 {<0.50}	<2.0 {<0.50}	
Chlorobenzene	ug/kg	--	--	2,000,000	--	--	<0.94 {<0.49}	<0.95 {<0.49}	<0.94 {<0.49}	<0.95 {<0.50}	<1.0 {<0.52}	<0.99 {<0.52}	<1.0 {<0.52}	
Chloroethane	ug/kg	--	--	--	--	--	<1.9 {<1.4}	<1.9 {<1.4}	<1.9 {<1.4}	<1.9 {<1.4}	<2.0 {<1.5}	<2.0 {<1.5}	<2.0 {<1.5}	
Chloroform	ug/kg	--	--	120,000	--	--	<0.94 {<0.47}	<0.95 {<0.47}	<0.94 {<0.47}	<0.95 {<0.48}	<1.0 {<0.50}	<0.99 {<0.50}	<1.0 {<0.50}	

INTERIM SOURCE REMOVAL ACTION (ISRA) - OUTFALL 009

WASTE CHARACTERIZATION SAMPLE RESULTS – AP/STP-1B  
THE BOEING COMPANY  
SANTA SUSANA FIELD LABORATORY

							Object Name:	APWC0201	APWC0202	APWC0203	APWC0204	APWC0205	APWC0206	APWC0207
							Sample Name:	APWC0201S001	APWC0202S001	APWC0203S001	APWC0204S001	APWC0205S001	APWC0206S001	APWC0207S001
							Collection Date:	7/28/2010	7/28/2010	7/28/2010	7/28/2010	7/28/2010	7/28/2010	7/28/2010
							Sample Depth (feet):	0.5 - 1.0	0.5 - 1.0	0.5 - 1.0	0.5 - 1.0	0.5 - 1.0	0.5 - 1.0	0.5 - 1.0
ANALYTE	UNITS	TTLIC	WET Leachate Testing Trigger <sup>a</sup>	TCLP Leachate Testing Trigger <sup>b</sup>	STLC	TCLP	RESULT <sup>c</sup>	RESULT <sup>c</sup>	RESULT <sup>c</sup>	RESULT <sup>c</sup>	RESULT <sup>c</sup>	RESULT <sup>c</sup>	RESULT <sup>c</sup>	
Chloromethane	ug/kg	--	--	--	--	--	<1.9 {<0.94}	<1.9 {<0.95}	<1.9 {<0.94}	<1.9 {<0.95}	<2.0 {<1.0}	<2.0 {<0.99}	<2.0 {<1.0}	
cis-1,2-Dichloroethene	ug/kg	--	--	--	--	--	<0.94 {<0.78}	<0.95 {<0.79}	<0.94 {<0.78}	<0.95 {<0.79}	<1.0 {<0.83}	<0.99 {<0.82}	<1.0 {<0.83}	
cis-1,3-Dichloropropene	ug/kg	--	--	--	--	--	<0.94 {<0.41}	<0.95 {<0.42}	<0.94 {<0.41}	<0.95 {<0.42}	<1.0 {<0.44}	<0.99 {<0.44}	<1.0 {<0.44}	
Dibromochloromethane	ug/kg	--	--	--	--	--	<0.94 {<0.66}	<0.95 {<0.66}	<0.94 {<0.66}	<0.95 {<0.67}	<1.0 {<0.70}	<0.99 {<0.69}	<1.0 {<0.70}	
Dibromomethane	ug/kg	--	--	--	--	--	<0.94 {<0.85}	<0.95 {<0.85}	<0.94 {<0.85}	<0.95 {<0.86}	<1.0 {<0.90}	<0.99 {<0.89}	<1.0 {<0.90}	
Dichlorodifluoromethane	ug/kg	--	--	--	--	--	<4.7 {<1.4}	<4.7 {<1.4}	<4.7 {<1.4}	<4.8 {<1.4}	<5.0 {<1.5}	<5.0 {<1.5}	<5.0 {<1.5}	
Ethylbenzene	ug/kg	--	--	--	--	--	<0.94 {<0.47}	<0.95 {<0.47}	<0.94 {<0.47}	<0.95 {<0.48}	<1.0 {<0.50}	<0.99 {<0.50}	<1.0 {<0.50}	
Hexachlorobutadiene	ug/kg	--	--	--	--	--	<1.9 {<0.75}	<1.9 {<0.76}	<1.9 {<0.75}	<1.9 {<0.76}	<2.0 {<0.80}	<2.0 {<0.79}	<2.0 {<0.80}	
Isopropylbenzene	ug/kg	--	--	--	--	--	<0.94 {<0.51}	<0.95 {<0.51}	<0.94 {<0.51}	<0.95 {<0.51}	<1.0 {<0.54}	<0.99 {<0.54}	<1.0 {<0.54}	
m,p-Xylenes	ug/kg	--	--	--	--	--	<1.9 {<0.75}	<1.9 {<0.76}	<1.9 {<0.75}	<1.9 {<0.76}	<2.0 {<0.80}	<2.0 {<0.79}	<2.0 {<0.80}	
Methylene chloride	ug/kg	--	--	--	--	--	<9.4 {<6.1}	<9.5 {<6.2}	<9.4 {<6.1}	<9.5 {<6.2}	<10 {<6.5}	<9.9 {<6.4}	<10 {<6.5}	
Methyl-tert-butyl Ether (MTBE)	ug/kg	--	--	--	--	--	<1.9 {<0.94}	<1.9 {<0.95}	<1.9 {<0.94}	<1.9 {<0.95}	<2.0 {<1.0}	<2.0 {<0.99}	<2.0 {<1.0}	
n-Butylbenzene	ug/kg	--	--	--	--	--	<1.9 {<0.68}	<1.9 {<0.68}	<1.9 {<0.68}	<1.9 {<0.69}	<2.0 {<0.72}	<2.0 {<0.71}	<2.0 {<0.72}	
n-Propylbenzene	ug/kg	--	--	--	--	--	<0.94 {<0.57}	<0.95 {<0.58}	<0.94 {<0.57}	<0.95 {<0.58}	<1.0 {<0.61}	<0.99 {<0.61}	<1.0 {<0.61}	
Naphthalene	ug/kg	--	--	--	--	--	<1.9 {<1.0}	<1.9 {<1.0}	<1.9 {<1.0}	<1.9 {<1.0}	<2.0 {<1.1}	<2.0 {<1.1}	<2.0 {<1.1}	
o-Xylene	ug/kg	--	--	--	--	--	<0.94 {<0.47}	<0.95 {<0.47}	<0.94 {<0.47}	<0.95 {<0.48}	<1.0 {<0.50}	<0.99 {<0.50}	<1.0 {<0.50}	
p-Isopropyltoluene	ug/kg	--	--	--	--	--	<0.94 {<0.68}	<0.95 {<0.68}	<0.94 {<0.68}	<0.95 {<0.69}	<1.0 {<0.72}	<0.99 {<0.71}	<1.0 {<0.72}	
sec-Butylbenzene	ug/kg	--	--	--	--	--	<1.9 {<0.63}	<1.9 {<0.63}	<1.9 {<0.63}	<1.9 {<0.64}	<2.0 {<0.67}	<2.0 {<0.66}	<2.0 {<0.67}	
Styrene	ug/kg	--	--	--	--	--	<0.94 {<0.55}	<0.95 {<0.55}	<0.94 {<0.55}	<0.95 {<0.55}	<1.0 {<0.58}	<0.99 {<0.58}	<1.0 {<0.58}	
tert-Butylbenzene	ug/kg	--	--	--	--	--	<1.9 {<0.58}	<1.9 {<0.59}	<1.9 {<0.58}	<1.9 {<0.59}	<2.0 {<0.62}	<2.0 {<0.62}	<2.0 {<0.62}	
Tetrachloroethene	ug/kg	--	--	14,000	--	--	<0.94 {<0.46}	<0.95 {<0.46}	<0.94 {<0.46}	<0.95 {<0.47}	<1.0 {<0.49}	<0.99 {<0.49}	<1.0 {<0.49}	
Toluene	ug/kg	--	--	--	--	--	<0.94 {<0.47}	<0.95 {<0.47}	<0.94 {<0.47}	<0.95 {<0.48}	<1.0 {<0.50}	<0.99 {<0.50}	<1.0 {<0.50}	
trans-1,2-Dichloroethene	ug/kg	--	--	--	--	--	<0.94 {<0.66}	<0.95 {<0.66}	<0.94 {<0.66}	<0.95 {<0.67}	<1.0 {<0.70}	<0.99 {<0.69}	<1.0 {<0.70}	
trans-1,3-Dichloropropene	ug/kg	--	--	--	--	--	<0.94 {<0.57}	<0.95 {<0.58}	<0.94 {<0.57}	<0.95 {<0.58}	<1.0 {<0.61}	<0.99 {<0.61}	<1.0 {<0.61}	
Trichloroethene	ug/kg	2,040,000	2,040,000	10,000	--	--	<0.94 {<0.47}	<0.95 {<0.47}	1.3	<0.95 {<0.48}	2.2	0.60 J	<1.0 {<0.50}	
Trichlorofluoromethane	ug/kg	--	--	--	--	--	<1.9 {<0.51}	<1.9 {<0.51}	<1.9 {<0.51}	<1.9 {<0.51}	<2.0 {<0.54}	<2.0 {<0.54}	<2.0 {<0.54}	
Vinyl acetate	ug/kg	--	--	--	--	--	<4.7 {<2.3}	<4.7 {<2.4}	<4.7 {<2.3}	<4.8 {<2.4}	<5.0 {<2.5}	<5.0 {<2.5}	<5.0 {<2.5}	
Vinyl chloride	ug/kg	--	--	4,000	--	--	<1.9 {<0.86}	<1.9 {<0.86}	<1.9 {<0.86}	<1.9 {<0.87}	<2.0 {<0.91}	<2.0 {<0.90}	<2.0 {<0.91}	
<b>RADIONUCLIDES</b>	--	--	--	--	--	--	R	R	R	R	R	R	R	

**INTERIM SOURCE REMOVAL ACTION (ISRA) - OUTFALL 009**

**WASTE CHARACTERIZATION SAMPLE RESULTS – AP/STP-1B  
THE BOEING COMPANY  
SANTA SUSANA FIELD LABORATORY**

							Object Name:	APWC0208	APWC0209	APWC0210
							Sample Name:	APWC0208S001	APWC0209S001	APWC0210S001
							Collection Date:	7/28/2010	7/28/2010	7/28/2010
							Sample Depth (feet):	0.5 - 1.0	0.5 - 1.0	0.5 - 1.0
ANALYTE	UNITS	TCLC	WET Leachate Testing Trigger <sup>a</sup>	TCLP Leachate Testing Trigger <sup>b</sup>	STLC	TCLP	RESULT <sup>c</sup>	RESULT <sup>c</sup>	RESULT <sup>c</sup>	
<b>METALS</b>										
Antimony	mg/kg	500	150	--	--	--	1.2 J	1.5 J	1.7 J	
Arsenic	mg/kg	500	50	100	--	--	7.1	5.7	6.1	
Barium	mg/kg	10,000	1,000	2,000	--	--	110	170	100	
Beryllium	mg/kg	75	7.5	--	--	--	0.57	0.58	0.51	
Cadmium	mg/kg	100	10	20	--	--	<0.20	<0.20	<0.20	
Chromium	mg/kg	500	50	100	--	--	140	24	24	
Chromium, WET	mg/L	--	--	--	5	--	1.2	--	--	
Chromium, TCLP	mg/L	--	--	--	--	5	<0.020	--	--	
Cobalt	mg/kg	8,000	800	--	--	--	5.1	5.5	5.3	
Copper	mg/kg	2,500	250	--	--	--	12	15	26	
Lead	mg/kg	1,000	50	100	--	--	12	9.0	19	
Mercury	mg/kg	20	2	4	--	--	0.022	0.019 J	0.015 J	
Molybdenum	mg/kg	3,500	3,500	--	--	--	0.76 J	1.3 J	0.89 J	
Nickel	mg/kg	2,000	200	--	--	--	13	14	14	
Selenium	mg/kg	100	10	20	--	--	<0.99	<1	<0.99	
Silver	mg/kg	500	50	100	--	--	1.6	7.7	<0.79	
Thallium	mg/kg	700	70	--	--	--	<0.79	<0.8	<0.79	
Vanadium	mg/kg	2,400	240	--	--	--	37	38	38	
Zinc	mg/kg	5,000	2,500	--	--	--	68 B	82 B	56 B	
<b>PCBs</b>										
Aroclor 1016	ug/kg	50,000	50,000	--	--	--	<2500 {<600}	<50 {<12}	<2500 {<600}	
Aroclor 1221	ug/kg	50,000	50,000	--	--	--	<2500 {<600}	<50 {<12}	<2500 {<600}	
Aroclor 1232	ug/kg	50,000	50,000	--	--	--	<2500 {<600}	<50 {<12}	<2500 {<600}	
Aroclor 1242	ug/kg	50,000	50,000	--	--	--	<2500 {<600}	<50 {<12}	<2500 {<600}	
Aroclor 1248	ug/kg	50,000	50,000	--	--	--	<2500 {<600}	<50 {<12}	<2500 {<600}	
Aroclor 1254	ug/kg	50,000	50,000	--	--	--	<2500 {<600}	<50 {<12}	<2500 {<600}	
Aroclor 1260	ug/kg	50,000	50,000	--	--	--	<2500 {<600}	<50 {<12}	<2500 {<600}	
<b>TPH</b>										
Gasoline Range Organics (C6-C12)	mg/kg	--	--	--	--	--	<0.13 {<0.35}	<0.14 {<0.37}	<0.14 {<0.36}	
EFH (C10 - C24)	mg/kg	--	--	--	--	--	35	<6.7 {<4.7}	68	
EFH (C10 - C40)	mg/kg	--	--	--	--	--	110	<6.7 {<4.7}	150	
EFH (C25 - C40)	mg/kg	--	--	--	--	--	77	<6.7 {<4.7}	82	
<b>VOCs</b>										
1,1,1,2-Tetrachloroethane	ug/kg	--	--	--	--	--	<2.0 {<0.57}	<2.0 {<0.57}	<2.0 {<0.57}	
1,1,1-Trichloroethane	ug/kg	--	--	--	--	--	<1.0 {<0.70}	<1.0 {<0.70}	<0.99 {<0.69}	

INTERIM SOURCE REMOVAL ACTION (ISRA) - OUTFALL 009

WASTE CHARACTERIZATION SAMPLE RESULTS – AP/STP-1B  
 THE BOEING COMPANY  
 SANTA SUSANA FIELD LABORATORY

							Object Name:	APWC0208	APWC0209	APWC0210
							Sample Name:	APWC0208S001	APWC0209S001	APWC0210S001
							Collection Date:	7/28/2010	7/28/2010	7/28/2010
							Sample Depth (feet):	0.5 - 1.0	0.5 - 1.0	0.5 - 1.0
ANALYTE	UNITS	TCLC	WET Leachate Testing Trigger <sup>a</sup>	TCLP Leachate Testing Trigger <sup>b</sup>	STLC	TCLP	RESULT <sup>c</sup>	RESULT <sup>c</sup>	RESULT <sup>c</sup>	
1,1,2,2-Tetrachloroethane	ug/kg	--	--	--	--	--	<2.0 {<0.86}	<2.0 {<0.86}	<2.0 {<0.85}	
1,1,2-Trichloroethane	ug/kg	--	--	--	--	--	<1.0 {<0.87}	<1.0 {<0.87}	<0.99 {<0.86}	
1,1-Dichloroethane	ug/kg	--	--	--	--	--	<1.0 {<0.50}	<1.0 {<0.50}	<0.99 {<0.50}	
1,1-Dichloroethene	ug/kg	--	--	14,000	--	--	<2.0 {<0.60}	<2.0 {<0.60}	<2.0 {<0.60}	
1,1-Dichloropropene	ug/kg	--	--	--	--	--	<1.0 {<0.40}	<1.0 {<0.40}	<0.99 {<0.40}	
1,2,3-Trichlorobenzene	ug/kg	--	--	--	--	--	<2.0 {<1.0}	<2.0 {<1.0}	<2.0 {<0.99}	
1,2,3-Trichloropropane	ug/kg	--	--	--	--	--	<2.0 {<1.0}	<2.0 {<1.0}	<2.0 {<0.99}	
1,2,4-Trichlorobenzene	ug/kg	--	--	--	--	--	<2.0 {<1.0}	<2.0 {<1.0}	<2.0 {<0.99}	
1,2,4-Trimethylbenzene	ug/kg	--	--	--	--	--	<1.0 {<0.78}	<1.0 {<0.78}	<0.99 {<0.77}	
1,2-Dibromo-3-chloropropane	ug/kg	--	--	--	--	--	<10 {<1.5}	<10 {<1.5}	<9.9 {<1.5}	
1,2-Dibromoethane (EDB)	ug/kg	--	--	--	--	--	<1.0 {<0.80}	<1.0 {<0.80}	<0.99 {<0.79}	
1,2-Dichlorobenzene	ug/kg	--	--	--	--	--	<1.0 {<0.95}	<1.0 {<0.95}	<0.99 {<0.94}	
1,2-Dichloroethane	ug/kg	--	--	10,000	--	--	<1.0 {<0.80}	<1.0 {<0.80}	<0.99 {<0.79}	
1,2-Dichloropropane	ug/kg	--	--	--	--	--	<1.0 {<0.80}	<1.0 {<0.80}	<0.99 {<0.79}	
1,3,5-Trimethylbenzene	ug/kg	--	--	--	--	--	<1.0 {<0.63}	<1.0 {<0.63}	<0.99 {<0.62}	
1,3-Dichlorobenzene	ug/kg	--	--	--	--	--	<1.0 {<0.84}	<1.0 {<0.84}	<0.99 {<0.83}	
1,3-Dichloropropane	ug/kg	--	--	--	--	--	<1.0 {<0.63}	<1.0 {<0.63}	<0.99 {<0.62}	
1,4-Dichlorobenzene	ug/kg	--	--	--	--	--	<1.0 {<0.94}	<1.0 {<0.94}	<0.99 {<0.93}	
2,2-Dichloropropane	ug/kg	--	--	--	--	--	<1.0 {<0.60}	<1.0 {<0.60}	<0.99 {<0.60}	
2-Butanone (MEK)	ug/kg	--	--	4,000,000	--	--	<10 {<6.0}	<10 {<6.0}	<9.9 {<6.0}	
2-Chlorotoluene	ug/kg	--	--	--	--	--	<2.0 {<0.87}	<2.0 {<0.87}	<2.0 {<0.86}	
2-Hexanone	ug/kg	--	--	--	--	--	<10 {<9.1}	<10 {<9.1}	<9.9 {<9.0}	
4-Chlorotoluene	ug/kg	--	--	--	--	--	<2.0 {<0.74}	<2.0 {<0.74}	<2.0 {<0.73}	
4-Methyl-2-pentanone (MIBK)	ug/kg	--	--	--	--	--	<5.0 {<4.5}	<5.0 {<4.5}	<5.0 {<4.5}	
Acetone	ug/kg	--	--	--	--	--	<10 {<8.0}	<10 {<8.0}	<9.9 {<7.9}	
Benzene	ug/kg	--	--	10,000	--	--	<1.0 {<0.50}	<1.0 {<0.50}	<0.99 {<0.50}	
Bromobenzene	ug/kg	--	--	--	--	--	<2.0 {<0.84}	<2.0 {<0.84}	<2.0 {<0.83}	
Bromochloromethane	ug/kg	--	--	--	--	--	<2.0 {<0.90}	<2.0 {<0.90}	<2.0 {<0.89}	
Bromodichloromethane	ug/kg	--	--	--	--	--	<1.0 {<0.50}	<1.0 {<0.50}	<0.99 {<0.50}	
Bromoform	ug/kg	--	--	--	--	--	<2.0 {<0.80}	<2.0 {<0.80}	<2.0 {<0.79}	
Bromomethane	ug/kg	--	--	--	--	--	<2.0 {<0.92}	<2.0 {<0.92}	<2.0 {<0.91}	
Carbon Disulfide	ug/kg	--	--	--	--	--	<5.0 {<0.97}	<5.0 {<0.97}	<5.0 {<0.96}	
Carbon tetrachloride	ug/kg	--	--	10,000	--	--	<2.0 {<0.50}	<2.0 {<0.50}	<2.0 {<0.50}	
Chlorobenzene	ug/kg	--	--	2,000,000	--	--	<1.0 {<0.52}	<1.0 {<0.52}	<0.99 {<0.52}	
Chloroethane	ug/kg	--	--	--	--	--	<2.0 {<1.5}	<2.0 {<1.5}	<2.0 {<1.5}	
Chloroform	ug/kg	--	--	120,000	--	--	<1.0 {<0.50}	<1.0 {<0.50}	<0.99 {<0.50}	

**INTERIM SOURCE REMOVAL ACTION (ISRA) - OUTFALL 009**

**WASTE CHARACTERIZATION SAMPLE RESULTS – AP/STP-1B  
THE BOEING COMPANY  
SANTA SUSANA FIELD LABORATORY**

							Object Name:	APWC0208	APWC0209	APWC0210
							Sample Name:	APWC0208S001	APWC0209S001	APWC0210S001
							Collection Date:	7/28/2010	7/28/2010	7/28/2010
							Sample Depth (feet):	0.5 - 1.0	0.5 - 1.0	0.5 - 1.0
ANALYTE	UNITS	TCLC	WET Leachate Testing Trigger <sup>a</sup>	TCLP Leachate Testing Trigger <sup>b</sup>	STLC	TCLP	RESULT <sup>c</sup>	RESULT <sup>c</sup>	RESULT <sup>c</sup>	
Chloromethane	ug/kg	--	--	--	--	--	<2.0 {<1.0}	<2.0 {<1.0}	<2.0 {<0.99}	
cis-1,2-Dichloroethene	ug/kg	--	--	--	--	--	<1.0 {<0.83}	<1.0 {<0.83}	<0.99 {<0.82}	
cis-1,3-Dichloropropene	ug/kg	--	--	--	--	--	<1.0 {<0.44}	<1.0 {<0.44}	<0.99 {<0.44}	
Dibromochloromethane	ug/kg	--	--	--	--	--	<1.0 {<0.70}	<1.0 {<0.70}	<0.99 {<0.69}	
Dibromomethane	ug/kg	--	--	--	--	--	<1.0 {<0.90}	<1.0 {<0.90}	<0.99 {<0.89}	
Dichlorodifluoromethane	ug/kg	--	--	--	--	--	<5.0 {<1.5}	<5.0 {<1.5}	<5.0 {<1.5}	
Ethylbenzene	ug/kg	--	--	--	--	--	<1.0 {<0.50}	<1.0 {<0.50}	<0.99 {<0.50}	
Hexachlorobutadiene	ug/kg	--	--	--	--	--	<2.0 {<0.80}	<2.0 {<0.80}	<2.0 {<0.79}	
Isopropylbenzene	ug/kg	--	--	--	--	--	<1.0 {<0.54}	<1.0 {<0.54}	<0.99 {<0.54}	
m,p-Xylenes	ug/kg	--	--	--	--	--	<2.0 {<0.80}	<2.0 {<0.80}	<2.0 {<0.79}	
Methylene chloride	ug/kg	--	--	--	--	--	<10 {<6.5}	<10 {<6.5}	<9.9 {<6.4}	
Methyl-tert-butyl Ether (MTBE)	ug/kg	--	--	--	--	--	<2.0 {<1.0}	<2.0 {<1.0}	<2.0 {<0.99}	
n-Butylbenzene	ug/kg	--	--	--	--	--	<2.0 {<0.72}	<2.0 {<0.72}	<2.0 {<0.71}	
n-Propylbenzene	ug/kg	--	--	--	--	--	<1.0 {<0.61}	<1.0 {<0.61}	<0.99 {<0.61}	
Naphthalene	ug/kg	--	--	--	--	--	<2.0 {<1.1}	<2.0 {<1.1}	<2.0 {<1.1}	
o-Xylene	ug/kg	--	--	--	--	--	<1.0 {<0.50}	<1.0 {<0.50}	<0.99 {<0.50}	
p-Isopropyltoluene	ug/kg	--	--	--	--	--	<1.0 {<0.72}	<1.0 {<0.72}	<0.99 {<0.71}	
sec-Butylbenzene	ug/kg	--	--	--	--	--	<2.0 {<0.67}	<2.0 {<0.67}	<2.0 {<0.66}	
Styrene	ug/kg	--	--	--	--	--	<1.0 {<0.58}	<1.0 {<0.58}	<0.99 {<0.58}	
tert-Butylbenzene	ug/kg	--	--	--	--	--	<2.0 {<0.62}	<2.0 {<0.62}	<2.0 {<0.62}	
Tetrachloroethene	ug/kg	--	--	14,000	--	--	<1.0 {<0.49}	<1.0 {<0.49}	<0.99 {<0.49}	
Toluene	ug/kg	--	--	--	--	--	<1.0 {<0.50}	<1.0 {<0.50}	<0.99 {<0.50}	
trans-1,2-Dichloroethene	ug/kg	--	--	--	--	--	<1.0 {<0.70}	<1.0 {<0.70}	<0.99 {<0.69}	
trans-1,3-Dichloropropene	ug/kg	--	--	--	--	--	<1.0 {<0.61}	<1.0 {<0.61}	<0.99 {<0.61}	
Trichloroethene	ug/kg	2,040,000	2,040,000	10,000	--	--	<1.0 {<0.50}	1.9	<0.99 {<0.50}	
Trichlorofluoromethane	ug/kg	--	--	--	--	--	<2.0 {<0.54}	<2.0 {<0.54}	<2.0 {<0.54}	
Vinyl acetate	ug/kg	--	--	--	--	--	<5.0 {<2.5}	<5.0 {<2.5}	<5.0 {<2.5}	
Vinyl chloride	ug/kg	--	--	4,000	--	--	<2.0 {<0.91}	<2.0 {<0.91}	<2.0 {<0.90}	
<b>RADIONUCLIDES</b>	--	--	--	--	--	--	R	R	R	

**INTERIM SOURCE REMOVAL ACTION (ISRA) - OUTFALL 009**

**WASTE CHARACTERIZATION SAMPLE RESULTS – AP/STP  
THE BOEING COMPANY  
SANTA SUSANA FIELD LABORATORY**

**Notes:**

--" - not analyzed / not applicable

<5 - Analyte not detected at or above the stated method detection limit (metals) or analyte not detected at or above the stated reporting limit (organics)

{<1} - Analyte not detected at or above the stated method detection limit (organics)

<sup>a</sup> - WET Leachate Testing Trigger = STLC limit \* 10

<sup>b</sup> - TCLP Leachate Testing Trigger = TCLP limit \* 20

<sup>c</sup> Waste characterization sample results not validated

B - Analyte was detected in the associated method blank

J - Estimated value. Analyte detected at a level less than the Reporting Limit (RL) and greater than or equal to the Method Detection Limit (MDL). The user of this data should be aware that this data is of limited reliability.

M1 - The MS and/or MSD were above the acceptance limits due to sample matrix interference. See Blank Spike (LCS).

µg/kg - micrograms per kilogram

mg/kg - milligrams per kilogram

mg/L - milligrams per liter

R - Radiological analysis includes gamma spectroscopy (Na-22, K-40, Mn-54, Co-60, Cs-134, Cs-137, Eu-152, Eu-154, Th-228, Th-232, U-235, U-238 and Am-241), strontium-90, and tritium. Boeing will be preparing a document that provides the radiological results and statistical analysis of these waste characterization samples.

R-3 - The RPD exceeded the acceptance limit due to sample matrix effects

## **WASTE CHARACTERIZATION: IN-SITU SOIL LOCATED AT AREA II ISRA OUTFALL 009 PLANNED EXCAVATION AP/STP-1C-1-EAST**

### **Introduction**

This report presents supporting detailed information for the July 29, 2010 in-situ characterization sampling of prospective soil wastes from planned SSFL Area II ISRA excavations in the vicinity of the former Area II incinerator.

### **Background**

In-situ characterization was performed for soil destined to be excavated from designated locations in SSFL Area II in accordance with the ISRA Workplan. A step-by-step approach was followed to accomplish characterization of the soil prior to excavation. The first step was to review available information regarding historical area usage and existing analytical data from past soil sampling in or near planned excavation sites. The objective was to identify all substances potentially impacting the soil in each planned excavation footprint to the degree that hazardous waste regulatory thresholds would be exceeded.

The next step was to develop and implement a random sampling plan for each of the planned excavation footprints. The collected soil samples were analyzed by a state certified laboratory and the results evaluated to determine whether any of the identified substances were present at concentrations requiring further investigation. In addition, the initial random sampling results were evaluated to determine the statistical adequacy of the data provided for waste characterization based on the guidelines presented in U.S. EPA SW-846. Soil was characterized non-hazardous when analyte concentrations among the samples exhibited a reasonably small variance and there was satisfactory margin between the mean of the samples and applicable regulatory thresholds. Otherwise, additional samples would be collected and subjected to analysis, or in lieu of further testing, the soil was summarily characterized as hazardous. Statistical analyses described in SW-846 are performed as necessary to determine minimum sample point requirements and the upper confidence levels of analytical results.

AP/STP-1C-1-East is part of a larger planned excavation footprint, AP/STP-1C-1. The footprint was subdivided into three (3) areas for sampling purposes: AP/STP-1C-1-East, AP/STP-1C-1-West, and AP/STP-1C-1-Main. This was necessary because the highly irregular shape of the original footprint suggested the possibility of a characteristically heterogeneous wastestream. To assure that randomly identified sample collection points did not cluster in any particular area to the exclusion of other areas, thereby potentially voiding the representativeness of the analytical results, the two significant protuberances from the main body of the planned excavation were addressed independently.

The review of historical information and existing analytical data relevant to planned excavation AP/STP-1C-1-East was based partly on the Group 2 RFI results. Evaluation of these data and other sources of relevant information, including recent sampling conducted specifically for ISRA, suggested that Regulated Metals (CAM17), Volatile Organic Compounds (VOC), Polychlorinated Biphenyls (PCB), and Petroleum Hydrocarbons should be addressed in the AP/STP-1C-1-East excavation footprint. A random sampling plan was developed for collection of five (5) samples from the planned excavation footprint, taking into account the relatively small area to be excavated. The samples were analyzed for CAM 17 metals, VOCs, PCBs, and Petroleum Hydrocarbons. All samples were collected, contained, and handled according to field practice requirements in SW-846.

## Results

Analytical results for the planned excavation area at AP/STP-1C-1-East are presented in Test America report ITG2665 issued on 8/6/10. Regulated Metals were below 10-Times their respective California Soluble Threshold Limit Concentration (STLC) threshold in three of the samples, but in the two remaining samples, elevated concentrations of Silver were detected at 160 parts per million (ppm) and 66 ppm. Also, in one of those samples, Barium was detected above its 10X STLC threshold at 1,200 ppm. Leachate tests, the California Waste Extraction Test (WET) and the RCRA Toxicity Characteristic Leaching Procedure (TCLP), were performed as required on the samples with elevated Silver and Barium. Both the TCLP and the WET resulted in Non-detections for the Silver. Only the WET was applicable to the Barium, yielding a detected concentration of 13 milligrams per liter (mg/L), which is well below the STLC hazardous waste limit of 100 mg/L.

No VOCs were detected, with the exception of one sample, which exhibited a Trichloroethylene (TCE) concentration of 0.00078 ppm. The detection was "J-flagged," meaning the concentration was so close to the detection capability of the laboratory test that the reported concentration was estimated and not reliably measured. The TCE was not detected in any of the other samples despite the satisfactorily low analytical Method Detection Limits (range 0.00049 ppm - 0.00050 ppm), no historical records have been found suggesting any kind of solvent related activities in the area, and the very low concentration detected in the sample is consistent with soil vapor migration or volatilization of a groundwater transported contaminant from an unknown source. For these reasons, the soils excavated from AP/STP-1C-1-East are not being characterized as "F-Listed" wastes.

No PCBs were detected in any of the samples and Petroleum Hydrocarbons were detected at very low levels, with a maximum concentration in the C10-C40 range of 23 ppm.

## Determination

According to analytical results and generator knowledge, the soil in the planned excavation footprint of SSFL Area II AP/STP-1C-1-East:










- Is Not a Listed Waste (analytical results and generator knowledge)
- Is Not ignitable (generator knowledge)
- Is Not corrosive (generator knowledge)
- Is Not reactive (generator knowledge)
- Is Not toxic (analytical results and generator knowledge)
  - Is Not Extremely or Acutely Hazardous Waste
  - Does not exceed any RCRA or Title 22 characteristic thresholds
  - Is Not subject to the Prop. 65 listing if it is applied to 22 CCR 66261.24(a)(7)
  - Is Not subject to Title 22 Appendix X list
  - Is Not known by experience or testing to pose a hazard to human health or environment because of its carcinogenicity, acute toxicity, chronic toxicity, bio-accumulative properties, or persistence in the environment.

**The soil in AP/STP-1C-1-East is NON-HAZARDOUS.**




**Outfall 009**  
**Sample Locations for AP/STP - 1C,**  
**AP/STP - 1B, and AP/STP - 1D**

**Base Map Legend**

-  Administrative Area Boundary
-  RFI Site Boundary
-  Report Group Boundary
-  NPDES Outfall
-  A/C Paving
-  Drainage
-  Non Jurisdictional Surface Water Pathway
-  Surface Water Divide
-  Elevation Contour

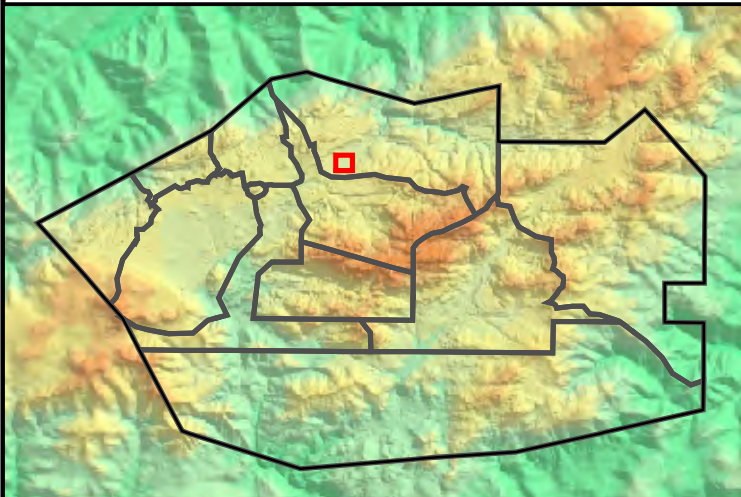
**Figure Legend**

-  Waste Characterization Sample



Document: ISRA\_Plots\_Working\_AP-STP-1C\_SampleLocations.mxd Date: Sep 02, 2010

1 inch = 25 feet  
 0 25 50 Feet



**INTERIM SOURCE REMOVAL ACTION (ISRA) - OUTFALL 009**

**WASTE CHARACTERIZATION SAMPLE RESULTS – AP/STP-1C-1 (East)  
THE BOEING COMPANY  
SANTA SUSANA FIELD LABORATORY**

							Object Name:	APWC0016	APWC0017	APWC0018	APWC0019	APWC0020
							Sample Name:	APWC0016S001	APWC0017S001	APWC0018S001	APWC0019S001	APWC0020S001
							Collection Date:	7/29/2010	7/29/2010	7/29/2010	7/29/2010	7/29/2010
							Sample Depth (feet):	0.5 - 1.0	0.5 - 1.0	0.5 - 1.0	0.5 - 1.0	0.5 - 1.0
ANALYTE	UNITS	TCLC	WET Leachate Testing Trigger <sup>a</sup>	TCLP Leachate Testing Trigger <sup>b</sup>	STLC	TCLP	RESULT <sup>c</sup>	RESULT <sup>c</sup>	RESULT <sup>c</sup>	RESULT <sup>c</sup>	RESULT <sup>c</sup>	
<b>METALS</b>												
Antimony	mg/kg	500	150	--	--	--	1.4 J	1.3 J	0.97 J	1.6 J	1 J	
Arsenic	mg/kg	500	50	100	--	--	9.5	7.2	7.5	7.9	8	
Barium	mg/kg	10,000	1,000	2,000	--	--	1,200	130	630	110	79	
Barium, WET	mg/L	--	--	--	100	--	13	--	--	--	--	
Beryllium	mg/kg	75	7.5	--	--	--	0.67	0.63	0.55	0.81	0.57	
Cadmium	mg/kg	100	10	20	--	--	1.1	<0.20	0.46 J	<0.20	<0.20	
Chromium	mg/kg	500	50	100	--	--	42	27	25	27	18	
Cobalt	mg/kg	8,000	800	--	--	--	6.4	6.7	5.5	7.1	4.6	
Copper	mg/kg	2,500	250	--	--	--	21	14	15	12	8.5	
Lead	mg/kg	1,000	50	100	--	--	26	12	18	5.5	6.7	
Mercury	mg/kg	20	2	4	--	--	0.029	0.013 J	<0.024	<0.024	0.017 J	
Molybdenum	mg/kg	3,500	3,500	--	--	--	1.1 J	0.95 J	0.86 J	0.91 J	0.67 J	
Nickel	mg/kg	2,000	200	--	--	--	17	16	15	17	11	
Selenium	mg/kg	100	10	20	--	--	<1	<0.99	<0.99	<1	<0.99	
Silver	mg/kg	500	50	100	--	--	160	<0.79	66	<0.8	0.95 J	
Silver, WET	mg/L	--	--	--	5	--	<0.12	--	<0.12	--	--	
Silver, TCLP	mg/L	--	--	--	--	5	<0.060	--	--	--	--	
Thallium	mg/kg	700	70	--	--	--	<0.8	<0.79	<0.79	<0.8	<0.79	
Vanadium	mg/kg	2,400	240	--	--	--	47	44	36	54	33	
Zinc	mg/kg	5,000	2,500	--	--	--	300	76	160	53	53	
<b>PCBs</b>												
Aroclor 1016	ug/kg	50,000	50,000	--	--	--	<50 {<12}	<50 {<12}	<50 {<12}	<50 {<12}	<50 {<12}	
Aroclor 1221	ug/kg	50,000	50,000	--	--	--	<50 {<12}	<50 {<12}	<50 {<12}	<50 {<12}	<50 {<12}	
Aroclor 1232	ug/kg	50,000	50,000	--	--	--	<50 {<12}	<50 {<12}	<50 {<12}	<50 {<12}	<50 {<12}	
Aroclor 1242	ug/kg	50,000	50,000	--	--	--	<50 {<12}	<50 {<12}	<50 {<12}	<50 {<12}	<50 {<12}	
Aroclor 1248	ug/kg	50,000	50,000	--	--	--	<50 {<12}	<50 {<12}	<50 {<12}	<50 {<12}	<50 {<12}	
Aroclor 1254	ug/kg	50,000	50,000	--	--	--	<50 {<12}	<50 {<12}	<50 {<12}	<50 {<12}	<50 {<12}	
Aroclor 1260	ug/kg	50,000	50,000	--	--	--	<50 {<12}	<50 {<12}	<50 {<12}	<50 {<12}	<50 {<12}	
<b>TPH</b>												
Gasoline Range Organics (C6-C12)	mg/kg	--	--	--	--	--	<0.35 {<0.13}	<0.3 {<0.11}	<0.28 {<0.11}	<0.36 {<0.13}	<0.33 {<0.12}	
EFH (C10 - C24)	mg/kg	--	--	--	--	--	3.9 J	<5 {<3.5}	4.6 J	<5 {<3.5}	<5 {<3.5}	
EFH (C10 - C40)	mg/kg	--	--	--	--	--	23	9.3	20	5.3	11	
EFH (C25 - C40)	mg/kg	--	--	--	--	--	19	7.4	15	3.5 J	8.5	
<b>VOCs</b>												
1,1,1,2-Tetrachloroethane	ug/kg	--	--	--	--	--	<2 {<0.57}	<2 {<0.57}	<2 {<0.57}	<2 {<0.57}	<2 {<0.56}	

**INTERIM SOURCE REMOVAL ACTION (ISRA) - OUTFALL 009**

**WASTE CHARACTERIZATION SAMPLE RESULTS – AP/STP-1C-1 (East)  
THE BOEING COMPANY  
SANTA SUSANA FIELD LABORATORY**

							Object Name:	APWC0016	APWC0017	APWC0018	APWC0019	APWC0020
							Sample Name:	APWC0016S001	APWC0017S001	APWC0018S001	APWC0019S001	APWC0020S001
							Collection Date:	7/29/2010	7/29/2010	7/29/2010	7/29/2010	7/29/2010
							Sample Depth (feet):	0.5 - 1.0	0.5 - 1.0	0.5 - 1.0	0.5 - 1.0	0.5 - 1.0
ANALYTE	UNITS	TTLIC	WET Leachate Testing Trigger <sup>a</sup>	TCLP Leachate Testing Trigger <sup>b</sup>	STLC	TCLP	RESULT <sup>c</sup>	RESULT <sup>c</sup>	RESULT <sup>c</sup>	RESULT <sup>c</sup>	RESULT <sup>c</sup>	
1,1,1-Trichloroethane	ug/kg	--	--	--	--	--	<1 {<0.7}	<1 {<0.7}	<0.99 {<0.69}	<1 {<0.7}	<0.98 {<0.68}	
1,1,2,2-Tetrachloroethane	ug/kg	--	--	--	--	--	<2 {<0.86}	<2 {<0.86}	<2 {<0.85}	<2 {<0.86}	<2 {<0.84}	
1,1,2-Trichloroethane	ug/kg	--	--	--	--	--	<1 {<0.87}	<1 {<0.87}	<0.99 {<0.86}	<1 {<0.87}	<0.98 {<0.85}	
1,1-Dichloroethane	ug/kg	--	--	--	--	--	<1 {<0.5}	<1 {<0.5}	<0.99 {<0.5}	<1 {<0.5}	<0.98 {<0.49}	
1,1-Dichloroethene	ug/kg	--	--	14,000	--	--	<2 {<0.6}	<2 {<0.6}	<2 {<0.6}	<2 {<0.6}	<2 {<0.59}	
1,1-Dichloropropene	ug/kg	--	--	--	--	--	<1 {<0.4}	<1 {<0.4}	<0.99 {<0.4}	<1 {<0.4}	<0.98 {<0.39}	
1,2,3-Trichlorobenzene	ug/kg	--	--	--	--	--	<2 {<1}	<2 {<1}	<2 {<0.99}	<2 {<1}	<2 {<0.98}	
1,2,3-Trichloropropane	ug/kg	--	--	--	--	--	<2 {<1}	<2 {<1}	<2 {<0.99}	<2 {<1}	<2 {<0.98}	
1,2,4-Trichlorobenzene	ug/kg	--	--	--	--	--	<2 {<1}	<2 {<1}	<2 {<0.99}	<2 {<1}	<2 {<0.98}	
1,2,4-Trimethylbenzene	ug/kg	--	--	--	--	--	<1 {<0.78}	<1 {<0.78}	<0.99 {<0.77}	<1 {<0.78}	<0.98 {<0.76}	
1,2-Dibromo-3-chloropropane	ug/kg	--	--	--	--	--	<10 {<1.5}	<10 {<1.5}	<9.9 {<1.5}	<10 {<1.5}	<9.8 {<1.5}	
1,2-Dibromoethane (EDB)	ug/kg	--	--	--	--	--	<1 {<0.8}	<1 {<0.8}	<0.99 {<0.79}	<1 {<0.8}	<0.98 {<0.78}	
1,2-Dichlorobenzene	ug/kg	--	--	--	--	--	<1 {<0.95}	<1 {<0.95}	<0.99 {<0.94}	<1 {<0.95}	<0.98 {<0.93}	
1,2-Dichloroethane	ug/kg	--	--	10,000	--	--	<1 {<0.8}	<1 {<0.8}	<0.99 {<0.79}	<1 {<0.8}	<0.98 {<0.78}	
1,2-Dichloropropane	ug/kg	--	--	--	--	--	<1 {<0.8}	<1 {<0.8}	<0.99 {<0.79}	<1 {<0.8}	<0.98 {<0.78}	
1,3,5-Trimethylbenzene	ug/kg	--	--	--	--	--	<1 {<0.63}	<1 {<0.63}	<0.99 {<0.62}	<1 {<0.63}	<0.98 {<0.62}	
1,3-Dichlorobenzene	ug/kg	--	--	--	--	--	<1 {<0.84}	<1 {<0.84}	<0.99 {<0.83}	<1 {<0.84}	<0.98 {<0.82}	
1,3-Dichloropropane	ug/kg	--	--	--	--	--	<1 {<0.63}	<1 {<0.63}	<0.99 {<0.62}	<1 {<0.63}	<0.98 {<0.62}	
1,4-Dichlorobenzene	ug/kg	--	--	--	--	--	<1 {<0.94}	<1 {<0.94}	<0.99 {<0.93}	<1 {<0.94}	<0.98 {<0.92}	
2,2-Dichloropropane	ug/kg	--	--	--	--	--	<1 {<0.6}	<1 {<0.6}	<0.99 {<0.6}	<1 {<0.6}	<0.98 {<0.59}	
2-Butanone (MEK)	ug/kg	--	--	4,000,000	--	--	<10 {<6}	<10 {<6}	<9.9 {<6}	<10 {<6}	<9.8 {<5.9}	
2-Chlorotoluene	ug/kg	--	--	--	--	--	<2 {<0.87}	<2 {<0.87}	<2 {<0.86}	<2 {<0.87}	<2 {<0.85}	
2-Hexanone	ug/kg	--	--	--	--	--	<10 {<9.1}	<10 {<9.1}	<9.9 {<9}	<10 {<9.1}	<9.8 {<8.9}	
4-Chlorotoluene	ug/kg	--	--	--	--	--	<2 {<0.74}	<2 {<0.74}	<2 {<0.73}	<2 {<0.74}	<2 {<0.72}	
4-Methyl-2-pentanone (MIBK)	ug/kg	--	--	--	--	--	<5 {<4.5}	<5 {<4.5}	<5 {<4.5}	<5 {<4.5}	<4.9 {<4.4}	
Acetone	ug/kg	--	--	--	--	--	<10 {<8}	<10 {<8}	<9.9 {<7.9}	<10 {<8}	<9.8 {<7.8}	
Benzene	ug/kg	--	--	10,000	--	--	<1 {<0.5}	<1 {<0.5}	<0.99 {<0.5}	<1 {<0.5}	<0.98 {<0.49}	
Bromobenzene	ug/kg	--	--	--	--	--	<2 {<0.84}	<2 {<0.84}	<2 {<0.83}	<2 {<0.84}	<2 {<0.82}	
Bromochloromethane	ug/kg	--	--	--	--	--	<2 {<0.9}	<2 {<0.9}	<2 {<0.89}	<2 {<0.9}	<2 {<0.88}	
Bromodichloromethane	ug/kg	--	--	--	--	--	<1 {<0.5}	<1 {<0.5}	<0.99 {<0.5}	<1 {<0.5}	<0.98 {<0.49}	
Bromoform	ug/kg	--	--	--	--	--	<2 {<0.8}	<2 {<0.8}	<2 {<0.79}	<2 {<0.8}	<2 {<0.78}	
Bromomethane	ug/kg	--	--	--	--	--	<2 {<0.92}	<2 {<0.92}	<2 {<0.91}	<2 {<0.92}	<2 {<0.9}	
Carbon Disulfide	ug/kg	--	--	--	--	--	<5 {<0.97}	<5 {<0.97}	<5 {<0.96}	<5 {<0.97}	<4.9 {<0.95}	
Carbon tetrachloride	ug/kg	--	--	10,000	--	--	<2 {<0.5}	<2 {<0.5}	<2 {<0.5}	<2 {<0.5}	<2 {<0.49}	
Chlorobenzene	ug/kg	--	--	2,000,000	--	--	<1 {<0.52}	<1 {<0.52}	<0.99 {<0.52}	<1 {<0.52}	<0.98 {<0.51}	
Chloroethane	ug/kg	--	--	--	--	--	<2 {<1.5}	<2 {<1.5}	<2 {<1.5}	<2 {<1.5}	<2 {<1.5}	

**INTERIM SOURCE REMOVAL ACTION (ISRA) - OUTFALL 009**

**WASTE CHARACTERIZATION SAMPLE RESULTS – AP/STP-1C-1 (East)  
THE BOEING COMPANY  
SANTA SUSANA FIELD LABORATORY**

							Object Name:	APWC0016	APWC0017	APWC0018	APWC0019	APWC0020
							Sample Name:	APWC0016S001	APWC0017S001	APWC0018S001	APWC0019S001	APWC0020S001
							Collection Date:	7/29/2010	7/29/2010	7/29/2010	7/29/2010	7/29/2010
							Sample Depth (feet):	0.5 - 1.0	0.5 - 1.0	0.5 - 1.0	0.5 - 1.0	0.5 - 1.0
ANALYTE	UNITS	TTLC	WET Leachate Testing Trigger <sup>a</sup>	TCLP Leachate Testing Trigger <sup>b</sup>	STLC	TCLP	RESULT <sup>c</sup>	RESULT <sup>c</sup>	RESULT <sup>c</sup>	RESULT <sup>c</sup>	RESULT <sup>c</sup>	
Chloroform	ug/kg	--	--	120,000	--	--	<1 {<0.5}	<1 {<0.5}	<0.99 {<0.5}	<1 {<0.5}	<0.98 {<0.49}	
Chloromethane	ug/kg	--	--	--	--	--	<2 {<1}	<2 {<1}	<2 {<0.99}	<2 {<1}	<2 {<0.98}	
cis-1,2-Dichloroethene	ug/kg	--	--	--	--	--	<1 {<0.83}	<1 {<0.83}	<0.99 {<0.82}	<1 {<0.83}	<0.98 {<0.81}	
cis-1,3-Dichloropropene	ug/kg	--	--	--	--	--	<1 {<0.44}	<1 {<0.44}	<0.99 {<0.44}	<1 {<0.44}	<0.98 {<0.43}	
Dibromochloromethane	ug/kg	--	--	--	--	--	<1 {<0.7}	<1 {<0.7}	<0.99 {<0.69}	<1 {<0.7}	<0.98 {<0.68}	
Dibromomethane	ug/kg	--	--	--	--	--	<1 {<0.9}	<1 {<0.9}	<0.99 {<0.89}	<1 {<0.9}	<0.98 {<0.88}	
Dichlorodifluoromethane	ug/kg	--	--	--	--	--	<5 {<1.5}	<5 {<1.5}	<5 {<1.5}	<5 {<1.5}	<4.9 {<1.5}	
Ethylbenzene	ug/kg	--	--	--	--	--	<1 {<0.5}	<1 {<0.5}	<0.99 {<0.5}	<1 {<0.5}	<0.98 {<0.49}	
Hexachlorobutadiene	ug/kg	--	--	--	--	--	<2 {<0.8}	<2 {<0.8}	<2 {<0.79}	<2 {<0.8}	<2 {<0.78}	
Isopropylbenzene	ug/kg	--	--	--	--	--	<1 {<0.54}	<1 {<0.54}	<0.99 {<0.54}	<1 {<0.54}	<0.98 {<0.53}	
m,p-Xylenes	ug/kg	--	--	--	--	--	<2 {<0.8}	<2 {<0.8}	<2 {<0.79}	<2 {<0.8}	<2 {<0.78}	
Methylene chloride	ug/kg	--	--	--	--	--	<10 {<6.5}	<10 {<6.5}	<9.9 {<6.4}	<10 {<6.5}	<9.8 {<6.4}	
Methyl-tert-butyl Ether (MTBE)	ug/kg	--	--	--	--	--	<2 {<1}	<2 {<1}	<2 {<0.99}	<2 {<1}	<2 {<0.98}	
n-Butylbenzene	ug/kg	--	--	--	--	--	<2 {<0.72}	<2 {<0.72}	<2 {<0.71}	<2 {<0.72}	<2 {<0.7}	
n-Propylbenzene	ug/kg	--	--	--	--	--	<1 {<0.61}	<1 {<0.61}	<0.99 {<0.61}	<1 {<0.61}	<0.98 {<0.6}	
Naphthalene	ug/kg	--	--	--	--	--	<2 {<1.1}	<2 {<1.1}	<2 {<1.1}	<2 {<1.1}	<2 {<1.1}	
o-Xylene	ug/kg	--	--	--	--	--	<1 {<0.5}	<1 {<0.5}	<0.99 {<0.5}	<1 {<0.5}	<0.98 {<0.49}	
p-Isopropyltoluene	ug/kg	--	--	--	--	--	<1 {<0.72}	<1 {<0.72}	<0.99 {<0.71}	<1 {<0.72}	<0.98 {<0.7}	
sec-Butylbenzene	ug/kg	--	--	--	--	--	<2 {<0.67}	<2 {<0.67}	<2 {<0.66}	<2 {<0.67}	<2 {<0.66}	
Styrene	ug/kg	--	--	--	--	--	<1 {<0.58}	<1 {<0.58}	<0.99 {<0.58}	<1 {<0.58}	<0.98 {<0.57}	
tert-Butylbenzene	ug/kg	--	--	--	--	--	<2 {<0.62}	<2 {<0.62}	<2 {<0.62}	<2 {<0.62}	<2 {<0.61}	
Tetrachloroethene	ug/kg	--	--	14,000	--	--	<1 {<0.49}	<1 {<0.49}	<0.99 {<0.49}	<1 {<0.49}	<0.98 {<0.48}	
Toluene	ug/kg	--	--	--	--	--	<1 {<0.5}	<1 {<0.5}	<0.99 {<0.5}	<1 {<0.5}	<0.98 {<0.49}	
trans-1,2-Dichloroethene	ug/kg	--	--	--	--	--	<1 {<0.7}	<1 {<0.7}	<0.99 {<0.69}	<1 {<0.7}	<0.98 {<0.68}	
trans-1,3-Dichloropropene	ug/kg	--	--	--	--	--	<1 {<0.61}	<1 {<0.61}	<0.99 {<0.61}	<1 {<0.61}	<0.98 {<0.6}	
Trichloroethene	ug/kg	2,040,000	2,040,000	10,000	--	--	0.78 J	<1 {<0.5}	<0.99 {<0.5}	<1 {<0.5}	<0.98 {<0.49}	
Trichlorofluoromethane	ug/kg	--	--	--	--	--	<2 {<0.54}	<2 {<0.54}	<2 {<0.54}	<2 {<0.54}	<2 {<0.53}	
Vinyl acetate	ug/kg	--	--	--	--	--	<5 {<2.5}	<5 {<2.5}	<5 {<2.5}	<5 {<2.5}	<4.9 {<2.4}	
Vinyl chloride	ug/kg	--	--	4,000	--	--	<2 {<0.91}	<2 {<0.91}	<2 {<0.9}	<2 {<0.91}	<2 {<0.89}	
<b>RADIONUCLIDES</b>	--	--	--	--	--	--	R	R	R	R	R	

**INTERIM SOURCE REMOVAL ACTION (ISRA) - OUTFALL 009**

**WASTE CHARACTERIZATION SAMPLE RESULTS – AP/STP  
THE BOEING COMPANY  
SANTA SUSANA FIELD LABORATORY**

**Notes:**

--" - not analyzed / not applicable

<5 - Analyte not detected at or above the stated method detection limit (metals) or analyte not detected at or above the stated reporting limit (organics)

{<1} - Analyte not detected at or above the stated method detection limit (organics)

<sup>a</sup> - WET Leachate Testing Trigger = STLC limit \* 10

<sup>b</sup> - TCLP Leachate Testing Trigger = TCLP limit \* 20

<sup>c</sup> Waste characterization sample results not validated

B - Analyte was detected in the associated method blank

J - Estimated value. Analyte detected at a level less than the Reporting Limit (RL) and greater than or equal to the Method Detection Limit (MDL). The user of this data should be aware that this data is of limited reliability.

M1 - The MS and/or MSD were above the acceptance limits due to sample matrix interference. See Blank Spike (LCS).

µg/kg - micrograms per kilogram

mg/kg - milligrams per kilogram

mg/L - milligrams per liter

R - Radiological analysis includes gamma spectroscopy (Na-22, K-40, Mn-54, Co-60, Cs-134, Cs-137, Eu-152, Eu-154, Th-228, Th-232, U-235, U-238 and Am-241), strontium-90, and tritium. Boeing will be preparing a document that provides the radiological results and statistical analysis of these waste characterization samples.

R-3 - The RPD exceeded the acceptance limit due to sample matrix effects

## **WASTE CHARACTERIZATION: IN-SITU SOIL LOCATED AT AREA II ISRA OUTFALL 009 PLANNED EXCAVATION AP/STP-1C-1-MAIN**

### **Introduction**

This report presents supporting detailed information for the July 29, 2010 in-situ characterization sampling of prospective soil wastes from planned SSFL Area II ISRA excavations in the vicinity of the former Area II incinerator.

### **Background**

In-situ characterization was performed for soil destined to be excavated from designated locations in SSFL Area II in accordance with the ISRA Workplan. A step-by-step approach was followed to accomplish characterization of the soil prior to excavation. The first step was to review available information regarding historical area usage and existing analytical data from past soil sampling in or near planned excavation sites. The objective was to identify all substances potentially impacting the soil in each planned excavation footprint to the degree that hazardous waste regulatory thresholds would be exceeded.

The next step was to develop and implement a random sampling plan for each of the planned excavation footprints. The collected soil samples were analyzed by a state certified laboratory and the results evaluated to determine whether any of the identified substances were present at concentrations requiring further investigation. In addition, the initial random sampling results were evaluated to determine the statistical adequacy of the data provided for waste characterization based on the guidelines presented in U.S. EPA SW-846. Soil was characterized non-hazardous when analyte concentrations among the samples exhibited a reasonably small variance and there was satisfactory margin between the mean of the samples and applicable regulatory thresholds. Otherwise, additional samples would be collected and subjected to analysis, or in lieu of further testing, the soil was summarily characterized as hazardous. Statistical analyses described in SW-846 are performed as necessary to determine minimum sample point requirements and the upper confidence levels of analytical results.

AP/STP-1C-1-Main is part of a larger planned excavation footprint, AP/STP-1C-1. The footprint was subdivided into three (3) areas for sampling purposes: AP/STP-1C-1-East, AP/STP-1C-1-West, and AP/STP-1C-1-Main. This was necessary because the highly irregular shape of the original footprint suggested the possibility of a characteristically heterogeneous wastestream. To assure that randomly identified sample collection points did not cluster in any particular area to the exclusion of other areas, thereby potentially voiding the representativeness of the analytical results, the two significant protuberances from the main body of the planned excavation were addressed independently.

The review of historical information and existing analytical data relevant to planned excavation AP/STP-1C-1-Main was based partly on the Group 2 RFI results. Evaluation of these data and other sources of relevant information, including recent sampling conducted specifically for ISRA, suggested that Regulated Metals (CAM17), Volatile Organic Compounds (VOC), Polychlorinated Biphenyls (PCB), and Petroleum Hydrocarbons should be addressed in the AP/STP-1C-1-Main excavation footprint. A random sampling plan was developed for collection of ten (10) samples from the planned excavation footprint, taking into account the relatively small area to be excavated. The samples were analyzed for CAM 17 metals, VOCs, PCBs, and Petroleum Hydrocarbons. All samples were collected, contained, and handled according to field practice requirements in SW-846.

## Results

Analytical results for the planned excavation area at AP/STP-1C-1-Main are presented in Test America reports ITG2665 issued on 8/6/10 and ITG2802 issued on 8/9/10. Regulated Metals were below 10-Times their respective California Soluble Threshold Limit Concentration (STLC) threshold in seven of the samples, but in the three remaining samples, elevated concentrations of Silver were detected at 120 parts per million (ppm), 92 ppm, and 55 ppm. Leachate tests, the California Waste Extraction Test (WET) and the RCRA Toxicity Characteristic Leaching Procedure (TCLP), were performed as required on the samples with elevated Silver. The TCLP resulted in a non-detection for Silver. WET results for Silver yielded a non-detection for one of the samples and concentrations of 0.24 mg/L and 0.29 mg/L for the remaining samples with elevated total Silver concentrations. Both of the WET detections were well below the STLC hazardous waste limit of 5 mg/L.

VOCs were detected, with Trichloroethylene (TCE) observed in three samples exhibiting concentrations of 0.00054 ppm, 0.0011 ppm, and 0.0076 ppm. The TCE was not detected in any of the other samples despite the satisfactorily low analytical Method Detection Limits (range 0.00048 ppm - 0.00055 ppm), no historical records have been found suggesting any kind of solvent related activities in the area, and the very low concentration detected in the sample is consistent with soil vapor migration or volatilization of a groundwater transported contaminant from an unknown source. For these reasons, the soils excavated from AP/STP-1C-1-Main are not being characterized as "F-Listed" wastes.

Low concentrations of PCBs, in the form of Aroclor 1254, were detected in three of the samples at concentrations of 0.091 ppm, 0.092 ppm, and 0.2 ppm. These concentrations are all below the 10X STLC hazardous waste threshold of 50 ppm. Petroleum Hydrocarbons were also detected at low levels, with the concentration of C10-C40 fraction hydrocarbons ranging between 9.2 ppm and 120 ppm.

## Determination

According to analytical results and generator knowledge, the soil in the planned excavation footprint of SSFL Area II AP/STP-1C-1-Main:

- Is Not a Listed Waste (analytical results and generator knowledge)
- Is Not ignitable (generator knowledge)
- Is Not corrosive (generator knowledge)
- Is Not reactive (generator knowledge)
- Is Not toxic (analytical results and generator knowledge)
  - Is Not Extremely or Acutely Hazardous Waste
  - Does not exceed any RCRA or Title 22 characteristic thresholds
  - Is Not subject to the Prop. 65 listing if it is applied to 22 CCR 66261.24(a)(7)
  - Is Not subject to Title 22 Appendix X list
  - Is Not known by experience or testing to pose a hazard to human health or environment because of its carcinogenicity, acute toxicity, chronic toxicity, bio-accumulative properties, or persistence in the environment.

**The soil in AP/STP-1C-1-Main is NON-HAZARDOUS.**

**Outfall 009**  
**Sample Locations for AP/STP - 1C,**  
**AP/STP - 1B, and AP/STP - 1D**

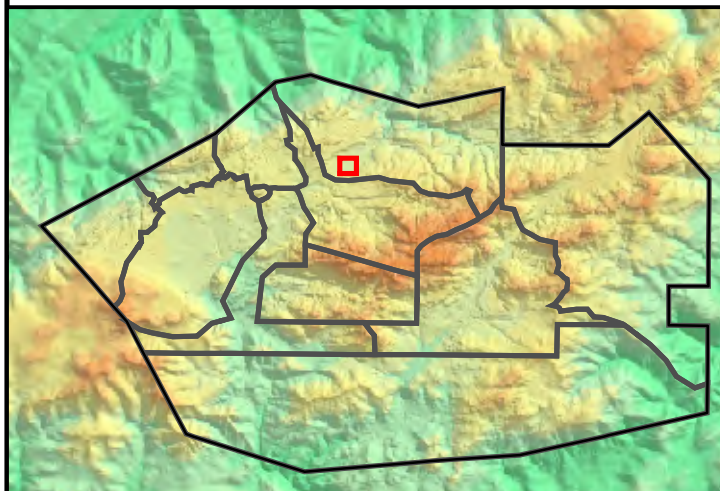
- Base Map Legend**
- Administrative Area Boundary
  - RFI Site Boundary
  - Report Group Boundary
  - NPDES Outfall
  - A/C Paving
  - Drainage
  - Non Jurisdictional Surface Water Pathway
  - Surface Water Divide
  - Elevation Contour

- Figure Legend**
- Waste Characterization Sample

Document: ISRA\_Plots\_Working\_AP-STP-1C\_SampleLocations.mxd Date: Sep 02, 2010

1 inch = 25 feet

0 25 50 Feet





**INTERIM SOURCE REMOVAL ACTION (ISRA) - OUTFALL 009**

**WASTE CHARACTERIZATION SAMPLE RESULTS – AP/STP-1C-1 (Main)  
THE BOEING COMPANY  
SANTA SUSANA FIELD LABORATORY**

							Object Name:	APWC0006	APWC0007	APWC0008	APWC0009	APWC0010	APWC0011	APWC0012
							Sample Name:	APWC0006S001	APWC0007S001	APWC0008S001	APWC0009S001	APWC0010S001	APWC0011S001	APWC0012S001
							Collection Date:	7/29/2010	7/30/2010	7/30/2010	7/30/2010	7/29/2010	7/30/2010	7/30/2010
							Sample Depth (feet):	0.5 - 1.0	0.5 - 1.0	0.0 - 0.5	0.5 - 1.0	0.5 - 1.0	0.5 - 1.0	0.5 - 1.0
ANALYTE	UNITS	TTLIC	WET Leachate Testing Trigger <sup>a</sup>	TCLP Leachate Testing Trigger <sup>b</sup>	STLC	TCLP	RESULT <sup>c</sup>	RESULT <sup>c</sup>	RESULT <sup>c</sup>	RESULT <sup>c</sup>	RESULT <sup>c</sup>	RESULT <sup>c</sup>	RESULT <sup>c</sup>	
<b>METALS</b>														
Antimony	mg/kg	500	150	--	--	--	0.92 J	<0.88	<0.87	0.95 J	1.1 J	1.1 J	1.1 J	
Arsenic	mg/kg	500	50	100	--	--	5.1	5.2	4.5	5.7	6.7	6.5	6.9	
Barium	mg/kg	10,000	1,000	2,000	--	--	180	93	110	170	680	93	850	
Beryllium	mg/kg	75	7.5	--	--	--	0.33 J	0.51	0.52	0.53	0.49	0.51	0.53	
Cadmium	mg/kg	100	10	20	--	--	<0.20	<0.20	<0.20	0.2 J	0.38 J	0.86	1.1	
Chromium	mg/kg	500	50	100	--	--	16	18	17	21	23	27	30	
Cobalt	mg/kg	8,000	800	--	--	--	3.5	4.4	4.5	5.3	5.5	4.6	4.8	
Copper	mg/kg	2,500	250	--	--	--	7	12	11	11	14	13	17	
Lead	mg/kg	1,000	50	100	--	--	9.9	22	13	12	18	22	29	
Mercury	mg/kg	20	2	4	--	--	0.019 J	0.05	0.031	0.03	0.023	0.15	0.044	
Molybdenum	mg/kg	3,500	3,500	--	--	--	0.43 J	0.87 J	0.82 J	0.91 J	0.85 J	10	1.2 J	
Nickel	mg/kg	2,000	200	--	--	--	9	12	11	13	14	12	14	
Selenium	mg/kg	100	10	20	--	--	<0.99	<1	<0.99	<0.99	<0.99	<1	<0.99	
Silver	mg/kg	500	50	100	--	--	32	4.1	4.2	22	42	35	92	
Silver, WET	mg/L	--	--	--	5	--	--	--	--	--	--	--	0.29	
Silver, TCLP	mg/L	--	--	--	--	5	--	--	--	--	--	--	--	
Thallium	mg/kg	700	70	--	--	--	<0.79	<0.8	<0.79	<0.79	<0.79	<0.8	<0.79	
Vanadium	mg/kg	2,400	240	--	--	--	22	29	30	33	32	30	36	
Zinc	mg/kg	5,000	2,500	--	--	--	91	84 B	72 B	100 B	140	89 B	190 B	
<b>PCBs</b>														
Aroclor 1016	ug/kg	50,000	50,000	--	--	--	<50 {<12}	<50 {<12}	<50 {<12}	<50 {<12}	<50 {<12}	<50 {<12}	<50 {<12}	
Aroclor 1221	ug/kg	50,000	50,000	--	--	--	<50 {<12}	<50 {<12}	<50 {<12}	<50 {<12}	<50 {<12}	<50 {<12}	<50 {<12}	
Aroclor 1232	ug/kg	50,000	50,000	--	--	--	<50 {<12}	<50 {<12}	<50 {<12}	<50 {<12}	<50 {<12}	<50 {<12}	<50 {<12}	
Aroclor 1242	ug/kg	50,000	50,000	--	--	--	<50 {<12}	<50 {<12}	<50 {<12}	<50 {<12}	<50 {<12}	<50 {<12}	<50 {<12}	
Aroclor 1248	ug/kg	50,000	50,000	--	--	--	<50 {<12}	<50 {<12}	<50 {<12}	<50 {<12}	<50 {<12}	<50 {<12}	<50 {<12}	
Aroclor 1254	ug/kg	50,000	50,000	--	--	--	<50 {<12}	91	<50 {<12}	<50 {<12}	<50 {<12}	92	<50 {<12}	
Aroclor 1260	ug/kg	50,000	50,000	--	--	--	<50 {<12}	<50 {<12}	<50 {<12}	<50 {<12}	<50 {<12}	<50 {<12}	<50 {<12}	
<b>TPH</b>														
Gasoline Range Organics (C6-C12)	mg/kg	--	--	--	--	--	<0.28 {<0.11}	<0.35 {<0.13}	<0.47 {<0.18}	<0.49 {<0.18}	<0.37 {<0.14}	<0.34 {<0.13}	<0.42 {<0.16}	
EFH (C10 - C24)	mg/kg	--	--	--	--	--	3.6 J	<5 {<3.5}	5.8	<5 {<3.5}	4.7 J	20	12	
EFH (C10 - C40)	mg/kg	--	--	--	--	--	19	29	58	16	26	120	55	
EFH (C25 - C40)	mg/kg	--	--	--	--	--	15	27	53	14	21	100	42	
<b>VOCs</b>														
1,1,1,2-Tetrachloroethane	ug/kg	--	--	--	--	--	<2 {<0.57}	<2.2 {<0.63}	<2.2 {<0.62}	<2 {<0.57}	<2 {<0.57}	<2.2 {<0.63}	<2.2 {<0.63}	
1,1,1-Trichloroethane	ug/kg	--	--	--	--	--	<0.99 {<0.7}	<1.1 {<0.77}	<1.1 {<0.77}	<1 {<0.7}	<1 {<0.7}	<1.1 {<0.77}	<1.1 {<0.77}	

**INTERIM SOURCE REMOVAL ACTION (ISRA) - OUTFALL 009**

**WASTE CHARACTERIZATION SAMPLE RESULTS – AP/STP-1C-1 (Main)  
THE BOEING COMPANY  
SANTA SUSANA FIELD LABORATORY**

ANALYTE	UNITS	TTLIC	WET Leachate Testing Trigger <sup>a</sup>	TCLP Leachate Testing Trigger <sup>b</sup>	STLC	TCLP	Object Name:	APWC0006	APWC0007	APWC0008	APWC0009	APWC0010	APWC0011	APWC0012
							Sample Name:	APWC0006S001	APWC0007S001	APWC0008S001	APWC0009S001	APWC0010S001	APWC0011S001	APWC0012S001
							Collection Date:	7/29/2010	7/30/2010	7/30/2010	7/30/2010	7/29/2010	7/30/2010	7/30/2010
							Sample Depth (feet):	0.5 - 1.0	0.5 - 1.0	0.0 - 0.5	0.5 - 1.0	0.5 - 1.0	0.5 - 1.0	0.5 - 1.0
							RESULT <sup>c</sup>	RESULT <sup>c</sup>	RESULT <sup>c</sup>	RESULT <sup>c</sup>	RESULT <sup>c</sup>	RESULT <sup>c</sup>	RESULT <sup>c</sup>	RESULT <sup>c</sup>
1,1,2,2-Tetrachloroethane	ug/kg	--	--	--	--	--	<2 {<0.85}	<2.2 {<0.95}	<2.2 {<0.94}	<2 {<0.86}	<2 {<0.86}	<2.2 {<0.95}	<2.2 {<0.95}	
1,1,2-Trichloroethane	ug/kg	--	--	--	--	--	<0.99 {<0.86}	<1.1 {<0.96}	<1.1 {<0.95}	<1 {<0.87}	<1 {<0.87}	<1.1 {<0.96}	<1.1 {<0.96}	
1,1-Dichloroethane	ug/kg	--	--	--	--	--	<0.99 {<0.5}	<1.1 {<0.55}	<1.1 {<0.55}	<1 {<0.5}	<1 {<0.5}	<1.1 {<0.55}	<1.1 {<0.55}	
1,1-Dichloroethene	ug/kg	--	--	14,000	--	--	<2 {<0.6}	<2.2 {<0.66}	<2.2 {<0.66}	<2 {<0.6}	<2 {<0.6}	<2.2 {<0.66}	<2.2 {<0.66}	
1,1-Dichloropropene	ug/kg	--	--	--	--	--	<0.99 {<0.4}	<1.1 {<0.44}	<1.1 {<0.44}	<1 {<0.4}	<1 {<0.4}	<1.1 {<0.44}	<1.1 {<0.44}	
1,2,3-Trichlorobenzene	ug/kg	--	--	--	--	--	<2 {<0.99}	<2.2 {<1.1}	<2.2 {<1.1}	<2 {<1}	<2 {<1}	<2.2 {<1.1}	<2.2 {<1.1}	
1,2,3-Trichloropropane	ug/kg	--	--	--	--	--	<2 {<0.99}	<2.2 {<1.1}	<2.2 {<1.1}	<2 {<1}	<2 {<1}	<2.2 {<1.1}	<2.2 {<1.1}	
1,2,4-Trichlorobenzene	ug/kg	--	--	--	--	--	<2 {<0.99}	<2.2 {<1.1}	<2.2 {<1.1}	<2 {<1}	<2 {<1}	<2.2 {<1.1}	<2.2 {<1.1}	
1,2,4-Trimethylbenzene	ug/kg	--	--	--	--	--	<0.99 {<0.78}	<1.1 {<0.86}	<1.1 {<0.86}	<1 {<0.78}	<1 {<0.78}	<1.1 {<0.86}	<1.1 {<0.86}	
1,2-Dibromo-3-chloropropane	ug/kg	--	--	--	--	--	<9.9 {<1.5}	<11 {<1.7}	<11 {<1.6}	<10 {<1.5}	<10 {<1.5}	<11 {<1.6}	<11 {<1.7}	
1,2-Dibromoethane (EDB)	ug/kg	--	--	--	--	--	<0.99 {<0.8}	<1.1 {<0.88}	<1.1 {<0.88}	<1 {<0.8}	<1 {<0.8}	<1.1 {<0.88}	<1.1 {<0.88}	
1,2-Dichlorobenzene	ug/kg	--	--	--	--	--	<0.99 {<0.94}	<1.1 {<1.1}	<1.1 {<1}	<1 {<0.95}	<1 {<0.95}	<1.1 {<1}	<1.1 {<1}	
1,2-Dichloroethane	ug/kg	--	--	10,000	--	--	<0.99 {<0.8}	<1.1 {<0.88}	<1.1 {<0.88}	<1 {<0.8}	<1 {<0.8}	<1.1 {<0.88}	<1.1 {<0.88}	
1,2-Dichloropropane	ug/kg	--	--	--	--	--	<0.99 {<0.8}	<1.1 {<0.88}	<1.1 {<0.88}	<1 {<0.8}	<1 {<0.8}	<1.1 {<0.88}	<1.1 {<0.88}	
1,3,5-Trimethylbenzene	ug/kg	--	--	--	--	--	<0.99 {<0.63}	<1.1 {<0.7}	<1.1 {<0.69}	<1 {<0.63}	<1 {<0.63}	<1.1 {<0.69}	<1.1 {<0.69}	
1,3-Dichlorobenzene	ug/kg	--	--	--	--	--	<0.99 {<0.83}	<1.1 {<0.93}	<1.1 {<0.92}	<1 {<0.84}	<1 {<0.84}	<1.1 {<0.92}	<1.1 {<0.93}	
1,3-Dichloropropane	ug/kg	--	--	--	--	--	<0.99 {<0.63}	<1.1 {<0.7}	<1.1 {<0.69}	<1 {<0.63}	<1 {<0.63}	<1.1 {<0.69}	<1.1 {<0.69}	
1,4-Dichlorobenzene	ug/kg	--	--	--	--	--	<0.99 {<0.93}	<1.1 {<1}	<1.1 {<1}	<1 {<0.94}	<1 {<0.94}	<1.1 {<1}	<1.1 {<1}	
2,2-Dichloropropane	ug/kg	--	--	--	--	--	<0.99 {<0.6}	<1.1 {<0.66}	<1.1 {<0.66}	<1 {<0.6}	<1 {<0.6}	<1.1 {<0.66}	<1.1 {<0.66}	
2-Butanone (MEK)	ug/kg	--	--	4,000,000	--	--	<9.9 {<6}	<11 {<6.6}	<11 {<6.6}	<10 {<6}	<10 {<6}	<11 {<6.6}	<11 {<6.6}	
2-Chlorotoluene	ug/kg	--	--	--	--	--	<2 {<0.86}	<2.2 {<0.96}	<2.2 {<0.95}	<2 {<0.87}	<2 {<0.87}	<2.2 {<0.96}	<2.2 {<0.96}	
2-Hexanone	ug/kg	--	--	--	--	--	<9.9 {<9}	<11 {<10}	<11 {<10}	<10 {<9.1}	<10 {<9.1}	<11 {<10}	<11 {<10}	
4-Chlorotoluene	ug/kg	--	--	--	--	--	<2 {<0.74}	<2.2 {<0.82}	<2.2 {<0.81}	<2 {<0.74}	<2 {<0.74}	<2.2 {<0.81}	<2.2 {<0.81}	
4-Methyl-2-pentanone (MIBK)	ug/kg	--	--	--	--	--	<5 {<4.5}	<5.5 {<5}	<5.5 {<4.9}	<5 {<4.5}	<5 {<4.5}	<5.5 {<4.9}	<5.5 {<5}	
Acetone	ug/kg	--	--	--	--	--	<9.9 {<8}	<11 {<8.8}	<11 {<8.8}	<10 {<8}	<10 {<8}	<11 {<8.8}	<11 {<8.8}	
Benzene	ug/kg	--	--	10,000	--	--	<0.99 {<0.5}	<1.1 {<0.55}	<1.1 {<0.55}	<1 {<0.5}	<1 {<0.5}	<1.1 {<0.55}	<1.1 {<0.55}	
Bromobenzene	ug/kg	--	--	--	--	--	<2 {<0.83}	<2.2 {<0.93}	<2.2 {<0.92}	<2 {<0.84}	<2 {<0.84}	<2.2 {<0.92}	<2.2 {<0.93}	
Bromochloromethane	ug/kg	--	--	--	--	--	<2 {<0.89}	<2.2 {<1}	<2.2 {<0.99}	<2 {<0.9}	<2 {<0.9}	<2.2 {<0.99}	<2.2 {<0.99}	
Bromodichloromethane	ug/kg	--	--	--	--	--	<0.99 {<0.5}	<1.1 {<0.55}	<1.1 {<0.55}	<1 {<0.5}	<1 {<0.5}	<1.1 {<0.55}	<1.1 {<0.55}	
Bromoform	ug/kg	--	--	--	--	--	<2 {<0.8}	<2.2 {<0.88}	<2.2 {<0.88}	<2 {<0.8}	<2 {<0.8}	<2.2 {<0.88}	<2.2 {<0.88}	
Bromomethane	ug/kg	--	--	--	--	--	<2 {<0.91}	<2.2 {<1}	<2.2 {<1}	<2 {<0.92}	<2 {<0.92}	<2.2 {<1}	<2.2 {<1}	
Carbon Disulfide	ug/kg	--	--	--	--	--	<5 {<0.96}	<5.5 {<1.1}	<5.5 {<1.1}	<5 {<0.97}	<5 {<0.97}	<5.5 {<1.1}	<5.5 {<1.1}	
Carbon tetrachloride	ug/kg	--	--	10,000	--	--	<2 {<0.5}	<2.2 {<0.55}	<2.2 {<0.55}	<2 {<0.5}	<2 {<0.5}	<2.2 {<0.55}	<2.2 {<0.55}	
Chlorobenzene	ug/kg	--	--	2,000,000	--	--	<0.99 {<0.52}	<1.1 {<0.58}	<1.1 {<0.57}	<1 {<0.52}	<1 {<0.52}	<1.1 {<0.57}	<1.1 {<0.57}	
Chloroethane	ug/kg	--	--	--	--	--	<2 {<1.5}	<2.2 {<1.7}	<2.2 {<1.6}	<2 {<1.5}	<2 {<1.5}	<2.2 {<1.6}	<2.2 {<1.7}	
Chloroform	ug/kg	--	--	120,000	--	--	<0.99 {<0.5}	<1.1 {<0.55}	<1.1 {<0.55}	<1 {<0.5}	<1 {<0.5}	<1.1 {<0.55}	<1.1 {<0.55}	

**INTERIM SOURCE REMOVAL ACTION (ISRA) - OUTFALL 009**

**WASTE CHARACTERIZATION SAMPLE RESULTS – AP/STP-1C-1 (Main)  
THE BOEING COMPANY  
SANTA SUSANA FIELD LABORATORY**

							Object Name:	APWC0006	APWC0007	APWC0008	APWC0009	APWC0010	APWC0011	APWC0012
							Sample Name:	APWC0006S001	APWC0007S001	APWC0008S001	APWC0009S001	APWC0010S001	APWC0011S001	APWC0012S001
							Collection Date:	7/29/2010	7/30/2010	7/30/2010	7/30/2010	7/29/2010	7/30/2010	7/30/2010
							Sample Depth (feet):	0.5 - 1.0	0.5 - 1.0	0.0 - 0.5	0.5 - 1.0	0.5 - 1.0	0.5 - 1.0	0.5 - 1.0
ANALYTE	UNITS	TTLIC	WET Leachate Testing Trigger <sup>a</sup>	TCLP Leachate Testing Trigger <sup>b</sup>	STLC	TCLP	RESULT <sup>c</sup>	RESULT <sup>c</sup>	RESULT <sup>c</sup>	RESULT <sup>c</sup>	RESULT <sup>c</sup>	RESULT <sup>c</sup>	RESULT <sup>c</sup>	
Chloromethane	ug/kg	--	--	--	--	--	<2 {<0.99}	<2.2 {<1.1}	<2.2 {<1.1}	<2 {<1}	<2 {<1}	<2.2 {<1.1}	<2.2 {<1.1}	
cis-1,2-Dichloroethene	ug/kg	--	--	--	--	--	<0.99 {<0.83}	<1.1 {<0.92}	<1.1 {<0.91}	<1 {<0.83}	<1 {<0.83}	<1.1 {<0.91}	<1.1 {<0.91}	
cis-1,3-Dichloropropene	ug/kg	--	--	--	--	--	<0.99 {<0.44}	<1.1 {<0.49}	<1.1 {<0.48}	<1 {<0.44}	<1 {<0.44}	<1.1 {<0.48}	<1.1 {<0.48}	
Dibromochloromethane	ug/kg	--	--	--	--	--	<0.99 {<0.7}	<1.1 {<0.77}	<1.1 {<0.77}	<1 {<0.7}	<1 {<0.7}	<1.1 {<0.77}	<1.1 {<0.77}	
Dibromomethane	ug/kg	--	--	--	--	--	<0.99 {<0.89}	<1.1 {<1}	<1.1 {<0.99}	<1 {<0.9}	<1 {<0.9}	<1.1 {<0.99}	<1.1 {<0.99}	
Dichlorodifluoromethane	ug/kg	--	--	--	--	--	<5 {<1.5}	<5.5 {<1.7}	<5.5 {<1.6}	<5 {<1.5}	<5 {<1.5}	<5.5 {<1.6}	<5.5 {<1.7}	
Ethylbenzene	ug/kg	--	--	--	--	--	<0.99 {<0.5}	<1.1 {<0.55}	<1.1 {<0.55}	<1 {<0.5}	<1 {<0.5}	<1.1 {<0.55}	<1.1 {<0.55}	
Hexachlorobutadiene	ug/kg	--	--	--	--	--	<2 {<0.8}	<2.2 {<0.88}	<2.2 {<0.88}	<2 {<0.8}	<2 {<0.8}	<2.2 {<0.88}	<2.2 {<0.88}	
Isopropylbenzene	ug/kg	--	--	--	--	--	<0.99 {<0.54}	<1.1 {<0.6}	<1.1 {<0.59}	<1 {<0.54}	<1 {<0.54}	<1.1 {<0.59}	<1.1 {<0.59}	
m,p-Xylenes	ug/kg	--	--	--	--	--	<2 {<0.8}	<2.2 {<0.88}	<2.2 {<0.88}	<2 {<0.8}	<2 {<0.8}	<2.2 {<0.88}	<2.2 {<0.88}	
Methylene chloride	ug/kg	--	--	--	--	--	<9.9 {<6.5}	<11 {<7.2}	<11 {<7.1}	<10 {<6.5}	<10 {<6.5}	<11 {<7.1}	<11 {<7.2}	
Methyl-tert-butyl Ether (MTBE)	ug/kg	--	--	--	--	--	<2 {<0.99}	<2.2 {<1.1}	<2.2 {<1.1}	<2 {<1}	<2 {<1}	<2.2 {<1.1}	<2.2 {<1.1}	
n-Butylbenzene	ug/kg	--	--	--	--	--	<2 {<0.72}	<2.2 {<0.8}	<2.2 {<0.79}	<2 {<0.72}	<2 {<0.72}	<2.2 {<0.79}	<2.2 {<0.79}	
n-Propylbenzene	ug/kg	--	--	--	--	--	<0.99 {<0.61}	<1.1 {<0.67}	<1.1 {<0.67}	<1 {<0.61}	<1 {<0.61}	<1.1 {<0.67}	<1.1 {<0.67}	
Naphthalene	ug/kg	--	--	--	--	--	<2 {<1.1}	<2.2 {<1.2}	<2.2 {<1.2}	<2 {<1.1}	<2 {<1.1}	<2.2 {<1.2}	<2.2 {<1.2}	
o-Xylene	ug/kg	--	--	--	--	--	<0.99 {<0.5}	<1.1 {<0.55}	<1.1 {<0.55}	<1 {<0.5}	<1 {<0.5}	<1.1 {<0.55}	<1.1 {<0.55}	
p-Isopropyltoluene	ug/kg	--	--	--	--	--	<0.99 {<0.72}	<1.1 {<0.8}	<1.1 {<0.79}	<1 {<0.72}	<1 {<0.72}	<1.1 {<0.79}	<1.1 {<0.79}	
sec-Butylbenzene	ug/kg	--	--	--	--	--	<2 {<0.67}	<2.2 {<0.74}	<2.2 {<0.73}	<2 {<0.67}	<2 {<0.67}	<2.2 {<0.74}	<2.2 {<0.74}	
Styrene	ug/kg	--	--	--	--	--	<0.99 {<0.58}	<1.1 {<0.64}	<1.1 {<0.64}	<1 {<0.58}	<1 {<0.58}	<1.1 {<0.64}	<1.1 {<0.64}	
tert-Butylbenzene	ug/kg	--	--	--	--	--	<2 {<0.62}	<2.2 {<0.69}	<2.2 {<0.68}	<2 {<0.62}	<2 {<0.62}	<2.2 {<0.68}	<2.2 {<0.68}	
Tetrachloroethene	ug/kg	--	--	14,000	--	--	<0.99 {<0.49}	<1.1 {<0.54}	<1.1 {<0.54}	<1 {<0.49}	<1 {<0.49}	<1.1 {<0.54}	<1.1 {<0.54}	
Toluene	ug/kg	--	--	--	--	--	<0.99 {<0.5}	<1.1 {<0.55}	<1.1 {<0.55}	<1 {<0.5}	<1 {<0.5}	<1.1 {<0.55}	<1.1 {<0.55}	
trans-1,2-Dichloroethene	ug/kg	--	--	--	--	--	<0.99 {<0.7}	<1.1 {<0.77}	<1.1 {<0.77}	<1 {<0.7}	<1 {<0.7}	<1.1 {<0.77}	<1.1 {<0.77}	
trans-1,3-Dichloropropene	ug/kg	--	--	--	--	--	<0.99 {<0.61}	<1.1 {<0.67}	<1.1 {<0.67}	<1 {<0.61}	<1 {<0.61}	<1.1 {<0.67}	<1.1 {<0.67}	
Trichloroethene	ug/kg	2,040,000	2,040,000	10,000	--	--	<0.99 {<0.5}	<1.1 {<0.55}	<1.1 {<0.55}	1.1	0.54 J	<1.1 {<0.55}	7.6	
Trichlorofluoromethane	ug/kg	--	--	--	--	--	<2 {<0.54}	<2.2 {<0.6}	<2.2 {<0.59}	<2 {<0.54}	<2 {<0.54}	<2.2 {<0.59}	<2.2 {<0.59}	
Vinyl acetate	ug/kg	--	--	--	--	--	<5 {<2.5}	<5.5 {<2.8}	<5.5 {<2.7}	<5 {<2.5}	<5 {<2.5}	<5.5 {<2.7}	<5.5 {<2.8}	
Vinyl chloride	ug/kg	--	--	4,000	--	--	<2 {<0.9}	<2.2 {<1}	<2.2 {<1}	<2 {<0.91}	<2 {<0.91}	<2.2 {<1}	<2.2 {<1}	
<b>RADIONUCLIDES</b>	--	--	--	--	--	--	R	R	R	R	R	R	R	

**INTERIM SOURCE REMOVAL ACTION (ISRA) - OUTFALL 009**

**WASTE CHARACTERIZATION SAMPLE RESULTS – AP/STP-1C-1 (Main)  
THE BOEING COMPANY  
SANTA SUSANA FIELD LABORATORY**

							Object Name:	APWC0013	APWC0014	APWC0015
							Sample Name:	APWC0013S001	APWC0014S001	APWC0015S001
							Collection Date:	7/29/2010	7/30/2010	7/30/2010
							Sample Depth (feet):	0.5 - 1.0	0.5 - 1.0	0.5 - 1.0
ANALYTE	UNITS	TCLC	WET Leachate Testing Trigger <sup>a</sup>	TCLP Leachate Testing Trigger <sup>b</sup>	STLC	TCLP	RESULT <sup>c</sup>	RESULT <sup>c</sup>	RESULT <sup>c</sup>	
<b>METALS</b>										
Antimony	mg/kg	500	150	--	--	--	0.88 J	<0.88	<0.87	
Arsenic	mg/kg	500	50	100	--	--	6.6	5.2	4.9	
Barium	mg/kg	10,000	1,000	2,000	--	--	110	120	380	
Beryllium	mg/kg	75	7.5	--	--	--	0.51	0.56	0.43 J	
Cadmium	mg/kg	100	10	20	--	--	1.6	<0.2	0.23 J	
Chromium	mg/kg	500	50	100	--	--	48	22	29	
Cobalt	mg/kg	8,000	800	--	--	--	5.2	4.7	4.2	
Copper	mg/kg	2,500	250	--	--	--	16	9.1	11	
Lead	mg/kg	1,000	50	100	--	--	20	7.8	15	
Mercury	mg/kg	20	2	4	--	--	0.21	0.027	0.029	
Molybdenum	mg/kg	3,500	3,500	--	--	--	0.96 J	0.81 J	0.83 J	
Nickel	mg/kg	2,000	200	--	--	--	14	12	12	
Selenium	mg/kg	100	10	20	--	--	<0.99	<1	<0.99	
Silver	mg/kg	500	50	100	--	--	120	4.2	55	
Silver, WET	mg/L	--	--	--	5	--	<0.12	--	0.24	
Silver, TCLP	mg/L	--	--	--	--	5	<0.06	--	--	
Thallium	mg/kg	700	70	--	--	--	<0.79	<0.8	<0.79	
Vanadium	mg/kg	2,400	240	--	--	--	33	32	29	
Zinc	mg/kg	5,000	2,500	--	--	--	130	55 B	100 B	
<b>PCBs</b>										
Aroclor 1016	ug/kg	50,000	50,000	--	--	--	<50 {<12}	<50 {<12}	<50 {<12}	
Aroclor 1221	ug/kg	50,000	50,000	--	--	--	<50 {<12}	<50 {<12}	<50 {<12}	
Aroclor 1232	ug/kg	50,000	50,000	--	--	--	<50 {<12}	<50 {<12}	<50 {<12}	
Aroclor 1242	ug/kg	50,000	50,000	--	--	--	<50 {<12}	<50 {<12}	<50 {<12}	
Aroclor 1248	ug/kg	50,000	50,000	--	--	--	<50 {<12}	<50 {<12}	<50 {<12}	
Aroclor 1254	ug/kg	50,000	50,000	--	--	--	200	<50 {<12}	<50 {<12}	
Aroclor 1260	ug/kg	50,000	50,000	--	--	--	<50 {<12}	<50 {<12}	<50 {<12}	
<b>TPH</b>										
Gasoline Range Organics (C6-C12)	mg/kg	--	--	--	--	--	<0.25 {<0.095}	<0.39 {<0.15}	<0.33 {<0.12}	
EFH (C10 - C24)	mg/kg	--	--	--	--	--	13	<5 {<3.5}	4.9 J	
EFH (C10 - C40)	mg/kg	--	--	--	--	--	100	9.2	27	
EFH (C25 - C40)	mg/kg	--	--	--	--	--	91	7.8	22	
<b>VOCs</b>										
1,1,1,2-Tetrachloroethane	ug/kg	--	--	--	--	--	<1.9 {<0.55}	<2.2 {<0.63}	<2.2 {<0.63}	
1,1,1-Trichloroethane	ug/kg	--	--	--	--	--	<0.97 {<0.68}	<1.1 {<0.78}	<1.1 {<0.77}	

**INTERIM SOURCE REMOVAL ACTION (ISRA) - OUTFALL 009**

**WASTE CHARACTERIZATION SAMPLE RESULTS – AP/STP-1C-1 (Main)  
THE BOEING COMPANY  
SANTA SUSANA FIELD LABORATORY**

							Object Name:	APWC0013	APWC0014	APWC0015
							Sample Name:	APWC0013S001	APWC0014S001	APWC0015S001
							Collection Date:	7/29/2010	7/30/2010	7/30/2010
							Sample Depth (feet):	0.5 - 1.0	0.5 - 1.0	0.5 - 1.0
ANALYTE	UNITS	TCLC	WET Leachate Testing Trigger <sup>a</sup>	TCLP Leachate Testing Trigger <sup>b</sup>	STLC	TCLP	RESULT <sup>c</sup>	RESULT <sup>c</sup>	RESULT <sup>c</sup>	
1,1,2,2-Tetrachloroethane	ug/kg	--	--	--	--	--	<1.9 {<0.83}	<2.2 {<0.95}	<2.2 {<0.95}	
1,1,2-Trichloroethane	ug/kg	--	--	--	--	--	<0.97 {<0.84}	<1.1 {<0.96}	<1.1 {<0.96}	
1,1-Dichloroethane	ug/kg	--	--	--	--	--	<0.97 {<0.48}	<1.1 {<0.55}	<1.1 {<0.55}	
1,1-Dichloroethene	ug/kg	--	--	14,000	--	--	<1.9 {<0.58}	<2.2 {<0.67}	<2.2 {<0.66}	
1,1-Dichloropropene	ug/kg	--	--	--	--	--	<0.97 {<0.39}	<1.1 {<0.44}	<1.1 {<0.44}	
1,2,3-Trichlorobenzene	ug/kg	--	--	--	--	--	<1.9 {<0.97}	<2.2 {<1.1}	<2.2 {<1.1}	
1,2,3-Trichloropropane	ug/kg	--	--	--	--	--	<1.9 {<0.97}	<2.2 {<1.1}	<2.2 {<1.1}	
1,2,4-Trichlorobenzene	ug/kg	--	--	--	--	--	<1.9 {<0.97}	<2.2 {<1.1}	<2.2 {<1.1}	
1,2,4-Trimethylbenzene	ug/kg	--	--	--	--	--	<0.97 {<0.75}	<1.1 {<0.86}	<1.1 {<0.86}	
1,2-Dibromo-3-chloropropane	ug/kg	--	--	--	--	--	<9.7 {<1.5}	<11 {<1.7}	<11 {<1.7}	
1,2-Dibromoethane (EDB)	ug/kg	--	--	--	--	--	<0.97 {<0.77}	<1.1 {<0.89}	<1.1 {<0.88}	
1,2-Dichlorobenzene	ug/kg	--	--	--	--	--	<0.97 {<0.92}	<1.1 {<1.1}	<1.1 {<1.1}	
1,2-Dichloroethane	ug/kg	--	--	10,000	--	--	<0.97 {<0.77}	<1.1 {<0.89}	<1.1 {<0.88}	
1,2-Dichloropropane	ug/kg	--	--	--	--	--	<0.97 {<0.77}	<1.1 {<0.89}	<1.1 {<0.88}	
1,3,5-Trimethylbenzene	ug/kg	--	--	--	--	--	<0.97 {<0.61}	<1.1 {<0.7}	<1.1 {<0.7}	
1,3-Dichlorobenzene	ug/kg	--	--	--	--	--	<0.97 {<0.81}	<1.1 {<0.93}	<1.1 {<0.93}	
1,3-Dichloropropane	ug/kg	--	--	--	--	--	<0.97 {<0.61}	<1.1 {<0.7}	<1.1 {<0.7}	
1,4-Dichlorobenzene	ug/kg	--	--	--	--	--	<0.97 {<0.91}	<1.1 {<1}	<1.1 {<1}	
2,2-Dichloropropane	ug/kg	--	--	--	--	--	<0.97 {<0.58}	<1.1 {<0.67}	<1.1 {<0.66}	
2-Butanone (MEK)	ug/kg	--	--	4,000,000	--	--	<9.7 {<5.8}	<11 {<6.7}	<11 {<6.6}	
2-Chlorotoluene	ug/kg	--	--	--	--	--	<1.9 {<0.84}	<2.2 {<0.96}	<2.2 {<0.96}	
2-Hexanone	ug/kg	--	--	--	--	--	<9.7 {<8.8}	<11 {<10}	<11 {<10}	
4-Chlorotoluene	ug/kg	--	--	--	--	--	<1.9 {<0.72}	<2.2 {<0.82}	<2.2 {<0.82}	
4-Methyl-2-pentanone (MIBK)	ug/kg	--	--	--	--	--	<4.8 {<4.4}	<5.5 {<5}	<5.5 {<5}	
Acetone	ug/kg	--	--	--	--	--	<9.7 {<7.7}	<11 {<8.9}	<11 {<8.8}	
Benzene	ug/kg	--	--	10,000	--	--	<0.97 {<0.48}	<1.1 {<0.55}	<1.1 {<0.55}	
Bromobenzene	ug/kg	--	--	--	--	--	<1.9 {<0.81}	<2.2 {<0.93}	<2.2 {<0.93}	
Bromochloromethane	ug/kg	--	--	--	--	--	<1.9 {<0.87}	<2.2 {<1}	<2.2 {<1}	
Bromodichloromethane	ug/kg	--	--	--	--	--	<0.97 {<0.48}	<1.1 {<0.55}	<1.1 {<0.55}	
Bromoform	ug/kg	--	--	--	--	--	<1.9 {<0.77}	<2.2 {<0.89}	<2.2 {<0.88}	
Bromomethane	ug/kg	--	--	--	--	--	<1.9 {<0.89}	<2.2 {<1}	<2.2 {<1}	
Carbon Disulfide	ug/kg	--	--	--	--	--	<4.8 {<0.94}	<5.5 {<1.1}	<5.5 {<1.1}	
Carbon tetrachloride	ug/kg	--	--	10,000	--	--	<1.9 {<0.48}	<2.2 {<0.55}	<2.2 {<0.55}	
Chlorobenzene	ug/kg	--	--	2,000,000	--	--	<0.97 {<0.5}	<1.1 {<0.58}	<1.1 {<0.58}	
Chloroethane	ug/kg	--	--	--	--	--	<1.9 {<1.5}	<2.2 {<1.7}	<2.2 {<1.7}	
Chloroform	ug/kg	--	--	120,000	--	--	<0.97 {<0.48}	<1.1 {<0.55}	<1.1 {<0.55}	

**INTERIM SOURCE REMOVAL ACTION (ISRA) - OUTFALL 009**

**WASTE CHARACTERIZATION SAMPLE RESULTS – AP/STP-1C-1 (Main)  
THE BOEING COMPANY  
SANTA SUSANA FIELD LABORATORY**

							Object Name:	APWC0013	APWC0014	APWC0015
							Sample Name:	APWC0013S001	APWC0014S001	APWC0015S001
							Collection Date:	7/29/2010	7/30/2010	7/30/2010
							Sample Depth (feet):	0.5 - 1.0	0.5 - 1.0	0.5 - 1.0
ANALYTE	UNITS	TCLC	WET Leachate Testing Trigger <sup>a</sup>	TCLP Leachate Testing Trigger <sup>b</sup>	STLC	TCLP	RESULT <sup>c</sup>	RESULT <sup>c</sup>	RESULT <sup>c</sup>	
Chloromethane	ug/kg	--	--	--	--	--	<1.9 {<0.97}	<2.2 {<1.1}	<2.2 {<1.1}	
cis-1,2-Dichloroethene	ug/kg	--	--	--	--	--	<0.97 {<0.8}	<1.1 {<0.92}	<1.1 {<0.92}	
cis-1,3-Dichloropropene	ug/kg	--	--	--	--	--	<0.97 {<0.43}	<1.1 {<0.49}	<1.1 {<0.49}	
Dibromochloromethane	ug/kg	--	--	--	--	--	<0.97 {<0.68}	<1.1 {<0.78}	<1.1 {<0.77}	
Dibromomethane	ug/kg	--	--	--	--	--	<0.97 {<0.87}	<1.1 {<1}	<1.1 {<1}	
Dichlorodifluoromethane	ug/kg	--	--	--	--	--	<4.8 {<1.5}	<5.5 {<1.7}	<5.5 {<1.7}	
Ethylbenzene	ug/kg	--	--	--	--	--	<0.97 {<0.48}	<1.1 {<0.55}	<1.1 {<0.55}	
Hexachlorobutadiene	ug/kg	--	--	--	--	--	<1.9 {<0.77}	<2.2 {<0.89}	<2.2 {<0.88}	
Isopropylbenzene	ug/kg	--	--	--	--	--	<0.97 {<0.52}	<1.1 {<0.6}	<1.1 {<0.6}	
m,p-Xylenes	ug/kg	--	--	--	--	--	<1.9 {<0.77}	<2.2 {<0.89}	<2.2 {<0.88}	
Methylene chloride	ug/kg	--	--	--	--	--	<9.7 {<6.3}	<11 {<7.2}	<11 {<7.2}	
Methyl-tert-butyl Ether (MTBE)	ug/kg	--	--	--	--	--	<1.9 {<0.97}	<2.2 {<1.1}	<2.2 {<1.1}	
n-Butylbenzene	ug/kg	--	--	--	--	--	<1.9 {<0.7}	<2.2 {<0.8}	<2.2 {<0.8}	
n-Propylbenzene	ug/kg	--	--	--	--	--	<0.97 {<0.59}	<1.1 {<0.68}	<1.1 {<0.67}	
Naphthalene	ug/kg	--	--	--	--	--	<1.9 {<1.1}	<2.2 {<1.2}	<2.2 {<1.2}	
o-Xylene	ug/kg	--	--	--	--	--	<0.97 {<0.48}	<1.1 {<0.55}	<1.1 {<0.55}	
p-Isopropyltoluene	ug/kg	--	--	--	--	--	<0.97 {<0.7}	<1.1 {<0.8}	<1.1 {<0.8}	
sec-Butylbenzene	ug/kg	--	--	--	--	--	<1.9 {<0.65}	<2.2 {<0.74}	<2.2 {<0.74}	
Styrene	ug/kg	--	--	--	--	--	<0.97 {<0.56}	<1.1 {<0.64}	<1.1 {<0.64}	
tert-Butylbenzene	ug/kg	--	--	--	--	--	<1.9 {<0.6}	<2.2 {<0.69}	<2.2 {<0.69}	
Tetrachloroethene	ug/kg	--	--	14,000	--	--	<0.97 {<0.47}	<1.1 {<0.54}	<1.1 {<0.54}	
Toluene	ug/kg	--	--	--	--	--	<0.97 {<0.48}	<1.1 {<0.55}	<1.1 {<0.55}	
trans-1,2-Dichloroethene	ug/kg	--	--	--	--	--	<0.97 {<0.68}	<1.1 {<0.78}	<1.1 {<0.77}	
trans-1,3-Dichloropropene	ug/kg	--	--	--	--	--	<0.97 {<0.59}	<1.1 {<0.68}	<1.1 {<0.67}	
Trichloroethene	ug/kg	2,040,000	2,040,000	10,000	--	--	<0.97 {<0.48}	<1.1 {<0.55}	<1.1 {<0.55}	
Trichlorofluoromethane	ug/kg	--	--	--	--	--	<1.9 {<0.52}	<2.2 {<0.6}	<2.2 {<0.6}	
Vinyl acetate	ug/kg	--	--	--	--	--	<4.8 {<2.4}	<5.5 {<2.8}	<5.5 {<2.8}	
Vinyl chloride	ug/kg	--	--	4,000	--	--	<1.9 {<0.88}	<2.2 {<1}	<2.2 {<1}	
<b>RADIONUCLIDES</b>	--	--	--	--	--	--	R	R	R	

**INTERIM SOURCE REMOVAL ACTION (ISRA) - OUTFALL 009**

**WASTE CHARACTERIZATION SAMPLE RESULTS – AP/STP  
THE BOEING COMPANY  
SANTA SUSANA FIELD LABORATORY**

**Notes:**

--" - not analyzed / not applicable

<5 - Analyte not detected at or above the stated method detection limit (metals) or analyte not detected at or above the stated reporting limit (organics)

{<1} - Analyte not detected at or above the stated method detection limit (organics)

<sup>a</sup> - WET Leachate Testing Trigger = STLC limit \* 10

<sup>b</sup> - TCLP Leachate Testing Trigger = TCLP limit \* 20

<sup>c</sup> Waste characterization sample results not validated

B - Analyte was detected in the associated method blank

J - Estimated value. Analyte detected at a level less than the Reporting Limit (RL) and greater than or equal to the Method Detection Limit (MDL). The user of this data should be aware that this data is of limited reliability.

M1 - The MS and/or MSD were above the acceptance limits due to sample matrix interference. See Blank Spike (LCS).

µg/kg - micrograms per kilogram

mg/kg - milligrams per kilogram

mg/L - milligrams per liter

R - Radiological analysis includes gamma spectroscopy (Na-22, K-40, Mn-54, Co-60, Cs-134, Cs-137, Eu-152, Eu-154, Th-228, Th-232, U-235, U-238 and Am-241), strontium-90, and tritium. Boeing will be preparing a document that provides the radiological results and statistical analysis of these waste characterization samples.

R-3 - The RPD exceeded the acceptance limit due to sample matrix effects

## **WASTE CHARACTERIZATION: IN-SITU SOIL LOCATED AT AREA II ISRA OUTFALL 009 PLANNED EXCAVATION AP/STP-1C-1-WEST**

### **Introduction**

This report presents supporting detailed information for the July 29, 2010 in-situ characterization sampling of prospective soil wastes from planned SSFL Area II ISRA excavations in the vicinity of the former Area II incinerator.

### **Background**

In-situ characterization was performed for soil destined to be excavated from designated locations in SSFL Area II in accordance with the ISRA Workplan. A step-by-step approach was followed to accomplish characterization of the soil prior to excavation. The first step was to review available information regarding historical area usage and existing analytical data from past soil sampling in or near planned excavation sites. The objective was to identify all substances potentially impacting the soil in each planned excavation footprint to the degree that hazardous waste regulatory thresholds would be exceeded.

The next step was to develop and implement a random sampling plan for each of the planned excavation footprints. The collected soil samples were analyzed by a state certified laboratory and the results evaluated to determine whether any of the identified substances were present at concentrations requiring further investigation. In addition, the initial random sampling results were evaluated to determine the statistical adequacy of the data provided for waste characterization based on the guidelines presented in U.S. EPA SW-846. Soil was characterized non-hazardous when analyte concentrations among the samples exhibited a reasonably small variance and there was satisfactory margin between the mean of the samples and applicable regulatory thresholds. Otherwise, additional samples would be collected and subjected to analysis, or in lieu of further testing, the soil was summarily characterized as hazardous. Statistical analyses described in SW-846 are performed as necessary to determine minimum sample point requirements and the upper confidence levels of analytical results.

AP/STP-1C-1-West is part of a larger planned excavation footprint, AP/STP-1C-1. The footprint was subdivided into three (3) areas for sampling purposes: AP/STP-1C-1-East, AP/STP-1C-1-West, and AP/STP-1C-1-Main. This was necessary because the highly irregular shape of the original footprint suggested the possibility of a characteristically heterogeneous wastestream. To assure that randomly identified sample collection points did not cluster in any particular area to the exclusion of other areas, thereby potentially voiding the representativeness of the analytical results, the two significant protuberances from the main body of the planned excavation were addressed independently.

The review of historical information and existing analytical data relevant to planned excavation AP/STP-1C-1-West was based partly on the Group 2 RFI results. Evaluation of these data and other sources of relevant information, including recent sampling conducted specifically for ISRA, suggested that Regulated Metals (CAM17), Volatile Organic Compounds (VOC), Polychlorinated Biphenyls (PCB), and Petroleum Hydrocarbons should be addressed in the AP/STP-1C-1-West excavation footprint. A random sampling plan was developed for collection of five (5) samples from the planned excavation footprint, taking into account the relatively small area to be excavated. The samples were analyzed for CAM 17 metals, VOCs, PCBs, and Petroleum Hydrocarbons. All samples were collected, contained, and handled according to field practice requirements in SW-846.



## Results

Analytical results for the planned excavation area at AP/STP-1C-1-West are presented in Test America report ITG2802 issued on 8/9/10. Regulated Metals were below 10-Times their respective California Soluble Threshold Limit Concentration (STLC) threshold in two of the samples, but in the three remaining samples, elevated concentrations of Silver were detected at 110 parts per million (ppm), 69 ppm, and 66 ppm. Also, in the same three samples, Chromium was detected above its 10X STLC threshold at 93 ppm, 55 ppm, and 50 ppm. Leachate tests, the California Waste Extraction Test (WET) and the RCRA Toxicity Characteristic Leaching Procedure (TCLP), were performed as required on the samples with elevated Silver and Chromium. The one required TCLP resulted in a non-detection for Silver. The required WET results for Silver yielded concentrations of 0.42 mg/L, 0.55 mg/L, and 2.3 mg/L, all of which are below the STLC hazardous waste limit of 5 mg/L. Similar leachate test results were obtained for the samples with elevated Chromium concentrations, although only the WET was required. Chromium in the WET leachate was detected at 1.5 mg/L, 1.5 mg/L, and 3.2 mg/L. These concentrations are below the STLC limit for Chromium, which is 5 mg/L.

With two exceptions, both from the same sample, no VOCs were detected. In one case, p-Isopropyltoluene was detected at a concentration of 0.00079 ppm, which is insignificant with respect to hazardous waste regulations. Acetone was also detected, exhibiting a concentration of 0.0089 ppm. This result was "J-flagged," meaning the concentration was so close to the detection capability of the laboratory test that the reported concentration was estimated and not reliably measured. The Acetone was not detected in any of the other samples despite the satisfactorily low analytical Method Detection Limits (range 0.0078 ppm - 0.0088 ppm), no historical records have been found suggesting any kind of solvent related activities in the area, and the very low concentration detected in the sample is consistent with soil vapor migration or volatilization of a groundwater transported contaminant from an unknown source. Furthermore, Acetone is potentially a laboratory artifact, unrelated to the soil from which samples were collected, especially at the very low concentrations that were detected. For these reasons, the soils excavated from AP/STP-1C-1-West are not being characterized as "F-Listed" wastes.

Four of the samples exhibited low concentrations of PCBs in the form of Aroclor 1254. The detections were 0.040 ppm, 0.082 ppm, 0.110 ppm, and 0.150 ppm. All of these detected concentrations are well below the 50 ppm 10X STLC threshold. Very low Petroleum Hydrocarbon detections were observed. The Petroleum Hydrocarbon concentrations for the C10-C40 fraction ranged between 6.2 ppm and 68 ppm.

## Determination

According to analytical results and generator knowledge, the soil in the planned excavation footprint of SSFL Area II AP/STP-1C-1-West:










- Is Not a Listed Waste (analytical results and generator knowledge)
- Is Not ignitable (generator knowledge)
- Is Not corrosive (generator knowledge)
- Is Not reactive (generator knowledge)
- Is Not toxic (analytical results and generator knowledge)
  - Is Not Extremely or Acutely Hazardous Waste
  - Does not exceed any RCRA or Title 22 characteristic thresholds
  - Is Not subject to the Prop. 65 listing if it is applied to 22 CCR 66261.24(a)(7)
  - Is Not subject to Title 22 Appendix X list
  - Is Not known by experience or testing to pose a hazard to human health or environment

because of its carcinogenicity, acute toxicity, chronic toxicity, bio-accumulative properties, or persistence in the environment.


**The soil in AP/STP-1C-1-West is NON-HAZARDOUS.**

**Outfall 009**  
**Sample Locations for AP/STP - 1C,**  
**AP/STP - 1B, and AP/STP - 1D**

**Base Map Legend**

-  Administrative Area Boundary
-  RFI Site Boundary
-  Report Group Boundary
-  NPDES Outfall
-  A/C Paving
-  Drainage
-  Non Jurisdictional Surface Water Pathway
-  Surface Water Divide
-  Elevation Contour

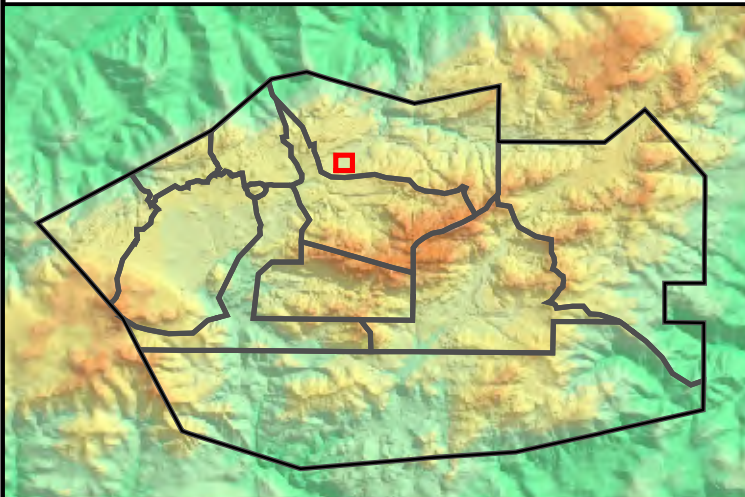
**Figure Legend**

-  Waste Characterization Sample



Document: ISRA\_Plots\_Working\_AP-STP-1C\_SampleLocations.mxd Date: Sep 02, 2010

1 inch = 25 feet  
 0 25 50 Feet



**INTERIM SOURCE REMOVAL ACTION (ISRA) - OUTFALL 009**

**WASTE CHARACTERIZATION SAMPLE RESULTS – AP/STP-1C-1 (West)  
THE BOEING COMPANY  
SANTA SUSANA FIELD LABORATORY**

							Object Name:	APWC0001	APWC0002	APWC0003	APWC0004	APWC0005
							Sample Name:	APWC0001S001	APWC0002S001	APWC0003S001	APWC0004S001	APWC0005S001
							Collection Date:	7/30/2010	7/30/2010	7/30/2010	7/30/2010	7/30/2010
							Sample Depth (feet):	0.5 - 1.0	0.0 - 0.5	0.5 - 1.0	0.5 - 1.0	0.5 - 1.0
ANALYTE	UNITS	TTLIC	WET Leachate Testing Trigger <sup>a</sup>	TCLP Leachate Testing Trigger <sup>b</sup>	STLC	TCLP	RESULT <sup>c</sup>	RESULT <sup>c</sup>	RESULT <sup>c</sup>	RESULT <sup>c</sup>	RESULT <sup>c</sup>	
<b>METALS</b>												
Antimony	mg/kg	500	150	--	--	--	<0.88	<0.87	0.88 J	<0.88	<0.87	
Arsenic	mg/kg	500	50	100	--	--	4.5	4.6	5.2	4.2	4.7	
Barium	mg/kg	10,000	1,000	2,000	--	--	93	86	89	96	87	
Beryllium	mg/kg	75	7.5	--	--	--	0.56	0.59	0.63	0.52	0.6	
Cadmium	mg/kg	100	10	20	--	--	1.4	0.21 J	1.9	3.8	<0.20	
Chromium	mg/kg	500	50	100	--	--	50	26	55	93	20	
Chromium, WET	mg/L	--	--	--	5	--	1.5	--	1.5	3.2	--	
Cobalt	mg/kg	8,000	800	--	--	--	4.5	4.7	5.1	4.5	4.9	
Copper	mg/kg	2,500	250	--	--	--	14	9.5	39	22	9.6	
Lead	mg/kg	1,000	50	100	--	--	13	7.7	16	16	6.4	
Mercury	mg/kg	20	2	4	--	--	0.25	0.019 J	1.4	0.62	<0.012	
Molybdenum	mg/kg	3,500	3,500	--	--	--	1.1 J	0.88 J	1.3 J	1.2 J	0.67 J	
Nickel	mg/kg	2,000	200	--	--	--	15	12	16	15	12	
Selenium	mg/kg	100	10	20	--	--	1.1 J	<0.99	1.4 J	<1	1.1 J	
Silver	mg/kg	500	50	100	--	--	69	33	110	66	1.8	
Silver, WET	mg/L	--	--	--	5	--	0.55	--	0.42	2.3	--	
Silver, TCLP	mg/L	--	--	--	--	5	--	--	<0.060	--	--	
Thallium	mg/kg	700	70	--	--	--	<0.8	<0.79	<0.79	<0.8	<0.79	
Vanadium	mg/kg	2,400	240	--	--	--	31	34	33	28	32	
Zinc	mg/kg	5,000	2,500	--	--	--	72 B	57 B	110 B	110 B	46 B	
<b>PCBs</b>												
Aroclor 1016	ug/kg	50,000	50,000	--	--	--	<50 {<12}	<50 {<12}	<50 {<12}	<50 {<12}	<50 {<12}	
Aroclor 1221	ug/kg	50,000	50,000	--	--	--	<50 {<12}	<50 {<12}	<50 {<12}	<50 {<12}	<50 {<12}	
Aroclor 1232	ug/kg	50,000	50,000	--	--	--	<50 {<12}	<50 {<12}	<50 {<12}	<50 {<12}	<50 {<12}	
Aroclor 1242	ug/kg	50,000	50,000	--	--	--	<50 {<12}	<50 {<12}	<50 {<12}	<50 {<12}	<50 {<12}	
Aroclor 1248	ug/kg	50,000	50,000	--	--	--	<50 {<12}	<50 {<12}	<50 {<12}	<50 {<12}	<50 {<12}	
Aroclor 1254	ug/kg	50,000	50,000	--	--	--	110	40 J	82	150	<50 {<12}	
Aroclor 1260	ug/kg	50,000	50,000	--	--	--	<50 {<12}	<50 {<12}	<50 {<12}	<50 {<12}	<50 {<12}	
<b>TPH</b>												
Gasoline Range Organics (C6-C12)	mg/kg	--	--	--	--	--	<0.37 {<0.14}	0.12 J	<0.42 {<0.16}	<0.31 {<0.12}	<0.34 {<0.13}	
EFH (C10 - C24)	mg/kg	--	--	--	--	--	5	4.5 J	10	17	<5 {<3.5}	
EFH (C10 - C40)	mg/kg	--	--	--	--	--	29	21	47	68	6.2	
EFH (C25 - C40)	mg/kg	--	--	--	--	--	24	16	37	51	5.4	
<b>VOCs</b>												
1,1,1,2-Tetrachloroethane	ug/kg	--	--	--	--	--	<2.2 {<0.63}	<2.2 {<0.62}	<2.2 {<0.63}	<2 {<0.57}	<2 {<0.56}	

**INTERIM SOURCE REMOVAL ACTION (ISRA) - OUTFALL 009**

**WASTE CHARACTERIZATION SAMPLE RESULTS – AP/STP-1C-1 (West)  
THE BOEING COMPANY  
SANTA SUSANA FIELD LABORATORY**

							Object Name:	APWC0001	APWC0002	APWC0003	APWC0004	APWC0005
							Sample Name:	APWC0001S001	APWC0002S001	APWC0003S001	APWC0004S001	APWC0005S001
							Collection Date:	7/30/2010	7/30/2010	7/30/2010	7/30/2010	7/30/2010
							Sample Depth (feet):	0.5 - 1.0	0.0 - 0.5	0.5 - 1.0	0.5 - 1.0	0.5 - 1.0
ANALYTE	UNITS	TTLIC	WET Leachate Testing Trigger <sup>a</sup>	TCLP Leachate Testing Trigger <sup>b</sup>	STLC	TCLP	RESULT <sup>c</sup>	RESULT <sup>c</sup>	RESULT <sup>c</sup>	RESULT <sup>c</sup>	RESULT <sup>c</sup>	
1,1,1-Trichloroethane	ug/kg	--	--	--	--	--	<1.1 {<0.77}	<1.1 {<0.77}	<1.1 {<0.77}	<0.99 {<0.69}	<0.98 {<0.68}	
1,1,2,2-Tetrachloroethane	ug/kg	--	--	--	--	--	<2.2 {<0.95}	<2.2 {<0.94}	<2.2 {<0.95}	<2 {<0.85}	<2 {<0.84}	
1,1,2-Trichloroethane	ug/kg	--	--	--	--	--	<1.1 {<0.96}	<1.1 {<0.95}	<1.1 {<0.96}	<0.99 {<0.86}	<0.98 {<0.85}	
1,1-Dichloroethane	ug/kg	--	--	--	--	--	<1.1 {<0.55}	<1.1 {<0.55}	<1.1 {<0.55}	<0.99 {<0.5}	<0.98 {<0.49}	
1,1-Dichloroethene	ug/kg	--	--	14,000	--	--	<2.2 {<0.66}	<2.2 {<0.66}	<2.2 {<0.66}	<2 {<0.6}	<2 {<0.59}	
1,1-Dichloropropene	ug/kg	--	--	--	--	--	<1.1 {<0.44}	<1.1 {<0.44}	<1.1 {<0.44}	<0.99 {<0.4}	<0.98 {<0.39}	
1,2,3-Trichlorobenzene	ug/kg	--	--	--	--	--	<2.2 {<1.1}	<2.2 {<1.1}	<2.2 {<1.1}	<2 {<0.99}	<2 {<0.98}	
1,2,3-Trichloropropane	ug/kg	--	--	--	--	--	<2.2 {<1.1}	<2.2 {<1.1}	<2.2 {<1.1}	<2 {<0.99}	<2 {<0.98}	
1,2,4-Trichlorobenzene	ug/kg	--	--	--	--	--	<2.2 {<1.1}	<2.2 {<1.1}	<2.2 {<1.1}	<2 {<0.99}	<2 {<0.98}	
1,2,4-Trimethylbenzene	ug/kg	--	--	--	--	--	<1.1 {<0.86}	<1.1 {<0.86}	<1.1 {<0.86}	<0.99 {<0.77}	<0.98 {<0.76}	
1,2-Dibromo-3-chloropropane	ug/kg	--	--	--	--	--	<11 {<1.7}	<11 {<1.6}	<11 {<1.7}	<9.9 {<1.5}	<9.8 {<1.5}	
1,2-Dibromoethane (EDB)	ug/kg	--	--	--	--	--	<1.1 {<0.88}	<1.1 {<0.88}	<1.1 {<0.88}	<0.99 {<0.79}	<0.98 {<0.78}	
1,2-Dichlorobenzene	ug/kg	--	--	--	--	--	<1.1 {<1}	<1.1 {<1}	<1.1 {<1}	<0.99 {<0.94}	<0.98 {<0.93}	
1,2-Dichloroethane	ug/kg	--	--	10,000	--	--	<1.1 {<0.88}	<1.1 {<0.88}	<1.1 {<0.88}	<0.99 {<0.79}	<0.98 {<0.78}	
1,2-Dichloropropane	ug/kg	--	--	--	--	--	<1.1 {<0.88}	<1.1 {<0.88}	<1.1 {<0.88}	<0.99 {<0.79}	<0.98 {<0.78}	
1,3,5-Trimethylbenzene	ug/kg	--	--	--	--	--	<1.1 {<0.69}	<1.1 {<0.69}	<1.1 {<0.7}	<0.99 {<0.62}	<0.98 {<0.62}	
1,3-Dichlorobenzene	ug/kg	--	--	--	--	--	<1.1 {<0.93}	<1.1 {<0.92}	<1.1 {<0.93}	<0.99 {<0.83}	<0.98 {<0.82}	
1,3-Dichloropropane	ug/kg	--	--	--	--	--	<1.1 {<0.69}	<1.1 {<0.69}	<1.1 {<0.7}	<0.99 {<0.62}	<0.98 {<0.62}	
1,4-Dichlorobenzene	ug/kg	--	--	--	--	--	<1.1 {<1}	<1.1 {<1}	<1.1 {<1}	<0.99 {<0.93}	<0.98 {<0.92}	
2,2-Dichloropropane	ug/kg	--	--	--	--	--	<1.1 {<0.66}	<1.1 {<0.66}	<1.1 {<0.66}	<0.99 {<0.6}	<0.98 {<0.59}	
2-Butanone (MEK)	ug/kg	--	--	4,000,000	--	--	<11 {<6.6}	<11 {<6.6}	<11 {<6.6}	<9.9 {<6}	<9.8 {<5.9}	
2-Chlorotoluene	ug/kg	--	--	--	--	--	<2.2 {<0.96}	<2.2 {<0.95}	<2.2 {<0.96}	<2 {<0.86}	<2 {<0.85}	
2-Hexanone	ug/kg	--	--	--	--	--	<11 {<10}	<11 {<10}	<11 {<10}	<9.9 {<9}	<9.8 {<8.9}	
4-Chlorotoluene	ug/kg	--	--	--	--	--	<2.2 {<0.81}	<2.2 {<0.81}	<2.2 {<0.82}	<2 {<0.73}	<2 {<0.72}	
4-Methyl-2-pentanone (MIBK)	ug/kg	--	--	--	--	--	<5.5 {<5}	<5.5 {<4.9}	<5.5 {<5}	<5 {<4.5}	<4.9 {<4.4}	
Acetone	ug/kg	--	--	--	--	--	<11 {<8.8}	8.9 J	<11 {<8.8}	<9.9 {<7.9}	<9.8 {<7.8}	
Benzene	ug/kg	--	--	10,000	--	--	<1.1 {<0.55}	<1.1 {<0.55}	<1.1 {<0.55}	<0.99 {<0.5}	<0.98 {<0.49}	
Bromobenzene	ug/kg	--	--	--	--	--	<2.2 {<0.93}	<2.2 {<0.92}	<2.2 {<0.93}	<2 {<0.83}	<2 {<0.82}	
Bromochloromethane	ug/kg	--	--	--	--	--	<2.2 {<0.99}	<2.2 {<0.99}	<2.2 {<0.99}	<2 {<0.89}	<2 {<0.88}	
Bromodichloromethane	ug/kg	--	--	--	--	--	<1.1 {<0.55}	<1.1 {<0.55}	<1.1 {<0.55}	<0.99 {<0.5}	<0.98 {<0.49}	
Bromoform	ug/kg	--	--	--	--	--	<2.2 {<0.88}	<2.2 {<0.88}	<2.2 {<0.88}	<2 {<0.79}	<2 {<0.78}	
Bromomethane	ug/kg	--	--	--	--	--	<2.2 {<1}	<2.2 {<1}	<2.2 {<1}	<2 {<0.91}	<2 {<0.9}	
Carbon Disulfide	ug/kg	--	--	--	--	--	<5.5 {<1.1}	<5.5 {<1.1}	<5.5 {<1.1}	<5 {<0.96}	<4.9 {<0.95}	
Carbon tetrachloride	ug/kg	--	--	10,000	--	--	<2.2 {<0.55}	<2.2 {<0.55}	<2.2 {<0.55}	<2 {<0.5}	<2 {<0.49}	
Chlorobenzene	ug/kg	--	--	2,000,000	--	--	<1.1 {<0.57}	<1.1 {<0.57}	<1.1 {<0.57}	<0.99 {<0.52}	<0.98 {<0.51}	
Chloroethane	ug/kg	--	--	--	--	--	<2.2 {<1.7}	<2.2 {<1.6}	<2.2 {<1.7}	<2 {<1.5}	<2 {<1.5}	

INTERIM SOURCE REMOVAL ACTION (ISRA) - OUTFALL 009

WASTE CHARACTERIZATION SAMPLE RESULTS – AP/STP-1C-1 (West)  
 THE BOEING COMPANY  
 SANTA SUSANA FIELD LABORATORY

							Object Name:	APWC0001	APWC0002	APWC0003	APWC0004	APWC0005
							Sample Name:	APWC0001S001	APWC0002S001	APWC0003S001	APWC0004S001	APWC0005S001
							Collection Date:	7/30/2010	7/30/2010	7/30/2010	7/30/2010	7/30/2010
							Sample Depth (feet):	0.5 - 1.0	0.0 - 0.5	0.5 - 1.0	0.5 - 1.0	0.5 - 1.0
ANALYTE	UNITS	TTLIC	WET Leachate Testing Trigger <sup>a</sup>	TCLP Leachate Testing Trigger <sup>b</sup>	STLC	TCLP	RESULT <sup>c</sup>	RESULT <sup>c</sup>	RESULT <sup>c</sup>	RESULT <sup>c</sup>	RESULT <sup>c</sup>	
Chloroform	ug/kg	--	--	120,000	--	--	<1.1 {<0.55}	<1.1 {<0.55}	<1.1 {<0.55}	<0.99 {<0.5}	<0.98 {<0.49}	
Chloromethane	ug/kg	--	--	--	--	--	<2.2 {<1.1}	<2.2 {<1.1}	<2.2 {<1.1}	<2 {<0.99}	<2 {<0.98}	
cis-1,2-Dichloroethene	ug/kg	--	--	--	--	--	<1.1 {<0.91}	<1.1 {<0.91}	<1.1 {<0.92}	<0.99 {<0.82}	<0.98 {<0.81}	
cis-1,3-Dichloropropene	ug/kg	--	--	--	--	--	<1.1 {<0.48}	<1.1 {<0.48}	<1.1 {<0.49}	<0.99 {<0.44}	<0.98 {<0.43}	
Dibromochloromethane	ug/kg	--	--	--	--	--	<1.1 {<0.77}	<1.1 {<0.77}	<1.1 {<0.77}	<0.99 {<0.69}	<0.98 {<0.68}	
Dibromomethane	ug/kg	--	--	--	--	--	<1.1 {<0.99}	<1.1 {<0.99}	<1.1 {<0.99}	<0.99 {<0.89}	<0.98 {<0.88}	
Dichlorodifluoromethane	ug/kg	--	--	--	--	--	<5.5 {<1.7}	<5.5 {<1.6}	<5.5 {<1.7}	<5 {<1.5}	<4.9 {<1.5}	
Ethylbenzene	ug/kg	--	--	--	--	--	<1.1 {<0.55}	<1.1 {<0.55}	<1.1 {<0.55}	<0.99 {<0.5}	<0.98 {<0.49}	
Hexachlorobutadiene	ug/kg	--	--	--	--	--	<2.2 {<0.88}	<2.2 {<0.88}	<2.2 {<0.88}	<2 {<0.79}	<2 {<0.78}	
Isopropylbenzene	ug/kg	--	--	--	--	--	<1.1 {<0.59}	<1.1 {<0.59}	<1.1 {<0.6}	<0.99 {<0.54}	<0.98 {<0.53}	
m,p-Xylenes	ug/kg	--	--	--	--	--	<2.2 {<0.88}	<2.2 {<0.88}	<2.2 {<0.88}	<2 {<0.79}	<2 {<0.78}	
Methylene chloride	ug/kg	--	--	--	--	--	<11 {<7.2}	<11 {<7.1}	<11 {<7.2}	<9.9 {<6.4}	<9.8 {<6.4}	
Methyl-tert-butyl Ether (MTBE)	ug/kg	--	--	--	--	--	<2.2 {<1.1}	<2.2 {<1.1}	<2.2 {<1.1}	<2 {<0.99}	<2 {<0.98}	
n-Butylbenzene	ug/kg	--	--	--	--	--	<2.2 {<0.79}	<2.2 {<0.79}	<2.2 {<0.79}	<2 {<0.71}	<2 {<0.7}	
n-Propylbenzene	ug/kg	--	--	--	--	--	<1.1 {<0.67}	<1.1 {<0.67}	<1.1 {<0.67}	<0.99 {<0.61}	<0.98 {<0.6}	
Naphthalene	ug/kg	--	--	--	--	--	<2.2 {<1.2}	<2.2 {<1.2}	<2.2 {<1.2}	<2 {<1.1}	<2 {<1.1}	
o-Xylene	ug/kg	--	--	--	--	--	<1.1 {<0.55}	<1.1 {<0.55}	<1.1 {<0.55}	<0.99 {<0.5}	<0.98 {<0.49}	
p-Isopropyltoluene	ug/kg	--	--	--	--	--	<1.1 {<0.79}	0.79 J	<1.1 {<0.79}	<0.99 {<0.71}	<0.98 {<0.7}	
sec-Butylbenzene	ug/kg	--	--	--	--	--	<2.2 {<0.74}	<2.2 {<0.73}	<2.2 {<0.74}	<2 {<0.66}	<2 {<0.66}	
Styrene	ug/kg	--	--	--	--	--	<1.1 {<0.64}	<1.1 {<0.64}	<1.1 {<0.64}	<0.99 {<0.58}	<0.98 {<0.57}	
tert-Butylbenzene	ug/kg	--	--	--	--	--	<2.2 {<0.68}	<2.2 {<0.68}	<2.2 {<0.68}	<2 {<0.62}	<2 {<0.61}	
Tetrachloroethene	ug/kg	--	--	14,000	--	--	<1.1 {<0.54}	<1.1 {<0.54}	<1.1 {<0.54}	<0.99 {<0.49}	<0.98 {<0.48}	
Toluene	ug/kg	--	--	--	--	--	<1.1 {<0.55}	<1.1 {<0.55}	<1.1 {<0.55}	<0.99 {<0.5}	<0.98 {<0.49}	
trans-1,2-Dichloroethene	ug/kg	--	--	--	--	--	<1.1 {<0.77}	<1.1 {<0.77}	<1.1 {<0.77}	<0.99 {<0.69}	<0.98 {<0.68}	
trans-1,3-Dichloropropene	ug/kg	--	--	--	--	--	<1.1 {<0.67}	<1.1 {<0.67}	<1.1 {<0.67}	<0.99 {<0.61}	<0.98 {<0.6}	
Trichloroethene	ug/kg	2,040,000	2,040,000	10,000	--	--	<1.1 {<0.55}	<1.1 {<0.55}	<1.1 {<0.55}	<0.99 {<0.5}	<0.98 {<0.49}	
Trichlorofluoromethane	ug/kg	--	--	--	--	--	<2.2 {<0.59}	<2.2 {<0.59}	<2.2 {<0.6}	<2 {<0.54}	<2 {<0.53}	
Vinyl acetate	ug/kg	--	--	--	--	--	<5.5 {<2.8}	<5.5 {<2.7}	<5.5 {<2.8}	<5 {<2.5}	<4.9 {<2.4}	
Vinyl chloride	ug/kg	--	--	4,000	--	--	<2.2 {<1}	<2.2 {<1}	<2.2 {<1}	<2 {<0.9}	<2 {<0.89}	
<b>RADIONUCLIDES</b>	--	--	--	--	--	--	R	R	R	R	R	

**INTERIM SOURCE REMOVAL ACTION (ISRA) - OUTFALL 009**

**WASTE CHARACTERIZATION SAMPLE RESULTS – AP/STP  
THE BOEING COMPANY  
SANTA SUSANA FIELD LABORATORY**

**Notes:**

--" - not analyzed / not applicable

<5 - Analyte not detected at or above the stated method detection limit (metals) or analyte not detected at or above the stated reporting limit (organics)

{<1} - Analyte not detected at or above the stated method detection limit (organics)

<sup>a</sup> - WET Leachate Testing Trigger = STLC limit \* 10

<sup>b</sup> - TCLP Leachate Testing Trigger = TCLP limit \* 20

<sup>c</sup> Waste characterization sample results not validated

B - Analyte was detected in the associated method blank

J - Estimated value. Analyte detected at a level less than the Reporting Limit (RL) and greater than or equal to the Method Detection Limit (MDL). The user of this data should be aware that this data is of limited reliability.

M1 - The MS and/or MSD were above the acceptance limits due to sample matrix interference. See Blank Spike (LCS).

µg/kg - micrograms per kilogram

mg/kg - milligrams per kilogram

mg/L - milligrams per liter

R - Radiological analysis includes gamma spectroscopy (Na-22, K-40, Mn-54, Co-60, Cs-134, Cs-137, Eu-152, Eu-154, Th-228, Th-232, U-235, U-238 and Am-241), strontium-90, and tritium. Boeing will be preparing a document that provides the radiological results and statistical analysis of these waste characterization samples.

R-3 - The RPD exceeded the acceptance limit due to sample matrix effects

## **WASTE CHARACTERIZATION: IN-SITU SOIL LOCATED AT AREA II ISRA OUTFALL 009 PLANNED EXCAVATION AP/STP-1C-2-East**

### **Introduction**

This report presents supporting detailed information for the July 29, 2010 in-situ characterization sampling of prospective soil wastes from planned SSFL Area II ISRA excavations in the vicinity of the former Area II incinerator.

### **Background**

In-situ characterization was performed for soil destined to be excavated from designated locations in SSFL Area II in accordance with the ISRA Workplan. A step-by-step approach was followed to accomplish characterization of the soil prior to excavation. The first step was to review available information regarding historical area usage and existing analytical data from past soil sampling in or near planned excavation sites. The objective was to identify all substances potentially impacting the soil in each planned excavation footprint to the degree that hazardous waste regulatory thresholds would be exceeded.

The next step was to develop and implement a random sampling plan for each of the planned excavation footprints. The collected soil samples were analyzed by a state certified laboratory and the results evaluated to determine whether any of the identified substances were present at concentrations requiring further investigation. In addition, the initial random sampling results were evaluated to determine the statistical adequacy of the data provided for waste characterization based on the guidelines presented in U.S. EPA SW-846. Soil was characterized non-hazardous when analyte concentrations among the samples exhibited a reasonably small variance and there was satisfactory margin between the mean of the samples and applicable regulatory thresholds. Otherwise, additional samples would be collected and subjected to analysis, or in lieu of further testing, the soil was summarily characterized as hazardous. Statistical analyses described in SW-846 are performed as necessary to determine minimum sample point requirements and the upper confidence levels of analytical results.

AP/STP-1C-2-East is part of a larger planned excavation footprint, AP/STP-1C-2. The footprint was subdivided into three (3) areas for sampling purposes: AP/STP-1C-2-East, AP/STP-1C-2-West, and AP/STP-1C-2-Main. In part, this was necessary because the irregular shape of the original footprint suggested the possibility of a characteristically heterogeneous wastestream. To address this potential issue, the significant protuberance on the east side of the main body of the planned excavation was identified as a separate area, with its own random sampling plan. This provided additional assurance that randomly identified sample collection points would not cluster in any particular area to the exclusion of other areas, which could void the representativeness of the collected samples. In addition to addressing sample collection point coverage, it was also necessary to accommodate potential changes in soil management strategy. Subsequent to initial waste characterization sampling, project management decided to retain the option of managing soil from a small portion on the western side of AP/STP-1C-2 separately from other soil contained in the excavation footprint. The original random samples provided data representative of the average properties of the entire AP/STP-1C-2-Main excavation footprint. However, when the west portion was separated from the main body, existing sampling data was no longer representative of the new area, identified as AP/STP-1C-2-West. To obtain the required representative waste characterization data, samples were collected from four new randomly identified collection points in the new area.

The review of historical information and existing analytical data relevant to planned excavation AP/STP-1C-2-East was based partly on the Group 2 RFI results. Evaluation of these data and



other sources of relevant information, including recent sampling conducted specifically for ISRA, suggested that Regulated Metals (CAM17), Volatile Organic Compounds (VOC), Polychlorinated Biphenyls (PCB), and Petroleum Hydrocarbons should be addressed in the AP/STP-1C-2-East excavation footprint. A random sampling plan was developed for collection of four (4) samples from the planned excavation footprint, taking into account the relatively small area to be excavated. The samples were analyzed for CAM 17 metals, VOCs, PCBs, and Petroleum Hydrocarbons. All samples were collected, contained, and handled according to field practice requirements in SW-846.

## **Results**

Analytical results for the planned excavation area at AP/STP-1C-2-East are presented in Test America reports ITG2664 issued on 8/6/10. Regulated Metals were below 10-Times their respective California Soluble Threshold Limit Concentration (STLC) threshold in all but one of the samples. In this sample an elevated concentration of lead was detected at 50 parts per million (ppm). As this equaled the 10X STLC threshold of 50 ppm, it was necessary to perform a California Waste Extraction Test (WET) to determine leaching characteristics. Lead was detected in the leachate at 0.86 milligrams per liter (mg/L), well below the STLC hazardous waste limit of 5 mg/L.

VOCs were detected, with Acetone observed in three samples exhibiting concentrations of 0.010 ppm, 0.020 ppm, and 0.022 ppm. The Acetone was not detected in any of the other samples, despite the satisfactorily low analytical Method Detection Limits (range 0.00043 ppm - 0.0091 ppm). Furthermore, no historical records have been found suggesting any kind of solvent related activities in the area with Acetone, and the very low concentrations detected in the samples are consistent with soil vapor migration, volatilization of a groundwater contaminant, or other manifestation of an unknown source. For these reasons, the soil excavated from AP/STP-1E-2 is not being characterized as "F-Listed" waste.

No PCBs were detected, but Petroleum Hydrocarbons were detected at low levels, with the concentration of C10-C40 fraction hydrocarbons ranging between 7.8 ppm and 16 ppm.

## **Determination**










According to analytical results and generator knowledge, the soil in the planned excavation footprint of SSFL Area II AP/STP-1C-2-East:

- Is Not a Listed Waste (analytical results and generator knowledge)
- Is Not ignitable (generator knowledge)
- Is Not corrosive (generator knowledge)
- Is Not reactive (generator knowledge)
- Is Not toxic (analytical results and generator knowledge)
  - Is Not Extremely or Acutely Hazardous Waste
  - Does not exceed any RCRA or Title 22 characteristic thresholds
  - Is Not subject to the Prop. 65 listing if it is applied to 22 CCR 66261.24(a)(7)
  - Is Not subject to Title 22 Appendix X list
  - Is Not known by experience or testing to pose a hazard to human health or environment because of its carcinogenicity, acute toxicity, chronic toxicity, bio-accumulative properties, or persistence in the environment.


**The soil in AP/STP-1C-2-East is NON-HAZARDOUS.**

**Outfall 009**  
**Sample Locations for AP/STP - 1C,**  
**AP/STP - 1B, and AP/STP - 1D**

**Base Map Legend**

-  Administrative Area Boundary
-  RFI Site Boundary
-  Report Group Boundary
-  NPDES Outfall
-  A/C Paving
-  Drainage
-  Non Jurisdictional Surface Water Pathway
-  Surface Water Divide
-  Elevation Contour

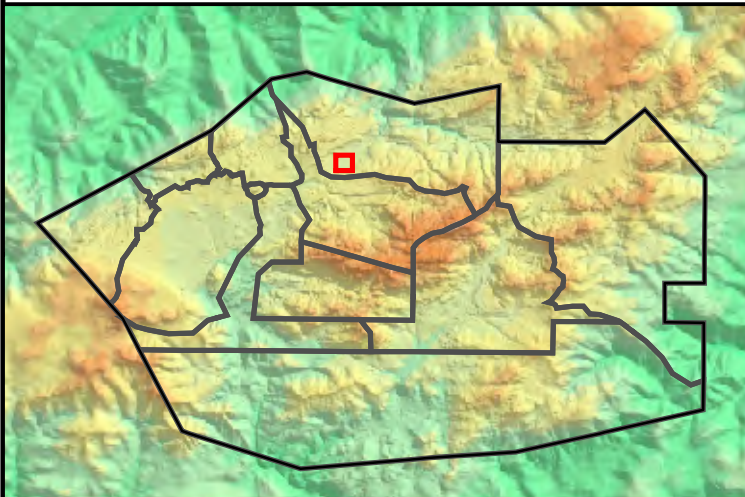
**Figure Legend**

-  Waste Characterization Sample



Document: ISRA\_Plots\_Working\_AP-STP-1C\_SampleLocations.mxd Date: Sep 02, 2010

1 inch = 25 feet  
 0 25 50 Feet



**INTERIM SOURCE REMOVAL ACTION (ISRA) - OUTFALL 009**

**WASTE CHARACTERIZATION SAMPLE RESULTS – AP/STP-1C-2 (East)  
THE BOEING COMPANY  
SANTA SUSANA FIELD LABORATORY**

			Object Name:			APWC0107	APWC0108	APWC0109	APWC0110
			Sample Name:			APWC0107S001	APWC0108S001	APWC0109S001	APWC0110S001
			Collection Date:			7/29/2010	7/29/2010	7/29/2010	7/29/2010
			Sample Depth (feet):			0.0 - 0.3	0.0 - 0.5	0.0 - 0.5	0.0 - 0.5
ANALYTE	UNITS	TTLIC	WET Leachate Testing Trigger <sup>a</sup>	TCLP Leachate Testing Trigger <sup>b</sup>	STLC	RESULT <sup>c</sup>	RESULT <sup>c</sup>	RESULT <sup>c</sup>	RESULT <sup>c</sup>
<b>METALS</b>									
Antimony	mg/kg	500	150	--	--	1 J	1.1 J	1.1 J	1.2 J
Arsenic	mg/kg	500	50	100	--	3.5	4.3	3.7	2.8
Barium	mg/kg	10,000	1,000	2,000	--	110	100	94	160
Beryllium	mg/kg	75	7.5	--	--	0.35 J	0.43 J	0.4 J	0.22 J
Cadmium	mg/kg	100	10	20	--	0.3 J	<0.20	2	1.3
Chromium	mg/kg	500	50	100	--	15	19	16	12
Cobalt	mg/kg	8,000	800	--	--	5.1	4.9	4.7	6.2
Copper	mg/kg	2,500	250	--	--	14	9.9	26	37
Lead	mg/kg	1,000	50	100	--	8.3	4.4	50	15
Lead, WET	mg/L	--	--	--	5	--	--	0.86	--
Mercury	mg/kg	20	2	4	--	<0.012	<0.012	0.012 J	0.016 J
Molybdenum	mg/kg	3,500	3,500	--	--	0.56 J	0.7 J	0.54 J	0.48 J
Nickel	mg/kg	2,000	200	--	--	10	12	11	9
Selenium	mg/kg	100	10	20	--	<0.99	<0.99	<0.99	<0.99
Silver	mg/kg	500	50	100	--	<0.79	<0.79	<0.79	2.7
Thallium	mg/kg	700	70	--	--	<0.79	<0.79	<0.79	<0.79
Vanadium	mg/kg	2,400	240	--	--	31	31	28	35
Zinc	mg/kg	5,000	2,500	--	--	85	53	660	220
<b>PCBs</b>									
Aroclor 1016	ug/kg	50,000	50,000	--	--	<50 {<12}	<50 {<12}	<50 {<12}	<50 {<12}
Aroclor 1221	ug/kg	50,000	50,000	--	--	<50 {<12}	<50 {<12}	<50 {<12}	<50 {<12}
Aroclor 1232	ug/kg	50,000	50,000	--	--	<50 {<12}	<50 {<12}	<50 {<12}	<50 {<12}
Aroclor 1242	ug/kg	50,000	50,000	--	--	<50 {<12}	<50 {<12}	<50 {<12}	<50 {<12}
Aroclor 1248	ug/kg	50,000	50,000	--	--	<50 {<12}	<50 {<12}	<50 {<12}	<50 {<12}
Aroclor 1254	ug/kg	50,000	50,000	--	--	<50 {<12}	<50 {<12}	<50 {<12}	<50 {<12}
Aroclor 1260	ug/kg	50,000	50,000	--	--	<50 {<12}	<50 {<12}	<50 {<12}	<50 {<12}
<b>TPH</b>									
Gasoline Range Organics (C6-C12)	mg/kg	--	--	--	--	<0.41 {<0.15}	<0.39 {<0.15}	<0.37 {<0.14}	<0.45 {<0.17}
EFH (C10 - C24)	mg/kg	--	--	--	--	<5 {<3.5}	<5 {<3.5}	<5 {<3.5}	4 J
EFH (C10 - C40)	mg/kg	--	--	--	--	15	7.8	9.4	16
EFH (C25 - C40)	mg/kg	--	--	--	--	13	4.7 J	7.3	12
<b>VOCs</b>									
1,1,1,2-Tetrachloroethane	ug/kg	--	--	--	--	<2 {<0.57}	<2 {<0.56}	<2 {<0.56}	<2 {<0.57}
1,1,1-Trichloroethane	ug/kg	--	--	--	--	<1 {<0.7}	<0.99 {<0.69}	<0.99 {<0.69}	<0.99 {<0.69}
1,1,2,2-Tetrachloroethane	ug/kg	--	--	--	--	<2 {<0.86}	<2 {<0.85}	<2 {<0.85}	<2 {<0.85}

**INTERIM SOURCE REMOVAL ACTION (ISRA) - OUTFALL 009**

**WASTE CHARACTERIZATION SAMPLE RESULTS – AP/STP-1C-2 (East)  
THE BOEING COMPANY  
SANTA SUSANA FIELD LABORATORY**

						Object Name:	APWC0107	APWC0108	APWC0109	APWC0110
						Sample Name:	APWC0107S001	APWC0108S001	APWC0109S001	APWC0110S001
						Collection Date:	7/29/2010	7/29/2010	7/29/2010	7/29/2010
						Sample Depth (feet):	0.0 - 0.3	0.0 - 0.5	0.0 - 0.5	0.0 - 0.5
ANALYTE	UNITS	TTLIC	WET Leachate Testing Trigger <sup>a</sup>	TCLP Leachate Testing Trigger <sup>b</sup>	STLC	RESULT <sup>c</sup>	RESULT <sup>c</sup>	RESULT <sup>c</sup>	RESULT <sup>c</sup>	
1,1,2-Trichloroethane	ug/kg	--	--	--	--	<1 {<0.87}	<0.99 {<0.86}	<0.99 {<0.86}	<0.99 {<0.86}	
1,1-Dichloroethane	ug/kg	--	--	--	--	<1 {<0.5}	<0.99 {<0.49}	<0.99 {<0.49}	<0.99 {<0.5}	
1,1-Dichloroethene	ug/kg	--	--	14,000	--	<2 {<0.6}	<2 {<0.59}	<2 {<0.59}	<2 {<0.6}	
1,1-Dichloropropene	ug/kg	--	--	--	--	<1 {<0.4}	<0.99 {<0.4}	<0.99 {<0.39}	<0.99 {<0.4}	
1,2,3-Trichlorobenzene	ug/kg	--	--	--	--	<2 {<1}	<2 {<0.99}	<2 {<0.99}	<2 {<0.99}	
1,2,3-Trichloropropane	ug/kg	--	--	--	--	<2 {<1}	<2 {<0.99}	<2 {<0.99}	<2 {<0.99}	
1,2,4-Trichlorobenzene	ug/kg	--	--	--	--	<2 {<1}	<2 {<0.99}	<2 {<0.99}	<2 {<0.99}	
1,2,4-Trimethylbenzene	ug/kg	--	--	--	--	<1 {<0.78}	<0.99 {<0.77}	<0.99 {<0.77}	<0.99 {<0.77}	
1,2-Dibromo-3-chloropropane	ug/kg	--	--	--	--	<10 {<1.5}	<9.9 {<1.5}	<9.9 {<1.5}	<9.9 {<1.5}	
1,2-Dibromoethane (EDB)	ug/kg	--	--	--	--	<1 {<0.8}	<0.99 {<0.79}	<0.99 {<0.79}	<0.99 {<0.79}	
1,2-Dichlorobenzene	ug/kg	--	--	--	--	<1 {<0.95}	<0.99 {<0.94}	<0.99 {<0.94}	<0.99 {<0.94}	
1,2-Dichloroethane	ug/kg	--	--	10,000	--	<1 {<0.8}	<0.99 {<0.79}	<0.99 {<0.79}	<0.99 {<0.79}	
1,2-Dichloropropane	ug/kg	--	--	--	--	<1 {<0.8}	<0.99 {<0.79}	<0.99 {<0.79}	<0.99 {<0.79}	
1,3,5-Trimethylbenzene	ug/kg	--	--	--	--	<1 {<0.63}	<0.99 {<0.62}	<0.99 {<0.62}	<0.99 {<0.62}	
1,3-Dichlorobenzene	ug/kg	--	--	--	--	<1 {<0.84}	<0.99 {<0.83}	<0.99 {<0.83}	<0.99 {<0.83}	
1,3-Dichloropropane	ug/kg	--	--	--	--	<1 {<0.63}	<0.99 {<0.62}	<0.99 {<0.62}	<0.99 {<0.62}	
1,4-Dichlorobenzene	ug/kg	--	--	--	--	<1 {<0.94}	<0.99 {<0.93}	<0.99 {<0.93}	<0.99 {<0.93}	
2,2-Dichloropropane	ug/kg	--	--	--	--	<1 {<0.6}	<0.99 {<0.59}	<0.99 {<0.59}	<0.99 {<0.6}	
2-Butanone (MEK)	ug/kg	--	--	4,000,000	--	<10 {<6}	<9.9 {<5.9}	<9.9 {<5.9}	<9.9 {<6}	
2-Chlorotoluene	ug/kg	--	--	--	--	<2 {<0.87}	<2 {<0.86}	<2 {<0.86}	<2 {<0.86}	
2-Hexanone	ug/kg	--	--	--	--	<10 {<9.1}	<9.9 {<9}	<9.9 {<9}	<9.9 {<9}	
4-Chlorotoluene	ug/kg	--	--	--	--	<2 {<0.74}	<2 {<0.73}	<2 {<0.73}	<2 {<0.73}	
4-Methyl-2-pentanone (MIBK)	ug/kg	--	--	--	--	<5 {<4.5}	<4.9 {<4.4}	<4.9 {<4.4}	<5 {<4.5}	
Acetone	ug/kg	--	--	--	--	22	<9.9 {<7.9}	20	10	
Benzene	ug/kg	--	--	10,000	--	<1 {<0.5}	<0.99 {<0.49}	<0.99 {<0.49}	<0.99 {<0.5}	
Bromobenzene	ug/kg	--	--	--	--	<2 {<0.84}	<2 {<0.83}	<2 {<0.83}	<2 {<0.83}	
Bromochloromethane	ug/kg	--	--	--	--	<2 {<0.9}	<2 {<0.89}	<2 {<0.89}	<2 {<0.89}	
Bromodichloromethane	ug/kg	--	--	--	--	<1 {<0.5}	<0.99 {<0.49}	<0.99 {<0.49}	<0.99 {<0.5}	
Bromoform	ug/kg	--	--	--	--	<2 {<0.8}	<2 {<0.79}	<2 {<0.79}	<2 {<0.79}	
Bromomethane	ug/kg	--	--	--	--	<2 {<0.92}	<2 {<0.91}	<2 {<0.91}	<2 {<0.91}	
Carbon Disulfide	ug/kg	--	--	--	--	<5 {<0.97}	<4.9 {<0.96}	<4.9 {<0.96}	<5 {<0.96}	
Carbon tetrachloride	ug/kg	--	--	10,000	--	<2 {<0.5}	<2 {<0.49}	<2 {<0.49}	<2 {<0.5}	
Chlorobenzene	ug/kg	--	--	2,000,000	--	<1 {<0.52}	<0.99 {<0.51}	<0.99 {<0.51}	<0.99 {<0.52}	
Chloroethane	ug/kg	--	--	--	--	<2 {<1.5}	<2 {<1.5}	<2 {<1.5}	<2 {<1.5}	
Chloroform	ug/kg	--	--	120,000	--	<1 {<0.5}	<0.99 {<0.49}	<0.99 {<0.49}	<0.99 {<0.5}	
Chloromethane	ug/kg	--	--	--	--	<2 {<1}	<2 {<0.99}	<2 {<0.99}	<2 {<0.99}	

**INTERIM SOURCE REMOVAL ACTION (ISRA) - OUTFALL 009**

**WASTE CHARACTERIZATION SAMPLE RESULTS – AP/STP-1C-2 (East)  
THE BOEING COMPANY  
SANTA SUSANA FIELD LABORATORY**

						Object Name:	APWC0107	APWC0108	APWC0109	APWC0110
						Sample Name:	APWC0107S001	APWC0108S001	APWC0109S001	APWC0110S001
						Collection Date:	7/29/2010	7/29/2010	7/29/2010	7/29/2010
						Sample Depth (feet):	0.0 - 0.3	0.0 - 0.5	0.0 - 0.5	0.0 - 0.5
ANALYTE	UNITS	TTLIC	WET Leachate Testing Trigger <sup>a</sup>	TCLP Leachate Testing Trigger <sup>b</sup>	STLC	RESULT <sup>c</sup>	RESULT <sup>c</sup>	RESULT <sup>c</sup>	RESULT <sup>c</sup>	
cis-1,2-Dichloroethene	ug/kg	--	--	--	--	<1 {<0.83}	<0.99 {<0.82}	<0.99 {<0.82}	<0.99 {<0.82}	
cis-1,3-Dichloropropene	ug/kg	--	--	--	--	<1 {<0.44}	<0.99 {<0.43}	<0.99 {<0.43}	<0.99 {<0.44}	
Dibromochloromethane	ug/kg	--	--	--	--	<1 {<0.7}	<0.99 {<0.69}	<0.99 {<0.69}	<0.99 {<0.69}	
Dibromomethane	ug/kg	--	--	--	--	<1 {<0.9}	<0.99 {<0.89}	<0.99 {<0.89}	<0.99 {<0.89}	
Dichlorodifluoromethane	ug/kg	--	--	--	--	<5 {<1.5}	<4.9 {<1.5}	<4.9 {<1.5}	<5 {<1.5}	
Ethylbenzene	ug/kg	--	--	--	--	<1 {<0.5}	<0.99 {<0.49}	<0.99 {<0.49}	<0.99 {<0.5}	
Hexachlorobutadiene	ug/kg	--	--	--	--	<2 {<0.8}	<2 {<0.79}	<2 {<0.79}	<2 {<0.79}	
Isopropylbenzene	ug/kg	--	--	--	--	<1 {<0.54}	<0.99 {<0.53}	<0.99 {<0.53}	<0.99 {<0.54}	
m,p-Xylenes	ug/kg	--	--	--	--	<2 {<0.8}	<2 {<0.79}	<2 {<0.79}	<2 {<0.79}	
Methylene chloride	ug/kg	--	--	--	--	<10 {<6.5}	<9.9 {<6.4}	<9.9 {<6.4}	<9.9 {<6.4}	
Methyl-tert-butyl Ether (MTBE)	ug/kg	--	--	--	--	<2 {<1}	<2 {<0.99}	<2 {<0.99}	<2 {<0.99}	
n-Butylbenzene	ug/kg	--	--	--	--	<2 {<0.72}	<2 {<0.71}	<2 {<0.71}	<2 {<0.71}	
n-Propylbenzene	ug/kg	--	--	--	--	<1 {<0.61}	<0.99 {<0.6}	<0.99 {<0.6}	<0.99 {<0.61}	
Naphthalene	ug/kg	--	--	--	--	<2 {<1.1}	<2 {<1.1}	<2 {<1.1}	<2 {<1.1}	
o-Xylene	ug/kg	--	--	--	--	<1 {<0.5}	<0.99 {<0.49}	<0.99 {<0.49}	<0.99 {<0.5}	
p-Isopropyltoluene	ug/kg	--	--	--	--	<1 {<0.72}	<0.99 {<0.71}	<0.99 {<0.71}	<0.99 {<0.71}	
sec-Butylbenzene	ug/kg	--	--	--	--	<2 {<0.67}	<2 {<0.66}	<2 {<0.66}	<2 {<0.66}	
Styrene	ug/kg	--	--	--	--	<1 {<0.58}	<0.99 {<0.57}	<0.99 {<0.57}	<0.99 {<0.58}	
tert-Butylbenzene	ug/kg	--	--	--	--	<2 {<0.62}	<2 {<0.61}	<2 {<0.61}	<2 {<0.62}	
Tetrachloroethene	ug/kg	--	--	14,000	--	<1 {<0.49}	<0.99 {<0.48}	<0.99 {<0.48}	<0.99 {<0.49}	
Toluene	ug/kg	--	--	--	--	<1 {<0.5}	<0.99 {<0.49}	<0.99 {<0.49}	<0.99 {<0.5}	
trans-1,2-Dichloroethene	ug/kg	--	--	--	--	<1 {<0.7}	<0.99 {<0.69}	<0.99 {<0.69}	<0.99 {<0.69}	
trans-1,3-Dichloropropene	ug/kg	--	--	--	--	<1 {<0.61}	<0.99 {<0.6}	<0.99 {<0.6}	<0.99 {<0.61}	
Trichloroethene	ug/kg	2,040,000	2,040,000	10,000	--	<1 {<0.5}	<0.99 {<0.49}	<0.99 {<0.49}	<0.99 {<0.5}	
Trichlorofluoromethane	ug/kg	--	--	--	--	<2 {<0.54}	<2 {<0.53}	<2 {<0.53}	<2 {<0.54}	
Vinyl acetate	ug/kg	--	--	--	--	<5 {<2.5}	<4.9 {<2.5}	<4.9 {<2.5}	<5 {<2.5}	
Vinyl chloride	ug/kg	--	--	4,000	--	<2 {<0.91}	<2 {<0.9}	<2 {<0.9}	<2 {<0.9}	
<b>RADIONUCLIDES</b>	--	--	--	--	--	R	R	R	R	

**INTERIM SOURCE REMOVAL ACTION (ISRA) - OUTFALL 009**

**WASTE CHARACTERIZATION SAMPLE RESULTS – AP/STP  
THE BOEING COMPANY  
SANTA SUSANA FIELD LABORATORY**

**Notes:**

--" - not analyzed / not applicable

<5 - Analyte not detected at or above the stated method detection limit (metals) or analyte not detected at or above the stated reporting limit (organics)

{<1} - Analyte not detected at or above the stated method detection limit (organics)

<sup>a</sup> - WET Leachate Testing Trigger = STLC limit \* 10

<sup>b</sup> - TCLP Leachate Testing Trigger = TCLP limit \* 20

<sup>c</sup> Waste characterization sample results not validated

B - Analyte was detected in the associated method blank

J - Estimated value. Analyte detected at a level less than the Reporting Limit (RL) and greater than or equal to the Method Detection Limit (MDL). The user of this data should be aware that this data is of limited reliability.

M1 - The MS and/or MSD were above the acceptance limits due to sample matrix interference. See Blank Spike (LCS).

µg/kg - micrograms per kilogram

mg/kg - milligrams per kilogram

mg/L - milligrams per liter

R - Radiological analysis includes gamma spectroscopy (Na-22, K-40, Mn-54, Co-60, Cs-134, Cs-137, Eu-152, Eu-154, Th-228, Th-232, U-235, U-238 and Am-241), strontium-90, and tritium. Boeing will be preparing a document that provides the radiological results and statistical analysis of these waste characterization samples.

R-3 - The RPD exceeded the acceptance limit due to sample matrix effects

## **WASTE CHARACTERIZATION: IN-SITU SOIL LOCATED AT AREA II ISRA OUTFALL 009 PLANNED EXCAVATION AP/STP-1C-2-MAIN**

### **Introduction**

This report presents supporting detailed information for the July 29, 2010 in-situ characterization sampling of prospective soil wastes from planned SSFL Area II ISRA excavations in the vicinity of the former Area II incinerator.

### **Background**

In-situ characterization was performed for soil destined to be excavated from designated locations in SSFL Area II in accordance with the ISRA Workplan. A step-by-step approach was followed to accomplish characterization of the soil prior to excavation. The first step was to review available information regarding historical area usage and existing analytical data from past soil sampling in or near planned excavation sites. The objective was to identify all substances potentially impacting the soil in each planned excavation footprint to the degree that hazardous waste regulatory thresholds would be exceeded.

The next step was to develop and implement a random sampling plan for each of the planned excavation footprints. The collected soil samples were analyzed by a state certified laboratory and the results evaluated to determine whether any of the identified substances were present at concentrations requiring further investigation. In addition, the initial random sampling results were evaluated to determine the statistical adequacy of the data provided for waste characterization based on the guidelines presented in U.S. EPA SW-846. Soil was characterized non-hazardous when analyte concentrations among the samples exhibited a reasonably small variance and there was satisfactory margin between the mean of the samples and applicable regulatory thresholds. Otherwise, additional samples were collected and subjected to analysis, or in lieu of further testing, the soil was summarily characterized as hazardous. Statistical analyses described in SW-846 are performed as necessary to determine minimum sample point requirements and the upper confidence levels of analytical results.

AP/STP-1C-2-Main is part of a larger planned excavation footprint, AP/STP-1C-2. The footprint was subdivided into three (3) areas for sampling purposes: AP/STP-1C-2-East, AP/STP-1C-2-West, and AP/STP-1C-2-Main. In part, this was necessary because the irregular shape of the original footprint suggested the possibility of a characteristically heterogeneous wastestream. To address this potential issue, the significant protuberance on the east side of the main body of the planned excavation was identified as a separate area, with its own random sampling plan. This provided additional assurance that randomly identified sample collection points would not cluster in any particular area to the exclusion of other areas, which could void the representativeness of the collected samples. In addition to addressing sample collection point coverage, it was also necessary to accommodate potential changes in soil management strategy. Subsequent to initial waste characterization sampling, project management decided to retain the option of managing soil from a small portion on the western side of AP/STP-1C-2 separately from other soil contained in the excavation footprint. The original random samples provided data representative of the average properties of the entire AP/STP-1C-2-Main excavation footprint. However, when the west portion was separated from the main body, existing sampling data was no longer representative of the new area, identified as AP/STP-1C-2-West. To obtain the required representative waste characterization data, samples were collected from four new randomly identified collection points in the new area.

The review of historical information and existing analytical data relevant to planned excavation AP/STP-1C-2-Main was based partly on the Group 2 RFI results. Evaluation of these data and other sources of relevant information, including recent sampling conducted specifically for ISRA, suggested that Regulated Metals (CAM17), Volatile Organic Compounds (VOC), Polychlorinated Biphenyls (PCB), and Petroleum Hydrocarbons should be addressed in the AP/STP-1A excavation footprint. A random sampling plan was developed for collection of four (4) samples from the planned excavation footprint, taking into account the relatively small area to be excavated. The samples were analyzed for CAM 17 metals, VOCs, PCBs, and Petroleum Hydrocarbons. All samples were collected, contained, and handled according to field practice requirements in SW-846.

### **Results**

Analytical results for the planned excavation area at AP/STP-1C-2-Main are presented in Test America report ITG2664 issued on 8/6/10. Only very low concentrations of Regulated Metals were detected in any of the samples from AP/STP-1C-2-Main. All of the detected Regulated Metals were well below 10-Times their respective California Soluble Threshold Limits (STLC) and no further testing was required.

No VOCs or PCBs were detected in any of the samples, while Method Detection Limits (MDL) for all analytes were no higher than the low parts per billion range (ppb). Petroleum Hydrocarbons were detected at very low levels, with a maximum concentration in the C10-C40 range of 52 ppm.

### **Determination**

According to analytical results and generator knowledge, the soil in the planned excavation footprint of SSFL Area II AP/STP-1C-2-Main:










- Is Not a Listed Waste (analytical results and generator knowledge)
- Is Not ignitable (generator knowledge)
- Is Not corrosive (generator knowledge)
- Is Not reactive (generator knowledge)
- Is Not toxic (analytical results and generator knowledge)
  - Is Not Extremely or Acutely Hazardous Waste
  - Does not exceed any RCRA or Title 22 characteristic thresholds
  - Is Not subject to the Prop. 65 listing if it is applied to 22 CCR 66261.24(a)(7)
  - Is Not subject to Title 22 Appendix X list
  - Is Not known by experience or testing to pose a hazard to human health or environment because of its carcinogenicity, acute toxicity, chronic toxicity, bio-accumulative properties, or persistence in the environment.

**The soil in AP/STP-1C-2-Main is NON-HAZARDOUS.**




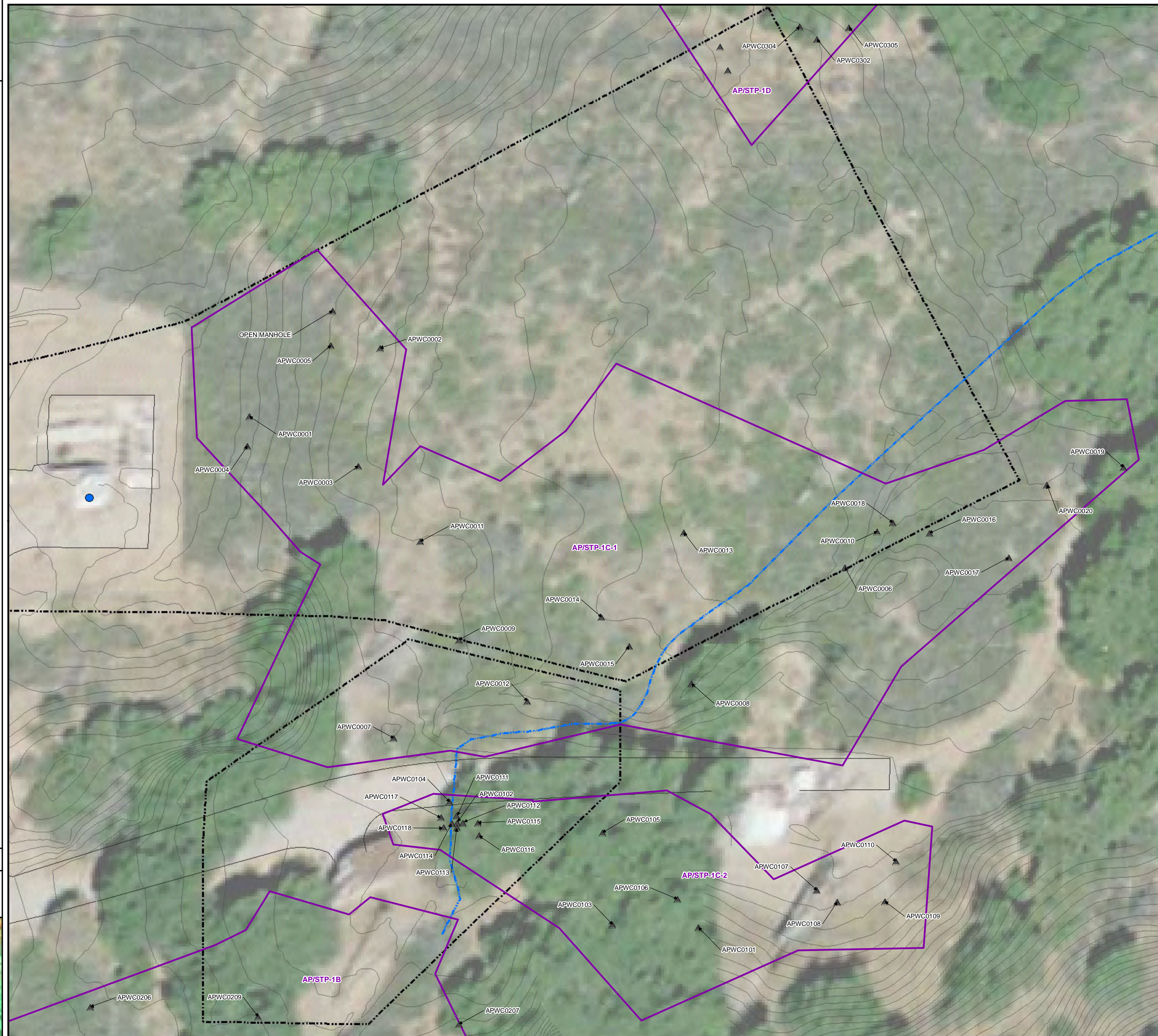
**Outfall 009**  
**Sample Locations for AP/STP - 1C,**  
**AP/STP - 1B, and AP/STP - 1D**

**Base Map Legend**

-  Administrative Area Boundary
-  RFI Site Boundary
-  Report Group Boundary
-  NPDES Outfall
-  A/C Paving
-  Drainage
-  Non Jurisdictional Surface Water Pathway
-  Surface Water Divide
-  Elevation Contour

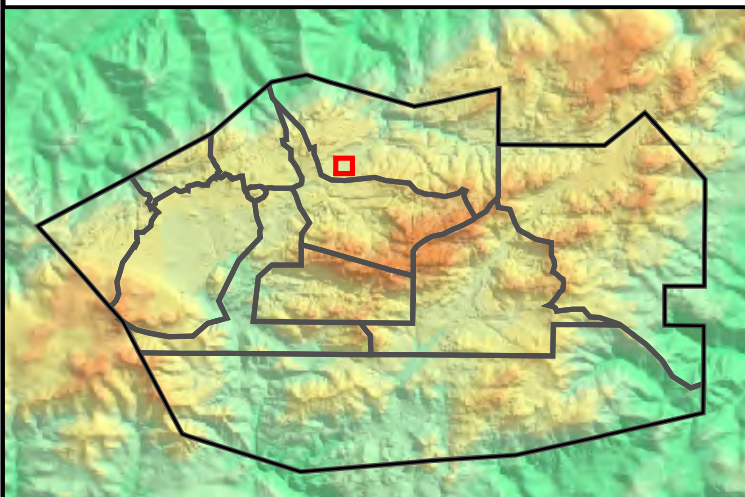
**Figure Legend**

-  Waste Characterization Sample



Document: ISRA\_Plots\_Working\_AP-STP-1C\_SampleLocations.mxd Date: Sep 02, 2010

1 inch = 25 feet  
 0 25 50 Feet



**INTERIM SOURCE REMOVAL ACTION (ISRA) - OUTFALL 009**

**WASTE CHARACTERIZATION SAMPLE RESULTS – AP/STP-1C-2 (Main)  
THE BOEING COMPANY  
SANTA SUSANA FIELD LABORATORY**

				Object Name:	APWC0101	APWC0103	APWC0105	APWC0106
				Sample Name:	APWC0101S001	APWC0103S001	APWC0105S001	APWC0106S001
				Collection Date:	7/29/2010	7/29/2010	7/29/2010	7/29/2010
				Sample Depth (feet):	0.4 - 0.9	0.5 - 1.0	0.5 - 1.0	0.5 - 1.0
ANALYTE	UNITS	TTLc	WET Leachate Testing Trigger <sup>a</sup>	TCLP Leachate Testing Trigger <sup>b</sup>	RESULT <sup>c</sup>	RESULT <sup>c</sup>	RESULT <sup>c</sup>	RESULT <sup>c</sup>
<b>METALS</b>								
Antimony	mg/kg	500	150	--	1.2 J	1.2 J	0.98 J	1.4 J
Arsenic	mg/kg	500	50	100	4.6	5.1	4.4	4.2
Barium	mg/kg	10,000	1,000	2,000	90	100	210	120
Beryllium	mg/kg	75	7.5	--	0.46 J	0.52	0.42 J	0.44 J
Cadmium	mg/kg	100	10	20	<0.20	<0.20	0.29 J	<0.20
Chromium	mg/kg	500	50	100	17	23	19	17
Cobalt	mg/kg	8,000	800	--	4.3	5.8	5.3	4.8
Copper	mg/kg	2,500	250	--	11	10	16	21
Lead	mg/kg	1,000	50	100	9.9	6.2	31	11
Mercury	mg/kg	20	2	4	0.019 J	<0.012	0.042	0.023
Molybdenum	mg/kg	3,500	3,500	--	0.58 J	0.58 J	0.78 J	0.64 J
Nickel	mg/kg	2,000	200	--	10	14	12	11
Selenium	mg/kg	100	10	20	<1	<1	<1	<1
Silver	mg/kg	500	50	100	<0.8	<0.8	6.3	<0.8
Thallium	mg/kg	700	70	--	<0.8	<0.8	<0.8	<0.8
Vanadium	mg/kg	2,400	240	--	28	35	30	30
Zinc	mg/kg	5,000	2,500	--	60	60	96	83
<b>PCBs</b>								
Aroclor 1016	ug/kg	50,000	50,000	--	<50 {<12}	<50 {<12}	<50 {<12}	<50 {<12}
Aroclor 1221	ug/kg	50,000	50,000	--	<50 {<12}	<50 {<12}	<50 {<12}	<50 {<12}
Aroclor 1232	ug/kg	50,000	50,000	--	<50 {<12}	<50 {<12}	<50 {<12}	<50 {<12}
Aroclor 1242	ug/kg	50,000	50,000	--	<50 {<12}	<50 {<12}	<50 {<12}	<50 {<12}
Aroclor 1248	ug/kg	50,000	50,000	--	<50 {<12}	<50 {<12}	<50 {<12}	<50 {<12}
Aroclor 1254	ug/kg	50,000	50,000	--	<50 {<12}	<50 {<12}	<50 {<12}	<50 {<12}
Aroclor 1260	ug/kg	50,000	50,000	--	<50 {<12}	<50 {<12}	<50 {<12}	<50 {<12}
<b>TPH</b>								
Gasoline Range Organics (C6-C12)	mg/kg	--	--	--	<0.42 {<0.16}	<0.38 {<0.14}	<0.37 {<0.14}	<0.44 {<0.17}
EFH (C10 - C24)	mg/kg	--	--	--	<5 {<3.5}	<5 {<3.5}	10	<5 {<3.5}
EFH (C10 - C40)	mg/kg	--	--	--	11	9.6	52	21
EFH (C25 - C40)	mg/kg	--	--	--	8.2	8.2	41	18
<b>VOCs</b>								
1,1,1,2-Tetrachloroethane	ug/kg	--	--	--	<2 {<0.57}	<2 {<0.57}	<2 {<0.57}	<2 {<0.57}
1,1,1-Trichloroethane	ug/kg	--	--	--	<1 {<0.7}	<0.99 {<0.7}	<0.99 {<0.7}	<1 {<0.7}
1,1,2,2-Tetrachloroethane	ug/kg	--	--	--	<2 {<0.86}	<2 {<0.85}	<2 {<0.85}	<2 {<0.86}
1,1,2-Trichloroethane	ug/kg	--	--	--	<1 {<0.87}	<0.99 {<0.86}	<0.99 {<0.86}	<1 {<0.87}

**INTERIM SOURCE REMOVAL ACTION (ISRA) - OUTFALL 009**

**WASTE CHARACTERIZATION SAMPLE RESULTS – AP/STP-1C-2 (Main)  
THE BOEING COMPANY  
SANTA SUSANA FIELD LABORATORY**

ANALYTE	UNITS	TTLC	Object Name:		APWC0101	APWC0103	APWC0105	APWC0106
			Leachate Testing Trigger <sup>a</sup>	TCLP Leachate Testing Trigger <sup>b</sup>	APWC0101S001	APWC0103S001	APWC0105S001	APWC0106S001
					7/29/2010	7/29/2010	7/29/2010	7/29/2010
					0.4 - 0.9	0.5 - 1.0	0.5 - 1.0	0.5 - 1.0
					RESULT <sup>c</sup>	RESULT <sup>c</sup>	RESULT <sup>c</sup>	RESULT <sup>c</sup>
1,1-Dichloroethane	ug/kg	--	--	--	<1 {<0.5}	<0.99 {<0.5}	<0.99 {<0.5}	<1 {<0.5}
1,1-Dichloroethene	ug/kg	--	--	14,000	<2 {<0.6}	<2 {<0.6}	<2 {<0.6}	<2 {<0.6}
1,1-Dichloropropene	ug/kg	--	--	--	<1 {<0.4}	<0.99 {<0.4}	<0.99 {<0.4}	<1 {<0.4}
1,2,3-Trichlorobenzene	ug/kg	--	--	--	<2 {<1}	<2 {<0.99}	<2 {<0.99}	<2 {<1}
1,2,3-Trichloropropane	ug/kg	--	--	--	<2 {<1}	<2 {<0.99}	<2 {<0.99}	<2 {<1}
1,2,4-Trichlorobenzene	ug/kg	--	--	--	<2 {<1}	<2 {<0.99}	<2 {<0.99}	<2 {<1}
1,2,4-Trimethylbenzene	ug/kg	--	--	--	<1 {<0.78}	<0.99 {<0.78}	<0.99 {<0.78}	<1 {<0.78}
1,2-Dibromo-3-chloropropane	ug/kg	--	--	--	<10 {<1.5}	<9.9 {<1.5}	<9.9 {<1.5}	<10 {<1.5}
1,2-Dibromoethane (EDB)	ug/kg	--	--	--	<1 {<0.8}	<0.99 {<0.8}	<0.99 {<0.8}	<1 {<0.8}
1,2-Dichlorobenzene	ug/kg	--	--	--	<1 {<0.95}	<0.99 {<0.94}	<0.99 {<0.94}	<1 {<0.95}
1,2-Dichloroethane	ug/kg	--	--	10,000	<1 {<0.8}	<0.99 {<0.8}	<0.99 {<0.8}	<1 {<0.8}
1,2-Dichloropropane	ug/kg	--	--	--	<1 {<0.8}	<0.99 {<0.8}	<0.99 {<0.8}	<1 {<0.8}
1,3,5-Trimethylbenzene	ug/kg	--	--	--	<1 {<0.63}	<0.99 {<0.63}	<0.99 {<0.63}	<1 {<0.63}
1,3-Dichlorobenzene	ug/kg	--	--	--	<1 {<0.84}	<0.99 {<0.83}	<0.99 {<0.83}	<1 {<0.84}
1,3-Dichloropropane	ug/kg	--	--	--	<1 {<0.63}	<0.99 {<0.63}	<0.99 {<0.63}	<1 {<0.63}
1,4-Dichlorobenzene	ug/kg	--	--	--	<1 {<0.94}	<0.99 {<0.93}	<0.99 {<0.93}	<1 {<0.94}
2,2-Dichloropropane	ug/kg	--	--	--	<1 {<0.6}	<0.99 {<0.6}	<0.99 {<0.6}	<1 {<0.6}
2-Butanone (MEK)	ug/kg	--	--	4,000,000	<10 {<6}	<9.9 {<6}	<9.9 {<6}	<10 {<6}
2-Chlorotoluene	ug/kg	--	--	--	<2 {<0.87}	<2 {<0.86}	<2 {<0.86}	<2 {<0.87}
2-Hexanone	ug/kg	--	--	--	<10 {<9.1}	<9.9 {<9}	<9.9 {<9}	<10 {<9.1}
4-Chlorotoluene	ug/kg	--	--	--	<2 {<0.74}	<2 {<0.74}	<2 {<0.74}	<2 {<0.74}
4-Methyl-2-pentanone (MIBK)	ug/kg	--	--	--	<5 {<4.5}	<5 {<4.5}	<5 {<4.5}	<5 {<4.5}
Acetone	ug/kg	--	--	--	<10 {<8}	<9.9 {<8}	<9.9 {<8}	<10 {<8}
Benzene	ug/kg	--	--	10,000	<1 {<0.5}	<0.99 {<0.5}	<0.99 {<0.5}	<1 {<0.5}
Bromobenzene	ug/kg	--	--	--	<2 {<0.84}	<2 {<0.83}	<2 {<0.83}	<2 {<0.84}
Bromochloromethane	ug/kg	--	--	--	<2 {<0.9}	<2 {<0.89}	<2 {<0.89}	<2 {<0.9}
Bromodichloromethane	ug/kg	--	--	--	<1 {<0.5}	<0.99 {<0.5}	<0.99 {<0.5}	<1 {<0.5}
Bromoform	ug/kg	--	--	--	<2 {<0.8}	<2 {<0.8}	<2 {<0.8}	<2 {<0.8}
Bromomethane	ug/kg	--	--	--	<2 {<0.92}	<2 {<0.91}	<2 {<0.91}	<2 {<0.92}
Carbon Disulfide	ug/kg	--	--	--	<5 {<0.97}	<5 {<0.96}	<5 {<0.96}	<5 {<0.97}
Carbon tetrachloride	ug/kg	--	--	10,000	<2 {<0.5}	<2 {<0.5}	<2 {<0.5}	<2 {<0.5}
Chlorobenzene	ug/kg	--	--	2,000,000	<1 {<0.52}	<0.99 {<0.52}	<0.99 {<0.52}	<1 {<0.52}
Chloroethane	ug/kg	--	--	--	<2 {<1.5}	<2 {<1.5}	<2 {<1.5}	<2 {<1.5}
Chloroform	ug/kg	--	--	120,000	<1 {<0.5}	<0.99 {<0.5}	<0.99 {<0.5}	<1 {<0.5}
Chloromethane	ug/kg	--	--	--	<2 {<1}	<2 {<0.99}	<2 {<0.99}	<2 {<1}
cis-1,2-Dichloroethene	ug/kg	--	--	--	<1 {<0.83}	<0.99 {<0.83}	<0.99 {<0.83}	<1 {<0.83}

**INTERIM SOURCE REMOVAL ACTION (ISRA) - OUTFALL 009**

**WASTE CHARACTERIZATION SAMPLE RESULTS – AP/STP-1C-2 (Main)  
THE BOEING COMPANY  
SANTA SUSANA FIELD LABORATORY**

				Object Name:	APWC0101	APWC0103	APWC0105	APWC0106
				Sample Name:	APWC0101S001	APWC0103S001	APWC0105S001	APWC0106S001
				Collection Date:	7/29/2010	7/29/2010	7/29/2010	7/29/2010
				Sample Depth (feet):	0.4 - 0.9	0.5 - 1.0	0.5 - 1.0	0.5 - 1.0
ANALYTE	UNITS	TTLIC	WET Leachate Testing Trigger <sup>a</sup>	TCLP Leachate Testing Trigger <sup>b</sup>	RESULT <sup>c</sup>	RESULT <sup>c</sup>	RESULT <sup>c</sup>	RESULT <sup>c</sup>
cis-1,3-Dichloropropene	ug/kg	--	--	--	<1 {<0.44}	<0.99 {<0.44}	<0.99 {<0.44}	<1 {<0.44}
Dibromochloromethane	ug/kg	--	--	--	<1 {<0.7}	<0.99 {<0.7}	<0.99 {<0.7}	<1 {<0.7}
Dibromomethane	ug/kg	--	--	--	<1 {<0.9}	<0.99 {<0.89}	<0.99 {<0.89}	<1 {<0.9}
Dichlorodifluoromethane	ug/kg	--	--	--	<5 {<1.5}	<5 {<1.5}	<5 {<1.5}	<5 {<1.5}
Ethylbenzene	ug/kg	--	--	--	<1 {<0.5}	<0.99 {<0.5}	<0.99 {<0.5}	<1 {<0.5}
Hexachlorobutadiene	ug/kg	--	--	--	<2 {<0.8}	<2 {<0.8}	<2 {<0.8}	<2 {<0.8}
Isopropylbenzene	ug/kg	--	--	--	<1 {<0.54}	<0.99 {<0.54}	<0.99 {<0.54}	<1 {<0.54}
m,p-Xylenes	ug/kg	--	--	--	<2 {<0.8}	<2 {<0.8}	<2 {<0.8}	<2 {<0.8}
Methylene chloride	ug/kg	--	--	--	<10 {<6.5}	<9.9 {<6.5}	<9.9 {<6.5}	<10 {<6.5}
Methyl-tert-butyl Ether (MTBE)	ug/kg	--	--	--	<2 {<1}	<2 {<0.99}	<2 {<0.99}	<2 {<1}
n-Butylbenzene	ug/kg	--	--	--	<2 {<0.72}	<2 {<0.72}	<2 {<0.72}	<2 {<0.72}
n-Propylbenzene	ug/kg	--	--	--	<1 {<0.61}	<0.99 {<0.61}	<0.99 {<0.61}	<1 {<0.61}
Naphthalene	ug/kg	--	--	--	<2 {<1.1}	<2 {<1.1}	<2 {<1.1}	<2 {<1.1}
o-Xylene	ug/kg	--	--	--	<1 {<0.5}	<0.99 {<0.5}	<0.99 {<0.5}	<1 {<0.5}
p-Isopropyltoluene	ug/kg	--	--	--	<1 {<0.72}	<0.99 {<0.72}	<0.99 {<0.72}	<1 {<0.72}
sec-Butylbenzene	ug/kg	--	--	--	<2 {<0.67}	<2 {<0.67}	<2 {<0.67}	<2 {<0.67}
Styrene	ug/kg	--	--	--	<1 {<0.58}	<0.99 {<0.58}	<0.99 {<0.58}	<1 {<0.58}
tert-Butylbenzene	ug/kg	--	--	--	<2 {<0.62}	<2 {<0.62}	<2 {<0.62}	<2 {<0.62}
Tetrachloroethene	ug/kg	--	--	14,000	<1 {<0.49}	<0.99 {<0.49}	<0.99 {<0.49}	<1 {<0.49}
Toluene	ug/kg	--	--	--	<1 {<0.5}	<0.99 {<0.5}	<0.99 {<0.5}	<1 {<0.5}
trans-1,2-Dichloroethene	ug/kg	--	--	--	<1 {<0.7}	<0.99 {<0.7}	<0.99 {<0.7}	<1 {<0.7}
trans-1,3-Dichloropropene	ug/kg	--	--	--	<1 {<0.61}	<0.99 {<0.61}	<0.99 {<0.61}	<1 {<0.61}
Trichloroethene	ug/kg	2,040,000	2,040,000	10,000	<1 {<0.5}	<0.99 {<0.5}	<0.99 {<0.5}	<1 {<0.5}
Trichlorofluoromethane	ug/kg	--	--	--	<2 {<0.54}	<2 {<0.54}	<2 {<0.54}	<2 {<0.54}
Vinyl acetate	ug/kg	--	--	--	<5 {<2.5}	<5 {<2.5}	<5 {<2.5}	<5 {<2.5}
Vinyl chloride	ug/kg	--	--	4,000	<2 {<0.91}	<2 {<0.9}	<2 {<0.9}	<2 {<0.91}
<b>RADIONUCLIDES</b>	--	--	--	--	R	R	R	R

**INTERIM SOURCE REMOVAL ACTION (ISRA) - OUTFALL 009**

**WASTE CHARACTERIZATION SAMPLE RESULTS – AP/STP  
THE BOEING COMPANY  
SANTA SUSANA FIELD LABORATORY**

**Notes:**

--" - not analyzed / not applicable

<5 - Analyte not detected at or above the stated method detection limit (metals) or analyte not detected at or above the stated reporting limit (organics)

{<1} - Analyte not detected at or above the stated method detection limit (organics)

<sup>a</sup> - WET Leachate Testing Trigger = STLC limit \* 10

<sup>b</sup> - TCLP Leachate Testing Trigger = TCLP limit \* 20

<sup>c</sup> Waste characterization sample results not validated

B - Analyte was detected in the associated method blank

J - Estimated value. Analyte detected at a level less than the Reporting Limit (RL) and greater than or equal to the Method Detection Limit (MDL). The user of this data should be aware that this data is of limited reliability.

M1 - The MS and/or MSD were above the acceptance limits due to sample matrix interference. See Blank Spike (LCS).

µg/kg - micrograms per kilogram

mg/kg - milligrams per kilogram

mg/L - milligrams per liter

R - Radiological analysis includes gamma spectroscopy (Na-22, K-40, Mn-54, Co-60, Cs-134, Cs-137, Eu-152, Eu-154, Th-228, Th-232, U-235, U-238 and Am-241), strontium-90, and tritium. Boeing will be preparing a document that provides the radiological results and statistical analysis of these waste characterization samples.

R-3 - The RPD exceeded the acceptance limit due to sample matrix effects

## **WASTE CHARACTERIZATION: IN-SITU SOIL LOCATED AT AREA II ISRA OUTFALL 009 PLANNED EXCAVATION AP/STP-1C-2-WEST**

### **Introduction**

This report presents supporting detailed information for the August 17, 2010 in-situ characterization sampling of prospective soil wastes from planned SSFL Area II ISRA excavations in the vicinity of the former Area II incinerator.

### **Background**

In-situ characterization was performed for soil destined to be excavated from designated locations in SSFL Area II in accordance with the ISRA Workplan. A step-by-step approach was followed to accomplish characterization of the soil prior to excavation. The first step was to review available information regarding historical area usage and existing analytical data from past soil sampling in or near planned excavation sites. The objective was to identify all substances potentially impacting the soil in each planned excavation footprint to the degree that hazardous waste regulatory thresholds would be exceeded.

The next step was to develop and implement a random sampling plan for each of the planned excavation footprints. The collected soil samples were analyzed by a state certified laboratory and the results evaluated to determine whether any of the identified substances were present at concentrations requiring further investigation. In addition, the initial random sampling results were evaluated to determine the statistical adequacy of the data provided for waste characterization based on the guidelines presented in U.S. EPA SW-846. Soil was characterized non-hazardous when analyte concentrations among the samples exhibited a reasonably small variance and there was satisfactory margin between the mean of the samples and applicable regulatory thresholds. Otherwise, additional samples were collected and subjected to analysis, or in lieu of further testing, the soil was summarily characterized as hazardous. Statistical analyses described in SW-846 are performed as necessary to determine minimum sample point requirements and the upper confidence levels of analytical results.

AP/STP-1C-2-West is part of a larger planned excavation footprint, AP/STP-1C-2. The footprint was subdivided into three (3) areas for sampling purposes: AP/STP-1C-2-East, AP/STP-1C-2-West, and AP/STP-1C-2-Main. In part, this was necessary because the irregular shape of the original footprint suggested the possibility of a characteristically heterogeneous wastestream. To address this potential issue, the significant protuberance on the east side of the main body of the planned excavation was identified as a separate area, with its own random sampling plan. This provided additional assurance that randomly identified sample collection points would not cluster in any particular area to the exclusion of other areas, which could void the representativeness of the collected samples. In addition to addressing sample collection point coverage, it was also necessary to accommodate potential changes in soil management strategy. Subsequent to initial waste characterization sampling, project management decided to retain the option of managing soil from a small portion on the western side of AP/STP-1C-2 separately from other soil contained in the excavation footprint. The original random samples provided data representative of the average properties of the entire AP/STP-1C-2-Main excavation footprint. However, when the west portion was separated from the main body, existing sampling data was no longer representative of the new area, identified as AP/STP-1C-2-West. To obtain the required representative waste characterization data, samples were collected from four new randomly identified collection points in the new area.

The review of historical information and existing analytical data relevant to planned excavation AP/STP-1C-2-West was based partly on the Group 2 RFI results. Evaluation of these data and other sources of relevant information, including recent sampling conducted specifically for ISRA, suggested that Regulated Metals (CAM17), Volatile Organic Compounds (VOC), Polychlorinated Biphenyls (PCB), and Petroleum Hydrocarbons should be addressed in the AP/STP-1C-2-West excavation footprint. The new random sampling plan was developed for collection of four (4) samples from the planned excavation footprint. The samples were analyzed for CAM 17 metals, VOCs, PCBs, and Petroleum Hydrocarbons. All samples were collected, contained, and handled according to field practice requirements in SW-846.

## **Results**

Analytical results for the planned excavation area at AP/STP-1C-2-West are presented in Test America report ITH1575 issued on 8/24/10. Only very low concentrations of Regulated Metals were detected in any of the samples from AP/STP-1C-2-West. All of the detected Regulated Metals were well below 10-Times their respective California Soluble Threshold Limits (STLC) and no further testing was required.

No VOCs or PCBs were detected in any of the samples, while Method Detection Limits (MDL) for all analytes were no higher than the low parts per billion range (ppb). Petroleum Hydrocarbons were detected at very low levels, with a maximum concentration in the C10-C40 range of 16 ppm.

## **Determination**










According to analytical results and generator knowledge, the soil in the planned excavation footprint of SSFL Area II AP/STP-1C-2-West:

- Is Not a Listed Waste (analytical results and generator knowledge)
- Is Not ignitable (generator knowledge)
- Is Not corrosive (generator knowledge)
- Is Not reactive (generator knowledge)
- Is Not toxic (analytical results and generator knowledge)
  - Is Not Extremely or Acutely Hazardous Waste
  - Does not exceed any RCRA or Title 22 characteristic thresholds
  - Is Not subject to the Prop. 65 listing if it is applied to 22 CCR 66261.24(a)(7)
  - Is Not subject to Title 22 Appendix X list
  - Is Not known by experience or testing to pose a hazard to human health or environment because of its carcinogenicity, acute toxicity, chronic toxicity, bio-accumulative properties, or persistence in the environment.


**The soil in AP/STP-1C-2-West is NON-HAZARDOUS.**

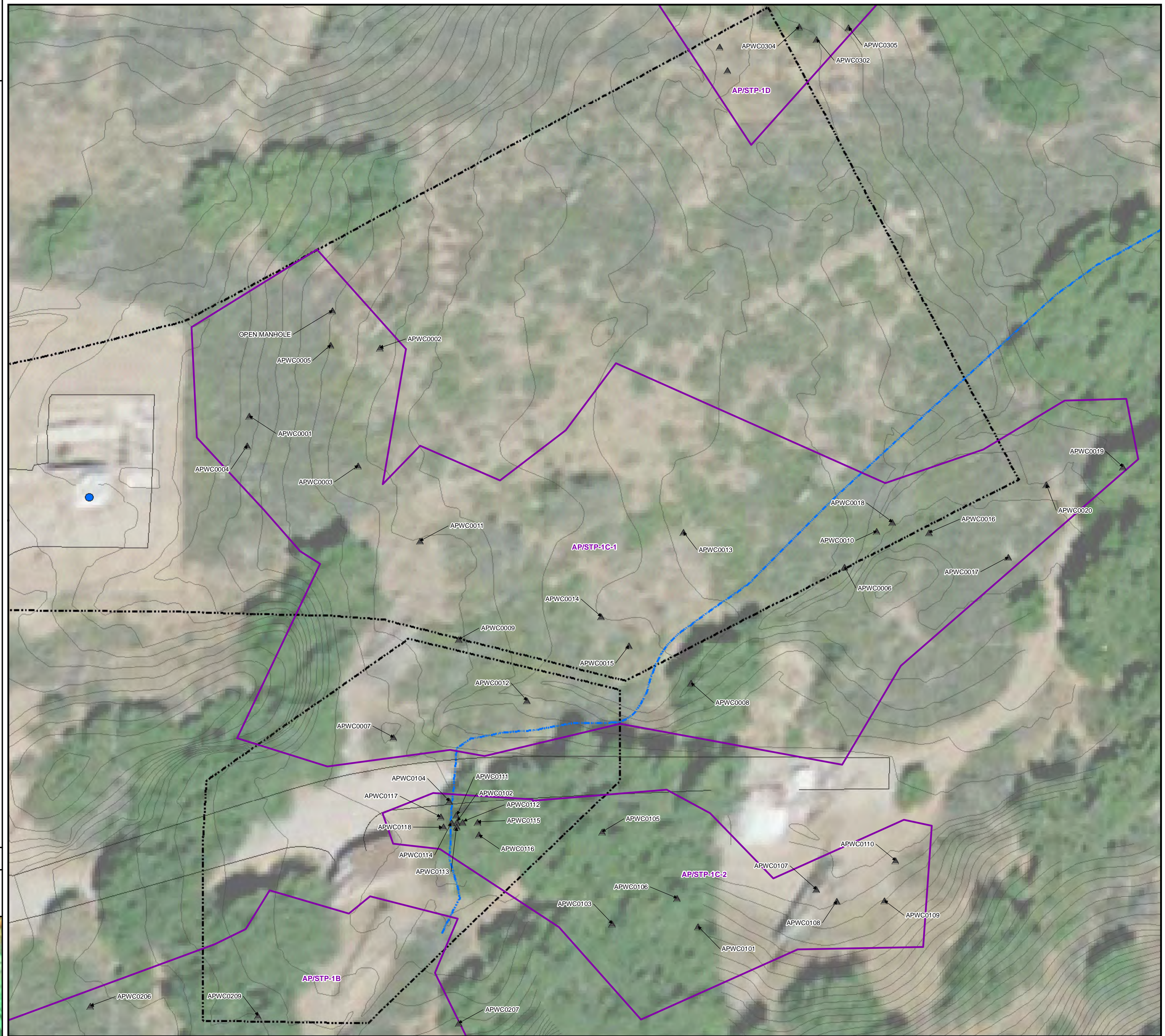
**Outfall 009**  
**Sample Locations for AP/STP - 1C,**  
**AP/STP - 1B, and AP/STP - 1D**

**Base Map Legend**

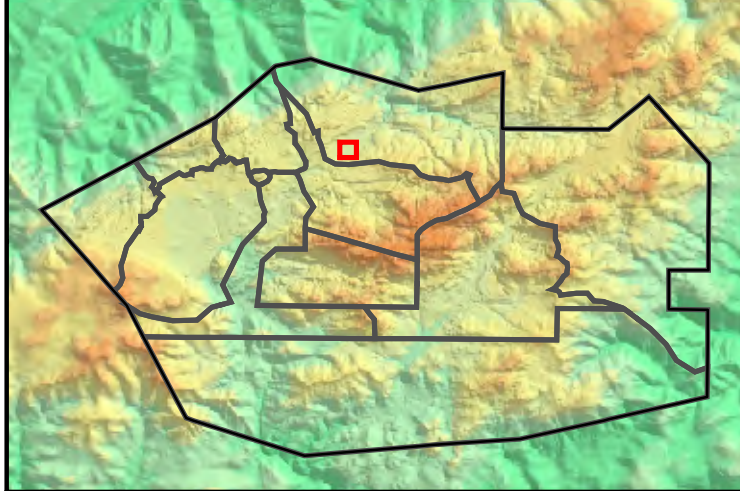
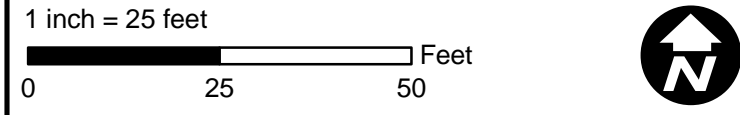
-  Administrative Area Boundary
-  RFI Site Boundary
-  Report Group Boundary
-  NPDES Outfall
-  A/C Paving
-  Drainage
-  Non Jurisdictional Surface Water Pathway
-  Surface Water Divide
-  Elevation Contour

**Figure Legend**

-  Waste Characterization Sample



Document: ISRA\_Plots\_Working\_AP-STP-1C\_SampleLocations.mxd Date: Sep 02, 2010





**INTERIM SOURCE REMOVAL ACTION (ISRA) - OUTFALL 009**

**WASTE CHARACTERIZATION SAMPLE RESULTS – AP/STP-1C-2 (West)  
THE BOEING COMPANY  
SANTA SUSANA FIELD LABORATORY**

				Object Name:	APWC0102	APWC0104	APWC0115	APWC0116	APWC0117	APWC0118
				Sample Name:	APWC0102S001	APWC0104S001	APWC0115S001	APWC0116S001	APWC0117S001	APWC0118S001
				Collection Date:	7/29/2010	7/29/2010	8/17/2010	8/17/2010	8/17/2010	8/17/2010
				Sample Depth (feet):	0.5 - 1.0	0.0 - 0.5	0.5 - 1.0	0.5 - 1.0	0.5 - 1.0	0.5 - 1.0
ANALYTE	UNITS	TTLIC	WET Leachate Testing Trigger <sup>a</sup>	TCLP Leachate Testing Trigger <sup>b</sup>	RESULT <sup>c</sup>	RESULT <sup>c</sup>	RESULT <sup>d</sup>	RESULT <sup>d</sup>	RESULT <sup>d</sup>	RESULT <sup>d</sup>
<b>METALS</b>										
Antimony	mg/kg	500	150	--	0.98 J	1.3 J	1.6	1.8	1.8	1.7
Arsenic	mg/kg	500	50	100	6.7	6	5.3	5.4	5.2	6.5
Barium	mg/kg	10,000	1,000	2,000	120	240	280	140	210	130
Beryllium	mg/kg	75	7.5	--	0.49	0.42 J	0.42	0.45	0.45	0.49
Cadmium	mg/kg	100	10	20	<0.20	0.21 J	2.6	<0.50 {<0.20}	<0.50 {<0.20}	<0.50 {<0.20}
Chromium	mg/kg	500	50	100	22	20	23	23	23	21
Cobalt	mg/kg	8,000	800	--	5.4	5	5.6	5.9	5.5	7.3
Copper	mg/kg	2,500	250	--	21	22	30	23	13	14
Lead	mg/kg	1,000	50	100	28	29	21	8.3	11	14
Mercury	mg/kg	20	2	4	0.04	0.033	0.032	0.014	0.017	0.017
Molybdenum	mg/kg	3,500	3,500	--	0.84 J	1.9 J	0.99	0.90	1.1	0.82
Nickel	mg/kg	2,000	200	--	15	14	15	16	16	16
Selenium	mg/kg	100	10	20	<0.99	<0.99	<2.0 {<1.0}	<2.0 {<1.0}	<2.0 {<1.0}	<2.0 {<0.99}
Silver	mg/kg	500	50	100	7	12	17	3	5.2	1.1
Thallium	mg/kg	700	70	--	<0.79	<0.79	<10 {<0.80}	<10 {<0.80}	<10 {<0.80}	<9.9 {<0.79}
Vanadium	mg/kg	2,400	240	--	35	30	39	37	36	36
Zinc	mg/kg	5,000	2,500	--	86	160	110	67	74	75
<b>PCBs</b>										
Aroclor 1016	ug/kg	50,000	50,000	--	<50 {<12}	<50 {<12}	<50 {<12}	<50 {<12}	<50 {<12}	<50 {<12}
Aroclor 1221	ug/kg	50,000	50,000	--	<50 {<12}	<50 {<12}	<50 {<12}	<50 {<12}	<50 {<12}	<50 {<12}
Aroclor 1232	ug/kg	50,000	50,000	--	<50 {<12}	<50 {<12}	<50 {<12}	<50 {<12}	<50 {<12}	<50 {<12}
Aroclor 1242	ug/kg	50,000	50,000	--	<50 {<12}	<50 {<12}	<50 {<12}	<50 {<12}	<50 {<12}	<50 {<12}
Aroclor 1248	ug/kg	50,000	50,000	--	<50 {<12}	<50 {<12}	<50 {<12}	<50 {<12}	<50 {<12}	<50 {<12}
Aroclor 1254	ug/kg	50,000	50,000	--	<50 {<12}	<50 {<12}	<50 {<12}	<50 {<12}	<50 {<12}	<50 {<12}
Aroclor 1260	ug/kg	50,000	50,000	--	<50 {<12}	<50 {<12}	<50 {<12}	<50 {<12}	<50 {<12}	<50 {<12}
<b>TPH</b>										
Gasoline Range Organics (C6-C12)	mg/kg	--	--	--	<0.37 {<0.14}	<0.37 {<0.14}	<0.38 {<0.14}	<0.34 {<0.13}	<0.39 {<0.14}	<0.38 {<0.14}
EFH (C10 - C24)	mg/kg	--	--	--	<5 {<3.5}	<5 {<3.5}	<5.0 {<3.5}	<10 {<7.0}	<5.0 {<3.5}	<5.0 {<3.5}
EFH (C10 - C40)	mg/kg	--	--	--	23	15	16	<10 {<7.0}	9.7	<5.0 {<3.5}
EFH (C25 - C40)	mg/kg	--	--	--	19	12	13	<10 {<7.0}	8.5	<5.0 {<3.5}
<b>VOCs</b>										
1,1,1,2-Tetrachloroethane	ug/kg	--	--	--	<2 {<0.57}	<2 {<0.57}	<1.9 {<0.55}	<2.0 {<0.57}	<2.2 {<0.63}	<2.0 {<0.58}
1,1,1-Trichloroethane	ug/kg	--	--	--	<1 {<0.7}	<0.99 {<0.69}	<0.96 {<0.67}	<0.99 {<0.69}	<1.1 {<0.77}	<1.0 {<0.71}
1,1,2,2-Tetrachloroethane	ug/kg	--	--	--	<2 {<0.86}	<2 {<0.85}	<1.9 {<0.83}	<2.0 {<0.85}	<2.2 {<0.95}	<2.0 {<0.88}
1,1,2-Trichloroethane	ug/kg	--	--	--	<1 {<0.87}	<0.99 {<0.86}	<0.96 {<0.84}	<0.99 {<0.86}	<1.1 {<0.96}	<1.0 {<0.89}

**INTERIM SOURCE REMOVAL ACTION (ISRA) - OUTFALL 009**

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THE BOEING COMPANY  
SANTA SUSANA FIELD LABORATORY**

		Object Name: Sample Name: Collection Date: Sample Depth (feet):			APWC0102 APWC0102S001 7/29/2010 0.5 - 1.0	APWC0104 APWC0104S001 7/29/2010 0.0 - 0.5	APWC0115 APWC0115S001 8/17/2010 0.5 - 1.0	APWC0116 APWC0116S001 8/17/2010 0.5 - 1.0	APWC0117 APWC0117S001 8/17/2010 0.5 - 1.0	APWC0118 APWC0118S001 8/17/2010 0.5 - 1.0
ANALYTE	UNITS	TTLC	WET Leachate Testing Trigger <sup>a</sup>	TCLP Leachate Testing Trigger <sup>b</sup>	RESULT <sup>c</sup>	RESULT <sup>c</sup>	RESULT <sup>d</sup>	RESULT <sup>d</sup>	RESULT <sup>d</sup>	RESULT <sup>d</sup>
1,1-Dichloroethane	ug/kg	--	--	--	<1 {<0.5}	<0.99 {<0.5}	<0.96 {<0.48}	<0.99 {<0.50}	<1.1 {<0.55}	<1.0 {<0.51}
1,1-Dichloroethene	ug/kg	--	--	14,000	<2 {<0.6}	<2 {<0.6}	<1.9 {<0.58}	<2.0 {<0.60}	<2.2 {<0.66}	<2.0 {<0.61}
1,1-Dichloropropene	ug/kg	--	--	--	<1 {<0.4}	<0.99 {<0.4}	<0.96 {<0.38}	<0.99 {<0.40}	<1.1 {<0.44}	<1.0 {<0.41}
1,2,3-Trichlorobenzene	ug/kg	--	--	--	<2 {<1}	<2 {<0.99}	<1.9 {<0.96}	<2.0 {<0.99}	<2.2 {<1.1}	<2.0 {<1.0}
1,2,3-Trichloropropane	ug/kg	--	--	--	<2 {<1}	<2 {<0.99}	<1.9 {<0.96}	<2.0 {<0.99}	<2.2 {<1.1}	<2.0 {<1.0}
1,2,4-Trichlorobenzene	ug/kg	--	--	--	<2 {<1}	<2 {<0.99}	<1.9 {<0.96}	<2.0 {<0.99}	<2.2 {<1.1}	<2.0 {<1.0}
1,2,4-Trimethylbenzene	ug/kg	--	--	--	<1 {<0.78}	<0.99 {<0.77}	<0.96 {<0.75}	<0.99 {<0.77}	<1.1 {<0.86}	<1.0 {<0.80}
1,2-Dibromo-3-chloropropane	ug/kg	--	--	--	<10 {<1.5}	<9.9 {<1.5}	<9.6 {<1.4}	<9.9 {<1.5}	<11 {<1.7}	<10 {<1.5}
1,2-Dibromoethane (EDB)	ug/kg	--	--	--	<1 {<0.8}	<0.99 {<0.79}	<0.96 {<0.77}	<0.99 {<0.79}	<1.1 {<0.88}	<1.0 {<0.82}
1,2-Dichlorobenzene	ug/kg	--	--	--	<1 {<0.95}	<0.99 {<0.94}	<0.96 {<0.91}	<0.99 {<0.94}	<1.1 {<1.0}	<1.0 {<0.97}
1,2-Dichloroethane	ug/kg	--	--	10,000	<1 {<0.8}	<0.99 {<0.79}	<0.96 {<0.77}	<0.99 {<0.79}	<1.1 {<0.88}	<1.0 {<0.82}
1,2-Dichloropropane	ug/kg	--	--	--	<1 {<0.8}	<0.99 {<0.79}	<0.96 {<0.77}	<0.99 {<0.79}	<1.1 {<0.88}	<1.0 {<0.82}
1,3,5-Trimethylbenzene	ug/kg	--	--	--	<1 {<0.63}	<0.99 {<0.62}	<0.96 {<0.61}	<0.99 {<0.62}	<1.1 {<0.70}	<1.0 {<0.64}
1,3-Dichlorobenzene	ug/kg	--	--	--	<1 {<0.84}	<0.99 {<0.83}	<0.96 {<0.81}	<0.99 {<0.83}	<1.1 {<0.93}	<1.0 {<0.86}
1,3-Dichloropropane	ug/kg	--	--	--	<1 {<0.63}	<0.99 {<0.62}	<0.96 {<0.61}	<0.99 {<0.62}	<1.1 {<0.70}	<1.0 {<0.64}
1,4-Dichlorobenzene	ug/kg	--	--	--	<1 {<0.94}	<0.99 {<0.93}	<0.96 {<0.90}	<0.99 {<0.93}	<1.1 {<1.0}	<1.0 {<0.96}
2,2-Dichloropropane	ug/kg	--	--	--	<1 {<0.6}	<0.99 {<0.6}	<0.96 {<0.58}	<0.99 {<0.60}	<1.1 {<0.66}	<1.0 {<0.61}
2-Butanone (MEK)	ug/kg	--	--	4,000,000	<10 {<6}	<9.9 {<6}	<9.6 {<5.8}	<9.9 {<6.0}	<11 {<6.6}	<10 {<6.1}
2-Chlorotoluene	ug/kg	--	--	--	<2 {<0.87}	<2 {<0.86}	<1.9 {<0.84}	<2.0 {<0.86}	<2.2 {<0.96}	<2.0 {<0.89}
2-Hexanone	ug/kg	--	--	--	<10 {<9.1}	<9.9 {<9}	<9.6 {<8.8}	<9.9 {<9.0}	<11 {<10}	<10 {<9.3}
4-Chlorotoluene	ug/kg	--	--	--	<2 {<0.74}	<2 {<0.73}	<1.9 {<0.71}	<2.0 {<0.73}	<2.2 {<0.82}	<2.0 {<0.76}
4-Methyl-2-pentanone (MIBK)	ug/kg	--	--	--	<5 {<4.5}	<5 {<4.5}	<4.8 {<4.3}	<5.0 {<4.5}	<5.5 {<5.0}	<5.1 {<4.6}
Acetone	ug/kg	--	--	--	<10 {<8}	<9.9 {<7.9}	<9.6 {<7.7}	<9.9 {<7.9}	<11 {<8.8}	<10 {<8.2}
Benzene	ug/kg	--	--	10,000	<1 {<0.5}	<0.99 {<0.5}	<0.96 {<0.48}	<0.99 {<0.50}	<1.1 {<0.55}	<1.0 {<0.51}
Bromobenzene	ug/kg	--	--	--	<2 {<0.84}	<2 {<0.83}	<1.9 {<0.81}	<2.0 {<0.83}	<2.2 {<0.93}	<2.0 {<0.86}
Bromochloromethane	ug/kg	--	--	--	<2 {<0.9}	<2 {<0.89}	<1.9 {<0.87}	<2.0 {<0.89}	<2.2 {<0.99}	<2.0 {<0.92}
Bromodichloromethane	ug/kg	--	--	--	<1 {<0.5}	<0.99 {<0.5}	<0.96 {<0.48}	<0.99 {<0.50}	<1.1 {<0.55}	<1.0 {<0.51}
Bromoform	ug/kg	--	--	--	<2 {<0.8}	<2 {<0.79}	<1.9 {<0.77}	<2.0 {<0.79}	<2.2 {<0.88}	<2.0 {<0.82}
Bromomethane	ug/kg	--	--	--	<2 {<0.92}	<2 {<0.91}	<1.9 {<0.88}	<2.0 {<0.91}	<2.2 {<1.0}	<2.0 {<0.94}
Carbon Disulfide	ug/kg	--	--	--	<5 {<0.97}	<5 {<0.96}	<4.8 {<0.93}	<5.0 {<0.96}	<5.5 {<1.1}	<5.1 {<0.99}
Carbon tetrachloride	ug/kg	--	--	10,000	<2 {<0.5}	<2 {<0.5}	<1.9 {<0.48}	<2.0 {<0.50}	<2.2 {<0.55}	<2.0 {<0.51}
Chlorobenzene	ug/kg	--	--	2,000,000	<1 {<0.52}	<0.99 {<0.52}	<0.96 {<0.50}	<0.99 {<0.52}	<1.1 {<0.57}	<1.0 {<0.53}
Chloroethane	ug/kg	--	--	--	<2 {<1.5}	<2 {<1.5}	<1.9 {<1.4}	<2.0 {<1.5}	<2.2 {<1.7}	<2.0 {<1.5}
Chloroform	ug/kg	--	--	120,000	<1 {<0.5}	<0.99 {<0.5}	<0.96 {<0.48}	<0.99 {<0.50}	<1.1 {<0.55}	<1.0 {<0.51}
Chloromethane	ug/kg	--	--	--	<2 {<1}	<2 {<0.99}	<1.9 {<0.96}	<2.0 {<0.99}	<2.2 {<1.1}	<2.0 {<1.0}
cis-1,2-Dichloroethene	ug/kg	--	--	--	<1 {<0.83}	<0.99 {<0.82}	<0.96 {<0.80}	<0.99 {<0.82}	<1.1 {<0.92}	<1.0 {<0.85}

**INTERIM SOURCE REMOVAL ACTION (ISRA) - OUTFALL 009**

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THE BOEING COMPANY  
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		Object Name: Sample Name: Collection Date: Sample Depth (feet):			APWC0102 APWC0102S001 7/29/2010 0.5 - 1.0	APWC0104 APWC0104S001 7/29/2010 0.0 - 0.5	APWC0115 APWC0115S001 8/17/2010 0.5 - 1.0	APWC0116 APWC0116S001 8/17/2010 0.5 - 1.0	APWC0117 APWC0117S001 8/17/2010 0.5 - 1.0	APWC0118 APWC0118S001 8/17/2010 0.5 - 1.0
ANALYTE	UNITS	TTLIC	WET Leachate Testing Trigger <sup>a</sup>	TCLP Leachate Testing Trigger <sup>b</sup>	RESULT <sup>c</sup>	RESULT <sup>c</sup>	RESULT <sup>d</sup>	RESULT <sup>d</sup>	RESULT <sup>d</sup>	RESULT <sup>d</sup>
cis-1,3-Dichloropropene	ug/kg	--	--	--	<1 {<0.44}	<0.99 {<0.44}	<0.96 {<0.42}	<0.99 {<0.44}	<1.1 {<0.49}	<1.0 {<0.45}
Dibromochloromethane	ug/kg	--	--	--	<1 {<0.7}	<0.99 {<0.69}	<0.96 {<0.67}	<0.99 {<0.69}	<1.1 {<0.77}	<1.0 {<0.71}
Dibromomethane	ug/kg	--	--	--	<1 {<0.9}	<0.99 {<0.89}	<0.96 {<0.87}	<0.99 {<0.89}	<1.1 {<0.99}	<1.0 {<0.92}
Dichlorodifluoromethane	ug/kg	--	--	--	<5 {<1.5}	<5 {<1.5}	<4.8 {<1.4}	<5.0 {<1.5}	<5.5 {<1.7}	<5.1 {<1.5}
Ethylbenzene	ug/kg	--	--	--	<1 {<0.5}	<0.99 {<0.5}	<0.96 {<0.48}	<0.99 {<0.50}	<1.1 {<0.55}	<1.0 {<0.51}
Hexachlorobutadiene	ug/kg	--	--	--	<2 {<0.8}	<2 {<0.79}	<1.9 {<0.77}	<2.0 {<0.79}	<2.2 {<0.88}	<2.0 {<0.82}
Isopropylbenzene	ug/kg	--	--	--	<1 {<0.54}	<0.99 {<0.54}	<0.96 {<0.52}	<0.99 {<0.54}	<1.1 {<0.60}	<1.0 {<0.55}
m,p-Xylenes	ug/kg	--	--	--	<2 {<0.8}	<2 {<0.79}	<1.9 {<0.77}	<2.0 {<0.79}	<2.2 {<0.88}	<2.0 {<0.82}
Methylene chloride	ug/kg	--	--	--	<10 {<6.5}	<9.9 {<6.4}	<9.6 {<6.2}	<9.9 {<6.4}	<11 {<7.2}	<10 {<6.6}
Methyl-tert-butyl Ether (MTBE)	ug/kg	--	--	--	<2 {<1}	<2 {<0.99}	<1.9 {<0.96}	<2.0 {<0.99}	<2.2 {<1.1}	<2.0 {<1.0}
n-Butylbenzene	ug/kg	--	--	--	<2 {<0.72}	<2 {<0.71}	<1.9 {<0.69}	<2.0 {<0.71}	<2.2 {<0.79}	<2.0 {<0.73}
n-Propylbenzene	ug/kg	--	--	--	<1 {<0.61}	<0.99 {<0.61}	<0.96 {<0.59}	<0.99 {<0.61}	<1.1 {<0.67}	<1.0 {<0.62}
Naphthalene	ug/kg	--	--	--	<2 {<1.1}	<2 {<1.1}	<1.9 {<1.1}	<2.0 {<1.1}	<2.2 {<1.2}	<2.0 {<1.1}
o-Xylene	ug/kg	--	--	--	<1 {<0.5}	<0.99 {<0.5}	<0.96 {<0.48}	<0.99 {<0.50}	<1.1 {<0.55}	<1.0 {<0.51}
p-Isopropyltoluene	ug/kg	--	--	--	<1 {<0.72}	<0.99 {<0.71}	<0.96 {<0.69}	<0.99 {<0.71}	<1.1 {<0.79}	<1.0 {<0.73}
sec-Butylbenzene	ug/kg	--	--	--	<2 {<0.67}	<2 {<0.66}	<1.9 {<0.64}	<2.0 {<0.66}	<2.2 {<0.74}	<2.0 {<0.68}
Styrene	ug/kg	--	--	--	<1 {<0.58}	<0.99 {<0.58}	<0.96 {<0.56}	<0.99 {<0.58}	<1.1 {<0.64}	<1.0 {<0.59}
tert-Butylbenzene	ug/kg	--	--	--	<2 {<0.62}	<2 {<0.62}	<1.9 {<0.60}	<2.0 {<0.62}	<2.2 {<0.68}	<2.0 {<0.63}
Tetrachloroethene	ug/kg	--	--	14,000	<1 {<0.49}	<0.99 {<0.49}	<0.96 {<0.47}	<0.99 {<0.49}	<1.1 {<0.54}	<1.0 {<0.50}
Toluene	ug/kg	--	--	--	<1 {<0.5}	<0.99 {<0.5}	<0.96 {<0.48}	<0.99 {<0.50}	<1.1 {<0.55}	<1.0 {<0.51}
trans-1,2-Dichloroethene	ug/kg	--	--	--	<1 {<0.7}	<0.99 {<0.69}	<0.96 {<0.67}	<0.99 {<0.69}	<1.1 {<0.77}	<1.0 {<0.71}
trans-1,3-Dichloropropene	ug/kg	--	--	--	<1 {<0.61}	<0.99 {<0.61}	<0.96 {<0.59}	<0.99 {<0.61}	<1.1 {<0.67}	<1.0 {<0.62}
Trichloroethene	ug/kg	2,040,000	2,040,000	10,000	<1 {<0.5}	<0.99 {<0.5}	<0.96 {<0.48}	<0.99 {<0.50}	<1.1 {<0.55}	<1.0 {<0.51}
Trichlorofluoromethane	ug/kg	--	--	--	<2 {<0.54}	<2 {<0.54}	<1.9 {<0.52}	<2.0 {<0.54}	<2.2 {<0.60}	<2.0 {<0.55}
Vinyl acetate	ug/kg	--	--	--	<5 {<2.5}	<5 {<2.5}	<4.8 {<2.4}	<5.0 {<2.5}	<5.5 {<2.8}	<5.1 {<2.6}
Vinyl chloride	ug/kg	--	--	4,000	<2 {<0.91}	<2 {<0.9}	<1.9 {<0.88}	<2.0 {<0.90}	<2.2 {<1.0}	<2.0 {<0.93}
<b>RADIONUCLIDES</b>	--	--	--	--	R	R	R	R	R	R

**INTERIM SOURCE REMOVAL ACTION (ISRA) - OUTFALL 009**

**WASTE CHARACTERIZATION SAMPLE RESULTS – AP/STP  
THE BOEING COMPANY  
SANTA SUSANA FIELD LABORATORY**

**Notes:**

--" - not analyzed / not applicable

<5 - Analyte not detected at or above the stated method detection limit (metals) or analyte not detected at or above the stated reporting limit (organics)

{<1} - Analyte not detected at or above the stated method detection limit (organics)

<sup>a</sup> - WET Leachate Testing Trigger = STLC limit \* 10

<sup>b</sup> - TCLP Leachate Testing Trigger = TCLP limit \* 20

<sup>c</sup> Waste characterization sample results not validated

B - Analyte was detected in the associated method blank

J - Estimated value. Analyte detected at a level less than the Reporting Limit (RL) and greater than or equal to the Method Detection Limit (MDL). The user of this data should be aware that this data is of limited reliability.

M1 - The MS and/or MSD were above the acceptance limits due to sample matrix interference. See Blank Spike (LCS).

µg/kg - micrograms per kilogram

mg/kg - milligrams per kilogram

mg/L - milligrams per liter

R - Radiological analysis includes gamma spectroscopy (Na-22, K-40, Mn-54, Co-60, Cs-134, Cs-137, Eu-152, Eu-154, Th-228, Th-232, U-235, U-238 and Am-241), strontium-90, and tritium. Boeing will be preparing a document that provides the radiological results and statistical analysis of these waste characterization samples.

R-3 - The RPD exceeded the acceptance limit due to sample matrix effects

## **WASTE CHARACTERIZATION: IN-SITU SOIL LOCATED AT AREA II ISRA OUTFALL 009 PLANNED EXCAVATION AP/STP-1E-1**

### **Introduction**

This report presents supporting detailed information for the July 29, 2010 in-situ characterization sampling of prospective soil wastes from planned SSFL Area II ISRA excavations in the vicinity of the former Area II incinerator.

### **Background**

In-situ characterization was performed for soil destined to be excavated from designated locations in SSFL Area II in accordance with the ISRA Workplan. A step-by-step approach was followed to accomplish characterization of the soil prior to excavation. The first step was to review available information regarding historical area usage and existing analytical data from past soil sampling in or near planned excavation sites. The objective was to identify all substances potentially impacting the soil in each planned excavation footprint to the degree that hazardous waste regulatory thresholds would be exceeded.

The next step was to develop and implement a random sampling plan for each of the planned excavation footprints. The collected soil samples were analyzed by a state certified laboratory and the results evaluated to determine whether any of the identified substances were present at concentrations requiring further investigation. In addition, the initial random sampling results were evaluated to determine the statistical adequacy of the data provided for waste characterization based on the guidelines presented in U.S. EPA SW-846. Soil was characterized non-hazardous when analyte concentrations among the samples exhibited a reasonably small variance and there was satisfactory margin between the mean of the samples and applicable regulatory thresholds. Otherwise, additional samples were collected and subjected to analysis, or in lieu of further testing, the soil was summarily characterized as hazardous. Statistical analyses described in SW-846 are performed as necessary to determine minimum sample point requirements and the upper confidence levels of analytical results.

The review of historical information and existing analytical data relevant to planned excavation AP/STP-1E-1 was based partly on the Group 2 RFI results. Evaluation of these data and other sources of relevant information, including recent sampling conducted specifically for ISRA, suggested that Regulated Metals (CAM17), Volatile Organic Compounds (VOC), Polychlorinated Biphenyls (PCB), and Petroleum Hydrocarbons should be addressed in the AP/STP-1E-1 excavation footprint. A random sampling plan was developed for collection of four (4) samples from the planned excavation footprint, taking into account the relatively small area to be excavated. The samples were analyzed for CAM 17 metals, VOCs, PCBs, and Petroleum Hydrocarbons. All samples were collected, contained, and handled according to field practice requirements in SW-846.

### **Results**

Analytical results for the planned excavation area at AP/STP-1E-1 are presented in Test America report ITG2667 issued on 8/6/10. Only very low concentrations of Regulated Metals were detected in any of the samples from AP/STP-1E-1. All of the detected Regulated Metals were well below 10-Times their respective California Soluble Threshold Limits (STLC) and no further testing was required.

There was one VOC detection of 2-Butanone (Methyl Ethyl Ketone - MEK) in a single sample. The VOC was detected at 0.018 ppm. As the origin of the MEK is likely paint or some other commercial product, the low concentration is not significant with respect to hazardous waste regulations.

No PCBs were detected in any of the samples, and Petroleum Hydrocarbons were detected at very low levels, with a maximum concentration in the C10-C40 range of 9.2 ppm.

**Determination**











According to analytical results and generator knowledge, the soil in the planned excavation footprint of SSFL Area II AP/STP-1E-1:

- Is Not a Listed Waste (analytical results and generator knowledge)
- Is Not ignitable (generator knowledge)
- Is Not corrosive (generator knowledge)
- Is Not reactive (generator knowledge)
- Is Not toxic (analytical results and generator knowledge)
  - Is Not Extremely or Acutely Hazardous Waste
  - Does not exceed any RCRA or Title 22 characteristic thresholds
  - Is Not subject to the Prop. 65 listing if it is applied to 22 CCR 66261.24(a)(7)
  - Is Not subject to Title 22 Appendix X list
  - Is Not known by experience or testing to pose a hazard to human health or environment because of its carcinogenicity, acute toxicity, chronic toxicity, bio-accumulative properties, or persistence in the environment.


**The soil in AP/STP-1E-1 is NON-HAZARDOUS.**

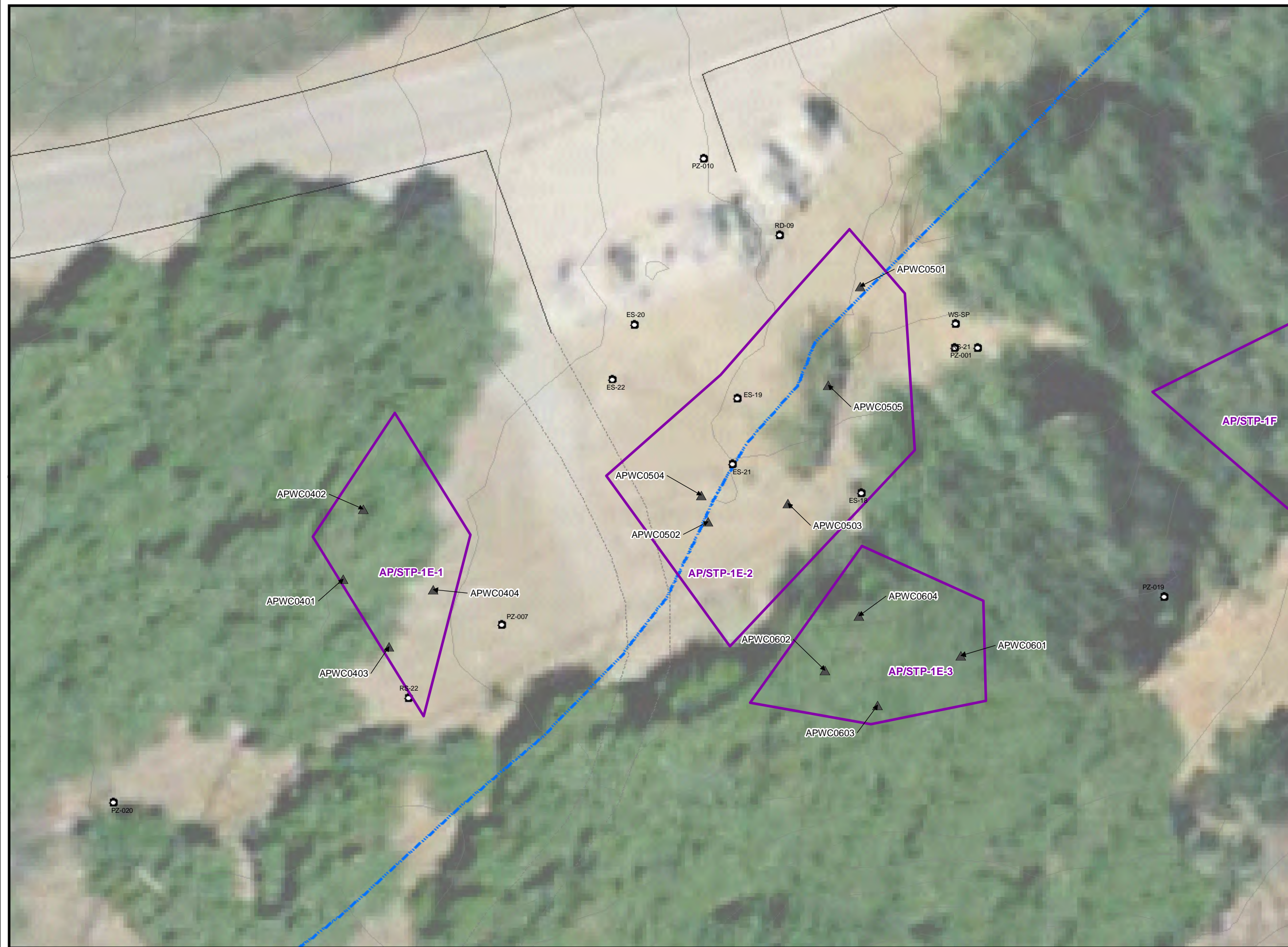
**Outfall 009**  
**Sample Locations for AP/STP - 1E-1,**  
**AP/STP - 1E-2, AP/STP - 1E-3**

**Base Map Legend**

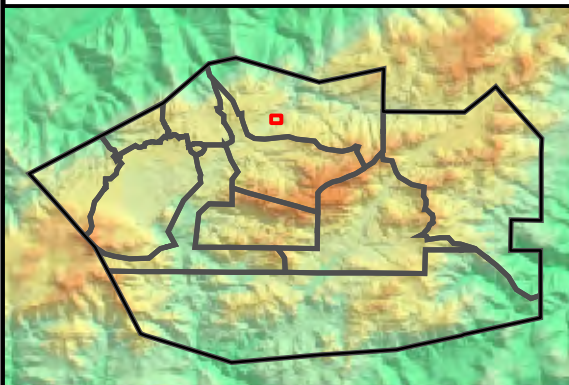
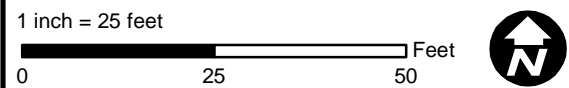
-  Administrative Area Boundary
-  RFI Site Boundary
-  Report Group Boundary
-  NPDES Outfall
-  Dirt Road
-  A/C Paving
-  Drainage
-  Non Jurisdictional Surface Water Pathway
-  Surface Water Divide
-  Elevation Contour

**Figure Legend**

-  Waste Characterization Sample



Document: ISRA\_Plots\_SP\_RD47\_SampleLocations\_060710.mxd Date: Jun 22, 2010



**INTERIM SOURCE REMOVAL ACTION (ISRA) - OUTFALL 009**

**WASTE CHARACTERIZATION SAMPLE RESULTS – AP/STP-1E-1  
THE BOEING COMPANY  
SANTA SUSANA FIELD LABORATORY**

				Object Name:	APWC0401	APWC0402	APWC0403	APWC0404
				Sample Name:	APWC0401S001	APWC0402S001	APWC0403S001	APWC0404S001
				Collection Date:	7/29/2010	7/29/2010	7/29/2010	7/29/2010
				Sample Depth (feet):	0.5 - 1.0	0.5 - 1.0	0.5 - 1.0	0.5 - 1.0
ANALYTE	UNITS	TTLc	WET Leachate Testing Trigger <sup>a</sup>	TCLP Leachate Testing Trigger <sup>b</sup>	RESULT <sup>c</sup>	RESULT <sup>c</sup>	RESULT <sup>c</sup>	RESULT <sup>c</sup>
<b>METALS</b>								
Antimony	mg/kg	500	150	--	1 J	0.9 J	0.93 J	1 J
Arsenic	mg/kg	500	50	100	5	4	5.2	4.4
Barium	mg/kg	10,000	1,000	2,000	110	71	100	98
Beryllium	mg/kg	75	7.5	--	0.58	0.5	0.62	0.59
Cadmium	mg/kg	100	10	20	<0.20	<0.20	<0.20	<0.20
Chromium	mg/kg	500	50	100	22	19	20	21
Cobalt	mg/kg	8,000	800	--	5.8	4.7	5.3	5.5
Copper	mg/kg	2,500	250	--	12	9.8	11	12
Lead	mg/kg	1,000	50	100	5.4	4.4	6.3	5.6
Mercury	mg/kg	20	2	4	<0.012	<0.012	0.014 J	<0.012
Molybdenum	mg/kg	3,500	3,500	--	0.67 J	0.66 J	0.74 J	0.62 J
Nickel	mg/kg	2,000	200	--	15	12	13	14
Selenium	mg/kg	100	10	20	<1	1.2 J	<1	<0.99
Silver	mg/kg	500	50	100	<0.8	<0.79	<0.8	<0.79
Thallium	mg/kg	700	70	--	<0.8	<0.79	<0.8	<0.79
Vanadium	mg/kg	2,400	240	--	35	30	37	34
Zinc	mg/kg	5,000	2,500	--	63	49	59	61
<b>PCBs</b>								
Aroclor 1016	ug/kg	50,000	50,000	--	<50 {<12}	<50 {<12}	<50 {<12}	<50 {<12}
Aroclor 1221	ug/kg	50,000	50,000	--	<50 {<12}	<50 {<12}	<50 {<12}	<50 {<12}
Aroclor 1232	ug/kg	50,000	50,000	--	<50 {<12}	<50 {<12}	<50 {<12}	<50 {<12}
Aroclor 1242	ug/kg	50,000	50,000	--	<50 {<12}	<50 {<12}	<50 {<12}	<50 {<12}
Aroclor 1248	ug/kg	50,000	50,000	--	<50 {<12}	<50 {<12}	<50 {<12}	<50 {<12}
Aroclor 1254	ug/kg	50,000	50,000	--	<50 {<12}	<50 {<12}	<50 {<12}	<50 {<12}
Aroclor 1260	ug/kg	50,000	50,000	--	<50 {<12}	<50 {<12}	<50 {<12}	<50 {<12}
<b>TPH</b>								
Gasoline Range Organics (C6-C12)	mg/kg	--	--	--	<0.32 {<0.12}	<0.36 {<0.13}	<0.36 {<0.13}	<0.31 {<0.12}
EFH (C10 - C24)	mg/kg	--	--	--	<5 {<3.5}	<5 {<3.5}	<5 {<3.5}	<5 {<3.5}
EFH (C10 - C40)	mg/kg	--	--	--	9.2	7.7	5.2	7.6
EFH (C25 - C40)	mg/kg	--	--	--	6.8	5.4	3.8 J	5.6
<b>VOCs</b>								
1,1,1,2-Tetrachloroethane	ug/kg	--	--	--	<2 {<0.56}	<2 {<0.57}	<2 {<0.58}	<2 {<0.57}
1,1,1-Trichloroethane	ug/kg	--	--	--	<0.98 {<0.69}	<1 {<0.7}	<1 {<0.71}	<1 {<0.7}
1,1,2,2-Tetrachloroethane	ug/kg	--	--	--	<2 {<0.85}	<2 {<0.86}	<2 {<0.87}	<2 {<0.86}
1,1,2-Trichloroethane	ug/kg	--	--	--	<0.98 {<0.86}	<1 {<0.87}	<1 {<0.88}	<1 {<0.87}



**INTERIM SOURCE REMOVAL ACTION (ISRA) - OUTFALL 009**

**WASTE CHARACTERIZATION SAMPLE RESULTS – AP/STP-1E-1  
THE BOEING COMPANY  
SANTA SUSANA FIELD LABORATORY**

				Object Name:	APWC0401	APWC0402	APWC0403	APWC0404
				Sample Name:	APWC0401S001	APWC0402S001	APWC0403S001	APWC0404S001
				Collection Date:	7/29/2010	7/29/2010	7/29/2010	7/29/2010
				Sample Depth (feet):	0.5 - 1.0	0.5 - 1.0	0.5 - 1.0	0.5 - 1.0
ANALYTE	UNITS	TTLIC	WET Leachate Testing Trigger <sup>a</sup>	TCLP Leachate Testing Trigger <sup>b</sup>	RESULT <sup>c</sup>	RESULT <sup>c</sup>	RESULT <sup>c</sup>	RESULT <sup>c</sup>
1,1-Dichloroethane	ug/kg	--	--	--	<0.98 {<0.49}	<1 {<0.5}	<1 {<0.51}	<1 {<0.5}
1,1-Dichloroethene	ug/kg	--	--	14,000	<2 {<0.59}	<2 {<0.6}	<2 {<0.61}	<2 {<0.6}
1,1-Dichloropropene	ug/kg	--	--	--	<0.98 {<0.39}	<1 {<0.4}	<1 {<0.4}	<1 {<0.4}
1,2,3-Trichlorobenzene	ug/kg	--	--	--	<2 {<0.98}	<2 {<1}	<2 {<1}	<2 {<1}
1,2,3-Trichloropropane	ug/kg	--	--	--	<2 {<0.98}	<2 {<1}	<2 {<1}	<2 {<1}
1,2,4-Trichlorobenzene	ug/kg	--	--	--	<2 {<0.98}	<2 {<1}	<2 {<1}	<2 {<1}
1,2,4-Trimethylbenzene	ug/kg	--	--	--	<0.98 {<0.77}	<1 {<0.78}	<1 {<0.79}	<1 {<0.78}
1,2-Dibromo-3-chloropropane	ug/kg	--	--	--	<9.8 {<1.5}	<10 {<1.5}	<10 {<1.5}	<10 {<1.5}
1,2-Dibromoethane (EDB)	ug/kg	--	--	--	<0.98 {<0.79}	<1 {<0.8}	<1 {<0.81}	<1 {<0.8}
1,2-Dichlorobenzene	ug/kg	--	--	--	<0.98 {<0.94}	<1 {<0.95}	<1 {<0.96}	<1 {<0.95}
1,2-Dichloroethane	ug/kg	--	--	10,000	<0.98 {<0.79}	<1 {<0.8}	<1 {<0.81}	<1 {<0.8}
1,2-Dichloropropane	ug/kg	--	--	--	<0.98 {<0.79}	<1 {<0.8}	<1 {<0.81}	<1 {<0.8}
1,3,5-Trimethylbenzene	ug/kg	--	--	--	<0.98 {<0.62}	<1 {<0.63}	<1 {<0.64}	<1 {<0.63}
1,3-Dichlorobenzene	ug/kg	--	--	--	<0.98 {<0.83}	<1 {<0.84}	<1 {<0.85}	<1 {<0.84}
1,3-Dichloropropane	ug/kg	--	--	--	<0.98 {<0.62}	<1 {<0.63}	<1 {<0.64}	<1 {<0.63}
1,4-Dichlorobenzene	ug/kg	--	--	--	<0.98 {<0.93}	<1 {<0.94}	<1 {<0.95}	<1 {<0.94}
2,2-Dichloropropane	ug/kg	--	--	--	<0.98 {<0.59}	<1 {<0.6}	<1 {<0.61}	<1 {<0.6}
2-Butanone (MEK)	ug/kg	--	--	4,000,000	<9.8 {<5.9}	18	<10 {<6.1}	<10 {<6}
2-Chlorotoluene	ug/kg	--	--	--	<2 {<0.86}	<2 {<0.87}	<2 {<0.88}	<2 {<0.87}
2-Hexanone	ug/kg	--	--	--	<9.8 {<9}	<10 {<9.1}	<10 {<9.2}	<10 {<9.1}
4-Chlorotoluene	ug/kg	--	--	--	<2 {<0.73}	<2 {<0.74}	<2 {<0.75}	<2 {<0.74}
4-Methyl-2-pentanone (MIBK)	ug/kg	--	--	--	<4.9 {<4.4}	<5 {<4.5}	<5.1 {<4.6}	<5 {<4.5}
Acetone	ug/kg	--	--	--	<9.8 {<7.9}	<10 {<8}	<10 {<8.1}	<10 {<8}
Benzene	ug/kg	--	--	10,000	<0.98 {<0.49}	<1 {<0.5}	<1 {<0.51}	<1 {<0.5}
Bromobenzene	ug/kg	--	--	--	<2 {<0.83}	<2 {<0.84}	<2 {<0.85}	<2 {<0.84}
Bromochloromethane	ug/kg	--	--	--	<2 {<0.89}	<2 {<0.9}	<2 {<0.91}	<2 {<0.9}
Bromodichloromethane	ug/kg	--	--	--	<0.98 {<0.49}	<1 {<0.5}	<1 {<0.51}	<1 {<0.5}
Bromoform	ug/kg	--	--	--	<2 {<0.79}	<2 {<0.8}	<2 {<0.81}	<2 {<0.8}
Bromomethane	ug/kg	--	--	--	<2 {<0.91}	<2 {<0.92}	<2 {<0.93}	<2 {<0.92}
Carbon Disulfide	ug/kg	--	--	--	<4.9 {<0.95}	<5 {<0.97}	<5.1 {<0.98}	<5 {<0.97}
Carbon tetrachloride	ug/kg	--	--	10,000	<2 {<0.49}	<2 {<0.5}	<2 {<0.51}	<2 {<0.5}
Chlorobenzene	ug/kg	--	--	2,000,000	<0.98 {<0.51}	<1 {<0.52}	<1 {<0.53}	<1 {<0.52}
Chloroethane	ug/kg	--	--	--	<2 {<1.5}	<2 {<1.5}	<2 {<1.5}	<2 {<1.5}
Chloroform	ug/kg	--	--	120,000	<0.98 {<0.49}	<1 {<0.5}	<1 {<0.51}	<1 {<0.5}
Chloromethane	ug/kg	--	--	--	<2 {<0.98}	<2 {<1}	<2 {<1}	<2 {<1}
cis-1,2-Dichloroethene	ug/kg	--	--	--	<0.98 {<0.82}	<1 {<0.83}	<1 {<0.84}	<1 {<0.83}

**INTERIM SOURCE REMOVAL ACTION (ISRA) - OUTFALL 009**

**WASTE CHARACTERIZATION SAMPLE RESULTS – AP/STP-1E-1  
THE BOEING COMPANY  
SANTA SUSANA FIELD LABORATORY**

					Object Name:	APWC0401	APWC0402	APWC0403	APWC0404
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					Collection Date:	7/29/2010	7/29/2010	7/29/2010	7/29/2010
					Sample Depth (feet):	0.5 - 1.0	0.5 - 1.0	0.5 - 1.0	0.5 - 1.0
ANALYTE	UNITS	TTLIC	WET Leachate Testing Trigger <sup>a</sup>	TCLP Leachate Testing Trigger <sup>b</sup>	RESULT <sup>c</sup>	RESULT <sup>c</sup>	RESULT <sup>c</sup>	RESULT <sup>c</sup>	
cis-1,3-Dichloropropene	ug/kg	--	--	--	<0.98 {<0.43}	<1 {<0.44}	<1 {<0.45}	<1 {<0.44}	
Dibromochloromethane	ug/kg	--	--	--	<0.98 {<0.69}	<1 {<0.7}	<1 {<0.71}	<1 {<0.7}	
Dibromomethane	ug/kg	--	--	--	<0.98 {<0.89}	<1 {<0.9}	<1 {<0.91}	<1 {<0.9}	
Dichlorodifluoromethane	ug/kg	--	--	--	<4.9 {<1.5}	<5 {<1.5}	<5.1 {<1.5}	<5 {<1.5}	
Ethylbenzene	ug/kg	--	--	--	<0.98 {<0.49}	<1 {<0.5}	<1 {<0.51}	<1 {<0.5}	
Hexachlorobutadiene	ug/kg	--	--	--	<2 {<0.79}	<2 {<0.8}	<2 {<0.81}	<2 {<0.8}	
Isopropylbenzene	ug/kg	--	--	--	<0.98 {<0.53}	<1 {<0.54}	<1 {<0.55}	<1 {<0.54}	
m,p-Xylenes	ug/kg	--	--	--	<2 {<0.79}	<2 {<0.8}	<2 {<0.81}	<2 {<0.8}	
Methylene chloride	ug/kg	--	--	--	<9.8 {<6.4}	<10 {<6.5}	<10 {<6.6}	<10 {<6.5}	
Methyl-tert-butyl Ether (MTBE)	ug/kg	--	--	--	<2 {<0.98}	<2 {<1}	<2 {<1}	<2 {<1}	
n-Butylbenzene	ug/kg	--	--	--	<2 {<0.71}	<2 {<0.72}	<2 {<0.73}	<2 {<0.72}	
n-Propylbenzene	ug/kg	--	--	--	<0.98 {<0.6}	<1 {<0.61}	<1 {<0.62}	<1 {<0.61}	
Naphthalene	ug/kg	--	--	--	<2 {<1.1}	<2 {<1.1}	<2 {<1.1}	<2 {<1.1}	
o-Xylene	ug/kg	--	--	--	<0.98 {<0.49}	<1 {<0.5}	<1 {<0.51}	<1 {<0.5}	
p-Isopropyltoluene	ug/kg	--	--	--	<0.98 {<0.71}	<1 {<0.72}	<1 {<0.73}	<1 {<0.72}	
sec-Butylbenzene	ug/kg	--	--	--	<2 {<0.66}	<2 {<0.67}	<2 {<0.68}	<2 {<0.67}	
Styrene	ug/kg	--	--	--	<0.98 {<0.57}	<1 {<0.58}	<1 {<0.59}	<1 {<0.58}	
tert-Butylbenzene	ug/kg	--	--	--	<2 {<0.61}	<2 {<0.62}	<2 {<0.63}	<2 {<0.62}	
Tetrachloroethene	ug/kg	--	--	14,000	<0.98 {<0.48}	<1 {<0.49}	<1 {<0.5}	<1 {<0.49}	
Toluene	ug/kg	--	--	--	<0.98 {<0.49}	<1 {<0.5}	<1 {<0.51}	<1 {<0.5}	
trans-1,2-Dichloroethene	ug/kg	--	--	--	<0.98 {<0.69}	<1 {<0.7}	<1 {<0.71}	<1 {<0.7}	
trans-1,3-Dichloropropene	ug/kg	--	--	--	<0.98 {<0.6}	<1 {<0.61}	<1 {<0.62}	<1 {<0.61}	
Trichloroethene	ug/kg	2,040,000	2,040,000	10,000	<0.98 {<0.49}	<1 {<0.5}	<1 {<0.51}	<1 {<0.5}	
Trichlorofluoromethane	ug/kg	--	--	--	<2 {<0.53}	<2 {<0.54}	<2 {<0.55}	<2 {<0.54}	
Vinyl acetate	ug/kg	--	--	--	<4.9 {<2.5}	<5 {<2.5}	<5.1 {<2.5}	<5 {<2.5}	
Vinyl chloride	ug/kg	--	--	4,000	<2 {<0.9}	<2 {<0.91}	<2 {<0.92}	<2 {<0.91}	
<b>RADIONUCLIDES</b>	--	--	--	--	R	R	R	R	

**INTERIM SOURCE REMOVAL ACTION (ISRA) - OUTFALL 009**

**WASTE CHARACTERIZATION SAMPLE RESULTS – AP/STP  
THE BOEING COMPANY  
SANTA SUSANA FIELD LABORATORY**

**Notes:**

--" - not analyzed / not applicable

<5 - Analyte not detected at or above the stated method detection limit (metals) or analyte not detected at or above the stated reporting limit (organics)

{<1} - Analyte not detected at or above the stated method detection limit (organics)

<sup>a</sup> - WET Leachate Testing Trigger = STLC limit \* 10

<sup>b</sup> - TCLP Leachate Testing Trigger = TCLP limit \* 20

<sup>c</sup> Waste characterization sample results not validated

B - Analyte was detected in the associated method blank

J - Estimated value. Analyte detected at a level less than the Reporting Limit (RL) and greater than or equal to the Method Detection Limit (MDL). The user of this data should be aware that this data is of limited reliability.

M1 - The MS and/or MSD were above the acceptance limits due to sample matrix interference. See Blank Spike (LCS).

µg/kg - micrograms per kilogram

mg/kg - milligrams per kilogram

mg/L - milligrams per liter

R - Radiological analysis includes gamma spectroscopy (Na-22, K-40, Mn-54, Co-60, Cs-134, Cs-137, Eu-152, Eu-154, Th-228, Th-232, U-235, U-238 and Am-241), strontium-90, and tritium. Boeing will be preparing a document that provides the radiological results and statistical analysis of these waste characterization samples.

R-3 - The RPD exceeded the acceptance limit due to sample matrix effects

## **WASTE CHARACTERIZATION: IN-SITU SOIL LOCATED AT AREA II ISRA OUTFALL 009 PLANNED EXCAVATION AP/STP-1E-2**

### **Introduction**

This report presents supporting detailed information for the July 30, 2010 in-situ characterization sampling of prospective soil wastes from planned SSFL Area II ISRA excavations in the vicinity of the former Area II incinerator.

### **Background**

In-situ characterization was performed for soil destined to be excavated from designated locations in SSFL Area II in accordance with the ISRA Workplan. A step-by-step approach was followed to accomplish characterization of the soil prior to excavation. The first step was to review available information regarding historical area usage and existing analytical data from past soil sampling in or near planned excavation sites. The objective was to identify all substances potentially impacting the soil in each planned excavation footprint to the degree that hazardous waste regulatory thresholds would be exceeded.

The next step was to develop and implement a random sampling plan for each of the planned excavation footprints. The collected soil samples were analyzed by a state certified laboratory and the results evaluated to determine whether any of the identified substances were present at concentrations requiring further investigation. In addition, the initial random sampling results were evaluated to determine the statistical adequacy of the data provided for waste characterization based on the guidelines presented in U.S. EPA SW-846. Soil was characterized non-hazardous when analyte concentrations among the samples exhibited a reasonably small variance and there was satisfactory margin between the mean of the samples and applicable regulatory thresholds. Otherwise, additional samples would be collected and subjected to analysis, or in lieu of further testing, the soil was summarily characterized as hazardous. Statistical analyses described in SW-846 are performed as necessary to determine minimum sample point requirements and the upper confidence levels of analytical results.

The review of historical information and existing analytical data relevant to planned excavation AP/STP-1E-2 was based partly on the Group 2 RFI results. Evaluation of these data and other sources of relevant information, including recent sampling conducted specifically for ISRA, suggested that Regulated Metals (CAM17), Volatile Organic Compounds (VOC), Polychlorinated Biphenyls (PCB), and Petroleum Hydrocarbons should be addressed in the AP/STP-1E-2 excavation footprint. A random sampling plan was developed for collection of five (5) samples from the planned excavation footprint, taking into account the relatively small area to be excavated. The samples were analyzed for CAM 17 metals, VOCs, PCBs, and Petroleum Hydrocarbons. All samples were collected, contained, and handled according to field practice requirements in SW-846.

### **Results**

Analytical results for the planned excavation area at AP/STP-1E-2 are presented in Test America report ITG2804 issued on 8/6/10. Only very low concentrations of Regulated Metals were detected in any of the samples from AP/STP-1E-2. All of the detected Regulated Metals were well below 10-Times their respective California Soluble Threshold Limits (STLC) and no further testing was required.

VOCs were detected in two samples only, with Acetone observed at concentrations of 0.0089 ppm and 0.020 ppm. Trichloroethylene was also detected in one of these samples at a concentration of 0.00055 ppm. These VOCs were not detected in any of the other samples, despite the satisfactorily low analytical Method Detection Limits (range 0.00039 ppm - 0.010 ppm). Furthermore, no historical records have been found suggesting any kind of solvent related activities in the area with the detected VOCs, and the very low concentrations detected in the samples are consistent with soil vapor migration, volatilization of a groundwater contaminant, or other manifestation of an unknown source. For these reasons, the soils excavated from AP/STP-1E-2 are not being characterized as "F-Listed" wastes.

No PCBs were detected. However, low-level Petroleum Hydrocarbons were detected, with the concentration of C10-C40 fraction hydrocarbons ranging between 4.4 ppm and 130 ppm. These concentrations do not present waste disposal issues.

### **Determination**

According to analytical results and generator knowledge, the soil in the planned excavation footprint of SSFL Area II AP/STP-1E-2:

- Is Not a Listed Waste (analytical results and generator knowledge)
- Is Not ignitable (generator knowledge)
- Is Not corrosive (generator knowledge)
- Is Not reactive (generator knowledge)
- Is Not toxic (analytical results and generator knowledge)
  - Is Not Extremely or Acutely Hazardous Waste
  - Does not exceed any RCRA or Title 22 characteristic thresholds
  - Is Not subject to the Prop. 65 listing if it is applied to 22 CCR 66261.24(a)(7)
  - Is Not subject to Title 22 Appendix X list
  - Is Not known by experience or testing to pose a hazard to human health or environment because of its carcinogenicity, acute toxicity, chronic toxicity, bio-accumulative properties, or persistence in the environment.

**The soil in AP/STP-1E-2 is NON-HAZARDOUS.**

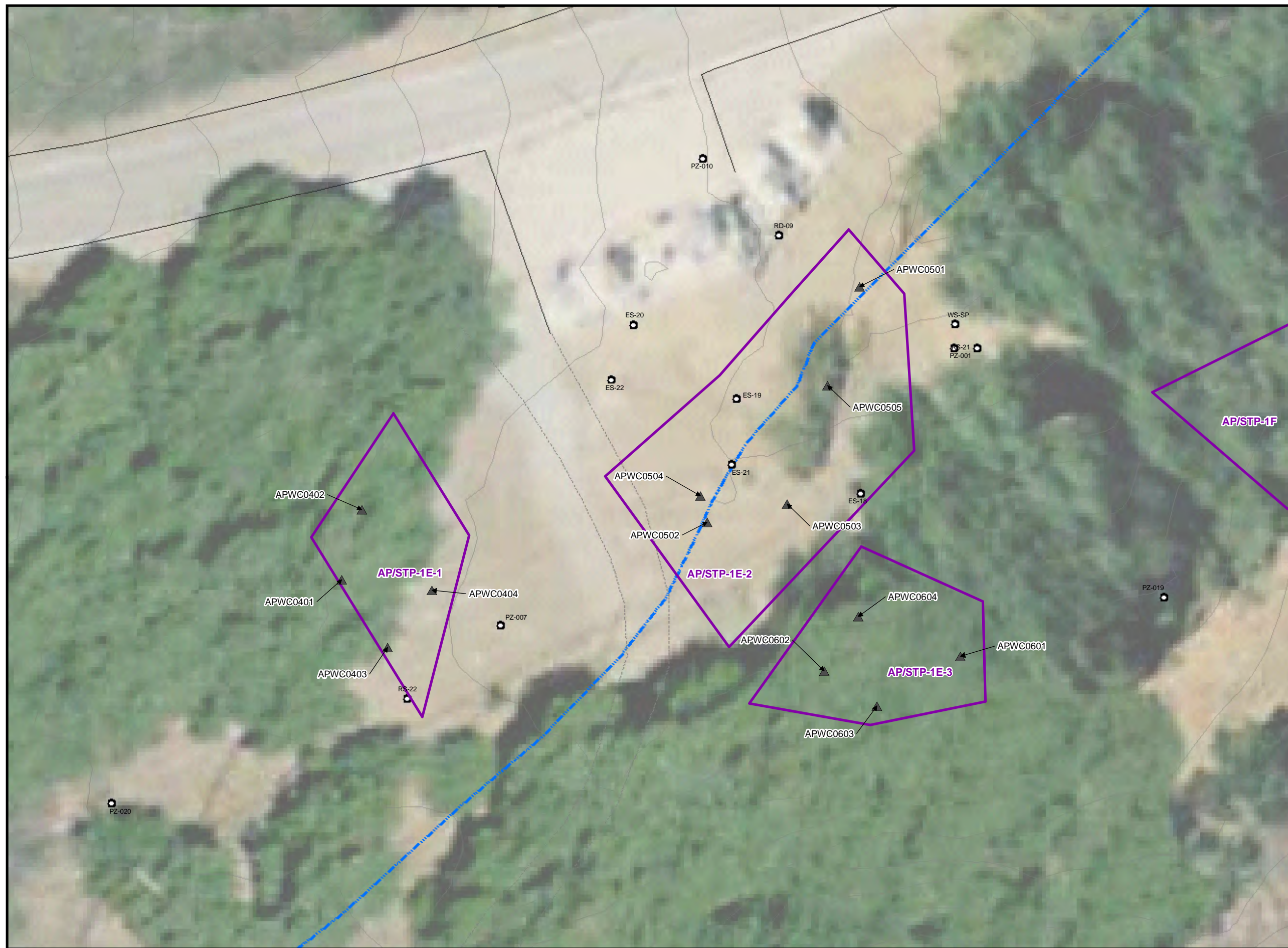
**Outfall 009**  
**Sample Locations for AP/STP - 1E-1,**  
**AP/STP - 1E-2, AP/STP - 1E-3**

**Base Map Legend**

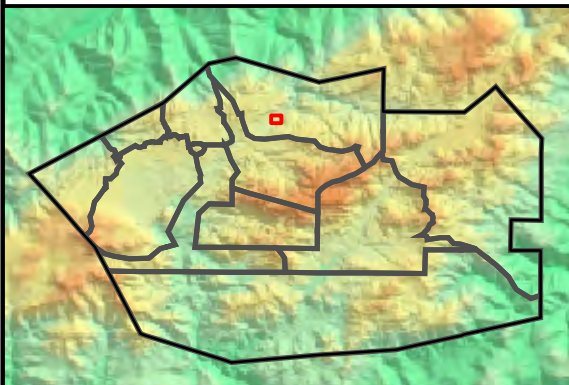
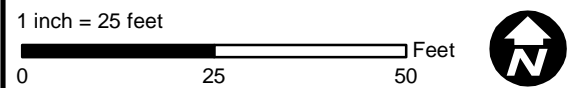
- Administrative Area Boundary
- RFI Site Boundary
- Report Group Boundary
- NPDES Outfall
- Dirt Road
- A/C Paving
- Drainage
- Non Jurisdictional Surface Water Pathway
- Surface Water Divide
- Elevation Contour

**Figure Legend**

- Waste Characterization Sample



Document: ISRA\_Plots\_SP\_RD47\_SampleLocations\_060710.mxd Date: Jun 22, 2010



**INTERIM SOURCE REMOVAL ACTION (ISRA) - OUTFALL 009**

**WASTE CHARACTERIZATION SAMPLE RESULTS – AP/STP-1E-2  
THE BOEING COMPANY  
SANTA SUSANA FIELD LABORATORY**

			Object Name:		APWC0501	APWC0502	APWC0503	APWC0504	APWC0505
			Sample Name:		APWC0501S001	APWC0502S001	APWC0503S001	APWC0504S001	APWC0505S001
			Collection Date:		7/30/2010	7/30/2010	7/30/2010	7/30/2010	7/30/2010
			Sample Depth (feet):		0.5 - 1.0	0.5 - 1.0	0.5 - 1.0	0.5 - 1.0	0.5 - 1.0
ANALYTE	UNITS	TTLIC	WET Leachate Testing Trigger <sup>a</sup>	TCLP Leachate Testing Trigger <sup>b</sup>	RESULT <sup>c</sup>	RESULT <sup>c</sup>	RESULT <sup>c</sup>	RESULT <sup>c</sup>	RESULT <sup>c</sup>
<b>METALS</b>									
Antimony	mg/kg	500	150	--	1.5 J	<0.87	<0.88	0.88 J	<0.87
Arsenic	mg/kg	500	50	100	9.4	7.2	4.6	2.5	4.4
Barium	mg/kg	10,000	1,000	2,000	120	72	100	78	91
Beryllium	mg/kg	75	7.5	--	0.5	0.56	0.49 J	<0.2	0.47 J
Cadmium	mg/kg	100	10	20	<0.20	<0.20	<0.20	<0.20	<0.20
Chromium	mg/kg	500	50	100	19	22	19	8.8	18
Cobalt	mg/kg	8,000	800	--	4.8	5.7	5.3	4.4	5
Copper	mg/kg	2,500	250	--	12	12	15	11	9.4
Lead	mg/kg	1,000	50	100	17	6.8	11	4.7	5.7
Mercury	mg/kg	20	2	4	0.02	0.013 J	<0.012	<0.012	<0.012
Molybdenum	mg/kg	3,500	3,500	--	0.94 J	0.88 J	0.68 J	0.45 J	0.7 J
Nickel	mg/kg	2,000	200	--	12	13	12	9	11
Selenium	mg/kg	100	10	20	<0.99	<0.99	<1	1 J	<0.99
Silver	mg/kg	500	50	100	13	<0.79	0.81 J	5.7	<0.79
Thallium	mg/kg	700	70	--	<0.79	<0.79	<0.8	<0.79	<0.79
Vanadium	mg/kg	2,400	240	--	34	40	35	26	32
Zinc	mg/kg	5,000	2,500	--	260	46	62	58	54
<b>PCBs</b>									
Aroclor 1016	ug/kg	50,000	50,000	--	<50 {<12}	<50 {<12}	<50 {<12}	<50 {<12}	<50 {<12}
Aroclor 1221	ug/kg	50,000	50,000	--	<50 {<12}	<50 {<12}	<50 {<12}	<50 {<12}	<50 {<12}
Aroclor 1232	ug/kg	50,000	50,000	--	<50 {<12}	<50 {<12}	<50 {<12}	<50 {<12}	<50 {<12}
Aroclor 1242	ug/kg	50,000	50,000	--	<50 {<12}	<50 {<12}	<50 {<12}	<50 {<12}	<50 {<12}
Aroclor 1248	ug/kg	50,000	50,000	--	<50 {<12}	<50 {<12}	<50 {<12}	<50 {<12}	<50 {<12}
Aroclor 1254	ug/kg	50,000	50,000	--	<50 {<12}	<50 {<12}	<50 {<12}	<50 {<12}	<50 {<12}
Aroclor 1260	ug/kg	50,000	50,000	--	<50 {<12}	<50 {<12}	<50 {<12}	<50 {<12}	<50 {<12}
<b>TPH</b>									
Gasoline Range Organics (C6-C12)	mg/kg	--	--	--	<0.37 {<0.14}	<0.37 {<0.14}	<0.39 {<0.15}	<0.34 {<0.13}	<0.36 {<0.13}
EFH (C10 - C24)	mg/kg	--	--	--	<5 {<3.5}	<5 {<3.5}	<5 {<3.5}	18	<5 {<3.5}
EFH (C10 - C40)	mg/kg	--	--	--	15	<5 {<3.5}	4.8 J	130	4.4 J
EFH (C25 - C40)	mg/kg	--	--	--	12	<5 {<3.5}	4.2 J	110	3.6 J
<b>VOCs</b>									
1,1,1,2-Tetrachloroethane	ug/kg	--	--	--	<2.2 {<0.63}	<2.2 {<0.63}	<1.9 {<0.55}	<2.2 {<0.63}	<2.2 {<0.63}
1,1,1-Trichloroethane	ug/kg	--	--	--	<1.1 {<0.77}	<1.1 {<0.77}	<0.97 {<0.68}	<1.1 {<0.78}	<1.1 {<0.78}
1,1,2,2-Tetrachloroethane	ug/kg	--	--	--	<2.2 {<0.95}	<2.2 {<0.95}	<1.9 {<0.83}	<2.2 {<0.95}	<2.2 {<0.96}
1,1,2-Trichloroethane	ug/kg	--	--	--	<1.1 {<0.96}	<1.1 {<0.96}	<0.97 {<0.84}	<1.1 {<0.96}	<1.1 {<0.97}

INTERIM SOURCE REMOVAL ACTION (ISRA) - OUTFALL 009

WASTE CHARACTERIZATION SAMPLE RESULTS – AP/STP-1E-2  
 THE BOEING COMPANY  
 SANTA SUSANA FIELD LABORATORY

			Object Name:		APWC0501	APWC0502	APWC0503	APWC0504	APWC0505
			Sample Name:		APWC0501S001	APWC0502S001	APWC0503S001	APWC0504S001	APWC0505S001
			Collection Date:		7/30/2010	7/30/2010	7/30/2010	7/30/2010	7/30/2010
			Sample Depth (feet):		0.5 - 1.0	0.5 - 1.0	0.5 - 1.0	0.5 - 1.0	0.5 - 1.0
ANALYTE	UNITS	TTLIC	WET Leachate Testing Trigger <sup>a</sup>	TCLP Leachate Testing Trigger <sup>b</sup>	RESULT <sup>c</sup>	RESULT <sup>c</sup>	RESULT <sup>c</sup>	RESULT <sup>c</sup>	RESULT <sup>c</sup>
1,1-Dichloroethane	ug/kg	--	--	--	<1.1 {<0.55}	<1.1 {<0.55}	<0.97 {<0.48}	<1.1 {<0.55}	<1.1 {<0.56}
1,1-Dichloroethene	ug/kg	--	--	14,000	<2.2 {<0.66}	<2.2 {<0.66}	<1.9 {<0.58}	<2.2 {<0.67}	<2.2 {<0.67}
1,1-Dichloropropene	ug/kg	--	--	--	<1.1 {<0.44}	<1.1 {<0.44}	<0.97 {<0.39}	<1.1 {<0.44}	<1.1 {<0.44}
1,2,3-Trichlorobenzene	ug/kg	--	--	--	<2.2 {<1.1}	<2.2 {<1.1}	<1.9 {<0.97}	<2.2 {<1.1}	<2.2 {<1.1}
1,2,3-Trichloropropane	ug/kg	--	--	--	<2.2 {<1.1}	<2.2 {<1.1}	<1.9 {<0.97}	<2.2 {<1.1}	<2.2 {<1.1}
1,2,4-Trichlorobenzene	ug/kg	--	--	--	<2.2 {<1.1}	<2.2 {<1.1}	<1.9 {<0.97}	<2.2 {<1.1}	<2.2 {<1.1}
1,2,4-Trimethylbenzene	ug/kg	--	--	--	<1.1 {<0.86}	<1.1 {<0.86}	<0.97 {<0.76}	<1.1 {<0.86}	<1.1 {<0.87}
1,2-Dibromo-3-chloropropane	ug/kg	--	--	--	<11 {<1.7}	<11 {<1.7}	<9.7 {<1.5}	<11 {<1.7}	<11 {<1.7}
1,2-Dibromoethane (EDB)	ug/kg	--	--	--	<1.1 {<0.88}	<1.1 {<0.88}	<0.97 {<0.78}	<1.1 {<0.89}	<1.1 {<0.89}
1,2-Dichlorobenzene	ug/kg	--	--	--	<1.1 {<1.1}	<1.1 {<1}	<0.97 {<0.92}	<1.1 {<1.1}	<1.1 {<1.1}
1,2-Dichloroethane	ug/kg	--	--	10,000	<1.1 {<0.88}	<1.1 {<0.88}	<0.97 {<0.78}	<1.1 {<0.89}	<1.1 {<0.89}
1,2-Dichloropropane	ug/kg	--	--	--	<1.1 {<0.88}	<1.1 {<0.88}	<0.97 {<0.78}	<1.1 {<0.89}	<1.1 {<0.89}
1,3,5-Trimethylbenzene	ug/kg	--	--	--	<1.1 {<0.7}	<1.1 {<0.7}	<0.97 {<0.61}	<1.1 {<0.7}	<1.1 {<0.7}
1,3-Dichlorobenzene	ug/kg	--	--	--	<1.1 {<0.93}	<1.1 {<0.93}	<0.97 {<0.81}	<1.1 {<0.93}	<1.1 {<0.93}
1,3-Dichloropropane	ug/kg	--	--	--	<1.1 {<0.7}	<1.1 {<0.7}	<0.97 {<0.61}	<1.1 {<0.7}	<1.1 {<0.7}
1,4-Dichlorobenzene	ug/kg	--	--	--	<1.1 {<1}	<1.1 {<1}	<0.97 {<0.91}	<1.1 {<1}	<1.1 {<1}
2,2-Dichloropropane	ug/kg	--	--	--	<1.1 {<0.66}	<1.1 {<0.66}	<0.97 {<0.58}	<1.1 {<0.67}	<1.1 {<0.67}
2-Butanone (MEK)	ug/kg	--	--	4,000,000	<11 {<6.6}	<11 {<6.6}	<9.7 {<5.8}	<11 {<6.7}	<11 {<6.7}
2-Chlorotoluene	ug/kg	--	--	--	<2.2 {<0.96}	<2.2 {<0.96}	<1.9 {<0.84}	<2.2 {<0.96}	<2.2 {<0.97}
2-Hexanone	ug/kg	--	--	--	<11 {<10}	<11 {<10}	<9.7 {<8.8}	<11 {<10}	<11 {<10}
4-Chlorotoluene	ug/kg	--	--	--	<2.2 {<0.82}	<2.2 {<0.82}	<1.9 {<0.72}	<2.2 {<0.82}	<2.2 {<0.82}
4-Methyl-2-pentanone (MIBK)	ug/kg	--	--	--	<5.5 {<5}	<5.5 {<5}	<4.8 {<4.4}	<5.5 {<5}	<5.6 {<5}
Acetone	ug/kg	--	--	--	20	<11 {<8.8}	<9.7 {<7.8}	8.9 J	<11 {<8.9}
Benzene	ug/kg	--	--	10,000	<1.1 {<0.55}	<1.1 {<0.55}	<0.97 {<0.48}	<1.1 {<0.55}	<1.1 {<0.56}
Bromobenzene	ug/kg	--	--	--	<2.2 {<0.93}	<2.2 {<0.93}	<1.9 {<0.81}	<2.2 {<0.93}	<2.2 {<0.93}
Bromochloromethane	ug/kg	--	--	--	<2.2 {<1}	<2.2 {<0.99}	<1.9 {<0.87}	<2.2 {<1}	<2.2 {<1}
Bromodichloromethane	ug/kg	--	--	--	<1.1 {<0.55}	<1.1 {<0.55}	<0.97 {<0.48}	<1.1 {<0.55}	<1.1 {<0.56}
Bromoform	ug/kg	--	--	--	<2.2 {<0.88}	<2.2 {<0.88}	<1.9 {<0.78}	<2.2 {<0.89}	<2.2 {<0.89}
Bromomethane	ug/kg	--	--	--	<2.2 {<1}	<2.2 {<1}	<1.9 {<0.89}	<2.2 {<1}	<2.2 {<1}
Carbon Disulfide	ug/kg	--	--	--	<5.5 {<1.1}	<5.5 {<1.1}	<4.8 {<0.94}	<5.5 {<1.1}	<5.6 {<1.1}
Carbon tetrachloride	ug/kg	--	--	10,000	<2.2 {<0.55}	<2.2 {<0.55}	<1.9 {<0.48}	<2.2 {<0.55}	<2.2 {<0.56}
Chlorobenzene	ug/kg	--	--	2,000,000	<1.1 {<0.58}	<1.1 {<0.57}	<0.97 {<0.5}	<1.1 {<0.58}	<1.1 {<0.58}
Chloroethane	ug/kg	--	--	--	<2.2 {<1.7}	<2.2 {<1.7}	<1.9 {<1.5}	<2.2 {<1.7}	<2.2 {<1.7}
Chloroform	ug/kg	--	--	120,000	<1.1 {<0.55}	<1.1 {<0.55}	<0.97 {<0.48}	<1.1 {<0.55}	<1.1 {<0.56}
Chloromethane	ug/kg	--	--	--	<2.2 {<1.1}	<2.2 {<1.1}	<1.9 {<0.97}	<2.2 {<1.1}	<2.2 {<1.1}
cis-1,2-Dichloroethene	ug/kg	--	--	--	<1.1 {<0.92}	<1.1 {<0.92}	<0.97 {<0.8}	<1.1 {<0.92}	<1.1 {<0.92}



**INTERIM SOURCE REMOVAL ACTION (ISRA) - OUTFALL 009**

**WASTE CHARACTERIZATION SAMPLE RESULTS – AP/STP-1E-2  
THE BOEING COMPANY  
SANTA SUSANA FIELD LABORATORY**

			Object Name:		APWC0501	APWC0502	APWC0503	APWC0504	APWC0505
			Sample Name:		APWC0501S001	APWC0502S001	APWC0503S001	APWC0504S001	APWC0505S001
			Collection Date:		7/30/2010	7/30/2010	7/30/2010	7/30/2010	7/30/2010
			Sample Depth (feet):		0.5 - 1.0	0.5 - 1.0	0.5 - 1.0	0.5 - 1.0	0.5 - 1.0
ANALYTE	UNITS	TTLIC	WET Leachate Testing Trigger <sup>a</sup>	TCLP Leachate Testing Trigger <sup>b</sup>	RESULT <sup>c</sup>	RESULT <sup>c</sup>	RESULT <sup>c</sup>	RESULT <sup>c</sup>	RESULT <sup>c</sup>
cis-1,3-Dichloropropene	ug/kg	--	--	--	<1.1 {<0.49}	<1.1 {<0.49}	<0.97 {<0.43}	<1.1 {<0.49}	<1.1 {<0.49}
Dibromochloromethane	ug/kg	--	--	--	<1.1 {<0.77}	<1.1 {<0.77}	<0.97 {<0.68}	<1.1 {<0.78}	<1.1 {<0.78}
Dibromomethane	ug/kg	--	--	--	<1.1 {<1}	<1.1 {<0.99}	<0.97 {<0.87}	<1.1 {<1}	<1.1 {<1}
Dichlorodifluoromethane	ug/kg	--	--	--	<5.5 {<1.7}	<5.5 {<1.7}	<4.8 {<1.5}	<5.5 {<1.7}	<5.6 {<1.7}
Ethylbenzene	ug/kg	--	--	--	<1.1 {<0.55}	<1.1 {<0.55}	<0.97 {<0.48}	<1.1 {<0.55}	<1.1 {<0.56}
Hexachlorobutadiene	ug/kg	--	--	--	<2.2 {<0.88}	<2.2 {<0.88}	<1.9 {<0.78}	<2.2 {<0.89}	<2.2 {<0.89}
Isopropylbenzene	ug/kg	--	--	--	<1.1 {<0.6}	<1.1 {<0.6}	<0.97 {<0.52}	<1.1 {<0.6}	<1.1 {<0.6}
m,p-Xylenes	ug/kg	--	--	--	<2.2 {<0.88}	<2.2 {<0.88}	<1.9 {<0.78}	<2.2 {<0.89}	<2.2 {<0.89}
Methylene chloride	ug/kg	--	--	--	<11 {<7.2}	<11 {<7.2}	<9.7 {<6.3}	<11 {<7.2}	<11 {<7.2}
Methyl-tert-butyl Ether (MTBE)	ug/kg	--	--	--	<2.2 {<1.1}	<2.2 {<1.1}	<1.9 {<0.97}	<2.2 {<1.1}	<2.2 {<1.1}
n-Butylbenzene	ug/kg	--	--	--	<2.2 {<0.8}	<2.2 {<0.79}	<1.9 {<0.7}	<2.2 {<0.8}	<2.2 {<0.8}
n-Propylbenzene	ug/kg	--	--	--	<1.1 {<0.67}	<1.1 {<0.67}	<0.97 {<0.59}	<1.1 {<0.68}	<1.1 {<0.68}
Naphthalene	ug/kg	--	--	--	<2.2 {<1.2}	<2.2 {<1.2}	<1.9 {<1.1}	<2.2 {<1.2}	<2.2 {<1.2}
o-Xylene	ug/kg	--	--	--	<1.1 {<0.55}	<1.1 {<0.55}	<0.97 {<0.48}	<1.1 {<0.55}	<1.1 {<0.56}
p-Isopropyltoluene	ug/kg	--	--	--	<1.1 {<0.8}	<1.1 {<0.79}	<0.97 {<0.7}	<1.1 {<0.8}	<1.1 {<0.8}
sec-Butylbenzene	ug/kg	--	--	--	<2.2 {<0.74}	<2.2 {<0.74}	<1.9 {<0.65}	<2.2 {<0.74}	<2.2 {<0.74}
Styrene	ug/kg	--	--	--	<1.1 {<0.64}	<1.1 {<0.64}	<0.97 {<0.56}	<1.1 {<0.64}	<1.1 {<0.64}
tert-Butylbenzene	ug/kg	--	--	--	<2.2 {<0.69}	<2.2 {<0.68}	<1.9 {<0.6}	<2.2 {<0.69}	<2.2 {<0.69}
Tetrachloroethene	ug/kg	--	--	14,000	<1.1 {<0.54}	<1.1 {<0.54}	<0.97 {<0.47}	<1.1 {<0.54}	<1.1 {<0.54}
Toluene	ug/kg	--	--	--	<1.1 {<0.55}	<1.1 {<0.55}	<0.97 {<0.48}	<1.1 {<0.55}	<1.1 {<0.56}
trans-1,2-Dichloroethene	ug/kg	--	--	--	<1.1 {<0.77}	<1.1 {<0.77}	<0.97 {<0.68}	<1.1 {<0.78}	<1.1 {<0.78}
trans-1,3-Dichloropropene	ug/kg	--	--	--	<1.1 {<0.67}	<1.1 {<0.67}	<0.97 {<0.59}	<1.1 {<0.68}	<1.1 {<0.68}
Trichloroethene	ug/kg	2,040,000	2,040,000	10,000	<1.1 {<0.55}	<1.1 {<0.55}	<0.97 {<0.48}	0.55 J	<1.1 {<0.56}
Trichlorofluoromethane	ug/kg	--	--	--	<2.2 {<0.6}	<2.2 {<0.6}	<1.9 {<0.52}	<2.2 {<0.6}	<2.2 {<0.6}
Vinyl acetate	ug/kg	--	--	--	<5.5 {<2.8}	<5.5 {<2.8}	<4.8 {<2.4}	<5.5 {<2.8}	<5.6 {<2.8}
Vinyl chloride	ug/kg	--	--	4,000	<2.2 {<1}	<2.2 {<1}	<1.9 {<0.88}	<2.2 {<1}	<2.2 {<1}
<b>RADIONUCLIDES</b>	--	--	--	--	R	R	R	R	R

**INTERIM SOURCE REMOVAL ACTION (ISRA) - OUTFALL 009**

**WASTE CHARACTERIZATION SAMPLE RESULTS – AP/STP  
THE BOEING COMPANY  
SANTA SUSANA FIELD LABORATORY**

**Notes:**

--" - not analyzed / not applicable

<5 - Analyte not detected at or above the stated method detection limit (metals) or analyte not detected at or above the stated reporting limit (organics)

{<1} - Analyte not detected at or above the stated method detection limit (organics)

<sup>a</sup> - WET Leachate Testing Trigger = STLC limit \* 10

<sup>b</sup> - TCLP Leachate Testing Trigger = TCLP limit \* 20

<sup>c</sup> Waste characterization sample results not validated

B - Analyte was detected in the associated method blank

J - Estimated value. Analyte detected at a level less than the Reporting Limit (RL) and greater than or equal to the Method Detection Limit (MDL). The user of this data should be aware that this data is of limited reliability.

M1 - The MS and/or MSD were above the acceptance limits due to sample matrix interference. See Blank Spike (LCS).

µg/kg - micrograms per kilogram

mg/kg - milligrams per kilogram

mg/L - milligrams per liter

R - Radiological analysis includes gamma spectroscopy (Na-22, K-40, Mn-54, Co-60, Cs-134, Cs-137, Eu-152, Eu-154, Th-228, Th-232, U-235, U-238 and Am-241), strontium-90, and tritium. Boeing will be preparing a document that provides the radiological results and statistical analysis of these waste characterization samples.

R-3 - The RPD exceeded the acceptance limit due to sample matrix effects

## **WASTE CHARACTERIZATION: IN-SITU SOIL LOCATED AT AREA II ISRA OUTFALL 009 PLANNED EXCAVATION AP/STP-1E-3**

### **Introduction**

This report presents supporting detailed information for the July 29 - 30, 2010 in-situ characterization sampling of prospective soil wastes from planned SSFL Area II ISRA excavations in the vicinity of the former Area II incinerator.

### **Background**

In-situ characterization was performed for soil destined to be excavated from designated locations in SSFL Area II in accordance with the ISRA Workplan. A step-by-step approach was followed to accomplish characterization of the soil prior to excavation. The first step was to review available information regarding historical area usage and existing analytical data from past soil sampling in or near planned excavation sites. The objective was to identify all substances potentially impacting the soil in each planned excavation footprint to the degree that hazardous waste regulatory thresholds would be exceeded.

The next step was to develop and implement a random sampling plan for each of the planned excavation footprints. The collected soil samples were analyzed by a state certified laboratory and the results evaluated to determine whether any of the identified substances were present at concentrations requiring further investigation. In addition, the initial random sampling results were evaluated to determine the statistical adequacy of the data provided for waste characterization based on the guidelines presented in U.S. EPA SW-846. Soil was characterized non-hazardous when analyte concentrations among the samples exhibited a reasonably small variance and there was satisfactory margin between the mean of the samples and applicable regulatory thresholds. Otherwise, additional samples were collected and subjected to analysis, or in lieu of further testing, the soil was summarily characterized as hazardous. Statistical analyses described in SW-846 are performed as necessary to determine minimum sample point requirements and the upper confidence levels of analytical results.

The review of historical information and existing analytical data relevant to planned excavation AP/STP-1E-3 was based partly on the Group 2 RFI results. Evaluation of these data and other sources of relevant information, including recent sampling conducted specifically for ISRA, suggested that Regulated Metals (CAM17), Volatile Organic Compounds (VOC), Polychlorinated Biphenyls (PCB), and Petroleum Hydrocarbons should be addressed in the AP/STP-1E-3 excavation footprint. A random sampling plan was developed for collection of four (4) samples from the planned excavation footprint, taking into account the relatively small area to be excavated. The samples were analyzed for CAM 17 metals, VOCs, PCBs, and Petroleum Hydrocarbons. All samples were collected, contained, and handled according to field practice requirements in SW-846.

### **Results**

Analytical results for the planned excavation area at AP/STP-1E-3 are presented in Test America reports ITG2666 and ITG2805, both of which were issued on 8/6/10. Only very low concentrations of Regulated Metals were detected in any of the samples from AP/STP-1E-3. All of the detected Regulated Metals were well below 10-Times their respective California Soluble Threshold Limits (STLC) and no further testing was required.

No VOCs or PCBs were detected in any of the samples, while Method Detection Limits (MDL) for all analytes were no higher than the low parts per billion range (ppb). Petroleum Hydrocarbons were detected at very low levels, with a maximum concentration in the C10-C40 range of 15 ppm.

**Determination**

According to analytical results and generator knowledge, the soil in the planned excavation footprint of SSFL Area II AP/STP-1E-3:

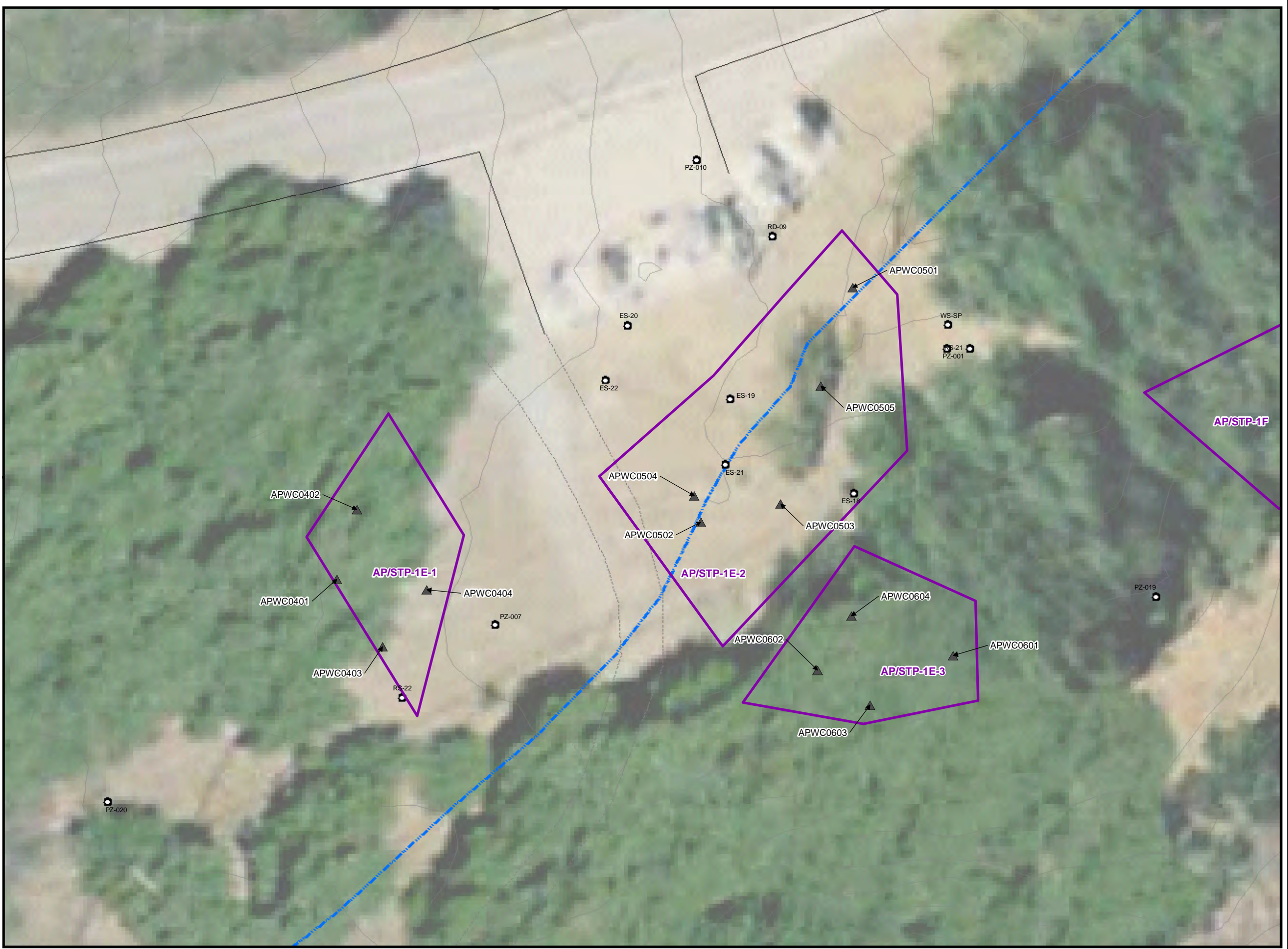
- Is Not a Listed Waste (analytical results and generator knowledge)
- Is Not ignitable (generator knowledge)
- Is Not corrosive (generator knowledge)
- Is Not reactive (generator knowledge)
- Is Not toxic (analytical results and generator knowledge)
  - Is Not Extremely or Acutely Hazardous Waste
  - Does not exceed any RCRA or Title 22 characteristic thresholds
  - Is Not subject to the Prop. 65 listing if it is applied to 22 CCR 66261.24(a)(7)
  - Is Not subject to Title 22 Appendix X list
  - Is Not known by experience or testing to pose a hazard to human health or environment because of its carcinogenicity, acute toxicity, chronic toxicity, bio-accumulative properties, or persistence in the environment.

**The soil in AP/STP-1E-3 is NON-HAZARDOUS.**

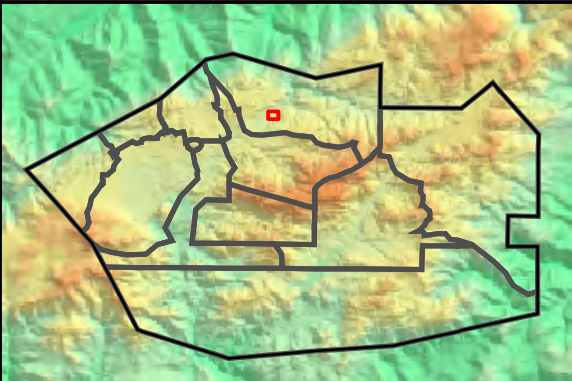
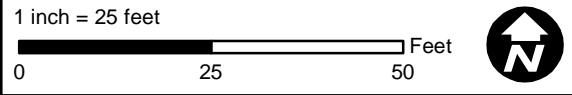
**Outfall 009**  
**Sample Locations for AP/STP - 1E-1,**  
**AP/STP - 1E-2, AP/STP - 1E-3**

- Base Map Legend**
- Administrative Area Boundary
  - RFI Site Boundary
  - Report Group Boundary
  - NPDES Outfall
  - Dirt Road
  - A/C Paving
  - Drainage
  - Non Jurisdictional Surface Water Pathway
  - Surface Water Divide
  - Elevation Contour

- Figure Legend**
- ▲ Waste Characterization Sample



Document: ISRA\_Plots\_SP\_RD47\_SampleLocations\_060710.mxd Date: Jun 22, 2010



S A N T A S U S A N A F I E L D L A B O R A T O R Y

FIGURE X

**INTERIM SOURCE REMOVAL ACTION (ISRA) - OUTFALL 009**

**WASTE CHARACTERIZATION SAMPLE RESULTS – AP/STP-1E-3  
THE BOEING COMPANY  
SANTA SUSANA FIELD LABORATORY**

				Object Name:	APWC0601	APWC0602	APWC0603	APWC0604
				Sample Name:	APWC0601S001	APWC0602S001	APWC0603S001	APWC0604S001
				Collection Date:	7/30/2010	7/29/2010	7/29/2010	7/30/2010
				Sample Depth (feet):	0.5 - 1.0	0.5 - 1.0	0.5 - 1.0	0.5 - 1.0
ANALYTE	UNITS	TTLc	WET Leachate Testing Trigger <sup>a</sup>	TCLP Leachate Testing Trigger <sup>b</sup>	RESULT <sup>c</sup>	RESULT <sup>c</sup>	RESULT <sup>c</sup>	RESULT <sup>c</sup>
<b>METALS</b>								
Antimony	mg/kg	500	150	--	<0.88	1.2 J	1.5 J	<0.87
Arsenic	mg/kg	500	50	100	4.8	5.9	6.8	4.7
Barium	mg/kg	10,000	1,000	2,000	89	93	120	83
Beryllium	mg/kg	75	7.5	--	0.5	0.59	0.69	0.51
Cadmium	mg/kg	100	10	20	<0.20	<0.20	<0.20	<0.20
Chromium	mg/kg	500	50	100	18	21	26	20
Cobalt	mg/kg	8,000	800	--	4.9	6.2	6.8	5.2
Copper	mg/kg	2,500	250	--	9.8	11	13	9.7
Lead	mg/kg	1,000	50	100	6.9	5.8	6.2	5.8
Mercury	mg/kg	20	2	4	<0.012	0.013 J	<0.012	<0.012
Molybdenum	mg/kg	3,500	3,500	--	0.83 J	0.86 J	0.89 J	0.77 J
Nickel	mg/kg	2,000	200	--	12	13	15	11
Selenium	mg/kg	100	10	20	<1	1.2 J	<0.99	0.99 J
Silver	mg/kg	500	50	100	<0.8	<0.8	<0.79	<0.79
Thallium	mg/kg	700	70	--	<0.8	<0.8	<0.79	<0.79
Vanadium	mg/kg	2,400	240	--	34	42	47	35
Zinc	mg/kg	5,000	2,500	--	51	53	63	50
<b>PCBs</b>								
Aroclor 1016	ug/kg	50,000	50,000	--	<50 {<12}	<50 {<12}	<50 {<12}	<50 {<12}
Aroclor 1221	ug/kg	50,000	50,000	--	<50 {<12}	<50 {<12}	<50 {<12}	<50 {<12}
Aroclor 1232	ug/kg	50,000	50,000	--	<50 {<12}	<50 {<12}	<50 {<12}	<50 {<12}
Aroclor 1242	ug/kg	50,000	50,000	--	<50 {<12}	<50 {<12}	<50 {<12}	<50 {<12}
Aroclor 1248	ug/kg	50,000	50,000	--	<50 {<12}	<50 {<12}	<50 {<12}	<50 {<12}
Aroclor 1254	ug/kg	50,000	50,000	--	<50 {<12}	<50 {<12}	<50 {<12}	<50 {<12}
Aroclor 1260	ug/kg	50,000	50,000	--	<50 {<12}	<50 {<12}	<50 {<12}	<50 {<12}
<b>TPH</b>								
Gasoline Range Organics (C6-C12)	mg/kg	--	--	--	<0.37 {<0.14}	<0.32 {<0.12}	<0.3 {<0.11}	<0.38 {<0.14}
EFH (C10 - C24)	mg/kg	--	--	--	<5 {<3.5}	<15 {<10}	<5 {<3.5}	<5 {<3.5}
EFH (C10 - C40)	mg/kg	--	--	--	4.6 J	15	7.4	<5 {<3.5}
EFH (C25 - C40)	mg/kg	--	--	--	3.9 J	10 J	5.3	<5 {<3.5}
<b>VOCs</b>								
1,1,1,2-Tetrachloroethane	ug/kg	--	--	--	<2.2 {<0.63}	<2 {<0.57}	<2 {<0.56}	<2.2 {<0.63}
1,1,1-Trichloroethane	ug/kg	--	--	--	<1.1 {<0.78}	<0.99 {<0.7}	<0.99 {<0.69}	<1.1 {<0.78}
1,1,2,2-Tetrachloroethane	ug/kg	--	--	--	<2.2 {<0.95}	<2 {<0.85}	<2 {<0.85}	<2.2 {<0.96}
1,1,2-Trichloroethane	ug/kg	--	--	--	<1.1 {<0.96}	<0.99 {<0.86}	<0.99 {<0.86}	<1.1 {<0.97}

**INTERIM SOURCE REMOVAL ACTION (ISRA) - OUTFALL 009**

**WASTE CHARACTERIZATION SAMPLE RESULTS – AP/STP-1E-3  
THE BOEING COMPANY  
SANTA SUSANA FIELD LABORATORY**

				Object Name:	APWC0601	APWC0602	APWC0603	APWC0604
				Sample Name:	APWC0601S001	APWC0602S001	APWC0603S001	APWC0604S001
				Collection Date:	7/30/2010	7/29/2010	7/29/2010	7/30/2010
				Sample Depth (feet):	0.5 - 1.0	0.5 - 1.0	0.5 - 1.0	0.5 - 1.0
ANALYTE	UNITS	TTLIC	WET Leachate Testing Trigger <sup>a</sup>	TCLP Leachate Testing Trigger <sup>b</sup>	RESULT <sup>c</sup>	RESULT <sup>c</sup>	RESULT <sup>c</sup>	RESULT <sup>c</sup>
1,1-Dichloroethane	ug/kg	--	--	--	<1.1 {<0.55}	<0.99 {<0.5}	<0.99 {<0.5}	<1.1 {<0.56}
1,1-Dichloroethene	ug/kg	--	--	14,000	<2.2 {<0.67}	<2 {<0.6}	<2 {<0.59}	<2.2 {<0.67}
1,1-Dichloropropene	ug/kg	--	--	--	<1.1 {<0.44}	<0.99 {<0.4}	<0.99 {<0.4}	<1.1 {<0.44}
1,2,3-Trichlorobenzene	ug/kg	--	--	--	<2.2 {<1.1}	<2 {<0.99}	<2 {<0.99}	<2.2 {<1.1}
1,2,3-Trichloropropane	ug/kg	--	--	--	<2.2 {<1.1}	<2 {<0.99}	<2 {<0.99}	<2.2 {<1.1}
1,2,4-Trichlorobenzene	ug/kg	--	--	--	<2.2 {<1.1}	<2 {<0.99}	<2 {<0.99}	<2.2 {<1.1}
1,2,4-Trimethylbenzene	ug/kg	--	--	--	<1.1 {<0.86}	<0.99 {<0.78}	<0.99 {<0.77}	<1.1 {<0.87}
1,2-Dibromo-3-chloropropane	ug/kg	--	--	--	<11 {<1.7}	<9.9 {<1.5}	<9.9 {<1.5}	<11 {<1.7}
1,2-Dibromoethane (EDB)	ug/kg	--	--	--	<1.1 {<0.89}	<0.99 {<0.8}	<0.99 {<0.79}	<1.1 {<0.89}
1,2-Dichlorobenzene	ug/kg	--	--	--	<1.1 {<1.1}	<0.99 {<0.94}	<0.99 {<0.94}	<1.1 {<1.1}
1,2-Dichloroethane	ug/kg	--	--	10,000	<1.1 {<0.89}	<0.99 {<0.8}	<0.99 {<0.79}	<1.1 {<0.89}
1,2-Dichloropropane	ug/kg	--	--	--	<1.1 {<0.89}	<0.99 {<0.8}	<0.99 {<0.79}	<1.1 {<0.89}
1,3,5-Trimethylbenzene	ug/kg	--	--	--	<1.1 {<0.7}	<0.99 {<0.63}	<0.99 {<0.62}	<1.1 {<0.7}
1,3-Dichlorobenzene	ug/kg	--	--	--	<1.1 {<0.93}	<0.99 {<0.83}	<0.99 {<0.83}	<1.1 {<0.93}
1,3-Dichloropropane	ug/kg	--	--	--	<1.1 {<0.7}	<0.99 {<0.63}	<0.99 {<0.62}	<1.1 {<0.7}
1,4-Dichlorobenzene	ug/kg	--	--	--	<1.1 {<1}	<0.99 {<0.93}	<0.99 {<0.93}	<1.1 {<1}
2,2-Dichloropropane	ug/kg	--	--	--	<1.1 {<0.67}	<0.99 {<0.6}	<0.99 {<0.59}	<1.1 {<0.67}
2-Butanone (MEK)	ug/kg	--	--	4,000,000	<11 {<6.7}	<9.9 {<6}	<9.9 {<5.9}	<11 {<6.7}
2-Chlorotoluene	ug/kg	--	--	--	<2.2 {<0.96}	<2 {<0.86}	<2 {<0.86}	<2.2 {<0.97}
2-Hexanone	ug/kg	--	--	--	<11 {<10}	<9.9 {<9}	<9.9 {<9}	<11 {<10}
4-Chlorotoluene	ug/kg	--	--	--	<2.2 {<0.82}	<2 {<0.74}	<2 {<0.73}	<2.2 {<0.82}
4-Methyl-2-pentanone (MIBK)	ug/kg	--	--	--	<5.5 {<5}	<5 {<4.5}	<5 {<4.5}	<5.6 {<5}
Acetone	ug/kg	--	--	--	<11 {<8.9}	<9.9 {<8}	<9.9 {<7.9}	<11 {<8.9}
Benzene	ug/kg	--	--	10,000	<1.1 {<0.55}	<0.99 {<0.5}	<0.99 {<0.5}	<1.1 {<0.56}
Bromobenzene	ug/kg	--	--	--	<2.2 {<0.93}	<2 {<0.83}	<2 {<0.83}	<2.2 {<0.93}
Bromochloromethane	ug/kg	--	--	--	<2.2 {<1}	<2 {<0.89}	<2 {<0.89}	<2.2 {<1}
Bromodichloromethane	ug/kg	--	--	--	<1.1 {<0.55}	<0.99 {<0.5}	<0.99 {<0.5}	<1.1 {<0.56}
Bromoform	ug/kg	--	--	--	<2.2 {<0.89}	<2 {<0.8}	<2 {<0.79}	<2.2 {<0.89}
Bromomethane	ug/kg	--	--	--	<2.2 {<1}	<2 {<0.91}	<2 {<0.91}	<2.2 {<1}
Carbon Disulfide	ug/kg	--	--	--	<5.5 {<1.1}	<5 {<0.96}	<5 {<0.96}	<5.6 {<1.1}
Carbon tetrachloride	ug/kg	--	--	10,000	<2.2 {<0.55}	<2 {<0.5}	<2 {<0.5}	<2.2 {<0.56}
Chlorobenzene	ug/kg	--	--	2,000,000	<1.1 {<0.58}	<0.99 {<0.52}	<0.99 {<0.51}	<1.1 {<0.58}
Chloroethane	ug/kg	--	--	--	<2.2 {<1.7}	<2 {<1.5}	<2 {<1.5}	<2.2 {<1.7}
Chloroform	ug/kg	--	--	120,000	<1.1 {<0.55}	<0.99 {<0.5}	<0.99 {<0.5}	<1.1 {<0.56}
Chloromethane	ug/kg	--	--	--	<2.2 {<1.1}	<2 {<0.99}	<2 {<0.99}	<2.2 {<1.1}
cis-1,2-Dichloroethene	ug/kg	--	--	--	<1.1 {<0.92}	<0.99 {<0.83}	<0.99 {<0.82}	<1.1 {<0.92}

**INTERIM SOURCE REMOVAL ACTION (ISRA) - OUTFALL 009**

**WASTE CHARACTERIZATION SAMPLE RESULTS – AP/STP-1E-3  
THE BOEING COMPANY  
SANTA SUSANA FIELD LABORATORY**

				Object Name:	APWC0601	APWC0602	APWC0603	APWC0604
				Sample Name:	APWC0601S001	APWC0602S001	APWC0603S001	APWC0604S001
				Collection Date:	7/30/2010	7/29/2010	7/29/2010	7/30/2010
				Sample Depth (feet):	0.5 - 1.0	0.5 - 1.0	0.5 - 1.0	0.5 - 1.0
ANALYTE	UNITS	TTLIC	WET Leachate Testing Trigger <sup>a</sup>	TCLP Leachate Testing Trigger <sup>b</sup>	RESULT <sup>c</sup>	RESULT <sup>c</sup>	RESULT <sup>c</sup>	RESULT <sup>c</sup>
cis-1,3-Dichloropropene	ug/kg	--	--	--	<1.1 {<0.49}	<0.99 {<0.44}	<0.99 {<0.44}	<1.1 {<0.49}
Dibromochloromethane	ug/kg	--	--	--	<1.1 {<0.78}	<0.99 {<0.7}	<0.99 {<0.69}	<1.1 {<0.78}
Dibromomethane	ug/kg	--	--	--	<1.1 {<1}	<0.99 {<0.89}	<0.99 {<0.89}	<1.1 {<1}
Dichlorodifluoromethane	ug/kg	--	--	--	<5.5 {<1.7}	<5 {<1.5}	<5 {<1.5}	<5.6 {<1.7}
Ethylbenzene	ug/kg	--	--	--	<1.1 {<0.55}	<0.99 {<0.5}	<0.99 {<0.5}	<1.1 {<0.56}
Hexachlorobutadiene	ug/kg	--	--	--	<2.2 {<0.89}	<2 {<0.8}	<2 {<0.79}	<2.2 {<0.89}
Isopropylbenzene	ug/kg	--	--	--	<1.1 {<0.6}	<0.99 {<0.54}	<0.99 {<0.53}	<1.1 {<0.6}
m,p-Xylenes	ug/kg	--	--	--	<2.2 {<0.89}	<2 {<0.8}	<2 {<0.79}	<2.2 {<0.89}
Methylene chloride	ug/kg	--	--	--	<11 {<7.2}	<9.9 {<6.5}	<9.9 {<6.4}	<11 {<7.2}
Methyl-tert-butyl Ether (MTBE)	ug/kg	--	--	--	<2.2 {<1.1}	<2 {<0.99}	<2 {<0.99}	<2.2 {<1.1}
n-Butylbenzene	ug/kg	--	--	--	<2.2 {<0.8}	<2 {<0.72}	<2 {<0.71}	<2.2 {<0.8}
n-Propylbenzene	ug/kg	--	--	--	<1.1 {<0.68}	<0.99 {<0.61}	<0.99 {<0.6}	<1.1 {<0.68}
Naphthalene	ug/kg	--	--	--	<2.2 {<1.2}	<2 {<1.1}	<2 {<1.1}	<2.2 {<1.2}
o-Xylene	ug/kg	--	--	--	<1.1 {<0.55}	<0.99 {<0.5}	<0.99 {<0.5}	<1.1 {<0.56}
p-Isopropyltoluene	ug/kg	--	--	--	<1.1 {<0.8}	<0.99 {<0.72}	<0.99 {<0.71}	<1.1 {<0.8}
sec-Butylbenzene	ug/kg	--	--	--	<2.2 {<0.74}	<2 {<0.67}	<2 {<0.66}	<2.2 {<0.74}
Styrene	ug/kg	--	--	--	<1.1 {<0.64}	<0.99 {<0.58}	<0.99 {<0.57}	<1.1 {<0.64}
tert-Butylbenzene	ug/kg	--	--	--	<2.2 {<0.69}	<2 {<0.62}	<2 {<0.61}	<2.2 {<0.69}
Tetrachloroethene	ug/kg	--	--	14,000	<1.1 {<0.54}	<0.99 {<0.49}	<0.99 {<0.49}	<1.1 {<0.54}
Toluene	ug/kg	--	--	--	<1.1 {<0.55}	<0.99 {<0.5}	<0.99 {<0.5}	<1.1 {<0.56}
trans-1,2-Dichloroethene	ug/kg	--	--	--	<1.1 {<0.78}	<0.99 {<0.7}	<0.99 {<0.69}	<1.1 {<0.78}
trans-1,3-Dichloropropene	ug/kg	--	--	--	<1.1 {<0.68}	<0.99 {<0.61}	<0.99 {<0.6}	<1.1 {<0.68}
Trichloroethene	ug/kg	2,040,000	2,040,000	10,000	<1.1 {<0.55}	<0.99 {<0.5}	<0.99 {<0.5}	<1.1 {<0.56}
Trichlorofluoromethane	ug/kg	--	--	--	<2.2 {<0.6}	<2 {<0.54}	<2 {<0.53}	<2.2 {<0.6}
Vinyl acetate	ug/kg	--	--	--	<5.5 {<2.8}	<5 {<2.5}	<5 {<2.5}	<5.6 {<2.8}
Vinyl chloride	ug/kg	--	--	4,000	<2.2 {<1}	<2 {<0.9}	<2 {<0.9}	<2.2 {<1}
<b>RADIONUCLIDES</b>	--	--	--	--	R	R	R	R



**INTERIM SOURCE REMOVAL ACTION (ISRA) - OUTFALL 009**

**WASTE CHARACTERIZATION SAMPLE RESULTS – AP/STP  
THE BOEING COMPANY  
SANTA SUSANA FIELD LABORATORY**

**Notes:**

--" - not analyzed / not applicable

<5 - Analyte not detected at or above the stated method detection limit (metals) or analyte not detected at or above the stated reporting limit (organics)

{<1} - Analyte not detected at or above the stated method detection limit (organics)

<sup>a</sup> - WET Leachate Testing Trigger = STLC limit \* 10

<sup>b</sup> - TCLP Leachate Testing Trigger = TCLP limit \* 20

<sup>c</sup> Waste characterization sample results not validated

B - Analyte was detected in the associated method blank

J - Estimated value. Analyte detected at a level less than the Reporting Limit (RL) and greater than or equal to the Method Detection Limit (MDL). The user of this data should be aware that this data is of limited reliability.

M1 - The MS and/or MSD were above the acceptance limits due to sample matrix interference. See Blank Spike (LCS).

µg/kg - micrograms per kilogram

mg/kg - milligrams per kilogram

mg/L - milligrams per liter

R - Radiological analysis includes gamma spectroscopy (Na-22, K-40, Mn-54, Co-60, Cs-134, Cs-137, Eu-152, Eu-154, Th-228, Th-232, U-235, U-238 and Am-241), strontium-90, and tritium. Boeing will be preparing a document that provides the radiological results and statistical analysis of these waste characterization samples.

R-3 - The RPD exceeded the acceptance limit due to sample matrix effects

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**ISRA 009, Area II  
AP/STP-1B, -1C-1, -1C-2 and -1E-2  
Soil Sampling for Radionuclides  
Waste Certification**

**Introduction**

This data package provides the laboratory results of the 54 samples taken at the AP/STP site in Area II during 2010, and 35 samples taken at the AP/STP site during 2011. Soil sample locations are shown in Appendix 1. Soil sample results were compared to the preliminary USEPA radiological trigger levels (RTLs) in order to determine if soil exceeds background as required for the NASA/DTSC Administrative Order on Consent (AOC)<sup>1</sup>.

**Methodology**

Samples taken for waste disposal characterization were analyzed for strontium-90, tritium and gamma emitting radionuclides by gamma spectroscopy, using an off-site laboratory<sup>2</sup>. Minimum detectable concentrations (MDC) for cesium-137 and strontium-90 averaged ~0.043 pCi/g and ~0.047 pCi/g respectively. Minimum detectable concentration for tritium averaged ~0.77 pCi/g. The gamma spectroscopy library also included the following contaminants-of-concern: Na-22, K-40, Mn-54, Co-60, Cs-134, Eu-152, Eu-154, Th-228, Th-232, U-235, U-238 and Am-241.

NASA and DTSC have signed an AOC that requires soils on Area II and portions of Area I to be cleaned up to background<sup>3</sup>. The USEPA has characterized local radionuclide background<sup>4</sup> in soil and has published preliminary radiological trigger levels (RTL) based on the higher of background threshold values (BTV) or minimum detectable concentrations (MDC)<sup>5</sup>.

On August 23, 2012, DTSC sent NASA a letter regarding excavation of ISRA soil<sup>6</sup>. In the letter, DTSC stated,

---

<sup>1</sup> "Administrative Order on Consent for Remedial Action (AOC)", December 6, 2010, signed by the National Aeronautics and Space Administration (NASA) and the Department of Toxic Substances Control (DTSC).

<sup>2</sup> Boeing, "ISRA Soil Management Plan", Attachment A, "ISRA Sampling for Radionuclides", July 2009.

<sup>3</sup> Page 5, Section 2.1 of the AOC states, "The cleanup of soils at the Site [Area II and portions of Area I] shall result in the end state of the Site after cleanup to be consistent with "background." That is, at the completion of the cleanup, no contaminants shall remain in the soil above local background levels, with the exception of the exercise of the exemptions that are specifically expressed in the AIP. All response actions taken pursuant to this Order shall be performed so as to accomplish this objective, in full compliance with the terms and conditions detailed in the AIP, and in accordance with workplans that have been submitted to and approved by DTSC. Similarly, to the extent any radiological materials are determined to be present at this portion of the Site, the cleanup of soils at the Site contaminated with radiological materials shall result in no radiological contaminants remaining in the soil above local background levels, with the exception of the exercise of the same exemptions expressed in the AIP."

<sup>4</sup> USEPA, "Final Radiological Background Study Report, Santa Susana Field Laboratory, Ventura County, California", October 2011.

<sup>5</sup> USEPA, "Technical Memorandum, Radiological Trigger Levels, Santa Susana Field Laboratory Site, Area IV Radiological Study", December 12, 2011.

<sup>6</sup> DTSC, "Management and Disposal of Radionuclide-impacted Soil Excavated for Interim Source Removal Actions on NASA Property, Santa Susana Field Laboratory, Ventura County, California", August 23, 2012

*"DTSC agrees with using the December 2011 USEPA RTLs for all radionuclides as the values for disposal of the ISRA soils. DTSC has concluded that use of the RTLs will not be inconsistent with SSFL radiological Lookup Table values."*

*"ISRA radiological soil sample results that exceed the RTLs and that have not been re-sampled may be re-sampled to evaluate the initial RTL exceedance. Soil at locations characterized by initial and re-sample radiological results exceeding their respective RTLs will be removed and disposed of at a LLRW disposal facility, per Section 2.10 of the AOC."*

*"Validated radiological sample concentrations below the sample MDC can be treated as "non-detects" and the associated soil is not subject to the Section 2.10, AOC soil disposal conditions."*

## Results

Appendix 2 shows the soil radionuclide data for the samples taken at AP/STP, including re-sampling where initial results exceeded RTLs. Only location APWC0030, in AP/STP-1C-1, exceeded the uranium-238 RTL in both original and resample analysis (see page 8 of Appendix 2). This location is fenced and excluded from the current AP/STP excavation. All other results were either non-detect (less than MDC) and/or less than the RTL in either the original analyses or in re-sampled analyses.

## Conclusions

Location APWC0030 in AP/STP-1C-1 exceeded the uranium-238 RTL and is therefore subject to the requirements of Section 2.10 of the AOC. Therefore, this location will be excavated at a later date.

Excavated soil from all other locations in AP/STP-1C-1, and all locations in AP/STP-1B, AP/STP-1C-2 and AP/STP-1E-2 is released for disposal with no radiological restrictions.



Phil Rutherford  
Manager, Health, Safety & Radiation Services

**Appendix 1**  
**AP/STP Sampling Locations**

# Outfall 009 Waste Characterization Sample Locations for AP/STP-1B

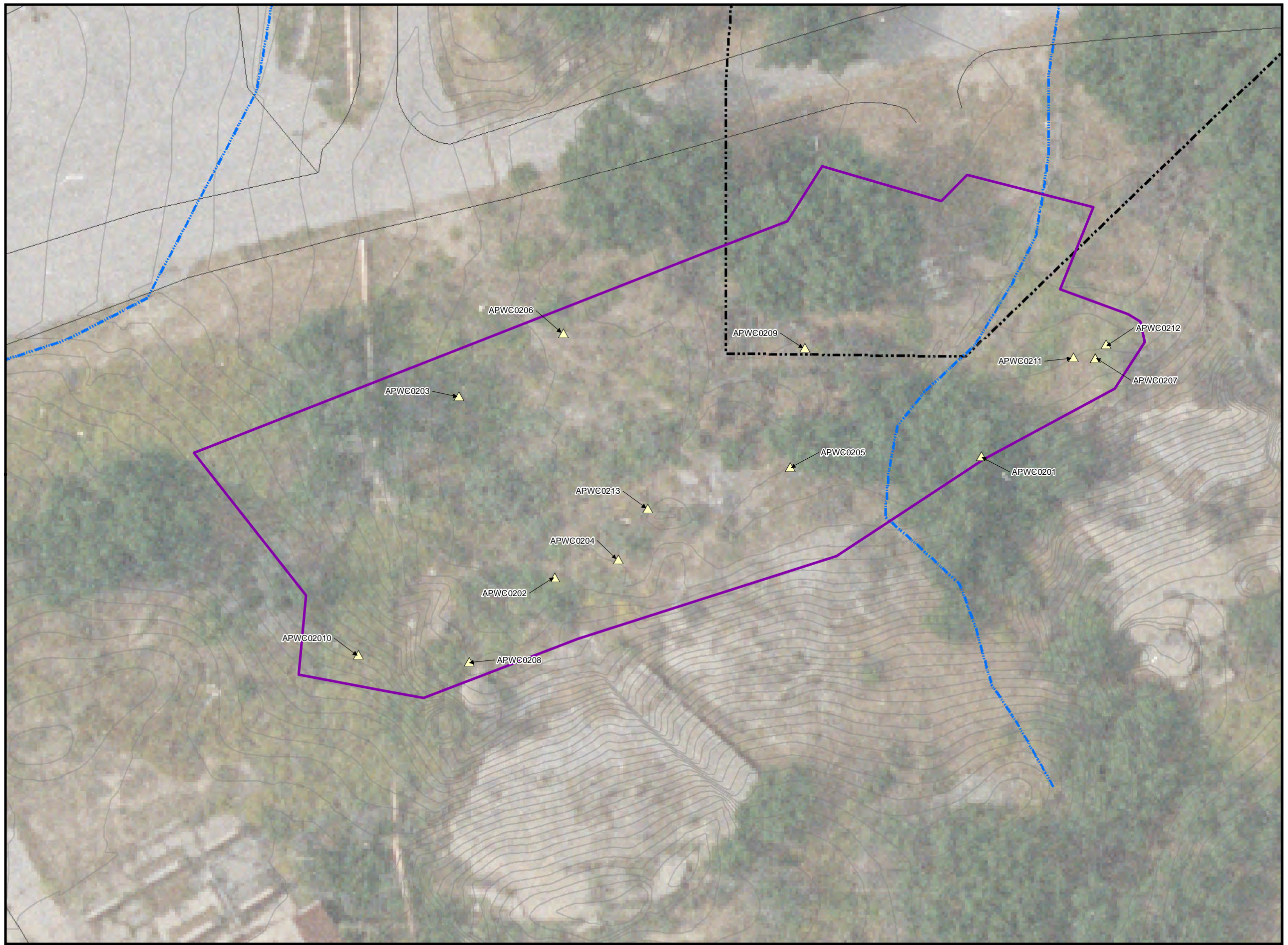
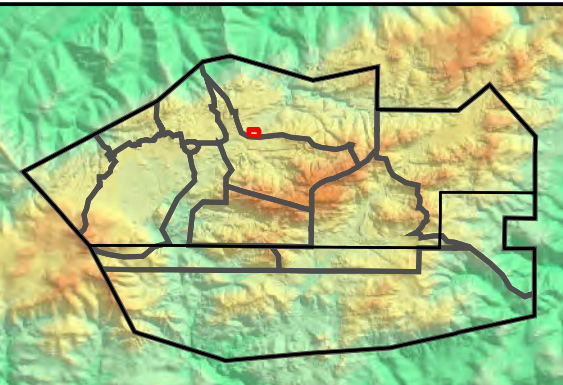
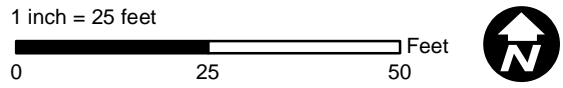
- Base Map Legend**
- Administrative Area Boundary
  - RFI Site Boundary
  - Report Group Boundary
  - NPDES Outfall
  - A/C Paving
  - Drainage
  - Non Jurisdictional Surface Water Pathway
  - Surface Water Divide

- Base Map Legend**
- ISRA Excavation Boundary
  - Waste Characterization Sample Location

**Note:**

1. Sample locations and depths were randomly selected. The 3ft x 3ft grid used in the sample location selection process is shown.
2. Aerial imagery from Google Earth, 2010.
3. Topographic contours from Lidar data, 2008.

Path: T:\projects\rock3\ISRA\Figures\NASA\AP-STP-1B\W.C.mxd Date: 11/23/2011



SANTA SUSANA FIELD LABORATORY

FIGURE 1

# Outfall 009 Waste Characterization Sample Locations for AP/STP-1C-1

- Base Map Legend**
- Administrative Area Boundary
  - RFI Site Boundary
  - Report Group Boundary
  - NPDES Outfall
  - A/C Paving
  - Drainage
  - Non Jurisdictional Surface Water Pathway
  - Surface Water Divide

- Base Map Legend**
- ISRA Excavation Boundary
  - Waste Characterization Sample Location

**December 2011 Trigger Levels**

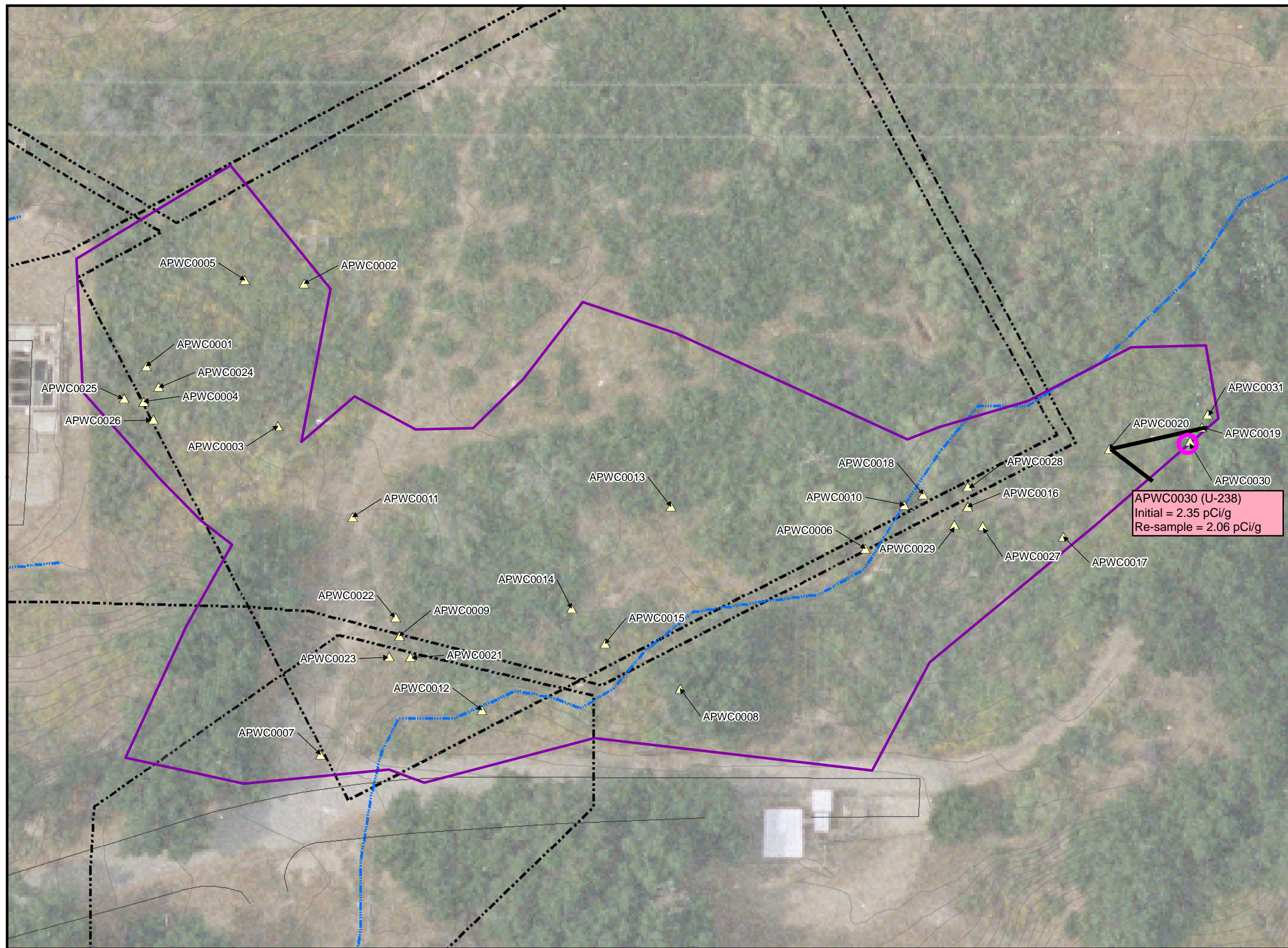
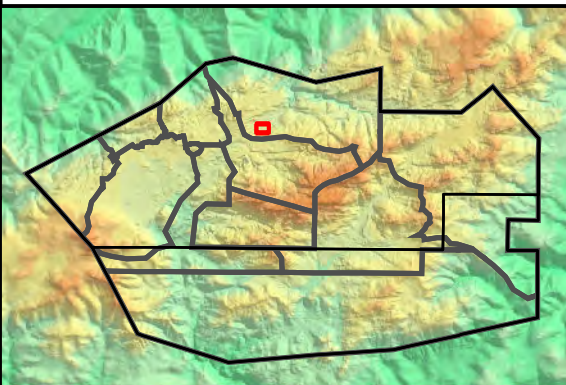
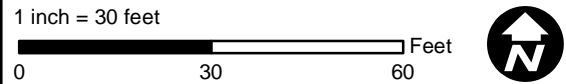
Cs-137 = 0.207 pCi/g  
U-235 = 0.151 pCi/g  
U-238 = 1.80 pCi/g

- Resampling necessary because initial result is non-detect, however, the detection limit is above the trigger level.
- Resampling necessary to confirm the initial radionuclide result that met or exceeded the trigger level.
- Resampling confirmed the initial radionuclide result that met or exceeded the trigger level.

**Note:**

1. Sample locations and depths were randomly selected. The 3ft x 3ft grid used in the sample location selection process is shown.
2. Aerial imagery from Google Earth, 2010.
3. Topographic contours from Lidar data, 2008.

Path: T:\projects\rock3\ISRA\Figures\NASA\AP-STP-1C-1\WC.mxd Date: 12/12/2011



SANTA SUSANA FIELD LABORATORY

FIGURE 1

# Outfall 009 Waste Characterization Sample Locations for AP/STP-1C-2

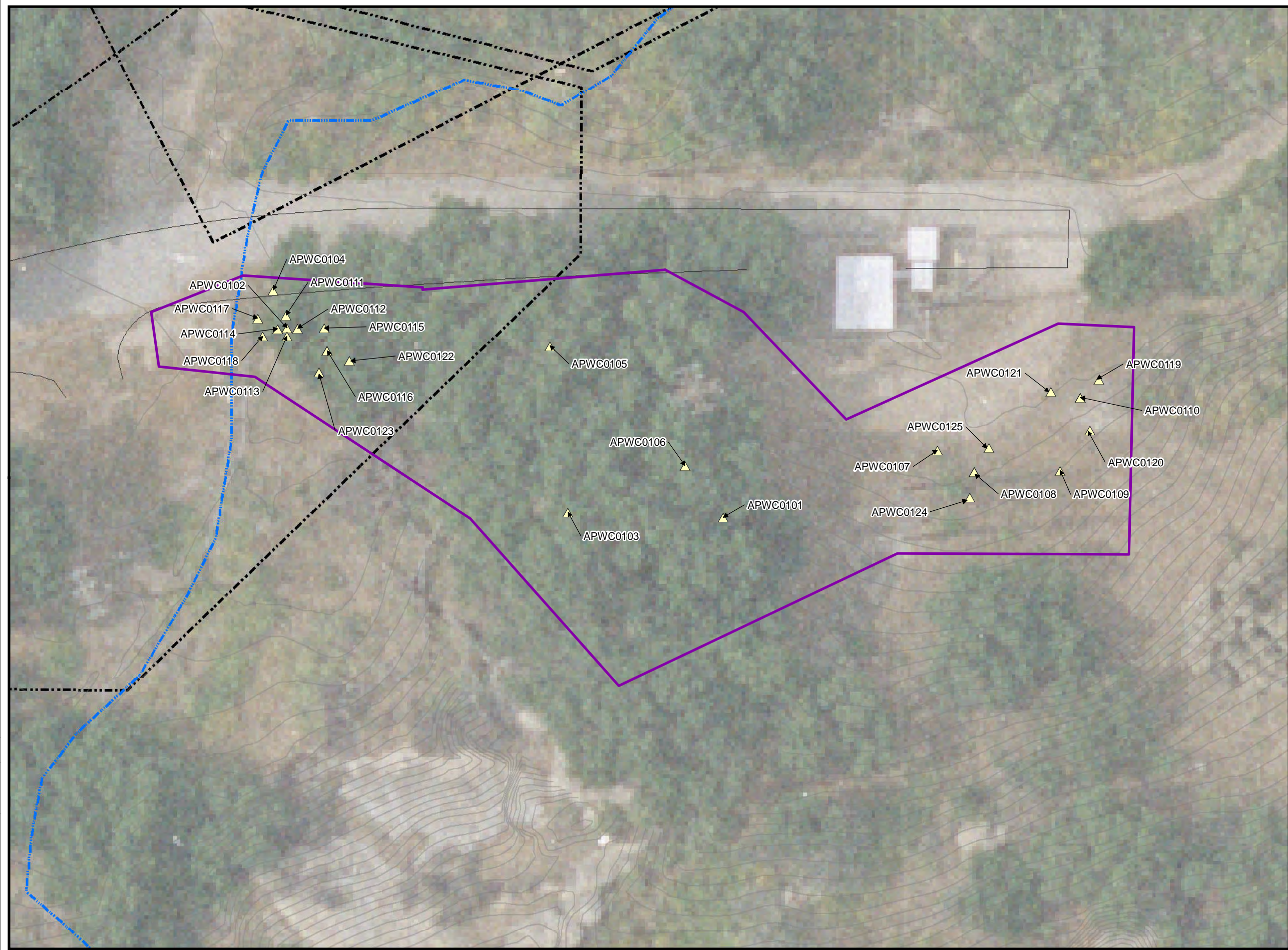
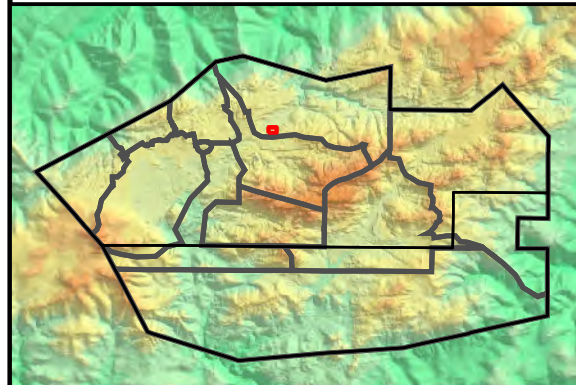
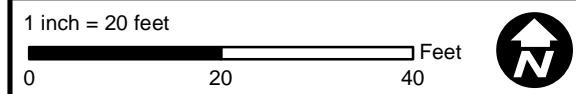
- Base Map Legend**
- Administrative Area Boundary
  - RFI Site Boundary
  - Report Group Boundary
  - NPDES Outfall
  - A/C Paving
  - Drainage
  - Non Jurisdictional Surface Water Pathway
  - Surface Water Divide

- Base Map Legend**
- ISRA Excavation Boundary
  - Waste Characterization Sample Location

**Note:**

1. Sample locations and depths were randomly selected. The 3ft x 3ft grid used in the sample location selection process is shown.
2. Aerial imagery from Google Earth, 2010.
3. Topographic contours from Lidar data, 2008.

Path: T:\projects\rock3\ISRA\Figures\NASA\AP-STP-1C-2\WC.mxd Date: 11/23/2011













SANTA SUSANA FIELD LABORATORY


FIGURE 1

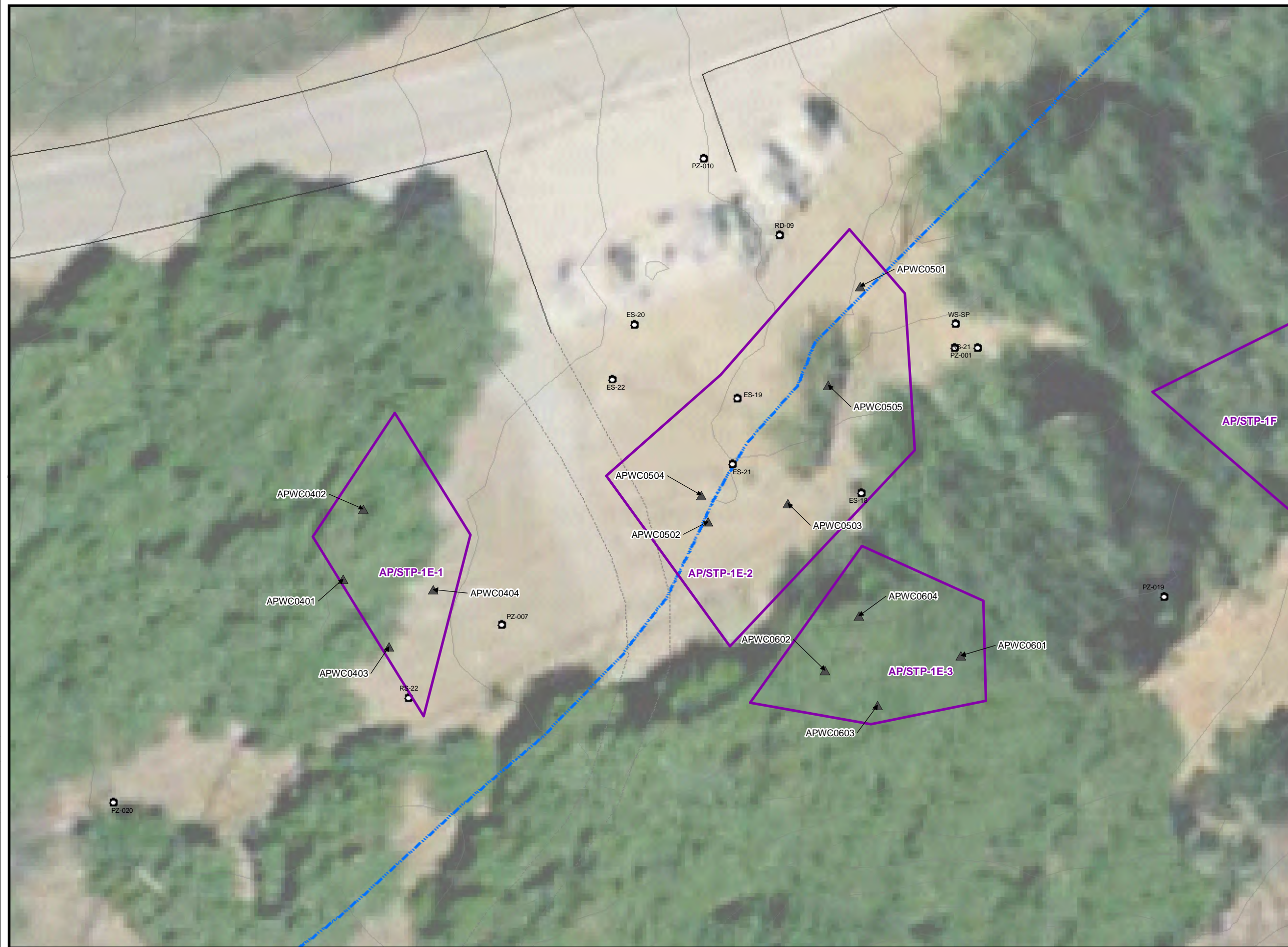
**Outfall 009**  
**Sample Locations for AP/STP - 1E-1,**  
**AP/STP - 1E-2, AP/STP - 1E-3**

**Base Map Legend**

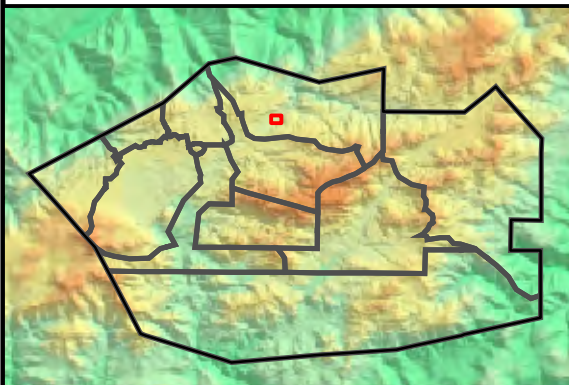
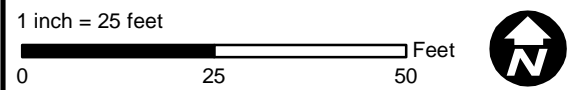
-  Administrative Area Boundary
-  RFI Site Boundary
-  Report Group Boundary
-  NPDES Outfall
-  Dirt Road
-  A/C Paving
-  Drainage
-  Non Jurisdictional Surface Water Pathway
-  Surface Water Divide
-  Elevation Contour

**Figure Legend**

-  Waste Characterization Sample



Document: ISRA\_Plots\_SP\_RD47\_SampleLocations\_060710.mxd Date: Jun 22, 2010





**Appendix 2**  
**AP/STP Radionuclide Results**





























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**ISRA 009, Area II**  
**AP/STP-1C-1 (Non-Hazardous, Radionuclides > LUT)**  
**Soil Sampling for Radionuclides**  
**and Waste Certification**

### Introduction

This data package provides the laboratory results of two samples taken at the AP/STP-1C-1 (Non Hazardous, Radionuclides>LUT) site in Area II. The location of the two soil samples and the demarcated area (designated by the pink shaded area) are shown in Appendix 1. Soil sample results are compared to the draft provisional DTSC look-up table (LUT) values in order to determine if soil exceeds background as required for the NASA/DTSC Administrative Order on Consent (AOC)<sup>1</sup>.

### Methodology

Numerous samples have been taken in the AP/STP-1C-1 area for waste characterization. The majority of samples exhibited no elevated concentrations of radionuclides above background. The minority of samples discussed here exhibited elevated concentrations of radionuclides above background.

Samples discussed here apply to the non-hazardous, radionuclides>LUT waste stream. Samples taken in 2011 for waste disposal characterization were analyzed for uranium-238 using gamma spectroscopy. These were a step-out sample (10/18/2011) for a neighboring unverified U-238 exceedance and a re-sample (11/16/2011) taken at the same location.

NASA and DTSC have signed an AOC that requires soils on Area II and portions of Area I to be cleaned up to background<sup>2</sup>. The USEPA has characterized local radionuclide background<sup>3</sup> in soil and has published preliminary radiological trigger levels (RTL) based on the higher of background threshold values (BTV) or minimum detectable concentrations (MDC)<sup>4</sup>.

On August 23, 2012, DTSC sent NASA a letter regarding excavation of ISRA soil<sup>5</sup>. In the letter, DTSC stated,

*“DTSC agrees with using the December 2011 USEPA RTLs for all radionuclides as the values for disposal of the ISRA soils. DTSC has concluded that use of the RTLs will not be inconsistent with SSFL radiological Lookup Table values.”*

---

<sup>1</sup> “Administrative Order on Consent for Remedial Action (AOC)”, December 6, 2010, signed by the National Aeronautics and Space Administration (NASA) and the Department of Toxic Substances Control (DTSC).

<sup>2</sup> Page 5, Section 2.1 of the AOC states, “The cleanup of soils at the Site [Area II and portions of Area I] shall result in the end state of the Site after cleanup to be consistent with “background.” That is, at the completion of the cleanup, no contaminants shall remain in the soil above local background levels, with the exception of the exercise of the exemptions that are specifically expressed in the AIP. All response actions taken pursuant to this Order shall be performed so as to accomplish this objective, in full compliance with the terms and conditions detailed in the AIP, and in accordance with workplans that have been submitted to and approved by DTSC. Similarly, to the extent any radiological materials are determined to be present at this portion of the Site, the cleanup of soils at the Site contaminated with radiological materials shall result in no radiological contaminants remaining in the soil above local background levels, with the exception of the exercise of the same exemptions expressed in the AIP.”

<sup>3</sup> USEPA, “Final Radiological Background Study Report, Santa Susana Field Laboratory, Ventura County, California”, October 2011.

<sup>4</sup> USEPA, “Technical Memorandum, Radiological Trigger Levels, Santa Susana Field Laboratory Site, Area IV Radiological Study”, December 12, 2011.

<sup>5</sup> DTSC, “Management and Disposal of Radionuclide-impacted Soil Excavated for Interim Source Removal Actions on NASA Property, Santa Susana Field Laboratory, Ventura County, California”, August 23, 2012

*"ISRA radiological soil sample results that exceed the RTLs and that have not been re-sampled may be re-sampled to evaluate the initial RTL exceedance. Soil at locations characterized by initial and re-sample radiological results exceeding their respective RTLs will be removed and disposed of at a LLRW disposal facility, per Section 2.10 of the AOC."*

*"Validated radiological sample concentrations below the sample MDC can be treated as "non-detects" and the associated soil is not subject to the Section 2.10, AOC soil disposal conditions."*

USEPA issued revised RTLs<sup>6</sup> in December 2012 which were, in general, higher than the original RTLs. USEPA also issued laboratory specific radiological reference concentrations (RRC) in December 2012<sup>7</sup>. Subsequently, DTSC issued draft provisional LUTs<sup>8</sup> for 16 radionuclides in January 2013, which in general matched the revised RTLs for those radionuclides whose RTLs were derived from BTVs<sup>9</sup> (for example cesium-137 and uranium-238). The draft provisional LUTs subset also matched exactly the lower of the two lab-specific RRCs. Consistent with DTSC's intent in issuing draft provisional LUTs for interim remedial action implementation, ELV-1C data is compared to draft provisional LUTs and sample MDCs to determine compliance with the DTSC/NASA AOC.

## Results

Appendix 2 shows the soil radionuclide data for the samples taken at the AP/STP-1C-1 non-hazardous area compared to the draft provisional LUTs and sample MDCs. LUT exceedances are highlighted in yellow

Both samples (2.35 and 2.06 pCi/g) exceed the uranium-238 LUT of 1.96 pCi/g.

Therefore, according to the NASA/DTSC AOC this waste is classified as contaminated above background.

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<sup>6</sup> USEPA, "Attachment A – Original and Corrected Radiological Trigger Levels - Development and Use of Radiological Reference Concentrations", Appendix K of "Final Radiological Characterization of Soils - Area IV and Northern Buffer Zone", December 21, 2012.

<sup>7</sup> USEPA, "Attachment B - Radiological Reference Concentrations - Development and Use of Radiological Reference Concentrations", Appendix K of "Final Radiological Characterization of Soils - Area IV and Northern Buffer Zone", December 21, 2012.

<sup>8</sup> DTSC, "Development of the Draft Provisional Radiological Look-Up Table", DTSC Public Meeting, Chatsworth, California, January 30, 2013.

<sup>9</sup> A notable exception was strontium-90 with a BTV of 0.075 pCi/g, an original RTL of 0.485 pCi/g, a revised RTL of 0.645 pCi/g, lab specific RRCs of 1.07 and 0.117 pCi/g and a draft provisional LUT of 0.117 pCi/g.



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## Conclusions

In compliance with the NASA/DTSC AOC, excavated soil from the AP/STP-1C-1 (non-hazardous, radionuclides>LUT) area will be disposed of at EnergySolutions, Clive, Utah, a licensed low-level radioactive waste site.



Phil Rutherford  
Manager, Health, Safety & Radiation Services

**Appendix 1**  
**ELV-1C Sampling Locations**

# Outfall 009 Waste Characterization Sample Locations for AP/STP-1C-1

- Base Map Legend**
- Administrative Area
  - Boundary
  - RFI Site Boundary
  - Report Group Boundary
  - NPDES Outfall
  - A/C Paving
  - Drainage
  - Non Jurisdictional Surface Water Pathway
  - Surface Water Divide

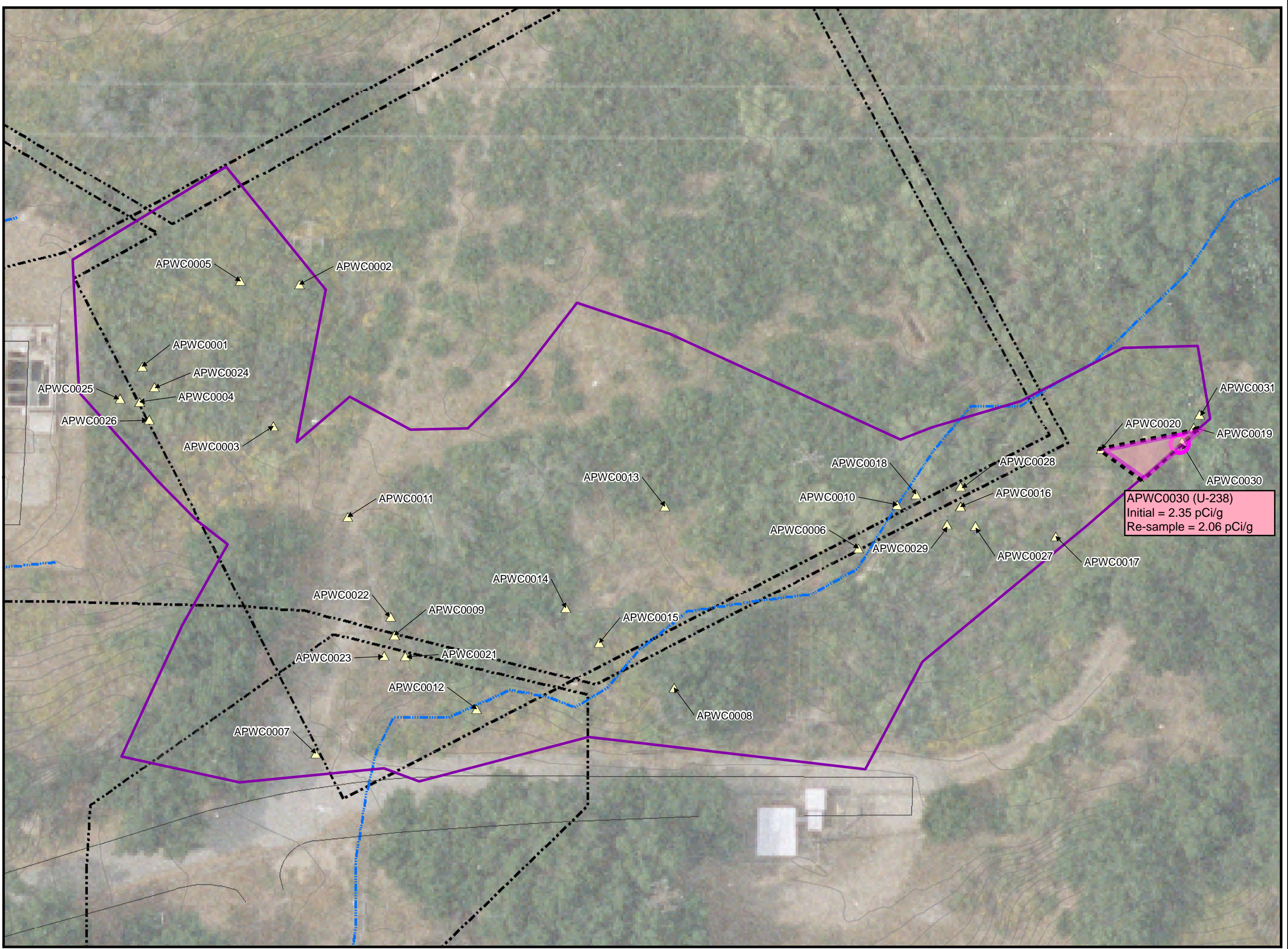
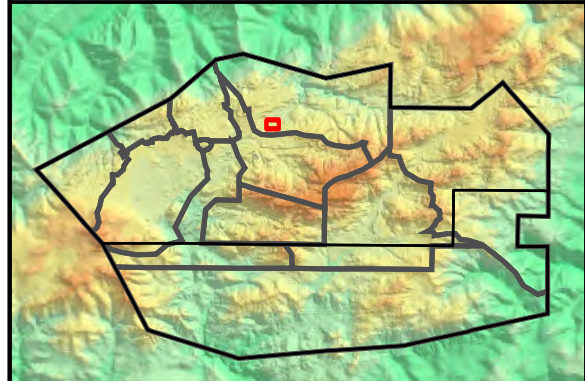
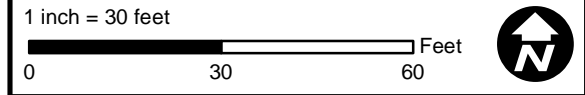
- Base Map Legend**
- ISRA Excavation Boundary
  - Waste Characterization Sample Location

- January 2013 LUT Value**  
U-238 = 1.96 pCi/g
- Sample with confirmed result above LUT value.
  - Boundary of soils with results above LUT value
  - Boundary of non-hazardous soil with radionuclides above LUT value.

**Note:**

- Sample locations and depths were randomly selected. The 3ft x 3ft grid used in the sample location selection process is shown.
- Aerial imagery from Google Earth, 2010.
- Topographic contours from Lidar data, 2008.

Path: T:\projects\rock3\ISRA\Figures\NASA\AP-STP-1C-1\WC.mxd Date: 12/12/2011



APWC0030 (U-238)  
Initial = 2.35 pCi/g  
Re-sample = 2.06 pCi/g



SANTA SUSANA FIELD LABORATORY

FIGURE 1

**Appendix 2**

**ELV-1C (Non-Hazardous, Radionuclides>LUT)  
Radionuclide Results**

AP-STP-1C-1 NASA ISRA - NON HAZARDOUS - RADIOLOGICAL > LUT

Sampling Date	Sampling Location (General)	Sampling Location (Specific)	Sample Serial Number	Media Type	Isotope	Activity	Error (+/-)	MDC	DTSC LUT	LUT Source	Activity > LUT ?	Activity > MDC ?	Detected Activity	Detected Activity > LUT ?	Non-detect Activity	Non-detect Activity > LUT ?	MDC > LUT ?	Ratio of MDC to LUT	Units	Error Type	Comments	Document
10/18/2011	AP/STP-1C-1	APWC0030	APWC0030S001	Soil	Uranium-238	2.35	1.05	0.92	1.96	BTV	YES	YES	2.35	YES	-	-	-	0.47	pCi/g	2 sigma	APWC0019 Stepout #1; Re-sampled	288414
11/16/2011	AP/STP-1C-1	APWC0030	APWC0030AS001	Soil	Uranium-238	2.06	0.771	0.474	1.96	BTV	YES	YES	2.06	YES	-	-	-	0.24	pCi/g	2 sigma	Re-sample	290463

**ISRA 009 – AP/STP-1E1.  
Soil Sampling for Radionuclides.  
Results and Statistical Analysis.  
Waste Certification.**

This data package provides the laboratory results and statistical analysis of the 4 samples taken at the ISRA Outfall 009, AP/STP-1E1 area. This analysis and data interpretation complies with the procedure approved by the California Department of Public Health<sup>1</sup>.

Samples taken for waste disposal characterization were analyzed for strontium-90, tritium and gamma emitting radionuclides by gamma spectroscopy, using an off-site laboratory. Minimum detectable activity (MDA) for cesium-137 and strontium-90 averaged ~0.041 pCi/g and ~0.046 pCi/g respectively. Minimum detectable activity for tritium averaged ~0.78 pCi/g. The gamma spectroscopy library also included the following contaminants-of-concern: Na-22, K-40, Mn-54, Co-60, Cs-134, Cs-137, Eu-152, Eu-154, Th-228, Th-232, U-235, U-238 and Am-241.

Statistical evaluation of sample analytical results to determine whether or not the sampled waste contains Cs-137 or Sr-90 activity elevated above local background was conducted using the Wilcoxon Rank Sum Test using protocols described in NUREG-1505<sup>2</sup> and DTSC guidance<sup>3</sup> (See Appendix 1). Appendix 2 shows the complete analytical results for all radionuclides. Complete laboratory data packages are available on request.

Local background data for cesium-137 and strontium-90 was taken from Table 20 of the 1995 McLaren/Hart report<sup>4</sup>. Background for tritium in soil is not well established, and is not reported in the 1995 McLaren/Hart report, therefore tritium background in soil is conservatively assumed to be zero. Tritium data is therefore compared to the MDA of the analysis and the EPA preliminary remediation goal (PRG)<sup>5</sup> for residential 10<sup>-6</sup> risk.

## **Conclusions**

**Cesium-137** - Based on the results of the statistical analysis of Appendix 1, soil to be excavated from AP/STP-1E1 does not exceed the local background for Cs-137. The incremental dose from Cs-137 above background is therefore zero mrem/y. All Cs-137 results are non-detect. The highest Cs-137 result is 0.008 pCi/g which is less than the highest background result of 0.213

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<sup>1</sup> Boeing, "Northern Drainage Waste Sampling for Radionuclides." Revision 9, November 5, 2007. (Attachment 3 to Northern Drainage Work Plan) and "ISRA Waste Sampling for Radionuclides", Attachment A to the ISRA Soil Management Plan.

<sup>2</sup> NUREG-1505, Nuclear Regulatory Commission, "A Non-parametric Statistical Methodology for the Design and Analysis of Final Status Decommissioning Surveys." January 1998. [http://www.philrutherford.com/Radiation\\_Cleanup\\_Standards/NUREG-1505.pdf](http://www.philrutherford.com/Radiation_Cleanup_Standards/NUREG-1505.pdf)

<sup>3</sup> DTSC, "Selecting Inorganic Constituents as Chemicals of Concern at Risk Assessments at Hazardous Waste Sites and Permitted Facilities." February 1997.

<sup>4</sup> McLaren/Hart, "Additional Soil and Water Sampling at the Brandeis-Bardin Institute and Santa Monica Mountains Conservancy." Jan 19, 1995. <http://www.etec.energy.gov/Health-and-Safety/Documents/BrandeisBardin/AddSoilandWaterSamp.pdf>

<sup>5</sup> EPA preliminary remediation goals for radionuclides (Effective January 1, 2007) - <http://epa-prgs.ornl.gov/radionuclides/>.

pCi/g. The highest non-background subtracted, non-detect Cs-137 result is equivalent to an effective dose of 0.0075 mrem/y<sup>6</sup>.

**Strontium-90** - Based on the results of the statistical analysis of Appendix 1, soil to be excavated from AP/STP-1E1 does not exceed the local background for Sr-90. The incremental dose from Sr-90 above background is therefore zero mrem/y. All Sr-90 results are non-detect. The highest Sr-90 result is 0.029 pCi/g which is non-detect and less than the highest background result of 0.13 pCi/g. The highest non-background subtracted, non-detect Sr-90 result is equivalent to an effective dose of 0.0017 mrem/y<sup>6</sup>.

**Tritium** - All tritium results are non-detect, the average tritium result is 0.039 pCi/g and the highest tritium result is 0.768 pCi/g. The highest non-detected, non-background subtracted tritium result is equivalent to an effective dose of 0.16 mrem/y<sup>6</sup>.

This waste is certified to be “radiologically” acceptable for shipment to, and disposal at, any waste disposal facility. The waste requires no further radiological controls.

This waste meets the requirements of disposal facility permits<sup>7,8</sup> and complies with the California Health & Safety Code<sup>9</sup>.

The Governor’s Executive Order D-62-02 prohibits the “*disposal of decommissioned materials to Class III landfills or unclassified management units.*” The soil from AP/STP-1E1 is not decommissioned material, and does not originate from the proximity of any radiological facility. The sampling in this certification has therefore been conducted as a best management practice that complies with the requirements of D-62-02. Verification sampling and/or approval by the

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<sup>6</sup> EPA dose compliance considerations for radionuclides (Effective August 3, 2010) - <http://epa-dccs.ornl.gov/>. Soil concentrations that meet the 10<sup>-6</sup> residential risk PRG are < 0.5 mrem/y. The Cs-137 residential PRG of 0.0597 pCi/g is equivalent to 0.056 mrem/y. The Sr-90 residential PRG of 0.231 pCi/g is equivalent to 0.014 mrem/y. The tritium residential PRG of 2.28 pCi/g is equivalent to 0.486 mrem/y.

<sup>7</sup> This waste is exempt from regulation and licensing or is expressly authorized for disposal under the Radiation Control Law (Division 104, Part 9, Chapter 8 of the California Health & Safety Code).

<sup>8</sup> This waste is not prohibited from disposal by any government agency with jurisdictional authority over this waste.

<sup>9</sup> Division 104, Part 9, Chapter 5, Article 1, Section 114715, “No person shall bury, throw away, or in any manner dispose of radioactive wastes within the state except in a manner and at locations as will result in no significant radioactive contamination of the environment.” For the purposes of this requirement, “significant” is defined in Section 114710 as amounts of radioactive materials that are likely to expose persons to ionizing radiation greater than the guide levels published by the Federal Radiation Council (FRC). The FRC no longer exists, but the applicable guide level last published by the FRC was 500 mrem per year to a member of the public. Because the regulatory dose limit to members of the public has since been lowered to 100 mrem per year, CDPH/RHB conservatively utilizes the lower dose for purposes of defining “significant” radioactive contamination in this Article of the California Health and Safety Code.  
<http://www.leginfo.ca.gov/cgi-bin/displaycode?section=hsc&group=114001-115000&file=114705-114780>

California Department of Public Health (CDPH) Radiologic Health Branch (RHB) are not required for the off-site disposal of decommissioned material or of the subject material<sup>10</sup>.



Phil Rutherford  
Manager, Health, Safety & Radiation Services

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<sup>10</sup> The California Department of Public Health (CDPH) Radiologic Health Branch (RHB) has stated in a November 9, 2007 email to Phil Rutherford (Boeing) ... *"The Governor's Executive Order D-62-02, does not specifically require the Department of Health Services (now the Department of Public Health) to perform verification sampling of decommissioned material or to provide approval for disposal of specific decommissioned material shipped offsite (e.g., to Class I or II landfills). The California DPH has not imposed a requirement that Boeing or the Department of Energy (DOE) seek DPH verification sampling or approval of all decommissioned material destined for Class I or II landfills in compliance with the Governor's Executive Order."*





**Appendix 1**

**Wilcoxon Rank Sum Statistical Test for Cesium-137 and Strontium-90**

### Soil Data from ISRA 009 - AP/STP-1E1

No.	Sample ID	Stockpile ID	Sampling Date	Laboratory Batch	Cesium-137 (pCi/g)				Strontium-90 (pCi/g)				Tritium (pCi/g)			
					Activity	+/- 2σ Error	MDA	Non-detect?	Activity	+/- 2σ Error	MDA	Non-detect?	Activity	+/- 2σ Error	MDA	Non-detect?
1	APWC0401S001	N/A	7/29/2010	257560	-0.00615	0.026	0.0447	NDA	0.00544	0.0274	0.0476	NDA	0.768	0.505	0.786	NDA
2	APWC0402S001	N/A	7/29/2010	257560	-0.0117	0.0221	0.0369	NDA	0.0146	0.0267	0.0463	NDA	-0.205	0.4	0.794	NDA
3	APWC0403S001	N/A	7/29/2010	257560	-0.0122	0.0245	0.0416	NDA	0.0287	0.0282	0.0462	NDA	-0.0857	0.405	0.775	NDA
4	APWC0404S001	N/A	7/29/2010	257560	0.00834	0.0239	0.042	NDA	-0.00501	0.0215	0.0447	NDA	-0.323	0.367	0.762	NDA

	Cesium-137 (pCi/g)				Strontium-90 (pCi/g)				Tritium (pCi/g)			
	Activity	MDA	Non-detect?		Activity	MDA	Non-detect?		Activity	MDA	Non-detect?	
<b>Average</b>	-0.005	0.041			0.011	0.046			0.039	0.779		
<b>Maximum</b>	0.008	0.045			0.029	0.048			0.768	0.794		
<b>Minimum</b>	-0.012	0.037			-0.005	0.045			-0.323	0.762		
<b>Count</b>			4				4				4	
<b>Number of Non-Detects</b>			4				4				4	
<b>% Non-Detects</b>			100%				100%				100%	

## Soil Data from ISRA 009 - AP/STP-1E1

### Wilcoxon Rank Sum Test -- (Cesium-137)

#### General Information:

The Wilcoxon Rank Sum method tests whether or not measurements of samples from a survey area (S) tend to be consistently larger than those from a background reference area (R) by more than the DCGL.

The null hypothesis,  $H_0$ , is: Survey sample concentrations exceed those in the background by more than the DCGL.

The alternative hypothesis,  $H_a$ , is: Survey sample concentrations do not exceed those in the background by more than the DCGL.

#### How to use this template:

- 1) Enter analysis results in Data Tab.
- 2) The Wilcoxon Rank Sum test is prescribed in, NUREG-1505, Nuclear Regulatory Commission, "A Non-parametric Statistical Methodology for the Design and Analysis of Final Status Decommissioning Surveys." January 1998.

Derived Concentration Guideline Level, DCGL (pCi/g)	0.00
Type I Error Rate, alpha:	0.05
Type II Error Rate, beta:	0.05
Number of Background Samples, m:	51
Number of Survey Samples, n:	4
z-value for alpha	1.645
No. of groups of tied measurements, g	10
Critical Value (excluding ties)	1478.8
<b>Critical Value (including ties)</b>	<b>1478.7</b>
<b>Sum of Reference Ranks</b>	<b>1530.0</b>
Sum of Survey Ranks	10.0
Sum of All Ranks	1540
Check Rank Sum $(n+m)*(n+m+1)/2$	1540

If the sum of the reference ranks is larger than the critical value, there is enough evidence to reject the null hypothesis and accept the alternative hypothesis. Otherwise the null hypothesis is accepted.

#### Test Result:

**Survey sample concentrations do not exceed those in the background by more than the DCGL**

	Bkgd Ref (R)	Survey (S)
Mean	0.087	-0.005
Max	0.213	0.008
Min	0.015	-0.012
$\sigma$	0.062	0.010
$m-1.96*\sigma$	-0.035	-0.024
$m+1.96*\sigma$	0.210	0.013

No.	Soil ID	Cs-137	Adjusted Cs-137	Area	Ranks	Reference Ranks
1		0.092	0.092	R	32	32
2		0.020	0.020	R	11	11
3		0.020	0.020	R	11	11
4		0.100	0.100	R	36.5	36.5
5		0.020	0.020	R	11	11
6		0.158	0.158	R	47.5	47.5
7		0.175	0.175	R	49	49
8		0.209	0.209	R	54	54
9		0.180	0.180	R	50	50
10		0.030	0.030	R	19	19
11		0.213	0.213	R	55	55
12		0.025	0.025	R	16	16
13		0.020	0.020	R	11	11
14		0.020	0.020	R	11	11
15		0.074	0.074	R	28	28
16		0.147	0.147	R	43	43
17		0.100	0.100	R	36.5	36.5

No.	Soil ID	Cs-137	Adjusted Cs-137	Area	Ranks	Reference Ranks
18		0.067	0.067	R	26.5	26.5
19		0.099	0.099	R	35	35
20		0.101	0.101	R	38	38
21		0.148	0.148	R	44	44
22		0.153	0.153	R	46	46
23		0.025	0.025	R	16	16
24		0.188	0.188	R	51	51
25		0.198	0.198	R	53	53
26		0.030	0.030	R	19	19
27		0.079	0.079	R	29	29
28		0.158	0.158	R	47.5	47.5
29		0.109	0.109	R	39	39
30		0.059	0.059	R	25	25
31		0.067	0.067	R	26.5	26.5
32		0.113	0.113	R	40	40
33		0.015	0.015	R	6	6
34		0.031	0.031	R	21	21
35		0.042	0.042	R	24	24
36		0.097	0.097	R	33.5	33.5
37		0.015	0.015	R	6	6
38		0.020	0.020	R	11	11
39		0.085	0.085	R	31	31
40		0.080	0.080	R	30	30
41		0.015	0.015	R	6	6
42		0.020	0.020	R	11	11
43		0.035	0.035	R	22.5	22.5
44		0.035	0.035	R	22.5	22.5
45		0.025	0.025	R	16	16
46		0.150	0.150	R	45	45
47		0.140	0.140	R	41.5	41.5
48		0.190	0.190	R	52	52
49		0.097	0.097	R	33.5	33.5
50		0.030	0.030	R	19	19
51		0.140	0.140	R	41.5	41.5
52	APWC0401S001	-0.006	-0.006	S	3	0
53	APWC0402S001	-0.012	-0.012	S	2	0
54	APWC0403S001	-0.012	-0.012	S	1	0
55	APWC0404S001	0.008	0.008	S	4	0
<b>Sum</b>					<b>1540.0</b>	<b>1530.0</b>

## Soil Data from ISRA 009 - AP/STP-1E1

### Wilcoxon Rank Sum Test -- (Strontium-90)

#### General Information:

The Wilcoxon Rank Sum method tests whether or not measurements of samples from a survey area (S) tend to be consistently larger than those from a background reference area (R) by more than the DCGL.

The null hypothesis,  $H_0$ , is: Survey sample concentrations exceed those in the background by more than the DCGL.

The alternative hypothesis,  $H_a$ , is: Survey sample concentrations do not exceed those in the background by more than the DCGL.

#### How to use this template:

- 1) Enter analysis results in Data Tab.
- 2) The Wilcoxon Rank Sum test is prescribed in, NUREG-1505, Nuclear Regulatory Commission, "A Non-parametric Statistical Methodology for the Design and Analysis of Final Status Decommissioning Surveys." January 1998.

Derived Concentration Guideline Level, DCGL (pCi/g)	0.0001
Type I Error Rate, alpha:	0.05
Type II Error Rate, beta:	0.05
Number of Background Samples, m:	51
Number of Survey Samples, n:	4
z-value for alpha	1.645
No. of groups of tied measurements, g	9
Critical Value (excluding ties)	1478.8
<b>Critical Value (including ties)</b>	<b>1478.4</b>
<b>Sum of Reference Ranks</b>	<b>1516.0</b>
Sum of Survey Ranks	24.0
Sum of All Ranks	1540
Check Rank Sum $(n+m)*(n+m+1)/2$	1540

If the sum of the reference ranks is larger than the critical value, there is enough evidence to reject the null hypothesis and accept the alternative hypothesis. Otherwise the null hypothesis is accepted.

#### Test Result:

**Survey sample concentrations do not exceed those in the background by more than the DCGL**

	Bkgd Ref (R)	Survey (S)
Mean	0.051	0.011
Max	0.130	0.029
Min	0.005	-0.005
$\sigma$	0.030	0.014
$m-1.96*\sigma$	-0.008	-0.017
$m+1.96*\sigma$	0.109	0.039

No.	Soil ID	Sr-90	Adjusted Sr-90	Area	Ranks	Reference Ranks
1		0.030	0.030	R	16	16
2		0.010	0.010	R	4.5	4.5
3		0.045	0.045	R	30.5	30.5
4		0.045	0.045	R	30.5	30.5
5		0.050	0.050	R	40	40
6		0.040	0.040	R	22	22
7		0.035	0.035	R	18.5	18.5
8		0.050	0.050	R	40	40
9		0.050	0.050	R	40	40
10		0.130	0.130	R	54.5	54.5
11		0.120	0.120	R	53	53
12		0.040	0.040	R	22	22
13		0.045	0.045	R	30.5	30.5
14		0.130	0.130	R	54.5	54.5
15		0.050	0.050	R	40	40
16		0.088	0.088	R	48	48
17		0.080	0.080	R	45	45

No.	Soil ID	Sr-90	Adjusted Sr-90	Area	Ranks	Reference Ranks
18		0.100	0.100	R	52	52
19		0.069	0.069	R	44	44
20		0.097	0.097	R	50	50
21		0.084	0.084	R	47	47
22		0.098	0.098	R	51	51
23		0.045	0.045	R	30.5	30.5
24		0.045	0.045	R	30.5	30.5
25		0.020	0.020	R	9	9
26		0.045	0.045	R	30.5	30.5
27		0.089	0.089	R	49	49
28		0.050	0.050	R	40	40
29		0.045	0.045	R	30.5	30.5
30		0.050	0.050	R	40	40
31		0.045	0.045	R	30.5	30.5
32		0.040	0.040	R	22	22
33		0.045	0.045	R	30.5	30.5
34		0.045	0.045	R	30.5	30.5
35		0.045	0.045	R	30.5	30.5
36		0.025	0.025	R	12.5	12.5
37		0.082	0.082	R	46	46
38		0.045	0.045	R	30.5	30.5
39		0.040	0.040	R	22	22
40		0.035	0.035	R	18.5	18.5
41		0.025	0.025	R	12.5	12.5
42		0.005	0.005	R	2	2
43		0.020	0.020	R	9	9
44		0.010	0.010	R	4.5	4.5
45		0.020	0.020	R	9	9
46		0.020	0.020	R	9	9
47		0.050	0.050	R	40	40
48		0.030	0.030	R	16	16
49		0.030	0.030	R	16	16
50		0.020	0.020	R	9	9
51		0.040	0.040	R	22	22
52	APWC0401S001	0.005	0.005	S	3	0
53	APWC0402S001	0.015	0.015	S	6	0
54	APWC0403S001	0.029	0.029	S	14	0
55	APWC0404S001	-0.005	-0.005	S	1	0
<b>Sum</b>					<b>1540.0</b>	<b>1516.0</b>











**Appendix 2**  
**Radionuclide Results**






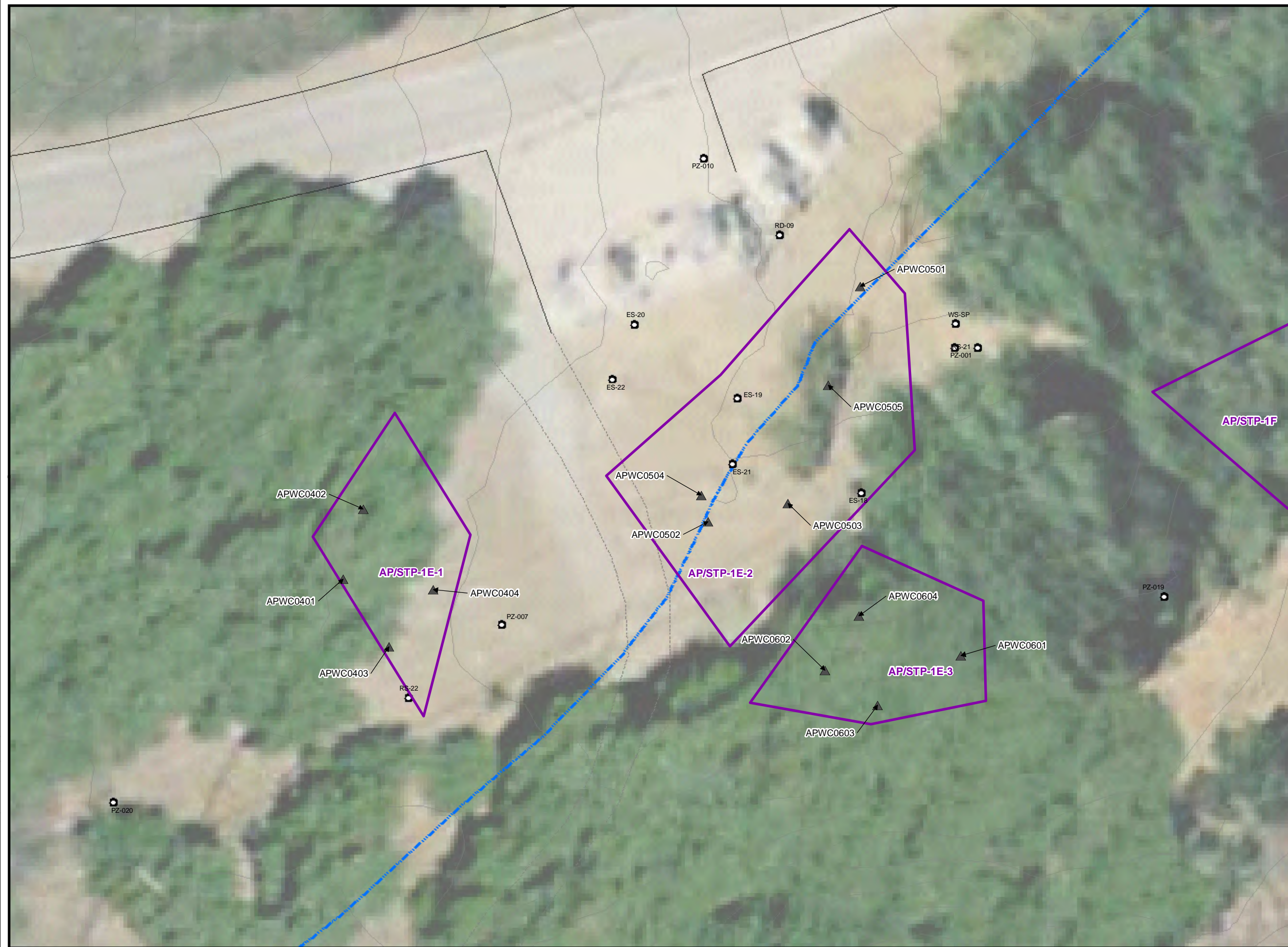
**Outfall 009**  
**Sample Locations for AP/STP - 1E-1,**  
**AP/STP - 1E-2, AP/STP - 1E-3**

**Base Map Legend**

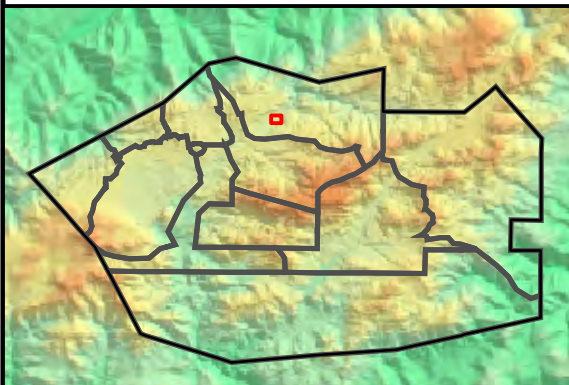
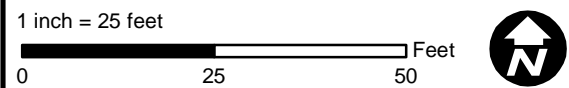
-  Administrative Area Boundary
-  RFI Site Boundary
-  Report Group Boundary
-  NPDES Outfall
-  Dirt Road
-  A/C Paving
-  Drainage
-  Non Jurisdictional Surface Water Pathway
-  Surface Water Divide
-  Elevation Contour

**Figure Legend**

-  Waste Characterization Sample



Document: ISRA\_Plots\_SP\_RD47\_SampleLocations\_060710.mxd Date: Jun 22, 2010



**ISRA 009 – AP/STP-1E3.  
Soil Sampling for Radionuclides.  
Results and Statistical Analysis.  
Waste Certification.**

This data package provides the laboratory results and statistical analysis of the 4 samples taken at the ISRA Outfall 009, AP/STP-1E3 area. This analysis and data interpretation complies with the procedure approved by the California Department of Public Health<sup>1</sup>.

Samples taken for waste disposal characterization were analyzed for strontium-90, tritium and gamma emitting radionuclides by gamma spectroscopy, using an off-site laboratory. Minimum detectable activity (MDA) for cesium-137 and strontium-90 averaged ~0.041 pCi/g and ~0.042 pCi/g respectively. Minimum detectable activity for tritium averaged ~0.65 pCi/g. The gamma spectroscopy library also included the following contaminants-of-concern: Na-22, K-40, Mn-54, Co-60, Cs-134, Cs-137, Eu-152, Eu-154, Th-228, Th-232, U-235, U-238 and Am-241.

Statistical evaluation of sample analytical results to determine whether or not the sampled waste contains Cs-137 or Sr-90 activity elevated above local background was conducted using the Wilcoxon Rank Sum Test using protocols described in NUREG-1505<sup>2</sup> and DTSC guidance<sup>3</sup> (See Appendix 1). Appendix 2 shows the complete analytical results for all radionuclides. Complete laboratory data packages are available on request.

Local background data for cesium-137 and strontium-90 was taken from Table 20 of the 1995 McLaren/Hart report<sup>4</sup>. Background for tritium in soil is not well established, and is not reported in the 1995 McLaren/Hart report, therefore tritium background in soil is conservatively assumed to be zero. Tritium data is therefore compared to the MDA of the analysis and the EPA preliminary remediation goal (PRG)<sup>5</sup> for residential 10<sup>-6</sup> risk.

## **Conclusions**

**Cesium-137** - Based on the results of the statistical analysis of Appendix 1, soil to be excavated from AP/STP-1E3 does not exceed the local background for Cs-137. The incremental dose from Cs-137 above background is therefore zero mrem/y. All except one Cs-137 results are non-detect. The highest Cs-137 result is 0.045 pCi/g which is less than the highest background result

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<sup>1</sup> Boeing, "Northern Drainage Waste Sampling for Radionuclides." Revision 9, November 5, 2007. (Attachment 3 to Northern Drainage Work Plan) and "ISRA Waste Sampling for Radionuclides", Attachment A to the ISRA Soil Management Plan.

<sup>2</sup> NUREG-1505, Nuclear Regulatory Commission, "A Non-parametric Statistical Methodology for the Design and Analysis of Final Status Decommissioning Surveys." January 1998. [http://www.philrutherford.com/Radiation\\_Cleanup\\_Standards/NUREG-1505.pdf](http://www.philrutherford.com/Radiation_Cleanup_Standards/NUREG-1505.pdf)

<sup>3</sup> DTSC, "Selecting Inorganic Constituents as Chemicals of Concern at Risk Assessments at Hazardous Waste Sites and Permitted Facilities." February 1997.

<sup>4</sup> McLaren/Hart, "Additional Soil and Water Sampling at the Brandeis-Bardin Institute and Santa Monica Mountains Conservancy." Jan 19, 1995. <http://www.etec.energy.gov/Health-and-Safety/Documents/BrandeisBardin/AddSoilandWaterSamp.pdf>

<sup>5</sup> EPA preliminary remediation goals for radionuclides (Effective January 1, 2007) - <http://epa-prgs.ornl.gov/radionuclides/>.

of 0.213 pCi/g. The highest non-background subtracted Cs-137 result is equivalent to an effective dose of 0.042 mrem/y<sup>6</sup>.

**Strontium-90** - Based on the results of the statistical analysis of Appendix 1, soil to be excavated from AP/STP-1E3 does not exceed the local background for Sr-90. The incremental dose from Sr-90 above background is therefore zero mrem/y. All Sr-90 results are non-detect. The highest Sr-90 result is 0.019 pCi/g which is non-detect and less than the highest background result of 0.13 pCi/g. The highest non-background subtracted, non-detect Sr-90 result is equivalent to an effective dose of 0.0011 mrem/y<sup>6</sup>.

**Tritium** - All tritium results are non-detect, the average tritium result is -0.126 pCi/g and the highest tritium result is 0.136 pCi/g. The highest non-detected, non-background subtracted tritium result is equivalent to an effective dose of 0.029 mrem/y<sup>6</sup>.

This waste is certified to be “radiologically” acceptable for shipment to, and disposal at, any waste disposal facility. The waste requires no further radiological controls.

This waste meets the requirements of disposal facility permits<sup>7,8</sup> and complies with the California Health & Safety Code<sup>9</sup>.

The Governor’s Executive Order D-62-02 prohibits the “*disposal of decommissioned materials to Class III landfills or unclassified management units.*” The soil from AP/STP-1E3 is not decommissioned material, and does not originate from the proximity of any radiological facility. The sampling in this certification has therefore been conducted as a best management practice that complies with the requirements of D-62-02. Verification sampling and/or approval by the

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<sup>6</sup> EPA dose compliance considerations for radionuclides (Effective August 3, 2010) - <http://epa-dccs.ornl.gov/>. Soil concentrations that meet the 10<sup>-6</sup> residential risk PRG are < 0.5 mrem/y. The Cs-137 residential PRG of 0.0597 pCi/g is equivalent to 0.056 mrem/y. The Sr-90 residential PRG of 0.231 pCi/g is equivalent to 0.014 mrem/y. The tritium residential PRG of 2.28 pCi/g is equivalent to 0.486 mrem/y.

<sup>7</sup> This waste is exempt from regulation and licensing or is expressly authorized for disposal under the Radiation Control Law (Division 104, Part 9, Chapter 8 of the California Health & Safety Code).

<sup>8</sup> This waste is not prohibited from disposal by any government agency with jurisdictional authority over this waste.

<sup>9</sup> Division 104, Part 9, Chapter 5, Article 1, Section 114715, “No person shall bury, throw away, or in any manner dispose of radioactive wastes within the state except in a manner and at locations as will result in no significant radioactive contamination of the environment.” For the purposes of this requirement, “significant” is defined in Section 114710 as amounts of radioactive materials that are likely to expose persons to ionizing radiation greater than the guide levels published by the Federal Radiation Council (FRC). The FRC no longer exists, but the applicable guide level last published by the FRC was 500 mrem per year to a member of the public. Because the regulatory dose limit to members of the public has since been lowered to 100 mrem per year, CDPH/RHB conservatively utilizes the lower dose for purposes of defining “significant” radioactive contamination in this Article of the California Health and Safety Code.  
<http://www.leginfo.ca.gov/cgi-bin/displaycode?section=hsc&group=114001-115000&file=114705-114780>

California Department of Public Health (CDPH) Radiologic Health Branch (RHB) are not required for the off-site disposal of decommissioned material or of the subject material<sup>10</sup>.



Phil Rutherford  
Manager, Health, Safety & Radiation Services

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<sup>10</sup> The California Department of Public Health (CDPH) Radiologic Health Branch (RHB) has stated in a November 9, 2007 email to Phil Rutherford (Boeing) ... *"The Governor's Executive Order D-62-02, does not specifically require the Department of Health Services (now the Department of Public Health) to perform verification sampling of decommissioned material or to provide approval for disposal of specific decommissioned material shipped offsite (e.g., to Class I or II landfills). The California DPH has not imposed a requirement that Boeing or the Department of Energy (DOE) seek DPH verification sampling or approval of all decommissioned material destined for Class I or II landfills in compliance with the Governor's Executive Order."*

**Appendix 1**

**Wilcoxon Rank Sum Statistical Test for Cesium-137 and Strontium-90**

### Soil Data from ISRA 009 - AP/STP-1E3

No.	Sample ID	Stockpile ID	Sampling Date	Laboratory Batch	Cesium-137 (pCi/g)				Strontium-90 (pCi/g)				Tritium (pCi/g)			
					Activity	+/- 2σ Error	MDA	Non-detect?	Activity	+/- 2σ Error	MDA	Non-detect?	Activity	+/- 2σ Error	MDA	Non-detect?
1	APWC0601	N/A	7/30/2010	257645	0.0451	0.0272	0.0358		0.0185	0.0243	0.0416	NDA	-0.305	0.384	0.788	NDA
2	APWC0602	N/A	7/29/2010	257563	-0.00293	0.0272	0.0482	NDA	0.0112	0.0233	0.0422	NDA	0.136	0.305	0.534	NDA
3	APWC0603	N/A	7/29/2010	257563	-0.0176	0.0236	0.0383	NDA	-0.0182	0.0232	0.0452	NDA	-0.0384	0.278	0.514	NDA
4	APWC0604	N/A	7/30/2010	257645	-0.00769	0.0234	0.0401	NDA	0.00661	0.0205	0.0381	NDA	-0.298	0.375	0.771	NDA

	Cesium-137 (pCi/g)				Strontium-90 (pCi/g)				Tritium (pCi/g)			
	Activity	MDA	Non-detect?		Activity	MDA	Non-detect?		Activity	MDA	Non-detect?	
<b>Average</b>	0.004	0.041			0.005	0.042			-0.126	0.652		
<b>Maximum</b>	0.045	0.048			0.019	0.045			0.136	0.788		
<b>Minimum</b>	-0.018	0.036			-0.018	0.038			-0.305	0.514		
<b>Count</b>			4				4				4	
<b>Number of Non-Detects</b>			3				4				4	
<b>% Non-Detects</b>			75%				100%				100%	

## Soil Data from ISRA 009 - AP/STP-1E3

### Wilcoxon Rank Sum Test -- (Cesium-137)

#### General Information:

The Wilcoxon Rank Sum method tests whether or not measurements of samples from a survey area (S) tend to be consistently larger than those from a background reference area (R) by more than the DCGL.

The null hypothesis,  $H_0$ , is: Survey sample concentrations exceed those in the background by more than the DCGL.

The alternative hypothesis,  $H_a$ , is: Survey sample concentrations do not exceed those in the background by more than the DCGL.

#### How to use this template:

- 1) Enter analysis results in Data Tab.
- 2) The Wilcoxon Rank Sum test is prescribed in, NUREG-1505, Nuclear Regulatory Commission, "A Non-parametric Statistical Methodology for the Design and Analysis of Final Status Decommissioning Surveys." January 1998.

Derived Concentration Guideline Level, DCGL (pCi/g)	0.00
Type I Error Rate, alpha:	0.05
Type II Error Rate, beta:	0.05
Number of Background Samples, m:	51
Number of Survey Samples, n:	4
z-value for alpha	1.645
No. of groups of tied measurements, g	10
Critical Value (excluding ties)	1478.8
<b>Critical Value (including ties)</b>	<b>1478.7</b>
<b>Sum of Reference Ranks</b>	<b>1510.0</b>
Sum of Survey Ranks	30.0
Sum of All Ranks	1540
Check Rank Sum $(n+m)*(n+m+1)/2$	1540

If the sum of the reference ranks is larger than the critical value, there is enough evidence to reject the null hypothesis and accept the alternative hypothesis. Otherwise the null hypothesis is accepted.

#### Test Result:

**Survey sample concentrations do not exceed those in the background by more than the DCGL**

	Bkgd Ref (R)	Survey (S)
Mean	0.087	0.004
Max	0.213	0.045
Min	0.015	-0.018
$\sigma$	0.062	0.028
$m-1.96*\sigma$	-0.035	-0.051
$m+1.96*\sigma$	0.210	0.059

No.	Soil ID	Cs-137	Adjusted Cs-137	Area	Ranks	Reference Ranks
1		0.092	0.092	R	32	32
2		0.020	0.020	R	10	10
3		0.020	0.020	R	10	10
4		0.100	0.100	R	36.5	36.5
5		0.020	0.020	R	10	10
6		0.158	0.158	R	47.5	47.5
7		0.175	0.175	R	49	49
8		0.209	0.209	R	54	54
9		0.180	0.180	R	50	50
10		0.030	0.030	R	18	18
11		0.213	0.213	R	55	55
12		0.025	0.025	R	15	15
13		0.020	0.020	R	10	10
14		0.020	0.020	R	10	10
15		0.074	0.074	R	28	28
16		0.147	0.147	R	43	43
17		0.100	0.100	R	36.5	36.5

No.	Soil ID	Cs-137	Adjusted Cs-137	Area	Ranks	Reference Ranks
18		0.067	0.067	R	26.5	26.5
19		0.099	0.099	R	35	35
20		0.101	0.101	R	38	38
21		0.148	0.148	R	44	44
22		0.153	0.153	R	46	46
23		0.025	0.025	R	15	15
24		0.188	0.188	R	51	51
25		0.198	0.198	R	53	53
26		0.030	0.030	R	18	18
27		0.079	0.079	R	29	29
28		0.158	0.158	R	47.5	47.5
29		0.109	0.109	R	39	39
30		0.059	0.059	R	25	25
31		0.067	0.067	R	26.5	26.5
32		0.113	0.113	R	40	40
33		0.015	0.015	R	5	5
34		0.031	0.031	R	20	20
35		0.042	0.042	R	23	23
36		0.097	0.097	R	33.5	33.5
37		0.015	0.015	R	5	5
38		0.020	0.020	R	10	10
39		0.085	0.085	R	31	31
40		0.080	0.080	R	30	30
41		0.015	0.015	R	5	5
42		0.020	0.020	R	10	10
43		0.035	0.035	R	21.5	21.5
44		0.035	0.035	R	21.5	21.5
45		0.025	0.025	R	15	15
46		0.150	0.150	R	45	45
47		0.140	0.140	R	41.5	41.5
48		0.190	0.190	R	52	52
49		0.097	0.097	R	33.5	33.5
50		0.030	0.030	R	18	18
51		0.140	0.140	R	41.5	41.5
52	APWC0601	0.045	0.045	S	24	0
53	APWC0602	-0.003	-0.003	S	3	0
54	APWC0603	-0.018	-0.018	S	1	0
55	APWC0604	-0.008	-0.008	S	2	0
<b>Sum</b>					<b>1540.0</b>	<b>1510.0</b>



## Soil Data from ISRA 009 - AP/STP-1E3

### Wilcoxon Rank Sum Test -- (Strontium-90)

#### General Information:

The Wilcoxon Rank Sum method tests whether or not measurements of samples from a survey area (S) tend to be consistently larger than those from a background reference area (R) by more than the DCGL.

The null hypothesis,  $H_0$ , is: Survey sample concentrations exceed those in the background by more than the DCGL.

The alternative hypothesis,  $H_a$ , is: Survey sample concentrations do not exceed those in the background by more than the DCGL.

#### How to use this template:

- 1) Enter analysis results in Data Tab.
- 2) The Wilcoxon Rank Sum test is prescribed in, NUREG-1505, Nuclear Regulatory Commission, "A Non-parametric Statistical Methodology for the Design and Analysis of Final Status Decommissioning Surveys." January 1998.

Derived Concentration Guideline Level, DCGL (pCi/g)	0.00
Type I Error Rate, alpha:	0.05
Type II Error Rate, beta:	0.05
Number of Background Samples, m:	51
Number of Survey Samples, n:	4
z-value for alpha	1.645
No. of groups of tied measurements, g	9
Critical Value (excluding ties)	1478.8
<b>Critical Value (including ties)</b>	<b>1478.4</b>
<b>Sum of Reference Ranks</b>	<b>1523.0</b>
Sum of Survey Ranks	17.0
Sum of All Ranks	1540
Check Rank Sum $(n+m)*(n+m+1)/2$	1540

If the sum of the reference ranks is larger than the critical value, there is enough evidence to reject the null hypothesis and accept the alternative hypothesis. Otherwise the null hypothesis is accepted.

#### Test Result:

**Survey sample concentrations do not exceed those in the background by more than the DCGL**

	Bkgd Ref (R)	Survey (S)
Mean	0.051	0.005
Max	0.130	0.019
Min	0.005	-0.018
$\sigma$	0.030	0.016
$m-1.96*\sigma$	-0.008	-0.027
$m+1.96*\sigma$	0.109	0.036

No.	Soil ID	Sr-90	Adjusted Sr-90	Area	Ranks	Reference Ranks
1		0.030	0.030	R	16	16
2		0.010	0.010	R	4.5	4.5
3		0.045	0.045	R	30.5	30.5
4		0.045	0.045	R	30.5	30.5
5		0.050	0.050	R	40	40
6		0.040	0.040	R	22	22
7		0.035	0.035	R	18.5	18.5
8		0.050	0.050	R	40	40
9		0.050	0.050	R	40	40
10		0.130	0.130	R	54.5	54.5
11		0.120	0.120	R	53	53
12		0.040	0.040	R	22	22
13		0.045	0.045	R	30.5	30.5
14		0.130	0.130	R	54.5	54.5
15		0.050	0.050	R	40	40
16		0.088	0.088	R	48	48
17		0.080	0.080	R	45	45

No.	Soil ID	Sr-90	Adjusted Sr-90	Area	Ranks	Reference Ranks
18		0.100	0.100	R	52	52
19		0.069	0.069	R	44	44
20		0.097	0.097	R	50	50
21		0.084	0.084	R	47	47
22		0.098	0.098	R	51	51
23		0.045	0.045	R	30.5	30.5
24		0.045	0.045	R	30.5	30.5
25		0.020	0.020	R	10	10
26		0.045	0.045	R	30.5	30.5
27		0.089	0.089	R	49	49
28		0.050	0.050	R	40	40
29		0.045	0.045	R	30.5	30.5
30		0.050	0.050	R	40	40
31		0.045	0.045	R	30.5	30.5
32		0.040	0.040	R	22	22
33		0.045	0.045	R	30.5	30.5
34		0.045	0.045	R	30.5	30.5
35		0.045	0.045	R	30.5	30.5
36		0.025	0.025	R	13.5	13.5
37		0.082	0.082	R	46	46
38		0.045	0.045	R	30.5	30.5
39		0.040	0.040	R	22	22
40		0.035	0.035	R	18.5	18.5
41		0.025	0.025	R	13.5	13.5
42		0.005	0.005	R	2	2
43		0.020	0.020	R	10	10
44		0.010	0.010	R	4.5	4.5
45		0.020	0.020	R	10	10
46		0.020	0.020	R	10	10
47		0.050	0.050	R	40	40
48		0.030	0.030	R	16	16
49		0.030	0.030	R	16	16
50		0.020	0.020	R	10	10
51		0.040	0.040	R	22	22
52	APWC0601	0.019	0.019	S	7	0
53	APWC0602	0.011	0.011	S	6	0
54	APWC0603	-0.018	-0.018	S	1	0
55	APWC0604	0.007	0.007	S	3	0
<b>Sum</b>					<b>1540.0</b>	<b>1523.0</b>













**Appendix 2**  
**Radionuclide Results**

ISRA Outfall 009 - AP/STP-1E3


Project Name	Sampling Organization	Sampling Date	Sampling Location (General)	Sampling Location (Specific)	Sample Serial Number	Media Type	Isotope	Value	Error (+/-)	MDA	Non-Detect?	Units	Error Type	Analysis Protocol	Analysis Organization	Document	Status
2010 ISRA Waste Characterization	MWH	7/30/2010	AP/STP-1E3	APWC0601	APWC0601S001	Soil	Americium-241	0.000595	0.0603	0.102	NDA	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL	257645	Waste
2010 ISRA Waste Characterization	MWH	7/29/2010	AP/STP-1E3	APWC0602	APWC0602S001	Soil	Americium-241	0.0134	0.187	0.354	NDA	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL	257563	Waste
2010 ISRA Waste Characterization	MWH	7/29/2010	AP/STP-1E3	APWC0603	APWC0603S001	Soil	Americium-241	-0.00934	0.0879	0.143	NDA	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL	257563	Waste
2010 ISRA Waste Characterization	MWH	7/30/2010	AP/STP-1E3	APWC0604	APWC0604S001	Soil	Americium-241	0.163	0.141	0.247	NDA	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL	257645	Waste
2010 ISRA Waste Characterization	MWH	7/30/2010	AP/STP-1E3	APWC0601	APWC0601S001	Soil	Cesium-134	0.0434	0.0253	0.0465	NDA	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL	257645	Waste
2010 ISRA Waste Characterization	MWH	7/29/2010	AP/STP-1E3	APWC0602	APWC0602S001	Soil	Cesium-134	0	0.053	0.0656	NDA	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL	257563	Waste
2010 ISRA Waste Characterization	MWH	7/29/2010	AP/STP-1E3	APWC0603	APWC0603S001	Soil	Cesium-134	0	0.0417	0.0558	NDA	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL	257563	Waste
2010 ISRA Waste Characterization	MWH	7/30/2010	AP/STP-1E3	APWC0604	APWC0604S001	Soil	Cesium-134	0.0618	0.0336	0.0633	NDA	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL	257645	Waste
2010 ISRA Waste Characterization	MWH	7/30/2010	AP/STP-1E3	APWC0601	APWC0601S001	Soil	Cesium-137	0.0451	0.0272	0.0358	NDA	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL	257645	Waste
2010 ISRA Waste Characterization	MWH	7/29/2010	AP/STP-1E3	APWC0602	APWC0602S001	Soil	Cesium-137	-0.00293	0.0272	0.0482	NDA	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL	257563	Waste
2010 ISRA Waste Characterization	MWH	7/29/2010	AP/STP-1E3	APWC0603	APWC0603S001	Soil	Cesium-137	-0.0176	0.0236	0.0383	NDA	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL	257563	Waste
2010 ISRA Waste Characterization	MWH	7/30/2010	AP/STP-1E3	APWC0604	APWC0604S001	Soil	Cesium-137	-0.00769	0.0234	0.0401	NDA	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL	257645	Waste
2010 ISRA Waste Characterization	MWH	7/30/2010	AP/STP-1E3	APWC0601	APWC0601S001	Soil	Cobalt-60	-0.00607	0.0174	0.0283	NDA	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL	257645	Waste
2010 ISRA Waste Characterization	MWH	7/29/2010	AP/STP-1E3	APWC0602	APWC0602S001	Soil	Cobalt-60	0.0233	0.0299	0.0536	NDA	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL	257563	Waste
2010 ISRA Waste Characterization	MWH	7/29/2010	AP/STP-1E3	APWC0603	APWC0603S001	Soil	Cobalt-60	-0.0066	0.0227	0.0368	NDA	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL	257563	Waste
2010 ISRA Waste Characterization	MWH	7/30/2010	AP/STP-1E3	APWC0604	APWC0604S001	Soil	Cobalt-60	0.0167	0.0277	0.0496	NDA	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL	257645	Waste
2010 ISRA Waste Characterization	MWH	7/30/2010	AP/STP-1E3	APWC0601	APWC0601S001	Soil	Europium-152	-0.0132	0.0477	0.0788	NDA	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL	257645	Waste
2010 ISRA Waste Characterization	MWH	7/29/2010	AP/STP-1E3	APWC0602	APWC0602S001	Soil	Europium-152	0.0225	0.0914	0.127	NDA	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL	257563	Waste
2010 ISRA Waste Characterization	MWH	7/29/2010	AP/STP-1E3	APWC0603	APWC0603S001	Soil	Europium-152	-0.0168	0.0594	0.0975	NDA	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL	257563	Waste
2010 ISRA Waste Characterization	MWH	7/30/2010	AP/STP-1E3	APWC0604	APWC0604S001	Soil	Europium-152	-0.0388	0.0677	0.112	NDA	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL	257645	Waste
2010 ISRA Waste Characterization	MWH	7/30/2010	AP/STP-1E3	APWC0601	APWC0601S001	Soil	Europium-154	-0.0256	0.0606	0.0992	NDA	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL	257645	Waste
2010 ISRA Waste Characterization	MWH	7/29/2010	AP/STP-1E3	APWC0602	APWC0602S001	Soil	Europium-154	-0.00781	0.0878	0.146	NDA	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL	257563	Waste
2010 ISRA Waste Characterization	MWH	7/29/2010	AP/STP-1E3	APWC0603	APWC0603S001	Soil	Europium-154	0.0563	0.0784	0.139	NDA	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL	257563	Waste
2010 ISRA Waste Characterization	MWH	7/30/2010	AP/STP-1E3	APWC0604	APWC0604S001	Soil	Europium-154	0.0305	0.0879	0.146	NDA	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL	257645	Waste
2010 ISRA Waste Characterization	MWH	7/30/2010	AP/STP-1E3	APWC0601	APWC0601S001	Soil	Manganese-54	-0.00574	0.0185	0.0324	NDA	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL	257645	Waste
2010 ISRA Waste Characterization	MWH	7/29/2010	AP/STP-1E3	APWC0602	APWC0602S001	Soil	Manganese-54	0.0118	0.0265	0.0477	NDA	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL	257563	Waste
2010 ISRA Waste Characterization	MWH	7/29/2010	AP/STP-1E3	APWC0603	APWC0603S001	Soil	Manganese-54	0.0128	0.022	0.0402	NDA	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL	257563	Waste
2010 ISRA Waste Characterization	MWH	7/30/2010	AP/STP-1E3	APWC0604	APWC0604S001	Soil	Manganese-54	0.00181	0.0249	0.0428	NDA	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL	257645	Waste
2010 ISRA Waste Characterization	MWH	7/30/2010	AP/STP-1E3	APWC0601	APWC0601S001	Soil	Potassium-40	23.3	2.18	0.229	NDA	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL	257645	Waste
2010 ISRA Waste Characterization	MWH	7/29/2010	AP/STP-1E3	APWC0602	APWC0602S001	Soil	Potassium-40	21.4	2.39	0.425	NDA	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL	257563	Waste
2010 ISRA Waste Characterization	MWH	7/29/2010	AP/STP-1E3	APWC0603	APWC0603S001	Soil	Potassium-40	22.5	2.22	0.304	NDA	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL	257563	Waste
2010 ISRA Waste Characterization	MWH	7/30/2010	AP/STP-1E3	APWC0604	APWC0604S001	Soil	Potassium-40	22.5	2.32	0.321	NDA	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL	257645	Waste
2010 ISRA Waste Characterization	MWH	7/30/2010	AP/STP-1E3	APWC0601	APWC0601S001	Soil	Sodium-22	-0.0103	0.0212	0.0346	NDA	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL	257645	Waste
2010 ISRA Waste Characterization	MWH	7/29/2010	AP/STP-1E3	APWC0602	APWC0602S001	Soil	Sodium-22	-0.00485	0.031	0.0513	NDA	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL	257563	Waste
2010 ISRA Waste Characterization	MWH	7/29/2010	AP/STP-1E3	APWC0603	APWC0603S001	Soil	Sodium-22	0.0198	0.0276	0.049	NDA	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL	257563	Waste
2010 ISRA Waste Characterization	MWH	7/30/2010	AP/STP-1E3	APWC0604	APWC0604S001	Soil	Sodium-22	0.01	0.0309	0.0512	NDA	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL	257645	Waste
2010 ISRA Waste Characterization	MWH	7/30/2010	AP/STP-1E3	APWC0601	APWC0601S001	Soil	Strontium-90	0.0185	0.0243	0.0416	NDA	pCi/g	2 sigma	EPA 905.0 Modified	GEL	257645	Waste
2010 ISRA Waste Characterization	MWH	7/29/2010	AP/STP-1E3	APWC0602	APWC0602S001	Soil	Strontium-90	0.0112	0.0233	0.0422	NDA	pCi/g	2 sigma	EPA 905.0 Modified	GEL	257563	Waste
2010 ISRA Waste Characterization	MWH	7/29/2010	AP/STP-1E3	APWC0603	APWC0603S001	Soil	Strontium-90	-0.0182	0.0232	0.0452	NDA	pCi/g	2 sigma	EPA 905.0 Modified	GEL	257563	Waste
2010 ISRA Waste Characterization	MWH	7/30/2010	AP/STP-1E3	APWC0604	APWC0604S001	Soil	Strontium-90	0.00661	0.0205	0.0381	NDA	pCi/g	2 sigma	EPA 905.0 Modified	GEL	257645	Waste
2010 ISRA Waste Characterization	MWH	7/30/2010	AP/STP-1E3	APWC0601	APWC0601S001	Soil	Thorium-228	1.41	0.203	0.047	NDA	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL	257645	Waste
2010 ISRA Waste Characterization	MWH	7/29/2010	AP/STP-1E3	APWC0602	APWC0602S001	Soil	Thorium-228	1.33	0.178	0.0794	NDA	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL	257563	Waste
2010 ISRA Waste Characterization	MWH	7/29/2010	AP/STP-1E3	APWC0603	APWC0603S001	Soil	Thorium-228	1.32	0.169	0.0571	NDA	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL	257563	Waste
2010 ISRA Waste Characterization	MWH	7/30/2010	AP/STP-1E3	APWC0604	APWC0604S001	Soil	Thorium-228	1.31	0.156	0.0661	NDA	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL	257645	Waste
2010 ISRA Waste Characterization	MWH	7/30/2010	AP/STP-1E3	APWC0601	APWC0601S001	Soil	Thorium-232	1.36	0.221	0.119	NDA	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL	257645	Waste
2010 ISRA Waste Characterization	MWH	7/29/2010	AP/STP-1E3	APWC0602	APWC0602S001	Soil	Thorium-232	1.36	0.311	0.184	NDA	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL	257563	Waste
2010 ISRA Waste Characterization	MWH	7/29/2010	AP/STP-1E3	APWC0603	APWC0603S001	Soil	Thorium-232	1.24	0.25	0.136	NDA	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL	257563	Waste
2010 ISRA Waste Characterization	MWH	7/30/2010	AP/STP-1E3	APWC0604	APWC0604S001	Soil	Thorium-232	1.61	0.306	0.159	NDA	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL	257645	Waste
2010 ISRA Waste Characterization	MWH	7/30/2010	AP/STP-1E3	APWC0601	APWC0601S001	Soil	Tritium	-0.305	0.384	0.788	NDA	pCi/g	2 sigma	EPA 906.0 Modified	GEL	257645	Waste
2010 ISRA Waste Characterization	MWH	7/29/2010	AP/STP-1E3	APWC0602	APWC0602S001	Soil	Tritium	0.136	0.305	0.534	NDA	pCi/g	2 sigma	EPA 906.0 Modified	GEL	257563	Waste
2010 ISRA Waste Characterization	MWH	7/29/2010	AP/STP-1E3	APWC0603	APWC0603S001	Soil	Tritium	-0.0384	0.278	0.514	NDA	pCi/g	2 sigma	EPA 906.0 Modified	GEL	257563	Waste
2010 ISRA Waste Characterization	MWH	7/30/2010	AP/STP-1E3	APWC0604	APWC0604S001	Soil	Tritium	-0.298	0.375	0.771	NDA	pCi/g	2 sigma	EPA 906.0 Modified	GEL	257645	Waste
2010 ISRA Waste Characterization	MWH	7/30/2010	AP/STP-1E3	APWC0601	APWC0601S001	Soil	Uranium-235	0.0553	0.0916	0.169	NDA	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL	257645	Waste
2010 ISRA Waste Characterization	MWH	7/29/2010	AP/STP-1E3	APWC0602	APWC0602S001	Soil	Uranium-235	0.0656	0.161	0.285	NDA	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL	257563	Waste
2010 ISRA Waste Characterization	MWH	7/29/2010	AP/STP-1E3	APWC0603	APWC0603S001	Soil	Uranium-235	0.0708	0.116	0.212	NDA	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL	257563	Waste
2010 ISRA Waste Characterization	MWH	7/30/2010	AP/STP-1E3	APWC0604	APWC0604S001	Soil	Uranium-235	0.096	0.14	0.261	NDA	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL	257645	Waste
2010 ISRA Waste Characterization	MWH	7/30/2010	AP/STP-1E3	APWC0601	APWC0601S001	Soil	Uranium-238	1.48	0.907	0.897	NDA	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL	257645	Waste
2010 ISRA Waste Characterization	MWH	7/29/2010	AP/STP-1E3	APWC0602	APWC0602S001	Soil	Uranium-238	-0.088	1.51	2.75	NDA	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL	257563	Waste
2010 ISRA Waste Characterization	MWH	7/29/2010	AP/STP-1E3	APWC0603	APWC0603S001	Soil	Uranium-238	1.13	1.11	1.26	NDA	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL	257563	Waste
2010 ISRA Waste Characterization	MWH	7/30/2010	AP/STP-1E3	APWC0604	APWC0604S001	Soil	Uranium-238	1.48	1.59	1.93	NDA	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL	257645	Waste

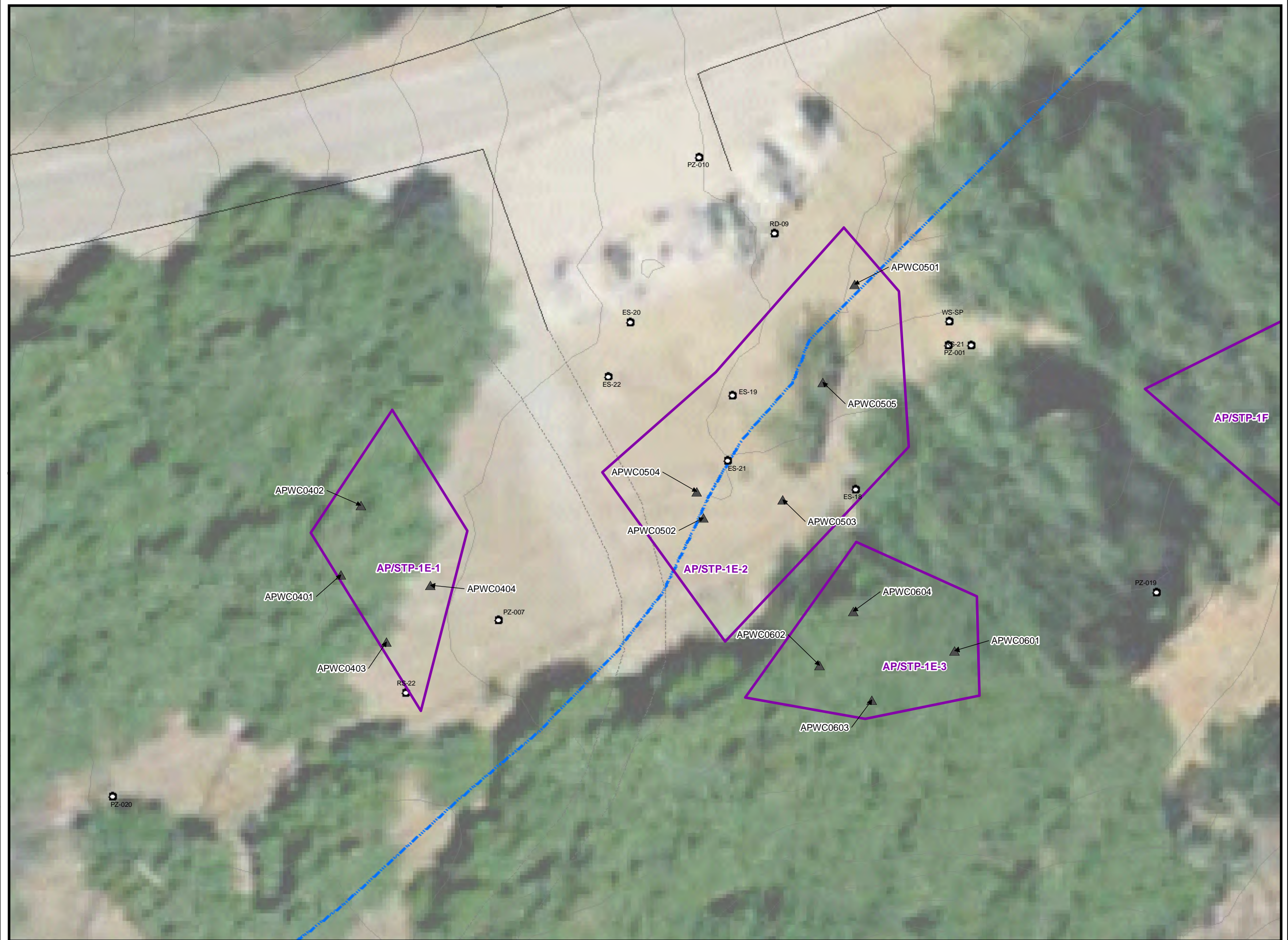
**Outfall 009**  
**Sample Locations for AP/STP - 1E-1,**  
**AP/STP - 1E-2, AP/STP - 1E-3**

**Base Map Legend**

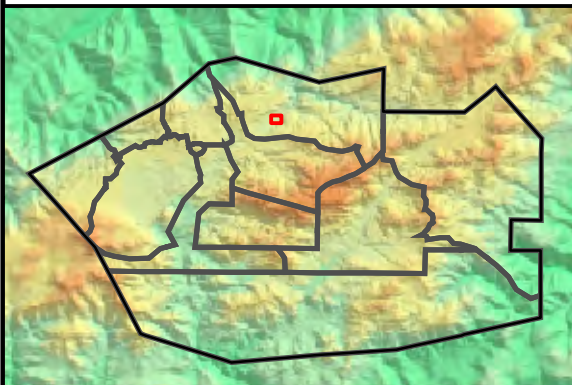
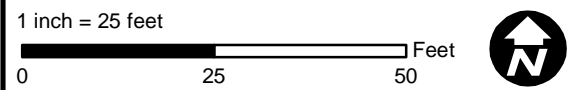
-  Administrative Area Boundary
-  RFI Site Boundary
-  Report Group Boundary
-  NPDES Outfall
-  Dirt Road
-  A/C Paving
-  Drainage
-  Non Jurisdictional Surface Water Pathway
-  Surface Water Divide
-  Elevation Contour

**Figure Legend**

-  Waste Characterization Sample



Document: ISRA\_Plots\_SP\_RD47\_SampleLocations\_060710.mxd Date: Jun 22, 2010



## WASTE CHARACTERIZATION: IN-SITU SOIL LOCATED AT ISRA AREA II PLANNED EXCAVATION ELV-1C NORTHEAST

### **Introduction**

This report presents supporting detailed information for the July 28, 2009 in-situ characterization of prospective soil wastes from planned ISRA excavations in SSFL Area II.

### **Background**

In-situ characterization of soil destined to be excavated from designated locations in SSFL Area II in accordance with the ISRA Workplan was performed. A step-by-step approach was followed to accomplish characterization of the soil prior to excavation. The first step was to review available information regarding historical area usage and existing analytical data from past soil sampling in the applicable SSFL Area II locations. The objective was to identify all substances that could have an impact on the determination of whether soil in each planned excavation footprint was hazardous or not.

The next step was to develop a random sampling plan for each of the planned excavation footprints to determine whether any of the identified substances are present at concentrations that require further investigation. An evaluation of the results of the initial random sampling was performed to determine whether the data was adequate for waste characterization based on the exhibited variance of any detected analytes and the relative difference between detected concentrations and regulatory thresholds. The soil was characterized non-hazardous when analyte concentrations among the samples exhibited a reasonably small variance and there was satisfactory margin between the mean of the samples and applicable regulatory thresholds. Otherwise, additional samples were collected and subjected to analysis or the soil was characterized as hazardous.

The review of historical information and existing analytical data relevant to planned excavation ELV-1C was based largely on the Group 2 RFI results, which indicated that Dioxins were of chief interest to the RFI team. However, detected concentrations of Dioxins were exceeding low with respect to applicable hazardous waste limits and they were not included in the characterization study. However, regulated Metals, Polychlorinated Biphenyls (PCB), and Semi-Volatile Organic Compounds (SVOC) were identified to be addressed in the ELV-1C excavation footprint. A random sampling plan was developed for collection of nine (12) samples from the planned excavation footprint. The samples were analyzed for CAM 17 metals, PCBs, and SVOCs. All samples were collected, contained, and handled according to field practice requirements in SW-846.

As a result of analytical findings from the first round of sampling pertaining to regulated metals, a decision was made to partition off the northeastern portion of the original ELV-1C excavation footprint for soil management purposes. This area is referred to as ELV-1C NORTHEAST (NE). An additional eight (8) random samples were collected from the remaining ELV-1C SOUTHWEST (SW) portion and subjected to analysis for CAM 17 metals. This area is referred to as ELV-1C SW for waste characterization purposes.

### **Results**

Analytical results for the ELV-1C NE planned excavation area are presented in TestAmerica report ISG2199 issued on 8/13/09. The results exhibited elevated concentrations of Lead, with a

maximum of 200 mg/kg. Lead at a concentration of 160 mg/kg was detected in another sample. Both of these samples were subjected to the RCRA TCLP and the California WET leachate tests. TCLP results of 0.35 mg/L and 0.28 mg/L, respectively, were well below the RCRA hazardous waste limit of 5 mg/L. California WET analyses resulted in respective Lead concentrations of 10 mg/L and 12 mg/L. These results did exceed the California hazardous waste limit of 5 mg/L.

Regulated metals other than Lead were below regulatory thresholds. SVOCs were detected, but all analytes were below 1 mg/kg individually and collectively. The same was true for PCBs, which were detected at low concentrations below 1 mg/kg for individual Aroclors and for the sum of the Aroclor concentrations detected in any given sample. Finally, the Fish Bioassay was passed.

### **Determination**

According to analytical results and generator knowledge, the soil in the planned excavation footprint of SSFL Area II ELV-1C NE:

Is Not a Listed Waste (generator knowledge)

Is Not ignitable (generator knowledge)

Is Not corrosive (generator knowledge)

Is Not reactive (generator knowledge)

Is toxic (analytical results)

Is Not Extremely or Acutely Hazardous Waste

**Exceeds the Title 22 threshold for Lead**

Is Not subject to the Prop. 65 listing

Is Not subject to Title 22 Appendix X list

Is Not known by experience or testing to pose a hazard to human health or environment because of its carcinogenicity, acute toxicity, chronic toxicity, bio-accumulative properties, or persistence in the environment.

**The soil in ELV-1C NE is HAZARDOUS.**

**INTERIM SOURCE REMOVAL ACTION (ISRA) - OUTFALL 009**

**ELV-1C (NORTHEASTERN PORTION) WASTE CHARACTERIZATION RESULTS  
THE BOEING COMPANY  
SANTA SUSANA FIELD LABORATORY**

							Object Name:	ISWC0052	ISWC0052	ISWC0053	ISWC0053	ISWC0054	ISWC0054
							Sample Name:	ISWC0052S001	ISWC0052AS001	ISWC0053S001	ISWC0053AS001	ISWC0054S001	ISWC0054AS001
							Collection Date:	7/28/2009	8/28/2009	7/28/2009	8/28/2009	7/28/2009	8/28/2009
							Sample Depth (feet):	0.3 - 0.7	0.3 - 0.7	0.6 - 1.1	0.6 - 1.1	0.0 - 0.4	0.0 - 0.4
ANALYTE	UNITS	TCLC	WET Leachate Testing Trigger <sup>1</sup>	TCLP Leachate Testing Trigger <sup>2</sup>	STLC	TCLP	RESULT	RESULT	RESULT	RESULT	RESULT	RESULT	
<b>METALS</b>													
Antimony	mg/kg	500	150	--	--	--	<10	--	<10	--	<10	--	
Arsenic	mg/kg	500	50	100	--	--	7.1 B	--	5.7	--	5.9 B	--	
Barium	mg/kg	10,000	1,000	2,000	--	--	77	--	79	--	79	--	
Beryllium	mg/kg	75	7.5	--	--	--	0.55	--	0.46 J	--	0.62	--	
Cadmium	mg/kg	100	10	20	--	--	0.57	--	1.7	--	1.7	--	
Chromium	mg/kg	500	50	100	--	--	24	--	40	--	36	--	
Cobalt	mg/kg	8,000	800	--	--	--	6.9	--	6.8	--	8.5	--	
Copper	mg/kg	2,500	250	--	--	--	32	--	58	--	34	--	
Lead	mg/kg	1,000	50	100	--	--	37	--	160	--	200	--	
Lead, WET	mg/L	--	--	--	5	--	--	--	12	--	10	--	
Lead, TCLP	mg/L	--	--	--	--	5	--	--	0.28	--	0.35	--	
Mercury	mg/kg	20	2	4	--	--	0.33	--	0.48	--	0.3	--	
Molybdenum	mg/kg	3,500	3,500	--	--	--	0.29 J	--	1.6 J	--	0.84 J	--	
Nickel	mg/kg	2,000	200	--	--	--	18	--	24	--	21	--	
Selenium	mg/kg	100	10	20	--	--	<2	--	<2	--	<2	--	
Silver	mg/kg	500	50	100	--	--	<1	--	0.96 J	--	<1	--	
Thallium	mg/kg	700	70	--	--	--	<10	--	<10	--	<10	--	
Vanadium	mg/kg	2,400	240	--	--	--	38	--	35	--	36	--	
Zinc	mg/kg	5,000	2,500	--	--	--	86	--	180	--	180	--	
<b>PCBs</b>													
Aroclor 1016	µg/kg	50,000	50,000	--	--	--	<0.05	--	<0.05	--	<0.05	--	
Aroclor 1221	µg/kg	50,000	50,000	--	--	--	<0.05	--	<0.05	--	<0.05	--	
Aroclor 1232	µg/kg	50,000	50,000	--	--	--	<0.05	--	<0.05	--	<0.05	--	
Aroclor 1242	µg/kg	50,000	50,000	--	--	--	<0.05	--	<0.05	--	<0.05	--	
Aroclor 1248	µg/kg	50,000	50,000	--	--	--	<0.05	--	<0.05	--	<0.05	--	
Aroclor 1254	µg/kg	50,000	50,000	--	--	--	0.076	--	0.3 A-01b	--	0.29 A-01, R-1	--	
Aroclor 1260	µg/kg	50,000	50,000	--	--	--	<0.05	--	0.27 A-01c, R-1	--	0.22 A-01a, R-1	--	
<b>SVOCs</b>													
1,2,4-Trichlorobenzene	µg/kg	--	--	--	--	--	<0.66	--	<1.3	--	<2.6	--	
1,2-Dichlorobenzene	µg/kg	--	--	--	--	--	<0.66	--	<1.3	--	<2.6	--	
1,2-Diphenylhydrazine/Azobenzene	µg/kg	--	--	--	--	--	<0.66	--	<1.3	--	<2.6	--	
1,3-Dichlorobenzene	µg/kg	--	--	--	--	--	<0.66	--	<1.3	--	<2.6	--	
1,4-Dichlorobenzene	µg/kg	--	--	150,000	--	--	<0.66	--	<1.3	--	<2.6	--	



**INTERIM SOURCE REMOVAL ACTION (ISRA) - OUTFALL 009**

**ELV-1C (NORTHEASTERN PORTION) WASTE CHARACTERIZATION RESULTS  
THE BOEING COMPANY  
SANTA SUSANA FIELD LABORATORY**

				Object Name:			ISWC0052	ISWC0052	ISWC0053	ISWC0053	ISWC0054	ISWC0054
				Sample Name:			ISWC0052S001	ISWC0052AS001	ISWC0053S001	ISWC0053AS001	ISWC0054S001	ISWC0054AS001
				Collection Date:			7/28/2009	8/28/2009	7/28/2009	8/28/2009	7/28/2009	8/28/2009
				Sample Depth (feet):			0.3 - 0.7	0.3 - 0.7	0.6 - 1.1	0.6 - 1.1	0.0 - 0.4	0.0 - 0.4
ANALYTE	UNITS	TTLIC	WET Leachate Testing Trigger <sup>1</sup>	TCLP Leachate Testing Trigger <sup>2</sup>	STLC	TCLP	RESULT	RESULT	RESULT	RESULT	RESULT	RESULT
2,4,5-Trichlorophenol	µg/kg	--	--	8,000,000	--	--	<0.66	--	<1.3	--	<2.6	--
2,4,6-Trichlorophenol	µg/kg	--	--	40,000	--	--	<0.66	--	<1.3	--	<2.6	--
2,4-Dichlorophenol	µg/kg	--	--	--	--	--	<0.66	--	<1.3	--	<2.6	--
2,4-Dimethylphenol	µg/kg	--	--	--	--	--	<0.66	--	<1.3	--	<2.6	--
2,4-Dinitrophenol	µg/kg	--	--	--	--	--	<1.3	--	<2.6	--	<5.3	--
2,4-Dinitrotoluene	µg/kg	--	--	2,600	--	--	<0.66	--	<1.3	--	<2.6	--
2,6-Dinitrotoluene	µg/kg	--	--	--	--	--	<0.66	--	<1.3	--	<2.6	--
2-Chloronaphthalene	µg/kg	--	--	--	--	--	<0.66	--	<1.3	--	<2.6	--
2-Chlorophenol	µg/kg	--	--	--	--	--	<0.66	--	<1.3	--	<2.6	--
2-Methylnaphthalene	µg/kg	--	--	--	--	--	<0.66	--	<1.3	--	<2.6	--
2-Methylphenol	µg/kg	--	--	--	--	--	<0.66	--	<1.3	--	<2.6	--
2-Nitroaniline	µg/kg	--	--	--	--	--	<0.66	--	<1.3	--	<2.6	--
2-Nitrophenol	µg/kg	--	--	--	--	--	<0.66	--	<1.3	--	<2.6	--
3,3'-Dichlorobenzidine	µg/kg	--	--	--	--	--	<1.7	--	<3.3	--	<6.6	--
3-Nitroaniline	µg/kg	--	--	--	--	--	<0.66	--	<1.3	--	<2.6	--
4,6-Dinitro-2-methylphenol	µg/kg	--	--	--	--	--	<0.84	--	<1.7	--	<3.4	--
4-Bromophenyl phenyl ether	µg/kg	--	--	--	--	--	<0.66	--	<1.3	--	<2.6	--
4-Chloro-3-methylphenol	µg/kg	--	--	--	--	--	<0.66	--	<1.3	--	<2.6	--
4-Chloroaniline	µg/kg	--	--	--	--	--	<0.66	--	<1.3	--	<2.6	--
4-Chlorophenyl phenyl ether	µg/kg	--	--	--	--	--	<0.66	--	<1.3	--	<2.6	--
4-Methylphenol	µg/kg	--	--	--	--	--	<0.66	--	<1.3	--	<2.6	--
4-Nitroaniline	µg/kg	--	--	--	--	--	<1.7	--	<3.3	--	<6.6	--
4-Nitrophenol	µg/kg	--	--	--	--	--	<1.7	--	<3.3	--	<6.6	--
Acenaphthene	µg/kg	--	--	--	--	--	<0.66	--	<1.3	--	<2.6	--
Acenaphthylene	µg/kg	--	--	--	--	--	<0.66	--	<1.3	--	<2.6	--
Aniline	µg/kg	--	--	--	--	--	<0.84 C-2a	--	<1.7	--	<3.4	--
Anthracene	µg/kg	--	--	--	--	--	<0.66	--	<1.3	--	<2.6	--
Benzidine	µg/kg	--	--	--	--	--	<1.3	--	<2.6	--	<5.3	--
Benzo(a)anthracene	µg/kg	--	--	--	--	--	<0.66	--	<1.3	--	<2.6	--
Benzo(a)pyrene	µg/kg	--	--	--	--	--	<0.66	--	<1.3	--	<2.6	--
Benzo(b)fluoranthene	µg/kg	--	--	--	--	--	<0.66	--	<1.3	--	<2.6	--
Benzo(g,h,i)perylene	µg/kg	--	--	--	--	--	<0.66	--	<1.3	--	<2.6	--
Benzo(k)fluoranthene	µg/kg	--	--	--	--	--	<0.66	--	<1.3	--	<2.6	--
Benzoic acid	µg/kg	--	--	--	--	--	<1.7	--	<3.3	--	<6.6	--

**INTERIM SOURCE REMOVAL ACTION (ISRA) - OUTFALL 009**

**ELV-1C (NORTHEASTERN PORTION) WASTE CHARACTERIZATION RESULTS  
THE BOEING COMPANY  
SANTA SUSANA FIELD LABORATORY**

							Object Name:	ISWC0052	ISWC0052	ISWC0053	ISWC0053	ISWC0054	ISWC0054
							Sample Name:	ISWC0052S001	ISWC0052AS001	ISWC0053S001	ISWC0053AS001	ISWC0054S001	ISWC0054AS001
							Collection Date:	7/28/2009	8/28/2009	7/28/2009	8/28/2009	7/28/2009	8/28/2009
							Sample Depth (feet):	0.3 - 0.7	0.3 - 0.7	0.6 - 1.1	0.6 - 1.1	0.0 - 0.4	0.0 - 0.4
ANALYTE	UNITS	TTLIC	WET Leachate Testing Trigger <sup>1</sup>	TCLP Leachate Testing Trigger <sup>2</sup>	STLC	TCLP	RESULT	RESULT	RESULT	RESULT	RESULT	RESULT	
Benzyl alcohol	µg/kg	--	--	--	--	--	<0.66	--	<1.3	--	<2.6	--	
Bis(2-chloroethoxy)methane	µg/kg	--	--	--	--	--	<0.66	--	<1.3	--	<2.6	--	
Bis(2-chloroethyl)ether	µg/kg	--	--	--	--	--	<0.34	--	<0.68	--	<1.4	--	
Bis(2-chloroisopropyl)ether	µg/kg	--	--	--	--	--	<0.66	--	<1.3	--	<2.6	--	
Bis(2-ethylhexyl)phthalate	µg/kg	--	--	--	--	--	<0.66	--	0.43 J	--	0.74 J	--	
Butyl benzyl phthalate	µg/kg	--	--	--	--	--	<0.66	--	<1.3	--	<2.6	--	
Chrysene	µg/kg	--	--	--	--	--	<0.66	--	<1.3	--	<2.6	--	
Dibenz(a,h)anthracene	µg/kg	--	--	--	--	--	<0.84	--	<1.7	--	<3.4	--	
Dibenzofuran	µg/kg	--	--	--	--	--	<0.66	--	<1.3	--	<2.6	--	
Diethyl phthalate	µg/kg	--	--	--	--	--	<0.66	--	<1.3	--	<2.6	--	
Dimethyl phthalate	µg/kg	--	--	--	--	--	<0.66	--	<1.3	--	<2.6	--	
Di-n-butyl phthalate	µg/kg	--	--	--	--	--	<0.66	--	<1.3	--	<2.6	--	
Di-n-octyl phthalate	µg/kg	--	--	--	--	--	<0.66	--	<1.3	--	<2.6	--	
Fluoranthene	µg/kg	--	--	--	--	--	<0.66	--	<1.3	--	<2.6	--	
Fluorene	µg/kg	--	--	--	--	--	<0.66	--	<1.3	--	<2.6	--	
Hexachlorobenzene	µg/kg	--	--	2,600	--	--	<0.66	--	<1.3	--	<2.6	--	
Hexachlorobutadiene	µg/kg	--	--	10,000	--	--	<0.66	--	<1.3	--	<2.6	--	
Hexachlorocyclopentadiene	µg/kg	--	--	--	--	--	<1.7	--	<3.3	--	<6.6	--	
Hexachloroethane	µg/kg	--	--	60,000	--	--	<0.66	--	<1.3	--	<2.6	--	
Indeno(1,2,3-cd)pyrene	µg/kg	--	--	--	--	--	<0.66	--	<1.3	--	<2.6	--	
Isophorone	µg/kg	--	--	--	--	--	<0.66	--	<1.3	--	<2.6	--	
Naphthalene	µg/kg	--	--	--	--	--	<0.66	--	<1.3	--	<2.6	--	
Nitrobenzene	µg/kg	--	--	40,000	--	--	<0.66	--	<1.3	--	<2.6	--	
N-Nitrosodimethylamine	µg/kg	--	--	--	--	--	<0.66	--	<1.3	--	<2.6	--	
N-Nitroso-di-n-propylamine	µg/kg	--	--	--	--	--	<0.5	--	<1	--	<2	--	
N-Nitrosodiphenylamine	µg/kg	--	--	--	--	--	<0.66	--	<1.3	--	<2.6	--	
Pentachlorophenol	µg/kg	17,000	17,000	2,000,000	--	--	<1.7	--	<3.3	--	<6.6	--	
Phenanthrene	µg/kg	--	--	--	--	--	<0.66	--	<1.3	--	<2.6	--	
Phenol	µg/kg	--	--	--	--	--	<0.66	--	<1.3	--	<2.6	--	
Pyrene	µg/kg	--	--	--	--	--	<0.66	--	<1.3	--	<2.6	--	
<b>RADIONUCLIDES</b>	--	--	--	--	--	--	R	R-G	R	R-G	R	R-G	

## INTERIM SOURCE REMOVAL ACTION (ISRA) - OUTFALL 009

### ELV WASTE CHARACTERIZATION SUMMARY NOTES THE BOEING COMPANY SANTA SUSANA FIELD LABORATORY

#### Notes:

--" - not analyzed / not applicable

<sup>1</sup> - WET Leachate Testing Trigger = STLC limit \* 10

<sup>2</sup> - TCLP Leachate Testing Trigger = TCLP limit \* 20

Grey highlighted cells indicate concentration meets or exceeds STLC.

A-01 - Sample result might be biased high due to coelution of Aroclors 1254 and 1260. The data was reprocessed in a different way as the calibration (3 peaks were used in the confirmation column).

A-01a - Sample result might be biased high due to coelution of Aroclors 1254 and 1260. The data was reprocessed in a different way as the calibration (4 peaks were used in the primary column).

A-01b - Sample result might be biased high due to coelution of Aroclors 1254 and 1260. The data was reprocessed in a different way as the calibration (4 peaks were used in the primary and 3 peaks were used in the confirmation column).

A-01c - Sample result might be biased high due to coelution of Aroclors 1254 and 1260. The data was reprocessed in a different way as the calibration (4 peaks were used in the primary column).

B - Analyte was detected in the associated Method Blank.

C - Calibration Verification recovery was above the method control limit for this analyte. Analyte not detected, data not impacted

C-2 - Calibration Verification recovery was below the method control limit for this analyte, however the average % difference for all analytes met method criteria.

I - Internal Standard recovery was outside of method limits. Matrix interference was confirmed.

J - Estimated value. Analyte detected at a level less than the Reporting Limit (RL) and greater than or equal to the Method Detection Limit (MDL). The user of this data should be aware that this data is of limited reliability.

L - Laboratory Control Sample and/or Laboratory Control Sample Duplicate recovery was above the acceptance limits. Analyte not detected, data not impacted.

M1 - The MS and/or MSD were above the acceptance limits due to sample matrix interference. See Blank Spike (LCS).

**INTERIM SOURCE REMOVAL ACTION (ISRA) - OUTFALL 009**

**ELV WASTE CHARACTERIZATION SUMMARY NOTES  
THE BOEING COMPANY  
SANTA SUSANA FIELD LABORATORY**

M2 - The MS and/or MSD were below the acceptance limits due to sample matrix interference. See Blank Spike (LCS).

µg/kg - micrograms per kilogram

mg/kg - milligrams per kilogram

mg/L - milligrams per liter

R - Radiological analysis includes gamma spectroscopy (Na-22, K-40, Mn-54, Co-60, Cs-134, Cs-137, Eu-152, Eu-154, Th-228, Th-232, U-235, U-238 and Am-241), strontium-90, and tritium. Boeing has prepared a document dated August 17, 2009 that provides the radiological results and statistical analysis of the Outfall 008 waste characterization samples. Based on the results, the document certifies the soil represented by these waste characterization samples to be "radiologically" acceptable for shipment to Class 1, 2, and/or 3 disposal facilities. The analysis and data interpretation complies with procedures approved by the California Department of Public Health.

R-1 - The relative percent difference (RPD) between the primary and confirmatory analysis exceeded 40%. Per method 8000B, the higher value was reported

R-G - Samples were recollected for gamma spectroscopy only (Na-22, K-40, Mn-54, Co-60, Cs-134, Cs-137, Eu-152, Eu-154, Th-228, Th-232, U-235, U-238 and Am-241)

## WASTE CHARACTERIZATION: IN-SITU SOIL LOCATED AT ISRA AREA II PLANNED EXCAVATION ELV-1C SOUTHWEST

### **Introduction**

This report presents supporting detailed information for the July 28, 2009 and August 24, 2009 in-situ characterization of prospective soil wastes from planned ISRA excavations in SSFL Area II.

### **Background**

In-situ characterization of soil destined to be excavated from designated locations in SSFL Area II in accordance with the ISRA Workplan was performed. A step-by-step approach was followed to accomplish characterization of the soil prior to excavation. The first step was to review available information regarding historical area usage and existing analytical data from past soil sampling in the applicable SSFL Area II locations. The objective was to identify all substances that could have an impact on the determination of whether soil in each planned excavation footprint was hazardous or not.

The next step was to develop a random sampling plan for each of the planned excavation footprints to determine whether any of the identified substances are present at concentrations that require further investigation. An evaluation of the results of the initial random sampling was performed to determine whether the data was adequate for waste characterization based on the exhibited variance of any detected analytes and the relative difference between detected concentrations and regulatory thresholds. The soil was characterized non-hazardous when analyte concentrations among the samples exhibited a reasonably small variance and there was satisfactory margin between the mean of the samples and applicable regulatory thresholds. Otherwise, additional samples were collected and subjected to analysis or the soil was characterized as hazardous.

The review of historical information and existing analytical data relevant to planned excavation ELV-1C was based largely on the Group 2 RFI results, which indicated that Dioxins were of chief interest to the RFI team. However, detected concentrations of Dioxins were exceeding low with respect to applicable hazardous waste limits and they were not included in the characterization study. However, regulated Metals, Polychlorinated Biphenyls (PCB), and Semi-Volatile Organic Compounds (SVOC) were identified to be addressed in the ELV-1C excavation footprint. A random sampling plan was developed for collection of nine (12) samples from the planned excavation footprint. The samples were analyzed for CAM 17 metals, PCBs, and SVOCs. All samples were collected, contained, and handled according to field practice requirements in SW-846.

As a result of analytical findings from the first round of sampling pertaining to regulated metals, a decision was made to partition off the northeastern portion of the original ELV-1C excavation footprint for soil management purposes. This area is referred to as ELV-1C NORTHEAST (NE). An additional eight (8) random samples were collected from the remaining ELV-1C SOUTHWEST (SW) portion and subjected to analysis for CAM 17 metals. This area is referred to as ELV-1C SW for waste characterization purposes.

## Results

Analytical results for the ELV-1C SW planned excavation area are presented in TestAmerica reports ISG2199 issued on 8/13/09 and ISH2198 issued on 9/8/09. Initial results exhibited only trace concentrations of SVOCs with all analytes below 1 mg/kg individually and collectively, and SVOCs were not included in the second sampling event. No PCBs were detected, and they, too, were excluded from subsequent sample analysis. Considering both the initial and second sampling event samples together, the concentrations of regulated metals were low, with the exception of Lead detected in two samples. Lead concentrations ranged from 6.5 mg/kg to a high of 56 mg/kg. Another sample exhibited Lead at 52 mg/kg. Both of these samples were subjected to the California Waste Extraction Test (WET), a leachate simulation that is used to estimate the potential of a given waste to leach hazardous concentrations of substances when exposed to the environment. The WET resulted in Lead leachate concentrations from the samples of 1.5 mg/L and 0.83 mg/L, respectively. These concentrations are well below the California STLC hazardous waste limit of 5 mg/L for Lead. Taking the 17 total samples into account, and the Standard Error of the Mean for the sample pool, the results were determined to be representative of the prospective waste.

Chromium was also detected in the ELV-1C SW samples, ranging from 20 mg/kg to a maximum concentration of 39 mg/kg. The Chromium detections did not represent a concern, however, as they were fairly tightly grouped, with an acceptably small variance among the 17 total samples. All other regulated metals were well below applicable regulatory thresholds.

## Determination

According to analytical results and generator knowledge, the soil in the planned excavation footprint of SSFL Area II ELV-1C SW:

- Is Not a Listed Waste (generator knowledge)
- Is Not ignitable (generator knowledge)
- Is Not corrosive (generator knowledge)
- Is Not reactive (generator knowledge)
- Is Not toxic (analytical results and generator knowledge)
  - Is Not Extremely or Acutely Hazardous Waste
  - Does Not exceed any RCRA or Title 22 thresholds
  - Is Not subject to the Prop. 65 listing
  - Is Not subject to Title 22 Appendix X list
  - Is Not known by experience or testing to pose a hazard to human health or environment because of its carcinogenicity, acute toxicity, chronic toxicity, bio-accumulative properties, or persistence in the environment.

**The soil in ELV-1C SW is NON-HAZARDOUS.**

**INTERIM SOURCE REMOVAL ACTION (ISRA) - OUTFALL 009**

**ELV-1C (SOUTHWESTERN PORTION) WASTE CHARACTERIZATION RESULTS  
THE BOEING COMPANY  
SANTA SUSANA FIELD LABORATORY**

			Object Name:			ISWC0049	ISWC0050	ISWC0051	ISWC0055	ISWC0055	ISWC0056	ISWC0057
			Sample Name:			ISWC0049S001	ISWC0050S001	ISWC0051S001	ISWC0055S001	ISWC0055AS001	ISWC0056S001	ISWC0057S001
			Collection Date:			7/28/2009	7/28/2009	7/28/2009	7/28/2009	8/28/2009	7/28/2009	7/28/2009
			Sample Depth (feet):			1.5 - 2.0	0.0 - 0.4	0.7 - 1.2	0.0 - 0.3	0.0 - 0.3	1.0 - 1.5	1.5 - 2.0
ANALYTE	UNITS	TTLIC	WET Leachate Testing Trigger <sup>a</sup>	TCLP Leachate Testing Trigger <sup>b</sup>	STLC	RESULT	RESULT	RESULT	RESULT	RESULT	RESULT	RESULT
<b>METALS</b>										--		
Antimony	mg/kg	500	150	--	--	<10 M2	<10	<10	<10	--	<10	<10
Arsenic	mg/kg	500	50	100	--	5.5	6.6 B	6.8	6.8	--	6 B	6.5
Barium	mg/kg	10,000	1,000	2,000	--	77	69	78	77	--	73	87
Beryllium	mg/kg	75	7.5	--	--	0.5	0.61	0.55	0.54	--	0.47 J	0.57
Cadmium	mg/kg	100	10	20	--	<0.5	<0.5	<0.5	0.39 J	--	<0.5	<0.5
Chromium	mg/kg	500	50	100	--	21	21	23	33	--	22	27
Cobalt	mg/kg	8,000	800	--	--	6.3	5.9	7.3	6.7	--	6.4	7
Copper	mg/kg	2,500	250	--	--	15	22	15	22	--	15	17
Lead	mg/kg	1,000	50	100	--	8	11	9.3	42	--	6.5	16
Lead, WET	mg/L	--	--	--	5	--	--	--	--	--	--	--
Mercury	mg/kg	20	2	4	--	0.0078 J	0.014 J	0.007 J	0.038	--	<0.033	0.01 J
Molybdenum	mg/kg	3,500	3,500	--	--	<2	0.32 J	0.33 J	0.68 J	--	<2	0.44 J
Nickel	mg/kg	2,000	200	--	--	14	14	15	25	--	15	17
Selenium	mg/kg	100	10	20	--	1.2 J	<2	1.6 J	1.7 J	--	<2	<2
Silver	mg/kg	500	50	100	--	<1	<1	<1	<1	--	<1	<1
Thallium	mg/kg	700	70	--	--	<10	<10	<10	<10	--	<10	<10
Vanadium	mg/kg	2,400	240	--	--	36	35	39	38	--	39	41
Zinc	mg/kg	5,000	2,500	--	--	70	63	60	93	--	57	70
<b>PCBs</b>												
Aroclor 1016	µg/kg	50,000	50,000	--	--	<0.05	<0.05	<0.05	<0.05	--	<0.05	<0.05
Aroclor 1221	µg/kg	50,000	50,000	--	--	<0.05	<0.05	<0.05	<0.05	--	<0.05	<0.05
Aroclor 1232	µg/kg	50,000	50,000	--	--	<0.05	<0.05	<0.05	<0.05	--	<0.05	<0.05
Aroclor 1242	µg/kg	50,000	50,000	--	--	<0.05	<0.05	<0.05	<0.05	--	<0.05	<0.05
Aroclor 1248	µg/kg	50,000	50,000	--	--	<0.05	<0.05	<0.05	<0.05	--	<0.05	<0.05
Aroclor 1254	µg/kg	50,000	50,000	--	--	<0.05	<0.05	<0.05	<0.05	--	<0.05	<0.05
Aroclor 1260	µg/kg	50,000	50,000	--	--	<0.05	<0.05	<0.05	<0.05	--	<0.05	<0.05
<b>SVOCs</b>												
1,2,4-Trichlorobenzene	µg/kg	--	--	--	--	<0.33	<0.33	<0.33	<0.66	--	<0.33	<0.66
1,2-Dichlorobenzene	µg/kg	--	--	--	--	<0.33	<0.33	<0.33	<0.66	--	<0.33	<0.66
1,2-Diphenylhydrazine/Azobenzene	µg/kg	--	--	--	--	<0.33	<0.33	<0.33	<0.66	--	<0.33	<0.66
1,3-Dichlorobenzene	µg/kg	--	--	--	--	<0.33	<0.33	<0.33	<0.66	--	<0.33	<0.66
1,4-Dichlorobenzene	µg/kg	--	--	150,000	--	<0.33	<0.33	<0.33	<0.66	--	<0.33	<0.66
2,4,5-Trichlorophenol	µg/kg	--	--	8,000,000	--	<0.33	<0.33	<0.33	<0.66	--	<0.33	<0.66
2,4,6-Trichlorophenol	µg/kg	--	--	40,000	--	<0.33	<0.33	<0.33	<0.66	--	<0.33	<0.66

**INTERIM SOURCE REMOVAL ACTION (ISRA) - OUTFALL 009**

**ELV-1C (SOUTHWESTERN PORTION) WASTE CHARACTERIZATION RESULTS  
THE BOEING COMPANY  
SANTA SUSANA FIELD LABORATORY**

			Object Name:			ISWC0049	ISWC0050	ISWC0051	ISWC0055	ISWC0055	ISWC0056	ISWC0057
			Sample Name:			ISWC0049S001	ISWC0050S001	ISWC0051S001	ISWC0055S001	ISWC0055AS001	ISWC0056S001	ISWC0057S001
			Collection Date:			7/28/2009	7/28/2009	7/28/2009	7/28/2009	8/28/2009	7/28/2009	7/28/2009
			Sample Depth (feet):			1.5 - 2.0	0.0 - 0.4	0.7 - 1.2	0.0 - 0.3	0.0 - 0.3	1.0 - 1.5	1.5 - 2.0
ANALYTE	UNITS	TTLIC	WET Leachate Testing Trigger <sup>a</sup>	TCLP Leachate Testing Trigger <sup>b</sup>	STLC	RESULT	RESULT	RESULT	RESULT	RESULT	RESULT	RESULT
2,4-Dichlorophenol	µg/kg	--	--	--	--	<0.33	<0.33	<0.33	<0.66	--	<0.33	<0.66
2,4-Dimethylphenol	µg/kg	--	--	--	--	<0.33	<0.33	<0.33	<0.66	--	<0.33	<0.66
2,4-Dinitrophenol	µg/kg	--	--	--	--	<0.66	<0.66	<0.66	<1.3	--	<0.66	<1.3
2,4-Dinitrotoluene	µg/kg	--	--	2,600	--	<0.33	<0.33	<0.33	<0.66	--	<0.33	<0.66
2,6-Dinitrotoluene	µg/kg	--	--	--	--	<0.33	<0.33	<0.33	<0.66	--	<0.33	<0.66
2-Chloronaphthalene	µg/kg	--	--	--	--	<0.33	<0.33	<0.33	<0.66	--	<0.33	<0.66
2-Chlorophenol	µg/kg	--	--	--	--	<0.33	<0.33	<0.33	<0.66	--	<0.33	<0.66
2-Methylnaphthalene	µg/kg	--	--	--	--	<0.33	<0.33	<0.33	<0.66	--	<0.33	<0.66
2-Methylphenol	µg/kg	--	--	--	--	<0.33	<0.33	<0.33	<0.66	--	<0.33	<0.66
2-Nitroaniline	µg/kg	--	--	--	--	<0.33	<0.33	<0.33	<0.66	--	<0.33	<0.66
2-Nitrophenol	µg/kg	--	--	--	--	<0.33	<0.33	<0.33	<0.66	--	<0.33	<0.66
3,3'-Dichlorobenzidine	µg/kg	--	--	--	--	<0.83	<0.83	<0.83	<1.7	--	<0.83	<1.7
3-Nitroaniline	µg/kg	--	--	--	--	<0.33	<0.33	<0.33	<0.66	--	<0.33	<0.66
4,6-Dinitro-2-methylphenol	µg/kg	--	--	--	--	<0.42	<0.42	<0.42	<0.84	--	<0.42	<0.84
4-Bromophenyl phenyl ether	µg/kg	--	--	--	--	<0.33	<0.33	<0.33	<0.66	--	<0.33	<0.66
4-Chloro-3-methylphenol	µg/kg	--	--	--	--	<0.33	<0.33	<0.33	<0.66	--	<0.33	<0.66
4-Chloroaniline	µg/kg	--	--	--	--	<0.33	<0.33	<0.33	<0.66	--	<0.33	<0.66
4-Chlorophenyl phenyl ether	µg/kg	--	--	--	--	<0.33	<0.33	<0.33	<0.66	--	<0.33	<0.66
4-Methylphenol	µg/kg	--	--	--	--	<0.33	<0.33	<0.33	<0.66	--	<0.33	<0.66
4-Nitroaniline	µg/kg	--	--	--	--	<0.83	<0.83	<0.83	<1.7	--	<0.83	<1.7
4-Nitrophenol	µg/kg	--	--	--	--	<0.83	<0.83	<0.83	<1.7	--	<0.83	<1.7
Acenaphthene	µg/kg	--	--	--	--	<0.33	<0.33	<0.33	<0.66	--	<0.33	<0.66
Acenaphthylene	µg/kg	--	--	--	--	<0.33	<0.33	<0.33	<0.66	--	<0.33	<0.66
Aniline	µg/kg	--	--	--	--	<0.42	<0.42	<0.42	<0.84	--	<0.42 C-2b	<0.84
Anthracene	µg/kg	--	--	--	--	<0.33	<0.33	<0.33	<0.66	--	<0.33	<0.66
Benzidine	µg/kg	--	--	--	--	<0.66	<0.66	<0.66	<1.3	--	<0.66 M2	<1.3
Benzo(a)anthracene	µg/kg	--	--	--	--	<0.33	<0.33	<0.33	<0.66	--	<0.33	<0.66
Benzo(a)pyrene	µg/kg	--	--	--	--	<0.33	<0.33	<0.33	<0.66	--	<0.33	<0.66
Benzo(b)fluoranthene	µg/kg	--	--	--	--	<0.33	<0.33	<0.33	<0.66	--	<0.33	<0.66
Benzo(g,h,i)perylene	µg/kg	--	--	--	--	<0.33	<0.33	<0.33	<0.66	--	<0.33	<0.66
Benzo(k)fluoranthene	µg/kg	--	--	--	--	<0.33	<0.33	<0.33	<0.66	--	<0.33	<0.66
Benzoic acid	µg/kg	--	--	--	--	<0.83	<0.83	<0.83	<1.7	--	<0.83	<1.7
Benzyl alcohol	µg/kg	--	--	--	--	<0.33	<0.33	<0.33	<0.66	--	<0.33	<0.66
Bis(2-chloroethoxy)methane	µg/kg	--	--	--	--	<0.33	<0.33	<0.33	<0.66	--	<0.33	<0.66
Bis(2-chloroethyl)ether	µg/kg	--	--	--	--	<0.17	<0.17	<0.17	<0.34	--	<0.17	<0.34



**INTERIM SOURCE REMOVAL ACTION (ISRA) - OUTFALL 009**

**ELV-1C (SOUTHWESTERN PORTION) WASTE CHARACTERIZATION RESULTS  
THE BOEING COMPANY  
SANTA SUSANA FIELD LABORATORY**

			Object Name:		ISWC0049	ISWC0050	ISWC0051	ISWC0055	ISWC0055	ISWC0056	ISWC0057	
			Sample Name:		ISWC0049S001	ISWC0050S001	ISWC0051S001	ISWC0055S001	ISWC0055AS001	ISWC0056S001	ISWC0057S001	
			Collection Date:		7/28/2009	7/28/2009	7/28/2009	7/28/2009	8/28/2009	7/28/2009	7/28/2009	
			Sample Depth (feet):		1.5 - 2.0	0.0 - 0.4	0.7 - 1.2	0.0 - 0.3	0.0 - 0.3	1.0 - 1.5	1.5 - 2.0	
ANALYTE	UNITS	TTLIC	WET Leachate Testing Trigger <sup>a</sup>	TCLP Leachate Testing Trigger <sup>b</sup>	STLC	RESULT	RESULT	RESULT	RESULT	RESULT	RESULT	
Bis(2-chloroisopropyl)ether	µg/kg	--	--	--	--	<0.33	<0.33	<0.33	<0.66	--	<0.33	<0.66
Bis(2-ethylhexyl)phthalate	µg/kg	--	--	--	--	<0.33	<0.33	0.2 J	0.26 J	--	<0.33	0.22 J
Butyl benzyl phthalate	µg/kg	--	--	--	--	<0.33	<0.33	<0.33	<0.66	--	<0.33	0.18 J
Chrysene	µg/kg	--	--	--	--	<0.33	<0.33	<0.33	<0.66	--	<0.33	<0.66
Dibenz(a,h)anthracene	µg/kg	--	--	--	--	<0.42	<0.42	<0.42	<0.84	--	<0.42	<0.84
Dibenzofuran	µg/kg	--	--	--	--	<0.33	<0.33	<0.33	<0.66	--	<0.33	<0.66
Diethyl phthalate	µg/kg	--	--	--	--	<0.33	<0.33	<0.33	<0.66	--	<0.33	<0.66
Dimethyl phthalate	µg/kg	--	--	--	--	<0.33	<0.33	<0.33	<0.66	--	<0.33	<0.66
Di-n-butyl phthalate	µg/kg	--	--	--	--	<0.33	<0.33	<0.33	<0.66	--	<0.33	<0.66
Di-n-octyl phthalate	µg/kg	--	--	--	--	<0.33	<0.33	<0.33	<0.66	--	<0.33	<0.66
Fluoranthene	µg/kg	--	--	--	--	<0.33	<0.33	<0.33	<0.66	--	<0.33	<0.66
Fluorene	µg/kg	--	--	--	--	<0.33	<0.33	<0.33	<0.66	--	<0.33	<0.66
Hexachlorobenzene	µg/kg	--	--	2,600	--	<0.33	<0.33	<0.33	<0.66	--	<0.33	<0.66
Hexachlorobutadiene	µg/kg	--	--	10,000	--	<0.33	<0.33	<0.33	<0.66	--	<0.33	<0.66
Hexachlorocyclopentadiene	µg/kg	--	--	--	--	<0.83	<0.83	<0.83 C-2	<1.7	--	<0.83	<1.7
Hexachloroethane	µg/kg	--	--	60,000	--	<0.33	<0.33	<0.33	<0.66	--	<0.33	<0.66
Indeno(1,2,3-cd)pyrene	µg/kg	--	--	--	--	<0.33	<0.33	<0.33	<0.66	--	<0.33	<0.66
Isophorone	µg/kg	--	--	--	--	<0.33	<0.33	<0.33	<0.66	--	<0.33	<0.66
Naphthalene	µg/kg	--	--	--	--	<0.33	<0.33	<0.33	<0.66	--	<0.33	<0.66
Nitrobenzene	µg/kg	--	--	40,000	--	<0.33	<0.33	<0.33	<0.66	--	<0.33	<0.66
N-Nitrosodimethylamine	µg/kg	--	--	--	--	<0.33	<0.33	<0.33	<0.66	--	<0.33	<0.66
N-Nitroso-di-n-propylamine	µg/kg	--	--	--	--	<0.25	<0.25	<0.25	<0.5	--	<0.25	<0.5
N-Nitrosodiphenylamine	µg/kg	--	--	--	--	<0.33	<0.33	<0.33	<0.66	--	<0.33	<0.66
Pentachlorophenol	µg/kg	17,000	17,000	2,000,000	--	<0.83	<0.83	<0.83	<1.7	--	<0.83	<1.7
Phenanthrene	µg/kg	--	--	--	--	<0.33	<0.33	<0.33	<0.66	--	<0.33	<0.66
Phenol	µg/kg	--	--	--	--	<0.33	<0.33	<0.33	<0.66	--	<0.33	<0.66
Pyrene	µg/kg	--	--	--	--	<0.33	<0.33	<0.33	<0.66	--	<0.33	<0.66
<b>RADIONUCLIDES</b>	--	--	--	--	--	R	R	R	R	R-G	R	R

**INTERIM SOURCE REMOVAL ACTION (ISRA) - OUTFALL 009**

**ELV-1C (SOUTHWESTERN PORTION) WASTE CHARACTERIZATION RESULTS  
THE BOEING COMPANY  
SANTA SUSANA FIELD LABORATORY**

			Object Name:			ISWC0058	ISWC0058	ISWC0059	ISWC0060	ISWC0096	ISWC0097	ISWC0098
			Sample Name:			ISWC0058S001	ISWC0058AS001	ISWC0059S001	ISWC0060S001	ISWC0096S001	ISWC0097S001	ISWC0098S001
			Collection Date:			7/28/2009	8/28/2009	7/28/2009	7/28/2009	8/24/2009	8/24/2009	8/24/2009
			Sample Depth (feet):			0.3 - 0.7	0.3 - 0.7	0.1 - 0.6	0.3 - 0.8	0.0 - 0.5	0.0 - 0.5	0.6 - 1.1
ANALYTE	UNITS	TTLIC	WET Leachate Testing Trigger <sup>a</sup>	TCLP Leachate Testing Trigger <sup>b</sup>	STLC	RESULT	RESULT	RESULT	RESULT	RESULT	RESULT	RESULT
<b>METALS</b>												
Antimony	mg/kg	500	150	--	--	<10	--	<10	<10	<10	<10	<10
Arsenic	mg/kg	500	50	100	--	6.7 B	--	6	5.4 B	6.4	8	7.1
Barium	mg/kg	10,000	1,000	2,000	--	74	--	77	68	81	91	100
Beryllium	mg/kg	75	7.5	--	--	0.57	--	0.49 J	0.55	0.63	0.75	0.86
Cadmium	mg/kg	100	10	20	--	0.34 J	--	0.24 J	<0.5	<0.5	1.3	<0.5
Chromium	mg/kg	500	50	100	--	28	--	25	21	24	31	28
Cobalt	mg/kg	8,000	800	--	--	7.7	--	6.4	6.3	6.8	7.8	8.4
Copper	mg/kg	2,500	250	--	--	18	--	15	13	18	40	20
Lead	mg/kg	1,000	50	100	--	52	--	11	8.1	24	56	9.7
Lead, WET	mg/L	--	--	--	5	0.83	--	--	--	--	1.5	--
Mercury	mg/kg	20	2	4	--	0.022 J	--	0.016 J	0.017 J	0.028 J	0.032 J	0.018 J
Molybdenum	mg/kg	3,500	3,500	--	--	0.56 J	--	0.33 J	<2	<2	0.22 J	<2
Nickel	mg/kg	2,000	200	--	--	19	--	15	13	17	21	21
Selenium	mg/kg	100	10	20	--	1.2 J	--	<2	<2	<2	<2	<2
Silver	mg/kg	500	50	100	--	<1	--	<1	<1	<1	<1	<1
Thallium	mg/kg	700	70	--	--	<10	--	<10	<10	<10	<10	<10
Vanadium	mg/kg	2,400	240	--	--	38	--	40	36	42	45	48
Zinc	mg/kg	5,000	2,500	--	--	92	--	83	61	76	160	82
<b>PCBs</b>												
Aroclor 1016	µg/kg	50,000	50,000	--	--	<0.05	--	<0.05	<0.05	--	--	--
Aroclor 1221	µg/kg	50,000	50,000	--	--	<0.05	--	<0.05	<0.05	--	--	--
Aroclor 1232	µg/kg	50,000	50,000	--	--	<0.05	--	<0.05	<0.05	--	--	--
Aroclor 1242	µg/kg	50,000	50,000	--	--	<0.05	--	<0.05	<0.05	--	--	--
Aroclor 1248	µg/kg	50,000	50,000	--	--	<0.05	--	<0.05	<0.05	--	--	--
Aroclor 1254	µg/kg	50,000	50,000	--	--	<0.05	--	<0.05	<0.05	--	--	--
Aroclor 1260	µg/kg	50,000	50,000	--	--	<0.05	--	<0.05	<0.05	--	--	--
<b>SVOCs</b>												
1,2,4-Trichlorobenzene	µg/kg	--	--	--	--	<0.33	--	<0.33	<0.33	--	--	--
1,2-Dichlorobenzene	µg/kg	--	--	--	--	<0.33	--	<0.33	<0.33	--	--	--
1,2-Diphenylhydrazine/Azobenzene	µg/kg	--	--	--	--	<0.33	--	<0.33	<0.33	--	--	--
1,3-Dichlorobenzene	µg/kg	--	--	--	--	<0.33	--	<0.33	<0.33	--	--	--
1,4-Dichlorobenzene	µg/kg	--	--	150,000	--	<0.33	--	<0.33	<0.33	--	--	--
2,4,5-Trichlorophenol	µg/kg	--	--	8,000,000	--	<0.33	--	<0.33	<0.33	--	--	--
2,4,6-Trichlorophenol	µg/kg	--	--	40,000	--	<0.33	--	<0.33	<0.33	--	--	--

**INTERIM SOURCE REMOVAL ACTION (ISRA) - OUTFALL 009**

**ELV-1C (SOUTHWESTERN PORTION) WASTE CHARACTERIZATION RESULTS  
THE BOEING COMPANY  
SANTA SUSANA FIELD LABORATORY**

			Object Name:		ISWC0058	ISWC0058	ISWC0059	ISWC0060	ISWC0096	ISWC0097	ISWC0098	
			Sample Name:		ISWC0058S001	ISWC0058AS001	ISWC0059S001	ISWC0060S001	ISWC0096S001	ISWC0097S001	ISWC0098S001	
			Collection Date:		7/28/2009	8/28/2009	7/28/2009	7/28/2009	8/24/2009	8/24/2009	8/24/2009	
			Sample Depth (feet):		0.3 - 0.7	0.3 - 0.7	0.1 - 0.6	0.3 - 0.8	0.0 - 0.5	0.0 - 0.5	0.6 - 1.1	
ANALYTE	UNITS	TTLIC	WET Leachate Testing Trigger <sup>a</sup>	TCLP Leachate Testing Trigger <sup>b</sup>	STLC	RESULT	RESULT	RESULT	RESULT	RESULT	RESULT	
2,4-Dichlorophenol	µg/kg	--	--	--	--	<0.33	--	<0.33	<0.33	--	--	--
2,4-Dimethylphenol	µg/kg	--	--	--	--	<0.33	--	<0.33	<0.33	--	--	--
2,4-Dinitrophenol	µg/kg	--	--	--	--	<0.66	--	<0.66	<0.66	--	--	--
2,4-Dinitrotoluene	µg/kg	--	--	2,600	--	<0.33	--	<0.33	<0.33	--	--	--
2,6-Dinitrotoluene	µg/kg	--	--	--	--	<0.33	--	<0.33	<0.33	--	--	--
2-Chloronaphthalene	µg/kg	--	--	--	--	<0.33	--	<0.33	<0.33	--	--	--
2-Chlorophenol	µg/kg	--	--	--	--	<0.33	--	<0.33	<0.33	--	--	--
2-Methylnaphthalene	µg/kg	--	--	--	--	<0.33	--	<0.33	<0.33	--	--	--
2-Methylphenol	µg/kg	--	--	--	--	<0.33	--	<0.33	<0.33	--	--	--
2-Nitroaniline	µg/kg	--	--	--	--	<0.33	--	<0.33	<0.33	--	--	--
2-Nitrophenol	µg/kg	--	--	--	--	<0.33	--	<0.33	<0.33	--	--	--
3,3'-Dichlorobenzidine	µg/kg	--	--	--	--	<0.83	--	<0.83	<0.83	--	--	--
3-Nitroaniline	µg/kg	--	--	--	--	<0.33	--	<0.33	<0.33	--	--	--
4,6-Dinitro-2-methylphenol	µg/kg	--	--	--	--	<0.42	--	<0.42	<0.42	--	--	--
4-Bromophenyl phenyl ether	µg/kg	--	--	--	--	<0.33	--	<0.33	<0.33	--	--	--
4-Chloro-3-methylphenol	µg/kg	--	--	--	--	<0.33	--	<0.33	<0.33	--	--	--
4-Chloroaniline	µg/kg	--	--	--	--	<0.33	--	<0.33	<0.33	--	--	--
4-Chlorophenyl phenyl ether	µg/kg	--	--	--	--	<0.33	--	<0.33	<0.33	--	--	--
4-Methylphenol	µg/kg	--	--	--	--	<0.33	--	<0.33	<0.33	--	--	--
4-Nitroaniline	µg/kg	--	--	--	--	<0.83	--	<0.83	<0.83	--	--	--
4-Nitrophenol	µg/kg	--	--	--	--	<0.83	--	<0.83	<0.83	--	--	--
Acenaphthene	µg/kg	--	--	--	--	<0.33	--	<0.33	<0.33	--	--	--
Acenaphthylene	µg/kg	--	--	--	--	<0.33	--	<0.33	<0.33	--	--	--
Aniline	µg/kg	--	--	--	--	<0.42	--	<0.42	<0.42	--	--	--
Anthracene	µg/kg	--	--	--	--	<0.33	--	<0.33	<0.33	--	--	--
Benzidine	µg/kg	--	--	--	--	<0.66	--	<0.66	<0.66	--	--	--
Benzo(a)anthracene	µg/kg	--	--	--	--	<0.33	--	<0.33	<0.33	--	--	--
Benzo(a)pyrene	µg/kg	--	--	--	--	<0.33	--	<0.33	<0.33	--	--	--
Benzo(b)fluoranthene	µg/kg	--	--	--	--	0.39	--	<0.33	<0.33	--	--	--
Benzo(g,h,i)perylene	µg/kg	--	--	--	--	<0.33	--	<0.33	<0.33	--	--	--
Benzo(k)fluoranthene	µg/kg	--	--	--	--	<0.33	--	<0.33	<0.33	--	--	--
Benzoic acid	µg/kg	--	--	--	--	<0.83	--	<0.83	<0.83	--	--	--
Benzyl alcohol	µg/kg	--	--	--	--	<0.33	--	<0.33	<0.33	--	--	--
Bis(2-chloroethoxy)methane	µg/kg	--	--	--	--	<0.33	--	<0.33	<0.33	--	--	--
Bis(2-chloroethyl)ether	µg/kg	--	--	--	--	<0.17	--	<0.17	<0.17	--	--	--

**INTERIM SOURCE REMOVAL ACTION (ISRA) - OUTFALL 009**

**ELV-1C (SOUTHWESTERN PORTION) WASTE CHARACTERIZATION RESULTS  
THE BOEING COMPANY  
SANTA SUSANA FIELD LABORATORY**

			Object Name:		ISWC0058	ISWC0058	ISWC0059	ISWC0060	ISWC0096	ISWC0097	ISWC0098	
			Sample Name:		ISWC0058S001	ISWC0058AS001	ISWC0059S001	ISWC0060S001	ISWC0096S001	ISWC0097S001	ISWC0098S001	
			Collection Date:		7/28/2009	8/28/2009	7/28/2009	7/28/2009	8/24/2009	8/24/2009	8/24/2009	
			Sample Depth (feet):		0.3 - 0.7	0.3 - 0.7	0.1 - 0.6	0.3 - 0.8	0.0 - 0.5	0.0 - 0.5	0.6 - 1.1	
ANALYTE	UNITS	TTLIC	WET Leachate Testing Trigger <sup>a</sup>	TCLP Leachate Testing Trigger <sup>b</sup>	STLC	RESULT	RESULT	RESULT	RESULT	RESULT	RESULT	
Bis(2-chloroisopropyl)ether	µg/kg	--	--	--	--	<0.33	--	<0.33	<0.33	--	--	--
Bis(2-ethylhexyl)phthalate	µg/kg	--	--	--	--	<0.33	--	0.19 J	<0.33	--	--	--
Butyl benzyl phthalate	µg/kg	--	--	--	--	<0.33	--	<0.33	<0.33	--	--	--
Chrysene	µg/kg	--	--	--	--	<0.33	--	<0.33	<0.33	--	--	--
Dibenz(a,h)anthracene	µg/kg	--	--	--	--	<0.42	--	<0.42	<0.42	--	--	--
Dibenzofuran	µg/kg	--	--	--	--	<0.33	--	<0.33	<0.33	--	--	--
Diethyl phthalate	µg/kg	--	--	--	--	<0.33	--	<0.33	<0.33	--	--	--
Dimethyl phthalate	µg/kg	--	--	--	--	<0.33	--	<0.33	<0.33	--	--	--
Di-n-butyl phthalate	µg/kg	--	--	--	--	<0.33	--	<0.33	<0.33	--	--	--
Di-n-octyl phthalate	µg/kg	--	--	--	--	<0.33	--	<0.33	<0.33	--	--	--
Fluoranthene	µg/kg	--	--	--	--	0.097 J	--	<0.33	<0.33	--	--	--
Fluorene	µg/kg	--	--	--	--	<0.33	--	<0.33	<0.33	--	--	--
Hexachlorobenzene	µg/kg	--	--	2,600	--	<0.33	--	<0.33	<0.33	--	--	--
Hexachlorobutadiene	µg/kg	--	--	10,000	--	<0.33	--	<0.33	<0.33	--	--	--
Hexachlorocyclopentadiene	µg/kg	--	--	--	--	<0.83 C-2	--	<0.83 C-2	<0.83 C-2	--	--	--
Hexachloroethane	µg/kg	--	--	60,000	--	<0.33	--	<0.33	<0.33	--	--	--
Indeno(1,2,3-cd)pyrene	µg/kg	--	--	--	--	<0.33	--	<0.33	<0.33	--	--	--
Isophorone	µg/kg	--	--	--	--	<0.33	--	<0.33	<0.33	--	--	--
Naphthalene	µg/kg	--	--	--	--	<0.33	--	<0.33	<0.33	--	--	--
Nitrobenzene	µg/kg	--	--	40,000	--	<0.33	--	<0.33	<0.33	--	--	--
N-Nitrosodimethylamine	µg/kg	--	--	--	--	<0.33	--	<0.33	<0.33	--	--	--
N-Nitroso-di-n-propylamine	µg/kg	--	--	--	--	<0.25	--	<0.25	<0.25	--	--	--
N-Nitrosodiphenylamine	µg/kg	--	--	--	--	<0.33	--	<0.33	<0.33	--	--	--
Pentachlorophenol	µg/kg	17,000	17,000	2,000,000	--	<0.83	--	<0.83	<0.83	--	--	--
Phenanthrene	µg/kg	--	--	--	--	<0.33	--	<0.33	<0.33	--	--	--
Phenol	µg/kg	--	--	--	--	<0.33	--	<0.33	<0.33	--	--	--
Pyrene	µg/kg	--	--	--	--	0.082 J	--	<0.33	<0.33	--	--	--
<b>RADIONUCLIDES</b>	--	--	--	--	--	R	R-G	R	R	R	R	R

**INTERIM SOURCE REMOVAL ACTION (ISRA) - OUTFALL 009**

**ELV-1C (SOUTHWESTERN PORTION) WASTE CHARACTERIZATION RESULTS  
THE BOEING COMPANY  
SANTA SUSANA FIELD LABORATORY**

						Object Name:	ISWC0099	ISWC0100	ISWC0101	ISWC0102	ISWC0103
						Sample Name:	ISWC0099S001	ISWC0100S001	ISWC0101S001	ISWC0102S001	ISWC0103S001
						Collection Date:	8/24/2009	8/24/2009	8/24/2009	8/24/2009	8/24/2009
						Sample Depth (feet):	0.7 - 1.3	0.7 - 1.2	0.2 - 0.8	0.0 - 0.5	0.0 - 0.5
ANALYTE	UNITS	TTLIC	WET Leachate Testing Trigger <sup>a</sup>	TCLP Leachate Testing Trigger <sup>b</sup>	STLC	RESULT	RESULT	RESULT	RESULT	RESULT	
<b>METALS</b>											
Antimony	mg/kg	500	150	--	--	<10	<10	<10	<10	<10	
Arsenic	mg/kg	500	50	100	--	7.5	7.6	7.8	6.9	4.9	
Barium	mg/kg	10,000	1,000	2,000	--	85	82	95	86	85	
Beryllium	mg/kg	75	7.5	--	--	0.67	0.73	0.76	0.72	0.65	
Cadmium	mg/kg	100	10	20	--	<0.5	0.41 J	1.7	<0.5	<0.5	
Chromium	mg/kg	500	50	100	--	25	39	32	28	20	
Cobalt	mg/kg	8,000	800	--	--	7.7	7.3	8.2	7.5	5.7	
Copper	mg/kg	2,500	250	--	--	17	21	29	18	12	
Lead	mg/kg	1,000	50	100	--	9.2	18	32	16	13	
Lead, WET	mg/L	--	--	--	5	--	--	--	--	--	
Mercury	mg/kg	20	2	4	--	0.0079 J	0.019 J	0.022 J	0.0089 J	0.009 J	
Molybdenum	mg/kg	3,500	3,500	--	--	<2	<2	<2	<2	<2	
Nickel	mg/kg	2,000	200	--	--	19	18	21	19	13	
Selenium	mg/kg	100	10	20	--	<2	<2	<2	<2	<2	
Silver	mg/kg	500	50	100	--	<1	<1	<1	<1	<1	
Thallium	mg/kg	700	70	--	--	<10	<10	<10	<10	<10	
Vanadium	mg/kg	2,400	240	--	--	44	43	49	45	37	
Zinc	mg/kg	5,000	2,500	--	--	68	140	230	80	59	
<b>PCBs</b>											
Aroclor 1016	µg/kg	50,000	50,000	--	--	--	--	--	--	--	
Aroclor 1221	µg/kg	50,000	50,000	--	--	--	--	--	--	--	
Aroclor 1232	µg/kg	50,000	50,000	--	--	--	--	--	--	--	
Aroclor 1242	µg/kg	50,000	50,000	--	--	--	--	--	--	--	
Aroclor 1248	µg/kg	50,000	50,000	--	--	--	--	--	--	--	
Aroclor 1254	µg/kg	50,000	50,000	--	--	--	--	--	--	--	
Aroclor 1260	µg/kg	50,000	50,000	--	--	--	--	--	--	--	
<b>SVOCs</b>											
1,2,4-Trichlorobenzene	µg/kg	--	--	--	--	--	--	--	--	--	
1,2-Dichlorobenzene	µg/kg	--	--	--	--	--	--	--	--	--	
1,2-Diphenylhydrazine/Azobenzene	µg/kg	--	--	--	--	--	--	--	--	--	
1,3-Dichlorobenzene	µg/kg	--	--	--	--	--	--	--	--	--	
1,4-Dichlorobenzene	µg/kg	--	--	150,000	--	--	--	--	--	--	
2,4,5-Trichlorophenol	µg/kg	--	--	8,000,000	--	--	--	--	--	--	
2,4,6-Trichlorophenol	µg/kg	--	--	40,000	--	--	--	--	--	--	

INTERIM SOURCE REMOVAL ACTION (ISRA) - OUTFALL 009

ELV-1C (SOUTHWESTERN PORTION) WASTE CHARACTERIZATION RESULTS  
 THE BOEING COMPANY  
 SANTA SUSANA FIELD LABORATORY

						Object Name:	ISWC0099	ISWC0100	ISWC0101	ISWC0102	ISWC0103
						Sample Name:	ISWC0099S001	ISWC0100S001	ISWC0101S001	ISWC0102S001	ISWC0103S001
						Collection Date:	8/24/2009	8/24/2009	8/24/2009	8/24/2009	8/24/2009
						Sample Depth (feet):	0.7 - 1.3	0.7 - 1.2	0.2 - 0.8	0.0 - 0.5	0.0 - 0.5
ANALYTE	UNITS	TTLIC	WET Leachate Testing Trigger <sup>a</sup>	TCLP Leachate Testing Trigger <sup>b</sup>	STLC	RESULT	RESULT	RESULT	RESULT	RESULT	
2,4-Dichlorophenol	µg/kg	--	--	--	--	--	--	--	--	--	
2,4-Dimethylphenol	µg/kg	--	--	--	--	--	--	--	--	--	
2,4-Dinitrophenol	µg/kg	--	--	--	--	--	--	--	--	--	
2,4-Dinitrotoluene	µg/kg	--	--	2,600	--	--	--	--	--	--	
2,6-Dinitrotoluene	µg/kg	--	--	--	--	--	--	--	--	--	
2-Chloronaphthalene	µg/kg	--	--	--	--	--	--	--	--	--	
2-Chlorophenol	µg/kg	--	--	--	--	--	--	--	--	--	
2-Methylnaphthalene	µg/kg	--	--	--	--	--	--	--	--	--	
2-Methylphenol	µg/kg	--	--	--	--	--	--	--	--	--	
2-Nitroaniline	µg/kg	--	--	--	--	--	--	--	--	--	
2-Nitrophenol	µg/kg	--	--	--	--	--	--	--	--	--	
3,3'-Dichlorobenzidine	µg/kg	--	--	--	--	--	--	--	--	--	
3-Nitroaniline	µg/kg	--	--	--	--	--	--	--	--	--	
4,6-Dinitro-2-methylphenol	µg/kg	--	--	--	--	--	--	--	--	--	
4-Bromophenyl phenyl ether	µg/kg	--	--	--	--	--	--	--	--	--	
4-Chloro-3-methylphenol	µg/kg	--	--	--	--	--	--	--	--	--	
4-Chloroaniline	µg/kg	--	--	--	--	--	--	--	--	--	
4-Chlorophenyl phenyl ether	µg/kg	--	--	--	--	--	--	--	--	--	
4-Methylphenol	µg/kg	--	--	--	--	--	--	--	--	--	
4-Nitroaniline	µg/kg	--	--	--	--	--	--	--	--	--	
4-Nitrophenol	µg/kg	--	--	--	--	--	--	--	--	--	
Acenaphthene	µg/kg	--	--	--	--	--	--	--	--	--	
Acenaphthylene	µg/kg	--	--	--	--	--	--	--	--	--	
Aniline	µg/kg	--	--	--	--	--	--	--	--	--	
Anthracene	µg/kg	--	--	--	--	--	--	--	--	--	
Benzidine	µg/kg	--	--	--	--	--	--	--	--	--	
Benzo(a)anthracene	µg/kg	--	--	--	--	--	--	--	--	--	
Benzo(a)pyrene	µg/kg	--	--	--	--	--	--	--	--	--	
Benzo(b)fluoranthene	µg/kg	--	--	--	--	--	--	--	--	--	
Benzo(g,h,i)perylene	µg/kg	--	--	--	--	--	--	--	--	--	
Benzo(k)fluoranthene	µg/kg	--	--	--	--	--	--	--	--	--	
Benzoic acid	µg/kg	--	--	--	--	--	--	--	--	--	
Benzyl alcohol	µg/kg	--	--	--	--	--	--	--	--	--	
Bis(2-chloroethoxy)methane	µg/kg	--	--	--	--	--	--	--	--	--	
Bis(2-chloroethyl)ether	µg/kg	--	--	--	--	--	--	--	--	--	

**INTERIM SOURCE REMOVAL ACTION (ISRA) - OUTFALL 009**

**ELV-1C (SOUTHWESTERN PORTION) WASTE CHARACTERIZATION RESULTS  
THE BOEING COMPANY  
SANTA SUSANA FIELD LABORATORY**

			<b>Object Name:</b>			<b>ISWC0099</b>	<b>ISWC0100</b>	<b>ISWC0101</b>	<b>ISWC0102</b>	<b>ISWC0103</b>
			Sample Name:			ISWC0099S001	ISWC0100S001	ISWC0101S001	ISWC0102S001	ISWC0103S001
			Collection Date:			8/24/2009	8/24/2009	8/24/2009	8/24/2009	8/24/2009
			Sample Depth (feet):			0.7 - 1.3	0.7 - 1.2	0.2 - 0.8	0.0 - 0.5	0.0 - 0.5
<b>ANALYTE</b>	<b>UNITS</b>	<b>TTLIC</b>	<b>WET Leachate Testing Trigger<sup>a</sup></b>	<b>TCLP Leachate Testing Trigger<sup>b</sup></b>	<b>STLC</b>	<b>RESULT</b>	<b>RESULT</b>	<b>RESULT</b>	<b>RESULT</b>	<b>RESULT</b>
Bis(2-chloroisopropyl)ether	µg/kg	--	--	--	--	--	--	--	--	--
Bis(2-ethylhexyl)phthalate	µg/kg	--	--	--	--	--	--	--	--	--
Butyl benzyl phthalate	µg/kg	--	--	--	--	--	--	--	--	--
Chrysene	µg/kg	--	--	--	--	--	--	--	--	--
Dibenz(a,h)anthracene	µg/kg	--	--	--	--	--	--	--	--	--
Dibenzofuran	µg/kg	--	--	--	--	--	--	--	--	--
Diethyl phthalate	µg/kg	--	--	--	--	--	--	--	--	--
Dimethyl phthalate	µg/kg	--	--	--	--	--	--	--	--	--
Di-n-butyl phthalate	µg/kg	--	--	--	--	--	--	--	--	--
Di-n-octyl phthalate	µg/kg	--	--	--	--	--	--	--	--	--
Fluoranthene	µg/kg	--	--	--	--	--	--	--	--	--
Fluorene	µg/kg	--	--	--	--	--	--	--	--	--
Hexachlorobenzene	µg/kg	--	--	2,600	--	--	--	--	--	--
Hexachlorobutadiene	µg/kg	--	--	10,000	--	--	--	--	--	--
Hexachlorocyclopentadiene	µg/kg	--	--	--	--	--	--	--	--	--
Hexachloroethane	µg/kg	--	--	60,000	--	--	--	--	--	--
Indeno(1,2,3-cd)pyrene	µg/kg	--	--	--	--	--	--	--	--	--
Isophorone	µg/kg	--	--	--	--	--	--	--	--	--
Naphthalene	µg/kg	--	--	--	--	--	--	--	--	--
Nitrobenzene	µg/kg	--	--	40,000	--	--	--	--	--	--
N-Nitrosodimethylamine	µg/kg	--	--	--	--	--	--	--	--	--
N-Nitroso-di-n-propylamine	µg/kg	--	--	--	--	--	--	--	--	--
N-Nitrosodiphenylamine	µg/kg	--	--	--	--	--	--	--	--	--
Pentachlorophenol	µg/kg	17,000	17,000	2,000,000	--	--	--	--	--	--
Phenanthrene	µg/kg	--	--	--	--	--	--	--	--	--
Phenol	µg/kg	--	--	--	--	--	--	--	--	--
Pyrene	µg/kg	--	--	--	--	--	--	--	--	--
<b>RADIONUCLIDES</b>	--	--	--	--	--	R	R	R	R	R

## INTERIM SOURCE REMOVAL ACTION (ISRA) - OUTFALL 009

### ELV WASTE CHARACTERIZATION SUMMARY NOTES THE BOEING COMPANY SANTA SUSANA FIELD LABORATORY

#### Notes:

--" - not analyzed / not applicable

<sup>1</sup> - WET Leachate Testing Trigger = STLC limit \* 10

<sup>2</sup> - TCLP Leachate Testing Trigger = TCLP limit \* 20

Grey highlighted cells indicate concentration meets or exceeds STLC.

A-01 - Sample result might be biased high due to coelution of Aroclors 1254 and 1260. The data was reprocessed in a different way as the calibration (3 peaks were used in the confirmation column).

A-01a - Sample result might be biased high due to coelution of Aroclors 1254 and 1260. The data was reprocessed in a different way as the calibration (4 peaks were used in the primary column).

A-01b - Sample result might be biased high due to coelution of Aroclors 1254 and 1260. The data was reprocessed in a different way as the calibration (4 peaks were used in the primary and 3 peaks were used in the confirmation column).

A-01c - Sample result might be biased high due to coelution of Aroclors 1254 and 1260. The data was reprocessed in a different way as the calibration (4 peaks were used in the primary column).

B - Analyte was detected in the associated Method Blank.

C - Calibration Verification recovery was above the method control limit for this analyte. Analyte not detected, data not impacted

C-2 - Calibration Verification recovery was below the method control limit for this analyte, however the average % difference for all analytes met method criteria.

I - Internal Standard recovery was outside of method limits. Matrix interference was confirmed.

J - Estimated value. Analyte detected at a level less than the Reporting Limit (RL) and greater than or equal to the Method Detection Limit (MDL). The user of this data should be aware that this data is of limited reliability.

L - Laboratory Control Sample and/or Laboratory Control Sample Duplicate recovery was above the acceptance limits. Analyte not detected, data not impacted.

M1 - The MS and/or MSD were above the acceptance limits due to sample matrix interference. See Blank Spike (LCS).



**INTERIM SOURCE REMOVAL ACTION (ISRA) - OUTFALL 009**

**ELV WASTE CHARACTERIZATION SUMMARY NOTES  
THE BOEING COMPANY  
SANTA SUSANA FIELD LABORATORY**

M2 - The MS and/or MSD were below the acceptance limits due to sample matrix interference. See Blank Spike (LCS).

µg/kg - micrograms per kilogram

mg/kg - milligrams per kilogram

mg/L - milligrams per liter

R - Radiological analysis includes gamma spectroscopy (Na-22, K-40, Mn-54, Co-60, Cs-134, Cs-137, Eu-152, Eu-154, Th-228, Th-232, U-235, U-238 and Am-241), strontium-90, and tritium. Boeing has prepared a document dated August 17, 2009 that provides the radiological results and statistical analysis of the Outfall 008 waste characterization samples. Based on the results, the document certifies the soil represented by these waste characterization samples to be "radiologically" acceptable for shipment to Class 1, 2, and/or 3 disposal facilities. The analysis and data interpretation complies with procedures approved by the California Department of Public Health.

R-1 - The relative percent difference (RPD) between the primary and confirmatory analysis exceeded 40%. Per method 8000B, the higher value was reported

R-G - Samples were recollected for gamma spectroscopy only (Na-22, K-40, Mn-54, Co-60, Cs-134, Cs-137, Eu-152, Eu-154, Th-228, Th-232, U-235, U-238 and Am-241)

## **WASTE CHARACTERIZATION: IN-SITU SOIL LOCATED AT ISRA AREA II PLANNED EXCAVATION ELV-1D POND (SHALLOW SOILS)**

### **Introduction**

This report presents supporting detailed information for the in-situ characterization of prospective soil wastes from the planned ISRA excavation at ELV-1D in SSFL Area II. Soil samples for this characterization were collected on July 28, 2009 and on October 7, 2013.

### **Background**

In-situ characterization was performed on soil destined to be excavated from designated locations in SSFL Area II in accordance with the ISRA Workplan. A step-by-step approach was followed to accomplish characterization of the soil prior to excavation. The first step was to review available information regarding historical area usage and existing analytical data from past soil sampling in the applicable SSFL Area II locations. The objective was to identify all substances that could have an impact on the determination of whether soil in each planned excavation footprint was hazardous or not.

The next step was to develop a random sampling plan for each of the planned excavation footprints to determine whether any of the identified substances are present at concentrations that require further investigation. An evaluation of the results of the initial random sampling was performed to determine whether the data was adequate for waste characterization based on the exhibited variance of any detected analytes and the relative difference between detected concentrations and regulatory thresholds. The soil was characterized non-hazardous when analyte concentrations among the samples exhibited a reasonably small variance and there was satisfactory margin between the mean of the samples and applicable regulatory thresholds. Otherwise, additional samples were collected and subjected to analysis or the soil was characterized as hazardous.

The review of historical information and existing analytical data relevant to planned excavation in the general ELV-1D area was based largely on the Group 2 RFI results. Evaluation of these data and other sources of relevant information suggested that soils here should be managed as two distinct areas, the former pond and the drainage.

For the ELV-1D POND, Volatile Organic Compounds (VOC), Regulated metals, and Semi-Volatile Organic Compounds (SVOC) were identified as potential impacts that should be addressed in the excavation footprint. Initially, a random sampling plan was developed for collection of eight (8) samples from the planned excavation footprint. The samples were analyzed for VOCs, CAM 17 metals, and SVOCs. A 96-hour Acute Aquatic Toxicity LC50 (Fish Bioassay) was also run on two of the samples. Excavation work at the site did not actually commence for some time.

Two additional samples were collected four years later during excavation activity, when photoionization detector monitoring indicated an increase in VOC presence. The intent of this sampling was to more clearly differentiate the boundaries of elevated VOC soil from lower concentration VOC soil for waste disposal facility profiling purposes. All samples were collected, contained, and handled according to field practice requirements in SW-846.

## **Results**

Analytical results for the ELV-1D POND planned excavation area are presented in TestAmerica report ISG2199 issued on 8/13/09. Later sampling results are found in GEL Laboratories report 335054 issued on 10/11/13 (total concentrations) and 335824 issued on 10/23/13 (TCLP results). The results exhibited elevated concentrations of Lead, with a maximum of 217 mg/kg. As this detection originated in one of the samples collected only for profiling purposes, no California WET leachate test was performed. Rather, leachate testing was limited to the TCLP to determine whether the waste was RCRA regulated. A TCLP result of 0.0425 mg/L was obtained, below the RCRA hazardous waste limit of 5 mg/L for Lead.

Other elevated Lead concentrations were detected at 99 mg/kg, 87 mg/kg, and 82 mg/kg in the original waste characterization samples. These concentrations fell below RCRA thresholds requiring TCLP testing, but did exceed California STLC thresholds requiring the California WET leachate test. All of these samples were subjected to the WET, resulting in respective Lead concentrations of 1.8 mg/L, 3.6 mg/L, and 1.8 mg/L for the three elevated Lead samples. These results did not exceed the California STLC hazardous waste limit for Lead of 5 mg/L.

Elevated Chromium was also detected. Chromium was detected elevated concentrations of 105 mg/kg, 55 mg/kg, and 51 mg/kg. Again, the maximum concentration of 105 mg/kg was detected in one of the samples collected for profiling purposes. Consequently, only TCLP results were needed to determine whether the waste was RCRA regulated or not. The TCLP concentration was 0.0115 mg/L, well below the 5 mg/L hazardous waste limit. The two remaining elevated Chromium concentrations related to the original characterization samples and were below the RCRA threshold for TCLP testing. California WET results were 0.45 mg/L and 0.66 mg/L, well below the STLC threshold for hazardous waste of 5 mg/L. Other regulated metals were below applicable regulatory thresholds.

SVOCs were detected, but all analytes were below 1 mg/kg individually, with the exception of Benzoic Acid, which is not directly regulated as a hazardous waste. It was detected ranging from 0.35 mg/kg to 5.420 mg/kg. When excluding Benzoic Acid, the collective concentration of all other detected SVOCs is 0.2823 mg/kg.

Both samples that were tested passed the Fish Bioassay.

Only trace concentrations of VOCs were detected. Four samples exhibited TCE ranging from 0.0038 mg/kg to 0.082 mg/kg. Historical background information indicated that the pond area may have been exposed to spent TCE solvent in the past. For this reason, the soil was characterized as impacted by RCRA Listed waste. Other detected VOCs included cis-1,2-Dichloroethylene in one sample at 0.00275 mg/kg. 1,2,4-Trichlorobenzene was detected in two of the samples at 0.00076 mg/kg and at 0.0019 mg/kg, while 1,2,3-Trichlorobenzene was detected in one sample at 0.0033 mg/kg. Acetone was also present, with detections in 4 samples ranging from 16 mg/kg to 29 mg/kg.

## **Determination**

According to analytical results and generator knowledge, the soil in the planned excavation footprint of SSFL Area II ELV-1D POND:

Is a RCRA F001/F002 Listed Waste (analytical results and generator knowledge) Is Not ignitable (generator knowledge)

Is Not corrosive (generator knowledge)

Is Not reactive (generator knowledge)

Is Not toxic (analytical results)

Is Not Extremely or Acutely Hazardous Waste

Does Not exceed any RCRA or Title 22 thresholds

Is Not subject to the Prop. 65 listing








Is Not subject to Title 22 Appendix X list

Is Not known by experience or testing to pose a hazard to human health or environment because of its carcinogenicity, acute toxicity, chronic toxicity, bio-accumulative properties, or persistence in the environment.



**The ELV-1D POND shallow soil is HAZARDOUS.**

# Outfall 009 Waste Characterization Sample Locations for ELV-1D

## Base Map Legend

-  Administrative Area Boundary
-  RFI Site Boundary
-  NPDES Outfall
-  A/C Paving
-  Drainage
-  Non Jurisdictional Surface Water Pathway
-  Surface Water Divide

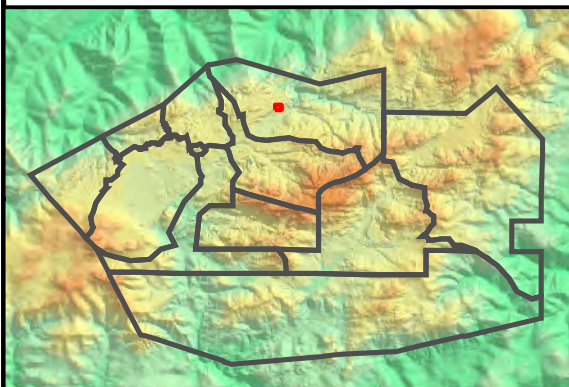
## Figure Legend

-  Planned ISRA Excavation Boundary
-  Sample Location
- Gray shading indicates sample not analyzed
- Green shading indicates sample only analyzed for radionuclides
- Blue shading indicates sample associated with deep soils waste certification

Note:  
1. Aerial imagery from 2010 Sage Consulting.  
2. Topographic contours from 2010 Sage Consulting.

Path: T:\projects\rock3\ISRA\Figures\Boeing\ELV-1D\ELV-1D\_Waste Charc.mxd Date: 11/5/2013

1 inch = 15 feet  
0 10 20 Feet



**INTERIM SOURCE REMOVAL ACTION (ISRA) - OUTFALL 009**

**WASTE CHARACTERIZATION SAMPLE RESULTS - ELV-1D (SHALLOW SOILS)  
THE BOEING COMPANY  
SANTA SUSANA FIELD LABORATORY**

				Object Name:			ISWC0061	ISWC0062	ISWC0063	ISWC0064	ISWC0065	ISWC0066
				Sample Name:			ISWC0061S001	ISWC0062S001	ISWC0063S001	ISWC0064S001	ISWC0065S001	ISWC0066S001
				Collection Date:			7/28/2009	7/28/2009	7/28/2009	7/28/2009	7/28/2009	7/28/2009
				Sample Depth (feet):			0 - 0.6	1 - 1.6	1 - 1.7	1 - 1.8	1 - 2	0 - 0.9
ANALYTE	UNITS	TTLIC	WET Leachate Testing Trigger <sup>a</sup>	TCLP Leachate Testing Trigger <sup>b</sup>	STLC	TCLP	RESULT <sup>c</sup>	RESULT <sup>c</sup>	RESULT <sup>c</sup>	RESULT <sup>c</sup>	RESULT <sup>c</sup>	RESULT <sup>c</sup>
<b>Metals</b>												
Antimony	mg/kg	500	150	--	--	--	<0.88	<0.88	<0.88	2.2	<0.88	1.4
Arsenic	mg/kg	500	50	100	--	--	3.6	4.9	3.0	8.0	2.7	4.0
Barium	mg/kg	10,000	1,000	2,000	--	--	54	59	61	87	77	96
Beryllium	mg/kg	75	7.5	--	--	--	0.39	0.33	0.48	0.47	0.32	0.57
Cadmium	mg/kg	100	10	20	--	--	1.1	1.9	0.22	4.5	2	5.1
Chromium	mg/kg	500	50	100	--	--	20	21	22	55	40	51
Chromium-STLC	mg/L	--	--	--	5	--	--	--	--	0.45	--	0.66
Chromium-TCLP	mg/L	--	--	--	--	5	--	--	--	--	--	--
Cobalt	mg/kg	8,000	800	--	--	--	4.5	3.7	4.4	5.1	3.4	4.9
Copper	mg/kg	2,500	250	--	--	--	12	16	8.3	85	13	48
Lead	mg/kg	1,000	50	100	--	--	18	24	5.6	99	21	82
Lead-STLC	mg/L	--	--	--	5	--	--	--	--	1.8	--	3.6
Lead-TCLP	mg/L	--	--	--	--	5	--	--	--	--	--	--
Mercury	mg/kg	20	2	4	--	--	0.0092	0.15	<0.0055	0.082	0.1	0.14
Molybdenum	mg/kg	3,500	3,500	--	--	--	0.71	0.79	<0.20	7.9	0.41	2.6
Nickel	mg/kg	2,000	200	--	--	--	11	11	11	24	12	25
Selenium	mg/kg	100	10	20	--	--	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Silver	mg/kg	500	50	100	--	--	<0.80	<0.80	<0.80	2.4	<0.80	1.9
Thallium	mg/kg	700	70	--	--	--	<0.80	<0.80	<0.80	<0.80	<0.80	<0.80
Vanadium	mg/kg	2,400	240	--	--	--	26	29	30	33	27	29
Zinc	mg/kg	5,000	2,500	--	--	--	350	160	57	350	440	980
<b>SVOCs</b>												
1,1'-Biphenyl	ug/kg	--	--	--	--	--	--	--	--	--	--	--
1,2,4-Trichlorobenzene	ug/kg	--	--	--	--	--	<330 {<50}	<660 {<100}	<330 {<50}	<660 {<100}	<330 {<50}	<500 {<75}
1,2-Dichlorobenzene	ug/kg	--	--	--	--	--	<330 {<60}	<660 {<120}	<330 {<60}	<660 {<120}	<330 {<60}	<500 {<90}
1,2-Diphenylhydrazine/Azobenzene	ug/kg	--	--	--	--	--	<330 {<60}	<660 {<120}	<330 {<60}	<660 {<120}	<330 {<60}	<500 {<90}
1,3-Dichlorobenzene	ug/kg	--	--	--	--	--	<330 {<90}	<660 {<180}	<330 {<90}	<660 {<180}	<330 {<90}	<500 {<140}
1,4-Dichlorobenzene	ug/kg	--	--	150,000	--	--	<330 {<65}	<660 {<130}	<330 {<65}	<660 {<130}	<330 {<65}	<500 {<98}
1-Methylnaphthalene	ug/kg	--	--	--	--	--	--	--	--	--	--	--
1-Naphthylamine	ug/kg	--	--	--	--	--	--	--	--	--	--	--
2,4,5-Trichlorophenol	ug/kg	--	--	8,000,000	--	--	<330 {<130}	<660 {<260}	<330 {<130}	<660 {<260}	<330 {<130}	<500 {<200}
2,4,6-Trichlorophenol	ug/kg	--	--	40,000	--	--	<330 {<75}	<660 {<150}	<330 {<75}	<660 {<150}	<330 {<75}	<500 {<110}
2,4-Dichlorophenol	ug/kg	--	--	--	--	--	<330 {<60}	<660 {<120}	<330 {<60}	<660 {<120}	<330 {<60}	<500 {<90}
2,4-Dimethylphenol	ug/kg	--	--	--	--	--	<330 {<100}	<660 {<200}	<330 {<100}	<660 {<200}	<330 {<100}	<500 {<150}
2,4-Dinitrophenol	ug/kg	--	--	--	--	--	<660 {<110}	<1300 {<220}	<660 {<110}	<1300 {<220}	<660 {<110}	<990 {<160}
2,4-Dinitrotoluene	ug/kg	--	--	2,600	--	--	<330 {<80}	<660 {<160}	<330 {<80}	<660 {<160}	<330 {<80}	<500 {<120}
2,6-Dinitrotoluene	ug/kg	--	--	--	--	--	<330 {<95}	<660 {<190}	<330 {<95}	<660 {<190}	<330 {<95}	<500 {<140}
2-Chloronaphthalene	ug/kg	--	--	--	--	--	<330 {<65}	<660 {<130}	<330 {<65}	<660 {<130}	<330 {<65}	<500 {<98}

**INTERIM SOURCE REMOVAL ACTION (ISRA) - OUTFALL 009**

**WASTE CHARACTERIZATION SAMPLE RESULTS - ELV-1D (SHALLOW SOILS)  
THE BOEING COMPANY  
SANTA SUSANA FIELD LABORATORY**

				Object Name:			ISWC0061	ISWC0062	ISWC0063	ISWC0064	ISWC0065	ISWC0066
				Sample Name:			ISWC0061S001	ISWC0062S001	ISWC0063S001	ISWC0064S001	ISWC0065S001	ISWC0066S001
				Collection Date:			7/28/2009	7/28/2009	7/28/2009	7/28/2009	7/28/2009	7/28/2009
				Sample Depth (feet):			0 - 0.6	1 - 1.6	1 - 1.7	1 - 1.8	1 - 2	0 - 0.9
ANALYTE	UNITS	TTLIC	WET Leachate Testing Trigger <sup>a</sup>	TCLP Leachate Testing Trigger <sup>b</sup>	STLC	TCLP	RESULT <sup>c</sup>	RESULT <sup>c</sup>	RESULT <sup>c</sup>	RESULT <sup>c</sup>	RESULT <sup>c</sup>	RESULT <sup>c</sup>
2-Chlorophenol	ug/kg	--	--	--	--	--	<330 {<70}	<660 {<140}	<330 {<70}	<660 {<140}	<330 {<70}	<500 {<100}
2-Methylnaphthalene	ug/kg	--	--	--	--	--	<330 {<70}	<660 {<140}	<330 {<70}	<660 {<140}	<330 {<70}	120
2-Methylphenol	ug/kg	--	--	--	--	--	<330 {<80}	<660 {<160}	<330 {<80}	<660 {<160}	<330 {<80}	<500 {<120}
2-Naphthylamine	ug/kg	--	--	--	--	--	--	--	--	--	--	--
2-Nitroaniline	ug/kg	--	--	--	--	--	<330 {<60}	<660 {<120}	<330 {<60}	<660 {<120}	<330 {<60}	<500 {<90}
2-Nitrophenol	ug/kg	--	--	--	--	--	<330 {<60}	<660 {<120}	<330 {<60}	<660 {<120}	<330 {<60}	<500 {<90}
3,3'-Dichlorobenzidine	ug/kg	10,000	--	--	--	--	<830 {<150}	<1700 {<300}	<830 {<150}	<1700 {<300}	<830 {<150}	<1200 {<220}
3-Nitroaniline	ug/kg	--	--	--	--	--	<330 {<75}	<660 {<150}	<330 {<75}	<660 {<150}	<330 {<75}	<500 {<110}
3,5-Dimethylphenol	ug/kg	--	--	--	--	--	--	--	--	--	--	--
4,6-Dinitro-2-methylphenol	ug/kg	--	--	--	--	--	<420 {<110}	<840 {<220}	<420 {<110}	<840 {<220}	<420 {<110}	<630 {<160}
4-Aminobiphenyl	ug/kg	--	--	--	--	--	--	--	--	--	--	--
4-Bromophenyl phenyl ether	ug/kg	--	--	--	--	--	<330 {<75}	<660 {<150}	<330 {<75}	<660 {<150}	<330 {<75}	<500 {<110}
4-Chloro-3-methylphenol	ug/kg	--	--	--	--	--	<330 {<70}	<660 {<140}	<330 {<70}	<660 {<140}	<330 {<70}	<500 {<100}
4-Chloroaniline	ug/kg	--	--	--	--	--	<330 {<120}	<660 {<240}	<330 {<120}	<660 {<240}	<330 {<120}	<500 {<180}
4-Chlorophenyl phenyl ether	ug/kg	--	--	--	--	--	<330 {<85}	<660 {<170}	<330 {<85}	<660 {<170}	<330 {<85}	<500 {<130}
4-Methylphenol	ug/kg	--	--	--	--	--	<330 {<80}	<660 {<160}	<330 {<80}	<660 {<160}	<330 {<80}	<500 {<120}
4-Nitroaniline	ug/kg	--	--	--	--	--	<830 {<90}	<1700 {<180}	<830 {<90}	<1700 {<180}	<830 {<90}	<1200 {<140}
4-Nitrophenol	ug/kg	--	--	--	--	--	<830 {<140}	<1700 {<280}	<830 {<140}	<1700 {<280}	<830 {<140}	<1200 {<210}
Acenaphthene	ug/kg	--	--	--	--	--	<330 {<60}	<660 {<120}	<330 {<60}	<660 {<120}	<330 {<60}	<500 {<90}
Acenaphthylene	ug/kg	--	--	--	--	--	<330 {<70}	<660 {<140}	<330 {<70}	<660 {<140}	<330 {<70}	<500 {<100}
Acetophenone	ug/kg	--	--	--	--	--	--	--	--	--	--	--
Aniline	ug/kg	--	--	--	--	--	<420 {<85}	<840 {<170}	<420 {<85}	<840 {<170}	<420 {<85}	<630 {<130}
Anthracene	ug/kg	--	--	--	--	--	<330 {<80}	<660 {<160}	<330 {<80}	<660 {<160}	<330 {<80}	<500 {<120}
Atrazine	ug/kg	--	--	--	--	--	--	--	--	--	--	--
Benzaldehyde	ug/kg	--	--	--	--	--	--	--	--	--	--	--
Benzidine	ug/kg	10,000	--	--	--	--	<660 {<660}	<1300 {<1300}	<660 {<660}	<1300 {<1300}	<660 {<660}	<990 {<990}
Benzo(a)anthracene	ug/kg	--	--	--	--	--	<330 {<70}	<660 {<140}	<330 {<70}	<660 {<140}	<330 {<70}	<500 {<100}
Benzo(a)pyrene	ug/kg	--	--	--	--	--	<330 {<55}	<660 {<110}	<330 {<55}	<660 {<110}	<330 {<55}	110
Benzo(b)fluoranthene	ug/kg	--	--	--	--	--	370	<660 {<100}	<330 {<50}	<660 {<100}	<330 {<50}	<500 {<75}
Benzo(g,h,i)perylene	ug/kg	--	--	--	--	--	<330 {<110}	<660 {<220}	<330 {<110}	<660 {<220}	<330 {<110}	<500 {<160}
Benzo(k)fluoranthene	ug/kg	--	--	--	--	--	<330 {<70}	<660 {<140}	<330 {<70}	<660 {<140}	<330 {<70}	<500 {<100}
Benzoic acid	ug/kg	--	--	--	--	--	<830 {<150}	<1700 {<300}	<830 {<150}	<1700 {<300}	<830 {<150}	460
Benzyl alcohol	ug/kg	--	--	--	--	--	<330 {<200}	<660 {<400}	<330 {<200}	<660 {<400}	<330 {<200}	<500 {<300}
Bis(2-chloroethoxy)methane	ug/kg	--	--	--	--	--	<330 {<70}	<660 {<140}	<330 {<70}	<660 {<140}	<330 {<70}	<500 {<100}
Bis(2-chloroethyl)ether	ug/kg	--	--	--	--	--	<170 {<60}	<340 {<120}	<170 {<60}	<340 {<120}	<170 {<60}	<260 {<90}
Bis(2-chloroisopropyl)ether	ug/kg	--	--	--	--	--	<330 {<60}	<660 {<120}	<330 {<60}	<660 {<120}	<330 {<60}	<500 {<90}
Bis(2-ethylhexyl)phthalate	ug/kg	--	--	--	--	--	<330 {<90}	<660 {<180}	<330 {<90}	<660 {<180}	<330 {<90}	<500 {<140}
Butyl benzyl phthalate	ug/kg	--	--	--	--	--	<330 {<80}	<660 {<160}	<330 {<80}	<660 {<160}	<330 {<80}	<500 {<120}
Caprolactam	ug/kg	--	--	--	--	--	--	--	--	--	--	--

**INTERIM SOURCE REMOVAL ACTION (ISRA) - OUTFALL 009**

**WASTE CHARACTERIZATION SAMPLE RESULTS - ELV-1D (SHALLOW SOILS)  
THE BOEING COMPANY  
SANTA SUSANA FIELD LABORATORY**

				Object Name:			ISWC0061	ISWC0062	ISWC0063	ISWC0064	ISWC0065	ISWC0066
				Sample Name:			ISWC0061S001	ISWC0062S001	ISWC0063S001	ISWC0064S001	ISWC0065S001	ISWC0066S001
				Collection Date:			7/28/2009	7/28/2009	7/28/2009	7/28/2009	7/28/2009	7/28/2009
				Sample Depth (feet):			0 - 0.6	1 - 1.6	1 - 1.7	1 - 1.8	1 - 2	0 - 0.9
ANALYTE	UNITS	TTLIC	WET Leachate Testing Trigger <sup>a</sup>	TCLP Leachate Testing Trigger <sup>b</sup>	STLC	TCLP	RESULT <sup>c</sup>	RESULT <sup>c</sup>	RESULT <sup>c</sup>	RESULT <sup>c</sup>	RESULT <sup>c</sup>	RESULT <sup>c</sup>
Carbazole	ug/kg	--	--	--	--	--	--	--	--	--	--	--
Chrysene	ug/kg	--	--	--	--	--	<330 {<75}	<660 {<150}	<330 {<75}	<660 {<150}	<330 {<75}	<500 {<110}
Dibenz(a,h)anthracene	ug/kg	--	--	--	--	--	<420 {<100}	<840 {<200}	<420 {<100}	<840 {<200}	<420 {<100}	<630 {<150}
Dibenzofuran	ug/kg	--	--	--	--	--	<330 {<60}	<660 {<120}	<330 {<60}	<660 {<120}	<330 {<60}	<500 {<90}
Diethyl phthalate	ug/kg	--	--	--	--	--	<330 {<95}	<660 {<190}	<330 {<95}	<660 {<190}	<330 {<95}	<500 {<140}
Dimethyl phthalate	ug/kg	--	--	--	--	--	<330 {<65}	<660 {<130}	<330 {<65}	<660 {<130}	<330 {<65}	<500 {<98}
Di-n-butyl phthalate	ug/kg	--	--	--	--	--	<330 {<90}	<660 {<180}	<330 {<90}	<660 {<180}	<330 {<90}	<500 {<140}
Di-n-octyl phthalate	ug/kg	--	--	--	--	--	<330 {<90}	<660 {<180}	<330 {<90}	<660 {<180}	<330 {<90}	<500 {<140}
Diphenylamine	ug/kg	--	--	--	--	--	--	--	--	--	--	--
Fluoranthene	ug/kg	--	--	--	--	--	<330 {<70}	<660 {<140}	<330 {<70}	<660 {<140}	<330 {<70}	120
Fluorene	ug/kg	--	--	--	--	--	<330 {<70}	<660 {<140}	<330 {<70}	<660 {<140}	<330 {<70}	<500 {<100}
Hexachlorobenzene	ug/kg	--	--	2,600	--	--	<330 {<70}	<660 {<140}	<330 {<70}	<660 {<140}	<330 {<70}	<500 {<100}
Hexachlorobutadiene	ug/kg	--	--	10,000	--	--	<330 {<60}	<660 {<120}	<330 {<60}	<660 {<120}	<330 {<60}	<500 {<90}
Hexachlorocyclopentadiene	ug/kg	--	--	--	--	--	<830 {<90}	<1700 {<180}	<830 {<90}	<1700 {<180}	<830 {<90}	<1200 {<140}
Hexachloroethane	ug/kg	--	--	60,000	--	--	<330 {<65}	<660 {<130}	<330 {<65}	<660 {<130}	<330 {<65}	<500 {<98}
Indeno(1,2,3-cd)pyrene	ug/kg	--	--	--	--	--	<330 {<130}	<660 {<260}	<330 {<130}	<660 {<260}	<330 {<130}	<500 {<200}
Isophorone	ug/kg	--	--	--	--	--	<330 {<60}	<660 {<120}	<330 {<60}	<660 {<120}	<330 {<60}	<500 {<90}
m,p-Cresols	ug/kg	--	--	4,000,000	--	--	--	--	--	--	--	--
Naphthalene	ug/kg	--	--	--	--	--	<330 {<60}	<660 {<120}	<330 {<60}	<660 {<120}	<330 {<60}	<500 {<90}
Nitrobenzene	ug/kg	--	--	40,000	--	--	<330 {<70}	<660 {<140}	<330 {<70}	<660 {<140}	<330 {<70}	<500 {<100}
N-Nitrosodimethylamine	ug/kg	10,000	--	--	--	--	<330 {<55}	<660 {<110}	<330 {<55}	<660 {<110}	<330 {<55}	<500 {<82}
N-Nitroso-di-n-propylamine	ug/kg	--	--	--	--	--	<250 {<70}	<500 {<140}	<250 {<70}	<500 {<140}	<250 {<70}	<380 {<100}
N-Nitrosodiphenylamine	ug/kg	--	--	--	--	--	<330 {<80}	<660 {<160}	<330 {<80}	<660 {<160}	<330 {<80}	<500 {<120}
p-(Dimethylamino)azobenzene	ug/kg	--	--	--	--	--	--	--	--	--	--	--
Pentachlorophenol	ug/kg	17,000	17,000	2,000,000	--	--	<830 {<150}	<1700 {<300}	<830 {<150}	<1700 {<300}	<830 {<150}	<1200 {<220}
Phenanthrene	ug/kg	--	--	--	--	--	<330 {<60}	<660 {<120}	<330 {<60}	<660 {<120}	<330 {<60}	120
Phenol	ug/kg	--	--	--	--	--	<330 {<90}	<660 {<180}	<330 {<90}	<660 {<180}	<330 {<90}	<500 {<140}
Pyrene	ug/kg	--	--	--	--	--	<330 {<80}	<660 {<160}	<330 {<80}	<660 {<160}	<330 {<80}	220
Pyridine	ug/kg	--	--	100	--	--	--	--	--	--	--	--
<b>VOCs</b>												
1,1,1,2-Tetrachloroethane	ug/kg	--	--	--	--	--	<2.2 {<0.63}	<2.5 {<0.71}	<1.9 {<0.55}	<2.2 {<0.63}	<2.5 {<0.70}	<2.3 {<0.66}
1,1,1-Trichloroethane	ug/kg	--	--	--	--	--	<1.1 {<0.78}	<1.2 {<0.87}	<0.97 {<0.68}	<1.1 {<0.77}	<1.2 {<0.86}	<1.2 {<0.81}
1,1,2,2-Tetrachloroethane	ug/kg	--	--	--	--	--	<2.2 {<0.96}	<2.5 {<1.1}	<1.9 {<0.83}	<2.2 {<0.95}	<2.5 {<1.1}	<2.3 {<0.99}
1,1,2-Trichloroethane	ug/kg	--	--	--	--	--	<1.1 {<0.97}	<1.2 {<1.1}	<0.97 {<0.84}	<1.1 {<0.96}	<1.2 {<1.1}	<1.2 {<1.0}
1,1-Dichloroethane	ug/kg	--	--	--	--	--	<1.1 {<0.56}	<1.2 {<0.62}	<0.97 {<0.49}	<1.1 {<0.55}	<1.2 {<0.62}	<1.2 {<0.58}
1,1-Dichloroethene	ug/kg	--	--	14,000	--	--	<2.2 {<0.67}	<2.5 {<0.75}	<1.9 {<0.58}	<2.2 {<0.66}	<2.5 {<0.74}	<2.3 {<0.69}
1,1-Dichloropropene	ug/kg	--	--	--	--	--	<1.1 {<0.45}	<1.2 {<0.50}	<0.97 {<0.39}	<1.1 {<0.44}	<1.2 {<0.49}	<1.2 {<0.46}
1,2,3-Trichlorobenzene	ug/kg	--	--	--	--	--	<2.2 {<1.1}	<2.2 {<1.1}	<1.9 {<0.97}	<2.2 {<1.1}	3.3	<2.3 {<1.2}
1,2,3-Trichloropropane	ug/kg	--	--	--	--	--	<2.2 {<1.1}	<2.5 {<1.2}	<1.9 {<0.97}	<2.2 {<1.1}	<2.5 {<1.2}	<2.3 {<1.2}



**INTERIM SOURCE REMOVAL ACTION (ISRA) - OUTFALL 009**

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THE BOEING COMPANY  
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				Object Name:			ISWC0061	ISWC0062	ISWC0063	ISWC0064	ISWC0065	ISWC0066
				Sample Name:			ISWC0061S001	ISWC0062S001	ISWC0063S001	ISWC0064S001	ISWC0065S001	ISWC0066S001
				Collection Date:			7/28/2009	7/28/2009	7/28/2009	7/28/2009	7/28/2009	7/28/2009
				Sample Depth (feet):			0 - 0.6	1 - 1.6	1 - 1.7	1 - 1.8	1 - 2	0 - 0.9
ANALYTE	UNITS	TTLIC	WET Leachate Testing Trigger <sup>a</sup>	TCLP Leachate Testing Trigger <sup>b</sup>	STLC	TCLP	RESULT <sup>c</sup>	RESULT <sup>c</sup>	RESULT <sup>c</sup>	RESULT <sup>c</sup>	RESULT <sup>c</sup>	RESULT <sup>c</sup>
1,2,4-Trichlorobenzene	ug/kg	--	--	--	--	--	<2.2 {<1.1}	<2.2 {<1.1}	<1.9 {<0.97}	<2.2 {<1.1}	1.9	<2.3 {<1.2}
1,2,4-Trimethylbenzene	ug/kg	--	--	--	--	--	<1.1 {<0.87}	<1.2 {<0.97}	<0.97 {<0.76}	<1.1 {<0.86}	<1.2 {<0.96}	<1.2 {<0.90}
1,2-Dibromo-3-chloropropane	ug/kg	--	--	--	--	--	<11 {<1.7}	<12 {<1.9}	<9.7 {<1.5}	<11 {<1.7}	<12 {<1.9}	<12 {<1.7}
1,2-Dibromoethane	ug/kg	--	--	--	--	--	<1.1 {<0.89}	<1.2 {<1.0}	<0.97 {<0.78}	<1.1 {<0.88}	<1.2 {<0.99}	<1.2 {<0.92}
1,2-Dichlorobenzene	ug/kg	--	--	--	--	--	<1.1 {<1.1}	<1.2 {<1.2}	<0.97 {<0.92}	<1.1 {<1.0}	<1.2 {<1.2}	<1.2 {<1.1}
1,2-Dichloroethane	ug/kg	--	--	10,000	--	--	<1.1 {<0.89}	<1.2 {<1.0}	<0.97 {<0.78}	<1.1 {<0.88}	<1.2 {<0.99}	<1.2 {<0.92}
1,2-Dichloropropane	ug/kg	--	--	--	--	--	<1.1 {<0.89}	<1.2 {<1.0}	<0.97 {<0.78}	<1.1 {<0.88}	<1.2 {<0.99}	<1.2 {<0.92}
1,3,5-Trimethylbenzene	ug/kg	--	--	--	--	--	<1.1 {<0.70}	<1.2 {<0.78}	<0.97 {<0.61}	<1.1 {<0.70}	<1.2 {<0.78}	<1.2 {<0.73}
1,3-Dichlorobenzene	ug/kg	--	--	--	--	--	<1.1 {<0.94}	<1.2 {<1.0}	<0.97 {<0.82}	<1.1 {<0.93}	<1.2 {<1.0}	<1.2 {<0.97}
1,3-Dichloropropane	ug/kg	--	--	--	--	--	<1.1 {<0.70}	<1.2 {<0.78}	<0.97 {<0.61}	<1.1 {<0.70}	<1.2 {<0.78}	<1.2 {<0.73}
1,4-Dichlorobenzene	ug/kg	--	--	--	--	--	<1.1 {<1.0}	<1.2 {<1.2}	<0.97 {<0.91}	<1.1 {<1.0}	<1.2 {<1.2}	<1.2 {<1.1}
2,2-Dichloropropane	ug/kg	--	--	--	--	--	<1.1 {<0.67}	<1.2 {<0.75}	<0.97 {<0.58}	<1.1 {<0.66}	<1.2 {<0.74}	<1.2 {<0.69}
2-Chloro-1,1,1-trifluoroethane	ug/kg	--	--	--	--	--	--	--	--	--	--	--
2-Chloroethylvinyl ether	ug/kg	--	--	--	--	--	--	--	--	--	--	--
2-Chlorotoluene	ug/kg	--	--	--	--	--	<2.2 {<0.97}	<2.5 {<1.1}	<1.9 {<0.84}	<2.2 {<0.96}	<2.5 {<1.1}	<2.3 {<1.0}
2-Hexanone	ug/kg	--	--	--	--	--	<11 {<10}	<12 {<11}	<9.7 {<8.8}	<11 {<10}	<12 {<11}	<12 {<11}
4-Chlorotoluene	ug/kg	--	--	--	--	--	<2.2 {<0.82}	<2.5 {<0.92}	<1.9 {<0.72}	<2.2 {<0.82}	<2.5 {<0.91}	<2.3 {<0.85}
4-Methyl-2-pentanone	ug/kg	--	--	--	--	--	<5.6 {<5.0}	<6.2 {<5.6}	<4.9 {<4.4}	<5.5 {<5.0}	<6.2 {<5.6}	<5.8 {<5.2}
Acetone	ug/kg	--	--	--	--	--	19	<12 {<10}	<9.7 {<7.8}	<11 {<8.8}	21	16
Benzene	ug/kg	--	--	10,000	--	--	<1.1 {<0.56}	<1.2 {<0.62}	<0.97 {<0.49}	<1.1 {<0.55}	<1.2 {<0.62}	<1.2 {<0.58}
Bromobenzene	ug/kg	--	--	--	--	--	<2.2 {<0.94}	<2.5 {<1.0}	<1.9 {<0.82}	<2.2 {<0.93}	<2.5 {<1.0}	<2.3 {<0.97}
Bromochloromethane	ug/kg	--	--	--	--	--	<2.2 {<1.0}	<2.5 {<1.1}	<1.9 {<0.87}	<2.2 {<0.99}	<2.5 {<1.1}	<2.3 {<1.0}
Bromodichloromethane	ug/kg	--	--	--	--	--	<1.1 {<0.56}	<1.2 {<0.62}	<0.97 {<0.49}	<1.1 {<0.55}	<1.2 {<0.62}	<1.2 {<0.58}
Bromoform	ug/kg	--	--	--	--	--	<2.2 {<0.89}	<2.5 {<1.0}	<1.9 {<0.78}	<2.2 {<0.88}	<2.5 {<0.99}	<2.3 {<0.92}
Bromomethane	ug/kg	--	--	--	--	--	<2.2 {<1.0}	<2.5 {<1.1}	<1.9 {<0.89}	<2.2 {<1.0}	<2.5 {<1.1}	<2.3 {<1.1}
Carbon disulfide	ug/kg	--	--	--	--	--	<5.6 {<1.1}	<6.2 {<1.2}	<4.9 {<0.94}	<5.5 {<1.1}	<6.2 {<1.2}	<5.8 {<1.1}
Carbon tetrachloride	ug/kg	--	--	10,000	--	--	<2.2 {<0.56}	<2.5 {<0.62}	<1.9 {<0.49}	<2.2 {<0.55}	<2.5 {<0.62}	<2.3 {<0.58}
Chlorobenzene	ug/kg	--	--	2,000,000	--	--	<1.1 {<0.58}	<1.2 {<0.65}	<0.97 {<0.50}	<1.1 {<0.57}	<1.2 {<0.64}	<1.2 {<0.60}
Chloroethane	ug/kg	--	--	--	--	--	<2.2 {<1.7}	<2.5 {<1.9}	<1.9 {<1.5}	<2.2 {<1.7}	<2.5 {<1.9}	<2.3 {<1.7}
Chloroform	ug/kg	--	--	120,000	--	--	<1.1 {<0.56}	<1.2 {<0.62}	<0.97 {<0.49}	<1.1 {<0.55}	<1.2 {<0.62}	<1.2 {<0.58}
Chloromethane	ug/kg	--	--	--	--	--	<2.2 {<1.1}	<2.5 {<1.2}	<1.9 {<0.97}	<2.2 {<1.1}	<2.5 {<1.2}	<2.3 {<1.2}
Chlorotrifluoroethylene	ug/kg	--	--	--	--	--	--	--	--	--	--	--
cis-1,2-Dichloroethene	ug/kg	--	--	--	--	--	<1.1 {<0.92}	<1.2 {<1.0}	<0.97 {<0.81}	<1.1 {<0.92}	<1.2 {<1.0}	<1.2 {<0.96}
cis-1,3-Dichloropropene	ug/kg	--	--	--	--	--	<1.1 {<0.49}	<1.2 {<0.55}	<0.97 {<0.43}	<1.1 {<0.49}	<1.2 {<0.54}	<1.2 {<0.51}
Dibromochloromethane	ug/kg	--	--	--	--	--	<1.1 {<0.78}	<1.2 {<0.87}	<0.97 {<0.68}	<1.1 {<0.77}	<1.2 {<0.86}	<1.2 {<0.81}
Dibromomethane	ug/kg	--	--	--	--	--	<1.1 {<1.0}	<1.2 {<1.1}	<0.97 {<0.87}	<1.1 {<0.99}	<1.2 {<1.1}	<1.2 {<1.0}
Dichlorodifluoromethane	ug/kg	--	--	--	--	--	<2.2 {<1.7}	<2.5 {<1.9}	<1.9 {<1.5}	<2.2 {<1.7}	<2.5 {<1.9}	<2.3 {<1.7}
Di-isopropyl Ether (DIPE)	ug/kg	--	--	--	--	--	<2.2 {<0.56}	<2.5 {<0.62}	<1.9 {<0.49}	<2.2 {<0.55}	<2.5 {<0.62}	<2.3 {<0.58}
Ethyl tert-Butyl Ether (ETBE)	ug/kg	--	--	--	--	--	<2.2 {<0.65}	<2.5 {<0.72}	<1.9 {<0.56}	<2.2 {<0.64}	<2.5 {<0.72}	<2.3 {<0.67}

**INTERIM SOURCE REMOVAL ACTION (ISRA) - OUTFALL 009**

**WASTE CHARACTERIZATION SAMPLE RESULTS - ELV-1D (SHALLOW SOILS)  
THE BOEING COMPANY  
SANTA SUSANA FIELD LABORATORY**

				Object Name:			ISWC0061	ISWC0062	ISWC0063	ISWC0064	ISWC0065	ISWC0066
				Sample Name:			ISWC0061S001	ISWC0062S001	ISWC0063S001	ISWC0064S001	ISWC0065S001	ISWC0066S001
				Collection Date:			7/28/2009	7/28/2009	7/28/2009	7/28/2009	7/28/2009	7/28/2009
				Sample Depth (feet):			0 - 0.6	1 - 1.6	1 - 1.7	1 - 1.8	1 - 2	0 - 0.9
ANALYTE	UNITS	TTLIC	WET Leachate Testing Trigger <sup>a</sup>	TCLP Leachate Testing Trigger <sup>b</sup>	STLC	TCLP	RESULT <sup>c</sup>	RESULT <sup>c</sup>	RESULT <sup>c</sup>	RESULT <sup>c</sup>	RESULT <sup>c</sup>	RESULT <sup>c</sup>
Ethylbenzene	ug/kg	--	--	--	--	--	<1.1 {<0.56}	<1.2 {<0.62}	<0.97 {<0.49}	<1.1 {<0.55}	<1.2 {<0.62}	<1.2 {<0.58}
Hexachlorobutadiene	ug/kg	--	--	10,000	--	--	<2.2 {<0.89}	<2.5 {<1.0}	<1.9 {<0.78}	<2.2 {<0.88}	<2.5 {<0.99}	<2.3 {<0.92}
Isopropyl ether	ug/kg	--	--	--	--	--	--	--	--	--	--	--
Isopropylbenzene	ug/kg	--	--	--	--	--	<1.1 {<0.60}	<1.2 {<0.67}	<0.97 {<0.52}	<1.1 {<0.60}	<1.2 {<0.67}	<1.2 {<0.62}
m,p-Xylenes	ug/kg	--	--	--	--	--	<2.2 {<0.89}	<2.5 {<1.0}	<1.9 {<0.78}	<2.2 {<0.88}	<2.5 {<0.99}	<2.3 {<0.92}
Methyl ethyl ketone	ug/kg	--	--	4,000,000	--	--	<11 {<6.7}	<11 {<6.5}	<9.7 {<5.8}	<12 {<7.0}	<12 {<7.4}	<12 {<6.9}
Methyl tert-butyl ether	ug/kg	--	--	--	--	--	<2.2 {<1.1}	<2.5 {<1.2}	<1.9 {<0.97}	<2.2 {<1.1}	<2.5 {<1.2}	<2.3 {<1.2}
Methylene chloride	ug/kg	--	--	--	--	--	<11 {<7.2}	<12 {<8.1}	<9.7 {<6.3}	<11 {<7.2}	<12 {<8.0}	<12 {<7.5}
Naphthalene	ug/kg	--	--	--	--	--	<2.2 {<1.2}	<2.2 {<1.2}	<1.9 {<1.1}	<2.2 {<1.2}	4.2	<2.3 {<1.3}
n-Butylbenzene	ug/kg	--	--	--	--	--	<2.2 {<0.80}	<2.5 {<0.90}	<1.9 {<0.70}	<2.2 {<0.79}	1.2	<2.3 {<0.83}
n-Propylbenzene	ug/kg	--	--	--	--	--	<1.1 {<0.68}	<1.2 {<0.76}	<0.97 {<0.59}	<1.1 {<0.67}	<1.2 {<0.75}	<1.2 {<0.70}
o-Xylene	ug/kg	--	--	--	--	--	<1.1 {<0.56}	<1.2 {<0.62}	<0.97 {<0.49}	<1.1 {<0.55}	<1.2 {<0.62}	<1.2 {<0.58}
p-Isopropyltoluene	ug/kg	--	--	--	--	--	<1.1 {<0.80}	<1.2 {<0.90}	<0.97 {<0.70}	<1.1 {<0.79}	<1.2 {<0.89}	<1.2 {<0.83}
sec-Butylbenzene	ug/kg	--	--	--	--	--	<2.2 {<0.75}	<2.5 {<0.83}	<1.9 {<0.65}	<2.2 {<0.74}	<2.5 {<0.83}	<2.3 {<0.77}
Styrene	ug/kg	--	--	--	--	--	<1.1 {<0.65}	<1.2 {<0.72}	<0.97 {<0.56}	<1.1 {<0.64}	<1.2 {<0.72}	<1.2 {<0.67}
tert-Amyl Methyl Ether (TAME)	ug/kg	--	--	--	--	--	<2.2 {<0.71}	<2.5 {<0.80}	<1.9 {<0.62}	<2.2 {<0.71}	<2.5 {<0.79}	<2.3 {<0.74}
tert-Butanol (TBA)	ug/kg	--	--	--	--	--	<56 {<11}	<62 {<12}	<49 {<9.7}	<55 {<11}	<62 {<12}	<58 {<12}
tert-Butylbenzene	ug/kg	--	--	--	--	--	<2.2 {<0.69}	<2.5 {<0.77}	<1.9 {<0.60}	<2.2 {<0.68}	<2.5 {<0.77}	<2.3 {<0.72}
Tetrachloroethene	ug/kg	--	--	14,000	--	--	<1.1 {<0.55}	<1.2 {<0.61}	<0.97 {<0.48}	<1.1 {<0.54}	<1.2 {<0.60}	<1.2 {<0.57}
Toluene	ug/kg	--	--	--	--	--	<1.1 {<0.56}	<1.2 {<0.62}	<0.97 {<0.49}	<1.1 {<0.55}	<1.2 {<0.62}	<1.2 {<0.58}
trans-1,2-Dichloroethene	ug/kg	--	--	--	--	--	<1.1 {<0.78}	<1.2 {<0.87}	<0.97 {<0.68}	<1.1 {<0.77}	<1.2 {<0.86}	<1.2 {<0.81}
trans-1,3-Dichloropropene	ug/kg	--	--	--	--	--	<1.1 {<0.68}	<1.2 {<0.76}	<0.97 {<0.59}	<1.1 {<0.67}	<1.2 {<0.75}	<1.2 {<0.70}
Trichloroethene	ug/kg	2,040,000	2,040,000	10,000	--	--	<1.1 {<0.56}	<1.2 {<0.62}	<0.97 {<0.49}	<1.1 {<0.55}	0.96	57
Trichlorofluoromethane	ug/kg	--	--	--	--	--	<2.2 {<0.60}	<2.5 {<0.67}	<1.9 {<0.52}	<2.2 {<0.60}	<2.5 {<0.67}	<2.3 {<0.62}
Trichlorotrifluoroethane	ug/kg	--	--	--	--	--	--	--	--	--	--	--
Vinyl acetate	ug/kg	--	--	--	--	--	<5.6 {<2.8}	<6.2 {<3.1}	<4.9 {<2.4}	<5.5 {<2.8}	<6.2 {<3.1}	<5.8 {<2.9}
Vinyl chloride	ug/kg	--	--	4,000	--	--	<2.2 {<1.0}	<2.5 {<1.1}	<1.9 {<0.88}	<2.2 {<1.0}	<2.5 {<1.1}	<2.3 {<1.1}
Xylenes, Total	ug/kg	--	--	--	--	--	<4.5 {<1.4}	<5.0 {<1.6}	<3.9 {<1.3}	<4.4 {<1.4}	<4.9 {<1.6}	<4.6 {<1.5}
<b>RADIONUCLIDES</b>	--	--	--	--	--	--	R	R	R	R	R	R

**INTERIM SOURCE REMOVAL ACTION (ISRA) - OUTFALL 009**

**WASTE CHARACTERIZATION SAMPLE RESULTS - ELV-1D (SHALLOW SOILS)  
THE BOEING COMPANY  
SANTA SUSANA FIELD LABORATORY**

				Object Name:			ISWC0067	ISWC0068	ISWC0143	ISWC0144
				Sample Name:			ISWC0067S001	ISWC0068S001	ISWC0143S001	ISWC0144S002
				Collection Date:			7/28/2009	7/28/2009	10/7/2013	10/7/2013
				Sample Depth (feet):			0 - 0.5	0 - 0.7	3.5 - 4.0	3.5 - 4.0
ANALYTE	UNITS	TTLIC	WET Leachate Testing Trigger <sup>a</sup>	TCLP Leachate Testing Trigger <sup>b</sup>	STLC	TCLP	RESULT <sup>c</sup>	RESULT <sup>c</sup>	RESULT <sup>c</sup>	RESULT <sup>c</sup>
<b>Metals</b>										
Antimony	mg/kg	500	150	--	--	--	5.6	<0.88	17.2	3.62
Arsenic	mg/kg	500	50	100	--	--	3.1	3.9	6.07	2.25
Barium	mg/kg	10,000	1,000	2,000	--	--	110	59	129	52.3
Beryllium	mg/kg	75	7.5	--	--	--	0.52	0.58	0.818	0.59
Cadmium	mg/kg	100	10	20	--	--	4.7	1.1	8.2	1.06
Chromium	mg/kg	500	50	100	--	--	44	24	105	19.2
Chromium-STLC	mg/L	--	--	--	5	--	--	--	--	--
Chromium-TCLP	mg/L	--	--	--	--	5	--	--	0.0115	--
Cobalt	mg/kg	8,000	800	--	--	--	5.4	4.6	10.8	8.84
Copper	mg/kg	2,500	250	--	--	--	30	15	80.2	18.3
Lead	mg/kg	1,000	50	100	--	--	87	8.2	217	7.9
Lead-STLC	mg/L	--	--	--	5	--	1.8	--	--	--
Lead-TCLP	mg/L	--	--	--	--	5	--	--	0.0425	--
Mercury	mg/kg	20	2	4	--	--	0.02	0.01	0.304	0.112
Molybdenum	mg/kg	3,500	3,500	--	--	--	2.7	<0.20	7.43	3.56
Nickel	mg/kg	2,000	200	--	--	--	22	14	31.7	15.1
Selenium	mg/kg	100	10	20	--	--	1.6	<1.0	<0.491	<0.477
Silver	mg/kg	500	50	100	--	--	0.82	0.82	3.98	0.226
Thallium	mg/kg	700	70	--	--	--	<0.80	<0.80	6.93	2.58
Vanadium	mg/kg	2,400	240	--	--	--	27	32	53.6	31.5
Zinc	mg/kg	5,000	2,500	--	--	--	950	120	779	170
<b>SVOCs</b>										
1,1'-Biphenyl	ug/kg	--	--	--	--	--	--	--	<999	<99.9
1,2,4-Trichlorobenzene	ug/kg	--	--	--	--	--	<330 {<50}	<330 {<50}	<999	<99.9
1,2-Dichlorobenzene	ug/kg	--	--	--	--	--	<330 {<60}	<330 {<60}	<999	<99.9
1,2-Diphenylhydrazine/Azobenzene	ug/kg	--	--	--	--	--	<330 {<60}	<330 {<60}	<999	<99.9
1,3-Dichlorobenzene	ug/kg	--	--	--	--	--	<330 {<90}	<330 {<90}	<999	<99.9
1,4-Dichlorobenzene	ug/kg	--	--	150,000	--	--	<330 {<65}	<330 {<65}	<999	<99.9
1-Methylnaphthalene	ug/kg	--	--	--	--	--	--	--	<99.9	<9.99
1-Naphthylamine	ug/kg	--	--	--	--	--	--	--	<999	<99.9
2,4,5-Trichlorophenol	ug/kg	--	--	8,000,000	--	--	<330 {<130}	<330 {<130}	<999	<99.9
2,4,6-Trichlorophenol	ug/kg	--	--	40,000	--	--	<330 {<75}	<330 {<75}	<999	<99.9
2,4-Dichlorophenol	ug/kg	--	--	--	--	--	<330 {<60}	<330 {<60}	<999	<99.9
2,4-Dimethylphenol	ug/kg	--	--	--	--	--	<330 {<100}	<330 {<100}	<999	<99.9
2,4-Dinitrophenol	ug/kg	--	--	--	--	--	<660 {<110}	<660 {<110}	<999	<99.9
2,4-Dinitrotoluene	ug/kg	--	--	2,600	--	--	<330 {<80}	<330 {<80}	<999	<99.9
2,6-Dinitrotoluene	ug/kg	--	--	--	--	--	<330 {<95}	<330 {<95}	<999	<99.9
2-Chloronaphthalene	ug/kg	--	--	--	--	--	<330 {<65}	<330 {<65}	<99.9	<9.99

**INTERIM SOURCE REMOVAL ACTION (ISRA) - OUTFALL 009**

**WASTE CHARACTERIZATION SAMPLE RESULTS - ELV-1D (SHALLOW SOILS)  
THE BOEING COMPANY  
SANTA SUSANA FIELD LABORATORY**

				Object Name:			ISWC0067	ISWC0068	ISWC0143	ISWC0144
				Sample Name:			ISWC0067S001	ISWC0068S001	ISWC0143S001	ISWC0144S002
				Collection Date:			7/28/2009	7/28/2009	10/7/2013	10/7/2013
				Sample Depth (feet):			0 - 0.5	0 - 0.7	3.5 - 4.0	3.5 - 4.0
ANALYTE	UNITS	TTLIC	WET Leachate Testing Trigger <sup>a</sup>	TCLP Leachate Testing Trigger <sup>b</sup>	STLC	TCLP	RESULT <sup>c</sup>	RESULT <sup>c</sup>	RESULT <sup>c</sup>	RESULT <sup>c</sup>
2-Chlorophenol	ug/kg	--	--	--	--	--	<330 {<70}	<330 {<70}	<999	<99.9
2-Methylnaphthalene	ug/kg	--	--	--	--	--	130	<330 {<70}	<99.9	<9.99
2-Methylphenol	ug/kg	--	--	--	--	--	<330 {<80}	<330 {<80}	<999	<99.9
2-Naphthylamine	ug/kg	--	--	--	--	--	--	--	<999	<99.9
2-Nitroaniline	ug/kg	--	--	--	--	--	<330 {<60}	<330 {<60}	<1100	<110
2-Nitrophenol	ug/kg	--	--	--	--	--	<330 {<60}	<330 {<60}	<999	<99.9
3,3'-Dichlorobenzidine	ug/kg	10,000	--	--	--	--	<830 {<150}	<830 {<150}	<999	<99.9
3-Nitroaniline	ug/kg	--	--	--	--	--	<330 {<75}	<330 {<75}	<999	<99.9
3,5-Dimethylphenol	ug/kg	--	--	--	--	--	--	--	<999	<99.9
4,6-Dinitro-2-methylphenol	ug/kg	--	--	--	--	--	<420 {<110}	<420 {<110}	<999	<99.9
4-Aminobiphenyl	ug/kg	--	--	--	--	--	--	--	<999	<99.9
4-Bromophenyl phenyl ether	ug/kg	--	--	--	--	--	<330 {<75}	<330 {<75}	<999	<99.9
4-Chloro-3-methylphenol	ug/kg	--	--	--	--	--	<330 {<70}	<330 {<70}	<1330	<133
4-Chloroaniline	ug/kg	--	--	--	--	--	<330 {<120}	<330 {<120}	<999	<99.9
4-Chlorophenyl phenyl ether	ug/kg	--	--	--	--	--	<330 {<85}	<330 {<85}	<999	<99.9
4-Methylphenol	ug/kg	--	--	--	--	--	<330 {<80}	<330 {<80}	--	--
4-Nitroaniline	ug/kg	--	--	--	--	--	<830 {<90}	<830 {<90}	<999	<99.9
4-Nitrophenol	ug/kg	--	--	--	--	--	<830 {<140}	<830 {<140}	<999	<99.9
Acenaphthene	ug/kg	--	--	--	--	--	<330 {<60}	<330 {<60}	<99.9	<9.99
Acenaphthylene	ug/kg	--	--	--	--	--	<330 {<70}	<330 {<70}	<99.9	<9.99
Acetophenone	ug/kg	--	--	--	--	--	--	--	<999	<99.9
Aniline	ug/kg	--	--	--	--	--	<420 {<85}	<420 {<85}	<999	<99.9
Anthracene	ug/kg	--	--	--	--	--	<330 {<80}	<330 {<80}	<99.9	<9.99
Atrazine	ug/kg	--	--	--	--	--	--	--	<1330	<133
Benzaldehyde	ug/kg	--	--	--	--	--	--	--	<999	<99.9
Benzidine	ug/kg	10,000	--	--	--	--	<660 {<660}	<660 {<660}	<999	<99.9
Benzo(a)anthracene	ug/kg	--	--	--	--	--	<330 {<70}	<330 {<70}	<99.9	<9.99
Benzo(a)pyrene	ug/kg	--	--	--	--	--	<330 {<55}	<330 {<55}	<99.9	<9.99
Benzo(b)fluoranthene	ug/kg	--	--	--	--	--	410	<330 {<50}	<99.9	<9.99
Benzo(g,h,i)perylene	ug/kg	--	--	--	--	--	190	<330 {<110}	156	16.3
Benzo(k)fluoranthene	ug/kg	--	--	--	--	--	<330 {<70}	<330 {<70}	<99.9	<9.99
Benzoic acid	ug/kg	--	--	--	--	--	350	<830 {<150}	5420	<167
Benzyl alcohol	ug/kg	--	--	--	--	--	<330 {<200}	<330 {<200}	<999	<99.9
Bis(2-chloroethoxy)methane	ug/kg	--	--	--	--	--	<330 {<70}	<330 {<70}	<999	<99.9
Bis(2-chloroethyl)ether	ug/kg	--	--	--	--	--	<170 {<60}	<170 {<60}	<999	<99.9
Bis(2-chloroisopropyl)ether	ug/kg	--	--	--	--	--	<330 {<60}	<330 {<60}	<999	<99.9
Bis(2-ethylhexyl)phthalate	ug/kg	--	--	--	--	--	<330 {<90}	<330 {<90}	<999	<99.9
Butyl benzyl phthalate	ug/kg	--	--	--	--	--	<330 {<80}	<330 {<80}	<999	<99.9
Caprolactam	ug/kg	--	--	--	--	--	--	--	<999	<99.9

**INTERIM SOURCE REMOVAL ACTION (ISRA) - OUTFALL 009**

**WASTE CHARACTERIZATION SAMPLE RESULTS - ELV-1D (SHALLOW SOILS)  
THE BOEING COMPANY  
SANTA SUSANA FIELD LABORATORY**

				Object Name:			ISWC0067	ISWC0068	ISWC0143	ISWC0144
				Sample Name:			ISWC0067S001	ISWC0068S001	ISWC0143S001	ISWC0144S002
				Collection Date:			7/28/2009	7/28/2009	10/7/2013	10/7/2013
				Sample Depth (feet):			0 - 0.5	0 - 0.7	3.5 - 4.0	3.5 - 4.0
ANALYTE	UNITS	TTLIC	WET Leachate Testing Trigger <sup>a</sup>	TCLP Leachate Testing Trigger <sup>b</sup>	STLC	TCLP	RESULT <sup>c</sup>	RESULT <sup>c</sup>	RESULT <sup>c</sup>	RESULT <sup>c</sup>
Carbazole	ug/kg	--	--	--	--	--	--	--	<99.9	<9.99
Chrysene	ug/kg	--	--	--	--	--	<330 {<75}	<330 {<75}	<99.9	<9.99
Dibenz(a,h)anthracene	ug/kg	--	--	--	--	--	<420 {<100}	<420 {<100}	<99.9	<9.99
Dibenzofuran	ug/kg	--	--	--	--	--	<330 {<60}	<330 {<60}	<999	<99.9
Diethyl phthalate	ug/kg	--	--	--	--	--	<330 {<95}	<330 {<95}	<999	<99.9
Dimethyl phthalate	ug/kg	--	--	--	--	--	<330 {<65}	<330 {<65}	<999	<99.9
Di-n-butyl phthalate	ug/kg	--	--	--	--	--	<330 {<90}	<330 {<90}	<999	<99.9
Di-n-octyl phthalate	ug/kg	--	--	--	--	--	<330 {<90}	<330 {<90}	<999	<99.9
Diphenylamine	ug/kg	--	--	--	--	--	--	--	<999	<99.9
Fluoranthene	ug/kg	--	--	--	--	--	100	<330 {<70}	<99.9	<9.99
Fluorene	ug/kg	--	--	--	--	--	<330 {<70}	<330 {<70}	<99.9	<9.99
Hexachlorobenzene	ug/kg	--	--	2,600	--	--	<330 {<70}	<330 {<70}	<999	<99.9
Hexachlorobutadiene	ug/kg	--	--	10,000	--	--	<330 {<60}	<330 {<60}	<999	<99.9
Hexachlorocyclopentadiene	ug/kg	--	--	--	--	--	<830 {<90}	<830 {<90}	<999	<99.9
Hexachloroethane	ug/kg	--	--	60,000	--	--	<330 {<65}	<330 {<65}	<999	<99.9
Indeno(1,2,3-cd)pyrene	ug/kg	--	--	--	--	--	<330 {<130}	<330 {<130}	<99.9	11.7
Isophorone	ug/kg	--	--	--	--	--	<330 {<60}	<330 {<60}	<999	<99.9
m,p-Cresols	ug/kg	--	--	4,000,000	--	--	--	--	<999	<99.9
Naphthalene	ug/kg	--	--	--	--	--	100	<330 {<60}	<99.9	<9.99
Nitrobenzene	ug/kg	--	--	40,000	--	--	<330 {<70}	<330 {<70}	<999	<99.9
N-Nitrosodimethylamine	ug/kg	10,000	--	--	--	--	<330 {<55}	<330 {<55}	<999	<99.9
N-Nitroso-di-n-propylamine	ug/kg	--	--	--	--	--	<250 {<70}	<250 {<70}	<999	<99.9
N-Nitrosodiphenylamine	ug/kg	--	--	--	--	--	<330 {<80}	<330 {<80}	--	--
p-(Dimethylamino)azobenzene	ug/kg	--	--	--	--	--	--	--	<999	<99.9
Pentachlorophenol	ug/kg	17,000	17,000	2,000,000	--	--	<830 {<150}	<830 {<150}	<999	<99.9
Phenanthrene	ug/kg	--	--	--	--	--	100	<330 {<60}	<99.9	<9.99
Phenol	ug/kg	--	--	--	--	--	<330 {<90}	<330 {<90}	<999	<99.9
Pyrene	ug/kg	--	--	--	--	--	130	<330 {<80}	<99.9	<9.99
Pyridine	ug/kg	--	--	100	--	--	--	--	<999	<99.9
<b>VOCs</b>										
1,1,1,2-Tetrachloroethane	ug/kg	--	--	--	--	--	<2.2 {<0.63}	<2.4 {<0.67}	<0.3	<0.3
1,1,1-Trichloroethane	ug/kg	--	--	--	--	--	<1.1 {<0.77}	<1.2 {<0.82}	<0.3	<0.3
1,1,2,2-Tetrachloroethane	ug/kg	--	--	--	--	--	<2.2 {<0.95}	<2.4 {<1.0}	<0.3	<0.3
1,1,2-Trichloroethane	ug/kg	--	--	--	--	--	<1.1 {<0.96}	<1.2 {<1.0}	<0.3	<0.3
1,1-Dichloroethane	ug/kg	--	--	--	--	--	<1.1 {<0.55}	<1.2 {<0.59}	<0.3	<0.3
1,1-Dichloroethene	ug/kg	--	--	14,000	--	--	<2.2 {<0.66}	<2.4 {<0.71}	<0.3	<0.3
1,1-Dichloropropene	ug/kg	--	--	--	--	--	<1.1 {<0.44}	<1.2 {<0.47}	--	--
1,2,3-Trichlorobenzene	ug/kg	--	--	--	--	--	<2.2 {<1.1}	<2.4 {<1.2}	<0.4	<0.4
1,2,3-Trichloropropane	ug/kg	--	--	--	--	--	<2.2 {<1.1}	<2.4 {<1.2}	<0.3	<0.3

**INTERIM SOURCE REMOVAL ACTION (ISRA) - OUTFALL 009**

**WASTE CHARACTERIZATION SAMPLE RESULTS - ELV-1D (SHALLOW SOILS)  
THE BOEING COMPANY  
SANTA SUSANA FIELD LABORATORY**

				Object Name:			ISWC0067	ISWC0068	ISWC0143	ISWC0144
				Sample Name:			ISWC0067S001	ISWC0068S001	ISWC0143S001	ISWC0144S002
				Collection Date:			7/28/2009	7/28/2009	10/7/2013	10/7/2013
				Sample Depth (feet):			0 - 0.5	0 - 0.7	3.5 - 4.0	3.5 - 4.0
ANALYTE	UNITS	TTLC	WET Leachate Testing Trigger <sup>a</sup>	TCLP Leachate Testing Trigger <sup>b</sup>	STLC	TCLP	RESULT <sup>c</sup>	RESULT <sup>c</sup>	RESULT <sup>c</sup>	RESULT <sup>c</sup>
1,2,4-Trichlorobenzene	ug/kg	--	--	--	--	--	<2.2 {<1.1}	<2.4 {<1.2}	0.76	<0.3
1,2,4-Trimethylbenzene	ug/kg	--	--	--	--	--	<1.1 {<0.86}	<1.2 {<0.92}	<0.3	<0.3
1,2-Dibromo-3-chloropropane	ug/kg	--	--	--	--	--	<11 {<1.7}	<12 {<1.8}	<0.5	<0.5
1,2-Dibromoethane	ug/kg	--	--	--	--	--	<1.1 {<0.88}	<1.2 {<0.94}	<0.3	<0.3
1,2-Dichlorobenzene	ug/kg	--	--	--	--	--	<1.1 {<1.1}	<1.2 {<1.1}	<0.3	<0.3
1,2-Dichloroethane	ug/kg	--	--	10,000	--	--	<1.1 {<0.88}	<1.2 {<0.94}	<0.3	<0.3
1,2-Dichloropropane	ug/kg	--	--	--	--	--	<1.1 {<0.88}	<1.2 {<0.94}	<0.3	<0.3
1,3,5-Trimethylbenzene	ug/kg	--	--	--	--	--	<1.1 {<0.70}	<1.2 {<0.74}	<0.3	<0.3
1,3-Dichlorobenzene	ug/kg	--	--	--	--	--	<1.1 {<0.93}	<1.2 {<0.99}	<0.3	<0.3
1,3-Dichloropropane	ug/kg	--	--	--	--	--	<1.1 {<0.70}	<1.2 {<0.74}	<0.3	<0.3
1,4-Dichlorobenzene	ug/kg	--	--	--	--	--	<1.1 {<1.0}	<1.2 {<1.1}	<0.3	<0.3
2,2-Dichloropropane	ug/kg	--	--	--	--	--	<1.1 {<0.66}	<1.2 {<0.71}	<0.3	<0.3
2-Chloro-1,1,1-trifluoroethane	ug/kg	--	--	--	--	--	--	--	<3	<3
2-Chloroethylvinyl ether	ug/kg	--	--	--	--	--	--	--	<1.5	<1.5
2-Chlorotoluene	ug/kg	--	--	--	--	--	<2.2 {<0.96}	<2.4 {<1.0}	<0.3	<0.3
2-Hexanone	ug/kg	--	--	--	--	--	<11 {<10}	<12 {<11}	<1.5	<1.5
4-Chlorotoluene	ug/kg	--	--	--	--	--	<2.2 {<0.82}	<2.4 {<0.87}	<0.3	<0.3
4-Methyl-2-pentanone	ug/kg	--	--	--	--	--	<5.5 {<5.0}	<5.9 {<5.3}	<1.5	<1.5
Acetone	ug/kg	--	--	--	--	--	29	<12 {<9.4}	<1.5	<1.5
Benzene	ug/kg	--	--	10,000	--	--	<1.1 {<0.55}	<1.2 {<0.59}	<0.3	<0.3
Bromobenzene	ug/kg	--	--	--	--	--	<2.2 {<0.93}	<2.4 {<0.99}	<0.3	<0.3
Bromochloromethane	ug/kg	--	--	--	--	--	<2.2 {<1.0}	<2.4 {<1.1}	<0.3	<0.3
Bromodichloromethane	ug/kg	--	--	--	--	--	<1.1 {<0.55}	<1.2 {<0.59}	<0.3	<0.3
Bromoform	ug/kg	--	--	--	--	--	<2.2 {<0.88}	<2.4 {<0.94}	<0.3	<0.3
Bromomethane	ug/kg	--	--	--	--	--	<2.2 {<1.0}	<2.4 {<1.1}	<0.3	<0.3
Carbon disulfide	ug/kg	--	--	--	--	--	<5.5 {<1.1}	<5.9 {<1.1}	--	--
Carbon tetrachloride	ug/kg	--	--	10,000	--	--	<2.2 {<0.55}	<2.4 {<0.59}	<0.3	<0.3
Chlorobenzene	ug/kg	--	--	2,000,000	--	--	<1.1 {<0.58}	<1.2 {<0.61}	<0.3	<0.3
Chloroethane	ug/kg	--	--	--	--	--	<2.2 {<1.7}	<2.4 {<1.8}	<0.3	<0.3
Chloroform	ug/kg	--	--	120,000	--	--	<1.1 {<0.55}	<1.2 {<0.59}	<0.3	<0.3
Chloromethane	ug/kg	--	--	--	--	--	<2.2 {<1.1}	<2.4 {<1.2}	<0.3	<0.3
Chlorotrifluoroethylene	ug/kg	--	--	--	--	--	--	--	<3	<3
cis-1,2-Dichloroethene	ug/kg	--	--	--	--	--	<1.1 {<0.92}	<1.2 {<0.98}	<0.3	2.75
cis-1,3-Dichloropropene	ug/kg	--	--	--	--	--	<1.1 {<0.49}	<1.2 {<0.52}	<0.3	<0.3
Dibromochloromethane	ug/kg	--	--	--	--	--	<1.1 {<0.77}	<1.2 {<0.82}	<0.3	<0.3
Dibromomethane	ug/kg	--	--	--	--	--	<1.1 {<1.0}	<1.2 {<1.1}	<0.3	<0.3
Dichlorodifluoromethane	ug/kg	--	--	--	--	--	<2.2 {<1.7}	<2.4 {<1.8}	<0.3	<0.3
Di-isopropyl Ether (DIPE)	ug/kg	--	--	--	--	--	<2.2 {<0.55}	<2.4 {<0.59}	--	--
Ethyl tert-Butyl Ether (ETBE)	ug/kg	--	--	--	--	--	<2.2 {<0.64}	<2.4 {<0.68}	<0.5	<0.5

**INTERIM SOURCE REMOVAL ACTION (ISRA) - OUTFALL 009**

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				Collection Date:			7/28/2009	7/28/2009	10/7/2013	10/7/2013
				Sample Depth (feet):			0 - 0.5	0 - 0.7	3.5 - 4.0	3.5 - 4.0
ANALYTE	UNITS	TTLIC	WET Leachate Testing Trigger <sup>a</sup>	TCLP Leachate Testing Trigger <sup>b</sup>	STLC	TCLP	RESULT <sup>c</sup>	RESULT <sup>c</sup>	RESULT <sup>c</sup>	RESULT <sup>c</sup>
Ethylbenzene	ug/kg	--	--	--	--	--	<1.1 {<0.55}	<1.2 {<0.59}	<0.3	<0.3
Hexachlorobutadiene	ug/kg	--	--	10,000	--	--	<2.2 {<0.88}	<2.4 {<0.94}	<0.3	<0.3
Isopropyl ether	ug/kg	--	--	--	--	--	--	--	<0.5	<0.5
Isopropylbenzene	ug/kg	--	--	--	--	--	<1.1 {<0.60}	<1.2 {<0.64}	<0.3	<0.3
m,p-Xylenes	ug/kg	--	--	--	--	--	<2.2 {<0.88}	<2.4 {<0.94}	<0.3	<0.3
Methyl ethyl ketone	ug/kg	--	--	4,000,000	--	--	<11 {<6.6}	<12 {<7.1}	<1.5	<1.5
Methyl tert-butyl ether	ug/kg	--	--	--	--	--	<2.2 {<1.1}	<2.4 {<1.2}	<0.3	<0.3
Methylene chloride	ug/kg	--	--	--	--	--	<11 {<7.2}	<12 {<7.6}	<2	<2
Naphthalene	ug/kg	--	--	--	--	--	<2.2 {<1.2}	<2.4 {<1.3}	--	--
n-Butylbenzene	ug/kg	--	--	--	--	--	<2.2 {<0.80}	<2.4 {<0.85}	<0.3	<0.3
n-Propylbenzene	ug/kg	--	--	--	--	--	<1.1 {<0.67}	<1.2 {<0.72}	<0.3	<0.3
o-Xylene	ug/kg	--	--	--	--	--	<1.1 {<0.55}	<1.2 {<0.59}	<0.3	<0.3
p-Isopropyltoluene	ug/kg	--	--	--	--	--	<1.1 {<0.80}	<1.2 {<0.85}	<0.3	<0.3
sec-Butylbenzene	ug/kg	--	--	--	--	--	<2.2 {<0.74}	<2.4 {<0.79}	<0.3	<0.3
Styrene	ug/kg	--	--	--	--	--	<1.1 {<0.64}	<1.2 {<0.68}	<0.3	<0.3
tert-Amyl Methyl Ether (TAME)	ug/kg	--	--	--	--	--	<2.2 {<0.71}	<2.4 {<0.75}	<0.5	<0.5
tert-Butanol (TBA)	ug/kg	--	--	--	--	--	<55 {<11}	<59 {<12}	<15	<15
tert-Butylbenzene	ug/kg	--	--	--	--	--	<2.2 {<0.69}	<2.4 {<0.73}	<0.3	<0.3
Tetrachloroethene	ug/kg	--	--	14,000	--	--	<1.1 {<0.54}	<1.2 {<0.58}	<0.3	<0.3
Toluene	ug/kg	--	--	--	--	--	<1.1 {<0.55}	<1.2 {<0.59}	<0.3	<0.3
trans-1,2-Dichloroethene	ug/kg	--	--	--	--	--	<1.1 {<0.77}	<1.2 {<0.82}	<0.3	<0.3
trans-1,3-Dichloropropene	ug/kg	--	--	--	--	--	<1.1 {<0.67}	<1.2 {<0.72}	<0.3	<0.3
Trichloroethene	ug/kg	2,040,000	2,040,000	10,000	--	--	<1.1 {<0.55}	<1.2 {<0.59}	3.8	82
Trichlorofluoromethane	ug/kg	--	--	--	--	--	<2.2 {<0.60}	<2.4 {<0.64}	<0.3	<0.3
Trichlorotrifluoroethane	ug/kg	--	--	--	--	--	--	--	<1.5	<1.5
Vinyl acetate	ug/kg	--	--	--	--	--	<5.5 {<2.8}	<5.9 {<2.9}	--	--
Vinyl chloride	ug/kg	--	--	4,000	--	--	<2.2 {<1.0}	<2.4 {<1.1}	<0.3	<0.3
Xylenes, Total	ug/kg	--	--	--	--	--	<4.4 {<1.4}	<4.7 {<1.5}	--	--
<b>RADIONUCLIDES</b>	--	--	--	--	--	--	R	R	R	R

**INTERIM SOURCE REMOVAL ACTION (ISRA) - OUTFALL 009**

**WASTE CHARACTERIZATION SAMPLE RESULTS - ELV-1D (SHALLOW SOILS)  
THE BOEING COMPANY  
SANTA SUSANA FIELD LABORATORY**

**Notes:**

"--" - not analyzed / not applicable

< - Analyte not detected at or above the stated method detection limit.

<sup>a</sup> - WET Leachate Testing Trigger = STLC limit \* 10

<sup>b</sup> - TCLP Leachate Testing Trigger = TCLP limit \* 20

<sup>c</sup> Waste characterization sample results not validated

ug/kg - micrograms per kilogram

mg/kg - milligrams per kilogram

mg/L - milligrams per liter

R - Radiological analysis performed on sample. Boeing has prepared a separate document that provides the radiological results and compares them to the draft provisional DTSC look-up table (LUT) values in order to determine if soil exceeds background as required for the NASA/DTSC Administrative Order on Consent (AOC).



## WASTE CHARACTERIZATION: IN-SITU SOIL LOCATED AT ISRA AREA II PLANNED EXCAVATION ELV-1D POND DEEP SOIL

### **Introduction**

Supporting detailed information is provided in this report for the June 27, 2013 in-situ sampling of prospective ISRA soil wastes. Excavation and removal of soil is planned to take place at the ELV-1D Pond ISRA project site in SSFL Area II. Soil characterized in this report underlies the originally characterized shallow soil, which is addressed in a separate characterization report.

### **Background**

This report represents a continuation of in-situ characterization of soil destined to be excavated from SSFL Area II in accordance with an approved ISRA Workplan. Following characterization of the originally targeted shallow soil at the former ELV impoundment referred to as the ELV-1D Pond, the decision was made to also remove deeper soil. Based on earlier investigation, distinctively darker soil was located beneath the originally characterized soil and was associated with significantly elevated Volatile Organic Compound (VOC) concentrations. To more fully characterize this deeper soil, a sampling plan was developed to collect two samples from the suspected low point of the former impoundment. The sample collection locations were identified using random sampling methodology within an approximate 12 foot by 28 foot area in the eastern portion of the planned excavation boundary.

Although the principal concern with respect to the ELV-1D Pond deep soil focused on VOCs, Regulated Metals and Semi-Volatile Organic Compounds (SVOC) were also identified as potential impacts that should be addressed in the excavation footprint. Each of the two (2) samples called for in the random sampling plan contained all soil collected between a depth of three or three and one-half feet down to a depth of 5 feet. The samples were analyzed for CAM 17 Metals, VOCs, and SVOC. Samples were collected, contained, and handled according to field practice requirements in SW-846.

### **Results**

Analytical results for the planned ELV-1D Pond deep soil excavation area are presented in GEL Laboratories report No. 328453, issued on 7/17/13. The results included detection of an elevated Lead concentration at 66 mg/kg in one sample. Lead in the second sample was detected at 7.55 mg/kg. Follow-up leachate testing (i.e. the California WET) was not conducted despite the one detection that exceeded the STLC threshold of 50 mg/kg because the soil is already known to carry the hazardous waste F001/F002 listing. Metals testing was ordered primarily for waste disposal profiling purposes, and total concentrations provide sufficient information for profile completion and evaluation. Mercury also exceeded the applicable STLC threshold of 2 mg/kg with a detected concentration of 2.45 mg/kg in one sample. Again, no leachate testing was performed for the reasons cited above. Other detected Metals included Chromium at a maximum concentration of 44 mg/kg, Selenium at a maximum concentration of 4.23 mg/kg, Beryllium at a maximum concentration of 1.14 mg/kg, and Nickel at a maximum concentration of 28 mg/kg. The remaining detected Metals exhibited proportionately lower concentrations.

A significant VOC presence was detected in the ELV-1D Pond deep soil samples. Trichloroethylene (TCE) is the driving constituent of concern. It was detected in the two soil samples at 93.5 mg/kg and 281 mg/kg. Tetrachloroethylene (PCE), another likely spent solvent,

was detected at 0.144 mg/kg and 1.11 mg/kg. Cis-1,2-Dichloroethylene, a daughter product of TCE, was detected at 4.14 mg/kg and 6.94 mg/kg. Another of the more prominent VOCs detected in the soil was Bromofluorobenzene at 5.36 mg/kg and 5.98 mg/kg. Acetone at a maximum concentration of 1.2 mg/kg; 1,2,4-Trimethylbenzene at a maximum concentration of 4.29 mg/kg; and n-Butylbenzene at a maximum concentration of 1.7 mg/kg were some of the lower concentration VOCs detected. Historical background information indicated that the pond area may have been exposed to spent TCE and other solvents in the past. For this reason, the soil has been determined to be impacted by RCRA Listed waste, which carries-over to the environmental media hosting it.

Only one SVOC was detected in the ELV-1D deep soil samples. Phenanthrene was detected in one of the samples at 3.18 mg/kg. It was not detected in the other sample. It is not directly regulated under hazardous waste regulations and no thresholds or limits have been established for this compound. No other SVOCs were present above the laboratory Minimum Detection Limits (MDL). However, as a result of matrix interference issues, the MDLs for one of the samples are elevated. In five instances, the MDLs in this sample are higher than applicable hazardous waste thresholds for particular SVOCs. This was true for 2,4-Dinitrotoluene; 3,3-Dichlorobenzidine; Benzidine; Hexachlorobenzene; and Hexachlorobutadiene. Yet, extensive soil sampling at SSFL has not revealed these compounds to be among those routinely detected at concentrations approaching hazardous waste thresholds or limits. Furthermore, the two sample points from which soil was collected are less than 10 feet apart, and MDLs for the other sample are below hazardous waste thresholds and limits for all analyzed SVOCs. No SVOCs were detected in this sample either. Consequently, there are no indications of widespread, elevated SVOCs in this area. Taken together, the historically negligible compounds in question, and the fact that they were not detected nearby, suggest there is little likelihood that they are present at elevated concentrations in the elevated MDL sample.

### **Determination**

According to analytical results and generator knowledge, the soil in the SSFL Area II ELV-1D Pond deep soil excavation site:

IS A RCRA F001/F002 Listed Waste (analytical results and generator knowledge)

Is Not ignitable (generator knowledge)

Is Not corrosive (generator knowledge)

Is Not reactive (generator knowledge)

IS TOXIC (analytical results)

Is Not Extremely or Acutely Hazardous Waste

EXCEEDS RCRA thresholds for TCE

IS SUBJECT TO the Prop. 65 listing








IS SUBJECT TO the Title 22 Appendix X list

Is Not known by experience or testing to pose a hazard to human health or environment because of its carcinogenicity, acute toxicity, chronic toxicity, bio-accumulative properties, or persistence in the environment.



**The ELV-1D Pond deep soil is HAZARDOUS.**

# Outfall 009 Waste Characterization Sample Locations for ELV-1D

## Base Map Legend

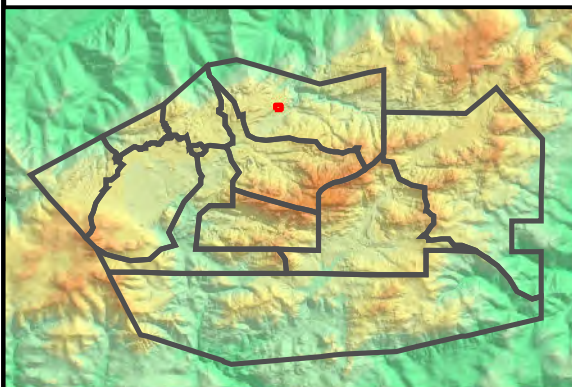
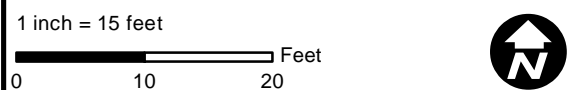
-  Administrative Area Boundary
-  RFI Site Boundary
-  NPDES Outfall
-  A/C Paving
-  Drainage
-  Non Jurisdictional Surface Water Pathway
-  Surface Water Divide

## Figure Legend

-  Planned ISRA Excavation Boundary
-  Sample Location
- Gray shading indicates sample not analyzed
- Green shading indicates sample only analyzed for radionuclides
- Blue shading indicates sample associated with deep soils waste certification

Note:  
1. Aerial imagery from 2010 Sage Consulting.  
2. Topographic contours from 2010 Sage Consulting.

Path: T:\projects\rock3\ISRA\Figures\Boeing\ELV-1D\ELV-1D\_Waste Charc.mxd Date: 11/5/2013



**INTERIM SOURCE REMOVAL ACTION (ISRA) - OUTFALL 009**

**WASTE CHARACTERIZATION SAMPLE RESULTS – ELV-1D (Deep Soil)**

**THE BOEING COMPANY**

**SANTA SUSANA FIELD LABORATORY**

		Object Name: Sample Name: Collection Date: Sample Depth (feet bgs):			ISWC0139 ISWC0139S001 6/27/2013 3 - 5	ISWC0140 ISWC0140S001 6/27/2013 3.5 - 5
ANALYTE	UNITS	TTLIC	WET Leachate Testing Trigger <sup>a</sup>	TCLP Leachate Testing Trigger <sup>b</sup>	RESULT <sup>c</sup>	RESULT <sup>c</sup>
<b>METALS</b>						
Antimony	mg/kg	500	150	--	<0.322	20.2
Arsenic	mg/kg	500	50	100	0.634	9.15
Barium	mg/kg	10,000	1,000	2,000	51.8	100
Beryllium	mg/kg	75	7.5	--	0.636	1.14
Cadmium	mg/kg	100	10	20	5.57	17.9
Chromium	mg/kg	500	50	100	16	44
Cobalt	mg/kg	8,000	800	--	6.23	11.6
Copper	mg/kg	2,500	250	--	8.52	55.4
Lead	mg/kg	1,000	50	100	7.55	66
Mercury	mg/kg	20	2	4	0.423	2.45
Molybdenum	mg/kg	3,500	3,500	--	0.438	2.22
Nickel	mg/kg	2,000	200	--	11	28
Selenium	mg/kg	100	10	20	4.23	4.08
Silver	mg/kg	500	50	100	<0.0977	0.227
Thallium	mg/kg	700	70	--	<0.488	13.9
Vanadium	mg/kg	2,400	240	--	26.5	51.5
Zinc	mg/kg	5,000	2,500	--	63	464
<b>VOCs</b>						
1,1,1,2-Tetrachloroethane	ug/kg	--	--	--	<30	<30
1,1,1-Trichloroethane	ug/kg	--	--	--	<30	<30
1,1,2,2-Tetrachloroethane	ug/kg	--	--	--	<30	<30
1,1,2-Trichloroethane	ug/kg	--	--	--	<30	<30
1,1-Dichloroethane	ug/kg	--	--	--	<30	<30
1,1-Dichloroethene	ug/kg	--	--	14,000	<30	<30
1,1-Dichloropropene	ug/kg	--	--	--	<30	<30
1,2,3-Trichlorobenzene	ug/kg	--	--	--	<40	<40
1,2,3-Trichloropropane	ug/kg	--	--	--	<30	<30
1,2,4-Trichlorobenzene	ug/kg	--	--	--	<30	<30
1,2,4-Trimethylbenzene	ug/kg	--	--	--	4290	3460
1,2-Dibromo-3-chloropropane	ug/kg	--	--	--	<50	<50
1,2-Dibromoethane (EDB)	ug/kg	--	--	--	<30	<30
1,2-Dichlorobenzene	ug/kg	--	--	--	<30	<30
1,2-Dichloroethane	ug/kg	--	--	10,000	<30	<30
1,2-Dichloropropane	ug/kg	--	--	--	<30	<30
1,3,5-Trimethylbenzene	ug/kg	--	--	--	<30	<30
1,3-Dichlorobenzene	ug/kg	--	--	--	<30	<30
1,3-Dichloropropane	ug/kg	--	--	--	<30	<30
1,4-Dichlorobenzene	ug/kg	--	--	--	<30	<30
2,2-Dichloropropane	ug/kg	--	--	--	<30	<30
2-Butanone (MEK)	ug/kg	--	--	4,000,000	<150	<150
2-Chloro-1,1,1-trifluoroethane	ug/kg	--	--	--	<300	<300

**INTERIM SOURCE REMOVAL ACTION (ISRA) - OUTFALL 009**

**WASTE CHARACTERIZATION SAMPLE RESULTS – ELV-1D (Deep Soil)**

**THE BOEING COMPANY  
SANTA SUSANA FIELD LABORATORY**

		Object Name: Sample Name: Collection Date: Sample Depth (feet bgs):			ISWC0139 ISWC0139S001 6/27/2013 3 - 5	ISWC0140 ISWC0140S001 6/27/2013 3.5 - 5
ANALYTE	UNITS	TTLIC	WET Leachate Testing Trigger <sup>a</sup>	TCLP Leachate Testing Trigger <sup>b</sup>	RESULT <sup>c</sup>	RESULT <sup>c</sup>
2-Chloroethylvinyl ether	ug/kg	--	--	--	<150	<150
2-Chlorotoluene	ug/kg	--	--	--	<30	<30
2-Hexanone	ug/kg	--	--	--	<150	<150
4-Chlorotoluene	ug/kg	--	--	--	<30	<30
4-Methyl-2-pentanone (MIBK)	ug/kg	--	--	--	<150	<150
Acetone	ug/kg	--	--	--	1200	479
Benzene	ug/kg	--	--	10,000	<30	<30
Bromobenzene	ug/kg	--	--	--	<30	<30
Bromochloromethane	ug/kg	--	--	--	<30	<30
Bromodichloromethane	ug/kg	--	--	--	<30	<30
Bromofluorobenzene	ug/kg	--	--	--	5360	5980
Bromoform	ug/kg	--	--	--	<30	<30
Bromomethane	ug/kg	--	--	--	<30	<30
Carbon tetrachloride	ug/kg	--	--	10,000	<30	<30
Chlorobenzene	ug/kg	--	--	2,000,000	<30	<30
Chloroethane	ug/kg	--	--	--	<30	<30
Chloroform	ug/kg	--	--	120,000	<30	<30
Chloromethane	ug/kg	--	--	--	<30	<30
Chlorotrifluoroethylene	ug/kg	--	--	--	<300	<300
cis-1,2-Dichloroethene	ug/kg	--	--	--	4140	6940
cis-1,3-Dichloropropene	ug/kg	--	--	--	<30	<30
Dibromochloromethane	ug/kg	--	--	--	<30	<30
Dibromomethane	ug/kg	--	--	--	<30	<30
Dichlorodifluoromethane	ug/kg	--	--	--	<30	<30
Ethyl tert-butyl ether	ug/kg	--	--	--	<50	<50
Ethylbenzene	ug/kg	--	--	--	<30	<30
Hexachlorobutadiene	ug/kg	--	--	10,000	<30	<30
Isopropyl ether	ug/kg	--	--	--	<50	<50
Isopropylbenzene	ug/kg	--	--	--	<30	<30
m,p-Xylenes	ug/kg	--	--	--	1360	1200
Methyl tert-amyl ether	ug/kg	--	--	--	<50	<50
Methylene chloride	ug/kg	--	--	--	<200	<200
n-Butylbenzene	ug/kg	--	--	--	1700	1300
n-Propylbenzene	ug/kg	--	--	--	<30	<30
o-Xylene	ug/kg	--	--	--	669	545
p-Isopropyltoluene	ug/kg	--	--	--	1110	873
sec-Butylbenzene	ug/kg	--	--	--	1010	931
Styrene	ug/kg	--	--	--	<30	<30
tert-Butyl Alcohol	ug/kg	--	--	--	<1500	<1500
tert-Butyl methyl ether	ug/kg	--	--	--	<30	<30
tert-Butylbenzene	ug/kg	--	--	--	<30	<30
Tetrachloroethene	ug/kg	--	--	14,000	1110	144

**INTERIM SOURCE REMOVAL ACTION (ISRA) - OUTFALL 009**

**WASTE CHARACTERIZATION SAMPLE RESULTS – ELV-1D (Deep Soil)**

**THE BOEING COMPANY**

**SANTA SUSANA FIELD LABORATORY**

		Object Name: Sample Name: Collection Date: Sample Depth (feet bgs):			ISWC0139 ISWC0139S001 6/27/2013 3 - 5	ISWC0140 ISWC0140S001 6/27/2013 3.5 - 5
ANALYTE	UNITS	TTLIC	WET Leachate Testing Trigger <sup>a</sup>	TCLP Leachate Testing Trigger <sup>b</sup>	RESULT <sup>c</sup>	RESULT <sup>c</sup>
Toluene	ug/kg	--	--	--	153	159
trans-1,2-Dichloroethene	ug/kg	--	--	--	39	121
trans-1,3-Dichloropropene	ug/kg	--	--	--	<30	<30
Trichloroethene	ug/kg	2,040,000	2,040,000	10,000	281000	93500
Trichlorofluoromethane	ug/kg	--	--	--	<30	<30
Trichlorotrifluoroethane	ug/kg	--	--	--	<150	<150
Vinyl chloride	ug/kg	--	--	4,000	105	403
<b>SVOCs</b>						
1,1'-Biphenyl	ug/kg	--	--	--	<1990	<19900
1,2,4-Trichlorobenzene	ug/kg	--	--	--	<1990	<19900
1,2-Dichlorobenzene	ug/kg	--	--	--	<1990	<19900
1,2-Diphenylhydrazine	ug/kg	--	--	--	<1990	<19900
1,3-Dichlorobenzene	ug/kg	--	--	--	<1990	<19900
1,4-Dichlorobenzene	ug/kg	--	--	150,000	<1990	<19900
1-Methylnaphthalene	ug/kg	--	--	--	<199	<19900
1-Naphthylamine	ug/kg	--	--	--	<1990	<19900
2,4,5-Trichlorophenol	ug/kg	--	--	8,000,000	<1990	<19900
2,4,6-Trichlorophenol	ug/kg	--	--	40,000	<1990	<19900
2,4-Dichlorophenol	ug/kg	--	--	--	<1990	<19900
2,4-Dimethylphenol	ug/kg	--	--	--	<1990	<19900
2,4-Dinitrophenol	ug/kg	--	--	--	<1990	<19900
2,4-Dinitrotoluene	ug/kg	--	--	2,600	<1990	<19900
2,6-Dinitrotoluene	ug/kg	--	--	--	<1990	<19900
2-Chloronaphthalene	ug/kg	--	--	--	<199	<19900
2-Chlorophenol	ug/kg	--	--	--	<1990	<19900
2-Methylnaphthalene	ug/kg	--	--	--	<199	<19900
2-Naphthylamine	ug/kg	--	--	--	<1990	<19900
2-Nitroaniline	ug/kg	--	--	--	<2190	<21900
2-Nitrophenol	ug/kg	--	--	--	<1990	<19900
3,3-Dichlorobenzidine	ug/kg	10,000	--	--	<1990	<19900
3-Nitroaniline	ug/kg	--	--	--	<1990	<19900
3,5-Dimethylphenol	ug/kg	--	--	--	<1990	<19900
4,6-Dinitro-2-methylphenol	ug/kg	--	--	--	<1990	<19900
4-Aminobiphenyl	ug/kg	--	--	--	<1990	<19900
4-Bromophenyl phenyl ether	ug/kg	--	--	--	<1990	<19900
4-Chloro-3-methylphenol	ug/kg	--	--	--	<2660	<26500
4-Chloroaniline	ug/kg	--	--	--	<1990	<19900
4-Chlorophenyl-phenylether	ug/kg	--	--	--	<1990	<19900
4-Nitroaniline	ug/kg	--	--	--	<1990	<19900
4-Nitrophenol	ug/kg	--	--	--	<1990	<19900
Acenaphthene	ug/kg	--	--	--	<199	<19900
Acenaphthylene	ug/kg	--	--	--	<199	<19900

**INTERIM SOURCE REMOVAL ACTION (ISRA) - OUTFALL 009**

**WASTE CHARACTERIZATION SAMPLE RESULTS – ELV-1D (Deep Soil)**

**THE BOEING COMPANY  
SANTA SUSANA FIELD LABORATORY**

		Object Name: Sample Name: Collection Date: Sample Depth (feet bgs):			ISWC0139 ISWC0139S001 6/27/2013 3 - 5	ISWC0140 ISWC0140S001 6/27/2013 3.5 - 5
ANALYTE	UNITS	TTLIC	WET Leachate Testing Trigger <sup>a</sup>	TCLP Leachate Testing Trigger <sup>b</sup>	RESULT <sup>c</sup>	RESULT <sup>c</sup>
Acetophenone	ug/kg	--	--	--	<1990	<19900
Aniline	ug/kg	--	--	--	<1990	<19900
Anthracene	ug/kg	--	--	--	<199	<1990
Atrazine	ug/kg	--	--	--	<2660	<26500
Benzaldehyde	ug/kg	--	--	--	<1990	<19900
Benzidine	ug/kg	10,000	--	--	<1990	<19900
Benzo(a)anthracene	ug/kg	--	--	--	<199	<1990
Benzo(a)pyrene	ug/kg	--	--	--	<199	<1990
Benzo(b)fluoranthene	ug/kg	--	--	--	<199	<1990
Benzo(ghi)perylene	ug/kg	--	--	--	<199	<1990
Benzo(k)fluoranthene	ug/kg	--	--	--	<199	<1990
Benzoic acid	ug/kg	--	--	--	<3320	<33100
Benzyl alcohol	ug/kg	--	--	--	<1990	<19900
bis(2-Chloroethoxy)methane	ug/kg	--	--	--	<1990	<19900
Bis(2-chloroethyl)ether	ug/kg	--	--	--	<1990	<19900
bis(2-Chloroisopropyl)ether	ug/kg	--	--	--	<1990	<19900
bis(2-Ethylhexyl) phthalate	ug/kg	--	--	--	<1990	<19900
Butyl benzyl phthalate	ug/kg	--	--	--	<1990	<19900
Caprolactam	ug/kg	--	--	--	<1990	<19900
Carbazole	ug/kg	--	--	--	<199	<1990
Chrysene	ug/kg	--	--	--	<199	<1990
Dibenzo(a,h)anthracene	ug/kg	--	--	--	<199	<1990
Dibenzofuran	ug/kg	--	--	--	<1990	<19900
Diethyl phthalate	ug/kg	--	--	--	<1990	<19900
Dimethyl phthalate	ug/kg	--	--	--	<1990	<19900
Di-n-butyl phthalate	ug/kg	--	--	--	<1990	<19900
Di-n-octyl phthalate	ug/kg	--	--	--	<1990	<19900
Diphenylamine	ug/kg	--	--	--	<1990	<19900
Fluoranthene	ug/kg	--	--	--	<199	<1990
Fluorene	ug/kg	--	--	--	<199	<1990
Hexachlorobenzene	ug/kg	--	--	2,600	<1990	<19900
Hexachlorobutadiene	ug/kg	--	--	10,000	<1990	<19900
Hexachlorocyclopentadiene	ug/kg	--	--	--	<1990	<19900
Hexachloroethane	ug/kg	--	--	60,000	<1990	<19900
Indeno(1,2,3-cd)pyrene	ug/kg	--	--	--	<199	<1990
Isophorone	ug/kg	--	--	--	<1990	<19900
m,p-Cresols	ug/kg	--	--	4,000,000	<1990	<19900
Naphthalene	ug/kg	--	--	--	<199	<1990
Nitrobenzene	ug/kg	--	--	40,000	<1990	<19900
N-Methyl-N-nitrosomethylamine	ug/kg	--	--	--	<1990	<19900
N-Nitroso-di-n-propylamine	ug/kg	--	--	--	<1990	<19900
o-Cresol	ug/kg	--	--	4,000,000	<1990	<19900

**INTERIM SOURCE REMOVAL ACTION (ISRA) - OUTFALL 009**

**WASTE CHARACTERIZATION SAMPLE RESULTS – ELV-1D (Deep Soil)  
THE BOEING COMPANY  
SANTA SUSANA FIELD LABORATORY**

		Object Name: Sample Name: Collection Date: Sample Depth (feet bgs):			ISWC0139 ISWC0139S001 6/27/2013 3 - 5	ISWC0140 ISWC0140S001 6/27/2013 3.5 - 5
ANALYTE	UNITS	TTLIC	WET Leachate Testing Trigger <sup>a</sup>	TCLP Leachate Testing Trigger <sup>b</sup>	RESULT <sup>c</sup>	RESULT <sup>c</sup>
p-(Dimethylamino)azobenzene	ug/kg	--	--	--	<1990	<19900
Pentachlorophenol	ug/kg	17,000	17,000	2,000,000	<1990	<19900
Phenanthrene	ug/kg	--	--	--	<199	3180
Phenol	ug/kg	--	--	--	<1990	<19900
Pyrene	ug/kg	--	--	--	<199	<1990
Pyridine	ug/kg	--	--	100	<1990	<19900
<b>RADIONUCLIDES</b>	--	--	--	--	R	R

**Notes:**

"--" - not analyzed / not applicable

< - Analyte not detected at or above the stated method detection limit.

<sup>a</sup> - WET Leachate Testing Trigger = STLC limit \* 10

<sup>b</sup> - TCLP Leachate Testing Trigger = TCLP limit \* 20

<sup>c</sup> Waste characterization sample results not validated

µg/kg - micrograms per kilogram

mg/kg - milligrams per kilogram

mg/L - milligrams per liter

R - Radiological analysis performed on sample. Boeing has prepared a separate document that provides the radiological results and compares them to the draft provisional DTSC look-up table (LUT) values in order to determine if soil exceeds background as required for the NASA/DTSC Administrative Order on Consent (AOC).