

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











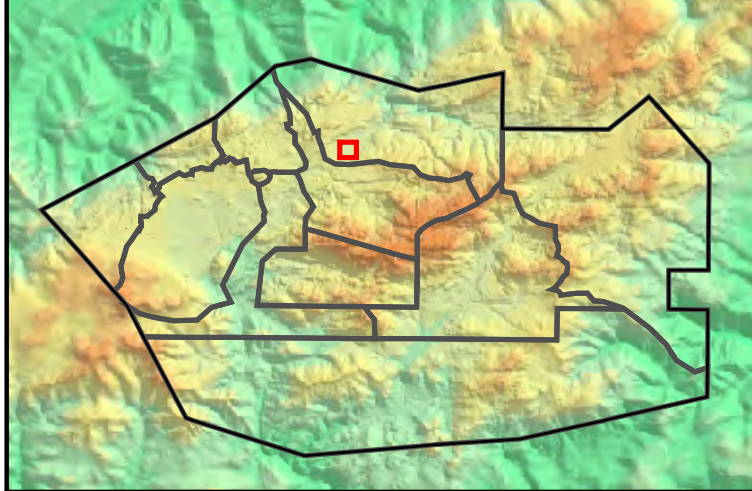
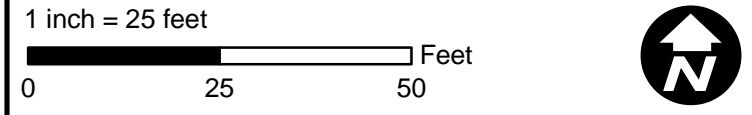
-  Administrative Area Boundary
-  RFI Site Boundary
-  Report Group Boundary
-  NPDES Outfall
-  A/C Paving
-  Drainage
-  Non Jurisdictional Surface Water Pathway
-  Surface Water Divide
-  Elevation Contour

Figure Legend

-  Waste Characterization Sample



Document: ISRA_Plots_Working_AP-STP-1C_SampleLocations.mxd Date: Sep 02, 2010



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 ^a	TCLP Leachate Testing Trigger ^b	STLC	TCLP	RESULT ^c	RESULT ^c	RESULT ^c	RESULT ^c	RESULT ^c	RESULT ^c	RESULT ^c	
METALS														
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	
PCBs														
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}	
TPH														
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	
VOCs														
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}	

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							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 ^c	RESULT ^c	RESULT ^c	RESULT ^c	RESULT ^c	RESULT ^c	RESULT ^c	RESULT ^c
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}	

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							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 ^a	TCLP Leachate Testing Trigger ^b	STLC	TCLP	RESULT ^c	RESULT ^c	RESULT ^c	RESULT ^c	RESULT ^c	RESULT ^c	RESULT ^c	
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}	
RADIONUCLIDES	--	--	--	--	--	--	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	TTLIC	WET Leachate Testing Trigger ^a	TCLP Leachate Testing Trigger ^b	STLC	TCLP	RESULT ^c	RESULT ^c	RESULT ^c	
METALS										
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	
PCBs										
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}	
TPH										
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	
VOCs										
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**

ANALYTE	UNITS	TTLIC	WET Leachate Testing Trigger ^a	TCLP Leachate Testing Trigger ^b	STLC	TCLP	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
							RESULT ^c	RESULT ^c	RESULT ^c	
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 ^a	TCLP Leachate Testing Trigger ^b	STLC	TCLP	RESULT ^c	RESULT ^c	RESULT ^c	
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}	
RADIONUCLIDES	--	--	--	--	--	--	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)

^a - WET Leachate Testing Trigger = STLC limit * 10

^b - TCLP Leachate Testing Trigger = TCLP limit * 20

^c 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