

WASTE CHARACTERIZATION: IN-SITU SOIL LOCATED AT ISRA OUTFALL 009 PLANNED EXCAVATION B1-1B

Introduction

This report presents supporting detailed information for the April 28, 2010 in-situ characterization of prospective soil wastes from planned ISRA excavations in SSFL Area I, near the former B-1 engine testing facility.

Background

In-situ characterization of soil destined to be excavated from designated locations in SSFL Area I 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 I 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 guidelines presented in U.S. EPA SW-846 are followed in evaluating the adequacy of sampling and the application of analytical results to regulatory thresholds. 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. 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 B1-1B was based partly on the Group 1A RFI results. Evaluation of these data and other sources of relevant information, including recent sampling conducted specifically for ISRA, suggested that Regulated Metals, Petroleum Hydrocarbons (TPH), and Semi-Volatile Organic Compounds (SVOC) should be addressed in the B1-1B excavation footprint. Based on random sampling, four (4) sample collection points were identified within the planned excavation footprint. This initial sample size was considered adequate for the relatively small area designated for excavation at B1-1B. The samples were analyzed for CAM 17 metals, TPH, and SVOCs. All samples were collected, contained, and handled according to field practice requirements in SW-846.

Results

Analytical results for the B1-1B planned excavation area are presented in GEL Laboratories reports 251958 issued on 5/10/10, 254951 issued 6/29/10, and 255483 issued 7/7/10. Regulated Metals were far below 10-Times their respective California Soluble Threshold Limits (STLC) in all cases, with the exception of one sample that exhibited Selenium at 15.2 parts per million (ppm). This is above the 10 ppm 10X STLC threshold. The Selenium concentrations in

the other 3 samples ranged between 0.257 ppm and 8.73 ppm. Subsequent analysis of the elevated sample, by the California Waste Extraction Test (WET) for leaching properties as required, resulted in a concentration of 0.101 milligrams per liter (mg/L), well below the 1 mg/L STLC hazardous waste limit.

Low concentrations of TPH were detected. The highest TPH level was exhibited by one sample with a concentration of 100 ppm. The TPH concentration in the other three samples ranged between Non-Detect and 21 ppm. These concentrations are below permit limits set for Municipal Solid Waste landfills. Gasoline range Petroleum Hydrocarbons were not detected.

Only one SVOC was detected in the soil samples from B1-1B. Pentachlorophenol was detected at 0.0755 ppm in one sample. This is one of a limited number of SVOCs for which direct hazardous waste regulatory thresholds have been established. The 10X STLC threshold is 17 ppm, while the RCRA 20X Toxicity Characteristic Leaching Procedure threshold is 2,000 ppm.

Determination

According to analytical results and generator knowledge, the soil in the planned excavation footprint of SSFL Area I B1-1B:

- 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 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 B1-1B is NON-HAZARDOUS.

Outfall 009 Waste Characterization Sample Locations for B1-1B

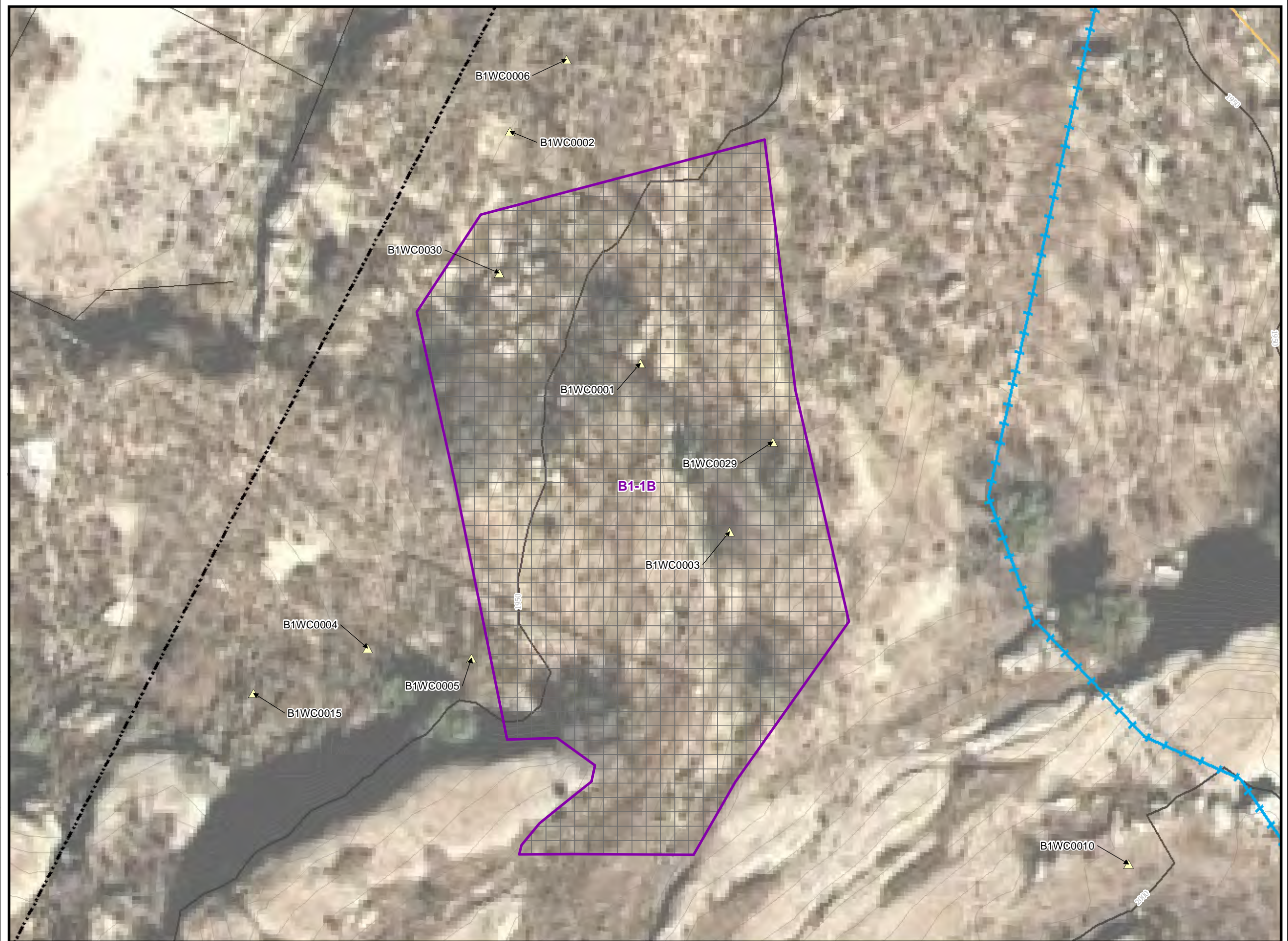
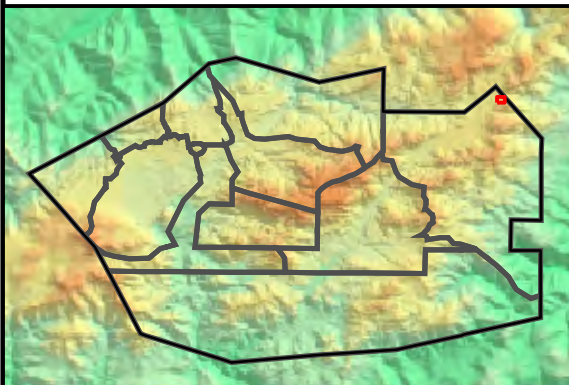
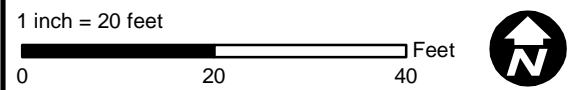
- Base Map Legend**
- Administrative Area Boundary
 - RFI Site Boundary
 - Report Group Boundary
 - NPDES Outfall
 - A/C Paving
 - Drainage
 - Non Jurisdictional Surface Water Pathway
 - Surface Water Divide
 - Elevation Contour

- 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.

Document: ISRA_Plots_SP_B1-1B_SampleLocations_062110_WC.mxd Date: Jun 21, 2010



SANTA SUSANA FIELD LABORATORY

FIGURE 1

INTERIM SOURCE REMOVAL ACTION (ISRA) - OUTFALL 009

**WASTE CHARACTERIZATION SAMPLE RESULTS – B1-1B
THE BOEING COMPANY
SANTA SUSANA FIELD LABORATORY**

				Object Name:		B1WC0001	B1WC0003	B1WC0029	B1WC0030
				Sample Name:		B1WC0001S001	B1WC0003S001	B1WC0029S001	B1WC0030S001
				Collection Date:		4/28/2010	4/28/2010	6/17/2010	6/17/2010
				Sample Depth (feet):		1.0 - 1.5	0.5 - 1.0	0.5 - 1.0	0.0 - 0.5
ANALYTE	UNITS	TTLIC	WET Leachate Testing Trigger ^a	TCLP Leachate Testing Trigger ^b	STLC	RESULT ^c	RESULT ^c	RESULT ^c	RESULT ^c
METALS									
Antimony	mg/kg	500	150	--	--	0.185 J	0.221	<0.325	<0.321
Arsenic	mg/kg	500	50	100	--	9.29	6.36	16.5	8.88
Barium	mg/kg	10,000	1,000	2,000	--	58.9	48.6	86.9	71.5
Beryllium	mg/kg	75	7.5	--	--	0.635	0.51	0.339 J	<0.0973
Cadmium	mg/kg	100	10	20	--	0.0628 J	0.0711 J	<0.492	<0.0973
Chromium	mg/kg	500	50	100	--	20.9	17.4	24.2	15.9
Cobalt	mg/kg	8,000	800	--	--	6.16	4.33	8.28	5.19
Copper	mg/kg	2,500	250	--	--	12.6	12.5	18.5	9
Lead	mg/kg	1,000	50	100	--	6.52	9.44	17.1	16.6
Mercury	mg/kg	20	2	4	--	<0.0113	<0.0112	0.0223	0.0157
Molybdenum	mg/kg	3,500	3,500	--	--	0.447	0.49	1.63	1.05
Nickel	mg/kg	2,000	200	--	--	10.9	8.86	11.4	9.62
Selenium	mg/kg	100	10	20	--	0.257 J	0.343 J	15.2	8.73
Selenium, WET	mg/L	--	--	--	1	--	--	0.101 J	--
Silver	mg/kg	500	50	100	--	0.0371 J	0.0241 J	<0.492	<0.486
Thallium	mg/kg	700	70	--	--	0.311	0.236	<0.492	<0.486
Vanadium	mg/kg	2,400	240	--	--	35.9	31.1	52.1	31.7
Zinc	mg/kg	5,000	2,500	--	--	60.9	54.8	75.6	83.6
TPH									
Gasoline Range Organics (C6-C12)	mg/kg	--	--	--	--	<9.4 {<9.4}	<9.1 {<9.1}	<1 {<1}	<9.6 {<9.6}
EFH (C10 - C24)	mg/kg	--	--	--	--	<16 {<5.4}	<12 {<4}	<12 {<4}	12 J
EFH (C10 - C40)	mg/kg	--	--	--	--	<16 {<5.4}	21	<12 {<4}	100
EFH (C25 - C40)	mg/kg	--	--	--	--	<16 {<5.4}	19	<12 {<4}	92
SVOCs									
1,1'-Biphenyl	ug/kg	--	--	--	--	<166 {<49.9}	<167 {<50}	<332 {<99.7}	<333 {<99.8}
1,2,4-Trichlorobenzene	ug/kg	--	--	--	--	<166 {<33.2}	<167 {<33.3}	<332 {<66.5}	<333 {<66.5}
1,2-Dichlorobenzene	ug/kg	--	--	--	--	<166 {<33.2}	<167 {<33.3}	<332 {<66.5}	<333 {<66.5}
1,3-Dichlorobenzene	ug/kg	--	--	--	--	<166 {<33.2}	<167 {<33.3}	<332 {<66.5}	<333 {<66.5}
1,4-Dichlorobenzene	ug/kg	--	--	150,000	--	<166 {<33.2}	<167 {<33.3}	<332 {<66.5}	<333 {<66.5}
1-Naphthylamine	ug/kg	--	--	--	--	<166 {<49.9}	<167 {<50}	<332 {<99.7}	<333 {<99.8}
2,4,5-Trichlorophenol	ug/kg	--	--	8,000,000	--	<166 {<33.2}	<167 {<33.3}	<332 {<66.5}	<333 {<66.5}
2,4,6-Trichlorophenol	ug/kg	--	--	40,000	--	<166 {<33.2}	<167 {<33.3}	<332 {<66.5}	<333 {<66.5}
2,4-Dichlorophenol	ug/kg	--	--	--	--	<166 {<33.2}	<167 {<33.3}	<332 {<66.5}	<333 {<66.5}
2,4-Dimethylphenol	ug/kg	--	--	--	--	<166 {<58.2}	<167 {<58.3}	<332 {<116}	<333 {<116}
2,4-Dinitrophenol	ug/kg	--	--	--	--	<332 {<63.2}	<333 {<63.3}	<665 {<126}	<665 {<126}

INTERIM SOURCE REMOVAL ACTION (ISRA) - OUTFALL 009

**WASTE CHARACTERIZATION SAMPLE RESULTS – B1-1B
THE BOEING COMPANY
SANTA SUSANA FIELD LABORATORY**

						Object Name:	B1WC0001	B1WC0003	B1WC0029	B1WC0030
						Sample Name:	B1WC0001S001	B1WC0003S001	B1WC0029S001	B1WC0030S001
						Collection Date:	4/28/2010	4/28/2010	6/17/2010	6/17/2010
						Sample Depth (feet):	1.0 - 1.5	0.5 - 1.0	0.5 - 1.0	0.0 - 0.5
ANALYTE	UNITS	TTLIC	WET Leachate Testing Trigger ^a	TCLP Leachate Testing Trigger ^b	STLC	RESULT ^c	RESULT ^c	RESULT ^c	RESULT ^c	
2,4-Dinitrotoluene	ug/kg	--	--	2,600	--	<166 {<16.6}	<167 {<16.7}	<332 {<33.2}	<333 {<33.3}	
2,6-Dinitrotoluene	ug/kg	--	--	--	--	<166 {<16.6}	<167 {<16.7}	<332 {<33.2}	<333 {<33.3}	
2-Chloronaphthalene	ug/kg	--	--	--	--	<16.6 {<5.49}	<16.7 {<5.5}	<33.2 {<11}	<33.3 {<11}	
2-Chlorophenol	ug/kg	--	--	--	--	<166 {<33.2}	<167 {<33.3}	<332 {<66.5}	<333 {<66.5}	
2-Methylnaphthalene	ug/kg	--	--	--	--	<16.6 {<3.32}	<16.7 {<3.33}	<33.2 {<6.65}	<33.3 {<6.65}	
2-Methylphenol	ug/kg	--	--	200	--	<166 {<33.2}	<167 {<33.3}	<332 {<66.5}	<333 {<66.5}	
2-Naphthylamine	ug/kg	--	--	--	--	<166 {<54.9}	<167 {<55}	<332 {<110}	<333 {<110}	
2-Nitroaniline	ug/kg	--	--	--	--	<166 {<33.2}	<167 {<33.3}	<332 {<66.5}	<333 {<66.5}	
2-Nitrophenol	ug/kg	--	--	--	--	<166 {<33.2}	<167 {<33.3}	<332 {<66.5}	<333 {<66.5}	
3,3-Dichlorobenzidine	ug/kg	--	--	--	--	<166 {<49.9}	<167 {<50}	<332 {<99.7}	<333 {<99.8}	
3-Nitroaniline	ug/kg	--	--	--	--	<166 {<33.2}	<167 {<33.3}	<332 {<66.5}	<333 {<66.5}	
4,6-Dinitro-2-methylphenol	ug/kg	--	--	--	--	<166 {<33.2}	<167 {<33.3}	<332 {<66.5}	<333 {<66.5}	
4-Aminobiphenyl	ug/kg	--	--	--	--	<166 {<33.2}	<167 {<33.3}	<332 {<66.5}	<333 {<66.5}	
4-Bromophenyl phenyl ether	ug/kg	--	--	--	--	<166 {<33.2}	<167 {<33.3}	<332 {<66.5}	<333 {<66.5}	
4-Chloro-3-methylphenol	ug/kg	--	--	--	--	<166 {<33.2}	<167 {<33.3}	<332 {<66.5}	<333 {<66.5}	
4-Chloroaniline	ug/kg	--	--	--	--	<166 {<33.2}	<167 {<33.3}	<332 {<66.5}	<333 {<66.5}	
4-Chlorophenyl-phenylether	ug/kg	--	--	--	--	<166 {<33.2}	<167 {<33.3}	<332 {<66.5}	<333 {<66.5}	
4-Methylphenol	ug/kg	--	--	200	--	<166 {<49.9}	<167 {<50}	<332 {<99.7}	<333 {<99.8}	
4-Nitroaniline	ug/kg	--	--	--	--	<166 {<49.9}	<167 {<50}	<332 {<99.7}	<333 {<99.8}	
4-Nitrophenol	ug/kg	--	--	--	--	<166 {<54.9}	<167 {<55}	<332 {<110}	<333 {<110}	
Acenaphthene	ug/kg	--	--	--	--	<16.6 {<5.49}	<16.7 {<5.5}	<33.2 {<11}	<33.3 {<11}	
Acenaphthylene	ug/kg	--	--	--	--	<16.6 {<4.99}	<16.7 {<5}	<33.2 {<9.97}	<33.3 {<9.98}	
Acetophenone	ug/kg	--	--	--	--	<166 {<33.2}	<167 {<33.3}	<332 {<66.5}	<333 {<66.5}	
Anthracene	ug/kg	--	--	--	--	<16.6 {<3.32}	<16.7 {<3.33}	<33.2 {<6.65}	<33.3 {<6.65}	
Atrazine	ug/kg	--	--	--	--	<166 {<49.9}	<167 {<50}	<332 {<99.7}	<333 {<99.8}	
Benzaldehyde	ug/kg	--	--	--	--	<166 {<49.9}	<167 {<50}	<332 {<99.7}	<333 {<99.8}	
Benzidine	ug/kg	--	--	--	--	<166 {<49.9}	<167 {<50}	<332 {<99.7}	<333 {<99.8}	
Benzo(a)anthracene	ug/kg	--	--	--	--	<16.6 {<4.99}	<16.7 {<5}	<33.2 {<9.97}	<33.3 {<9.98}	
Benzo(a)pyrene	ug/kg	--	--	--	--	<16.6 {<4.99}	<16.7 {<5}	<33.2 {<9.97}	<33.3 {<9.98}	
Benzo(b)fluoranthene	ug/kg	--	--	--	--	<16.6 {<4.99}	<16.7 {<5}	<33.2 {<9.97}	<33.3 {<9.98}	
Benzo(ghi)perylene	ug/kg	--	--	--	--	<16.6 {<4.99}	<16.7 {<5}	<33.2 {<9.97}	<33.3 {<9.98}	
Benzo(k)fluoranthene	ug/kg	--	--	--	--	<16.6 {<4.99}	<16.7 {<5}	<33.2 {<9.97}	<33.3 {<9.98}	
Bis(2-chloroethoxy)methane	ug/kg	--	--	--	--	<166 {<33.2}	<167 {<33.3}	<332 {<66.5}	<333 {<66.5}	
Bis(2-chloroethyl)ether	ug/kg	--	--	--	--	<166 {<33.2}	<167 {<33.3}	<332 {<66.5}	<333 {<66.5}	
Bis(2-chloroisopropyl)ether	ug/kg	--	--	--	--	<166 {<33.2}	<167 {<33.3}	<332 {<66.5}	<333 {<66.5}	
bis(2-Ethylhexyl) phthalate	ug/kg	--	--	--	--	<166 {<33.2}	<167 {<33.3}	<332 {<66.5}	<333 {<66.5}	

INTERIM SOURCE REMOVAL ACTION (ISRA) - OUTFALL 009

**WASTE CHARACTERIZATION SAMPLE RESULTS – B1-1B
THE BOEING COMPANY
SANTA SUSANA FIELD LABORATORY**

						Object Name:	B1WC0001	B1WC0003	B1WC0029	B1WC0030
						Sample Name:	B1WC0001S001	B1WC0003S001	B1WC0029S001	B1WC0030S001
						Collection Date:	4/28/2010	4/28/2010	6/17/2010	6/17/2010
						Sample Depth (feet):	1.0 - 1.5	0.5 - 1.0	0.5 - 1.0	0.0 - 0.5
ANALYTE	UNITS	TTLIC	WET Leachate Testing Trigger ^a	TCLP Leachate Testing Trigger ^b	STLC	RESULT ^c	RESULT ^c	RESULT ^c	RESULT ^c	
Butyl benzyl phthalate	ug/kg	--	--	--	--	<166 {<33.2}	<167 {<33.3}	<332 {<66.5}	<333 {<66.5}	
Caprolactam	ug/kg	--	--	--	--	<166 {<33.2}	<167 {<33.3}	<332 {<66.5}	<333 {<66.5}	
Carbazole	ug/kg	--	--	--	--	<16.6 {<4.99}	<16.7 {<5}	<33.2 {<9.97}	<33.3 {<9.98}	
Chrysene	ug/kg	--	--	--	--	<16.6 {<4.99}	<16.7 {<5}	<33.2 {<9.97}	<33.3 {<9.98}	
Dibenzo(a,h)anthracene	ug/kg	--	--	--	--	<16.6 {<4.99}	<16.7 {<5}	<33.2 {<9.97}	<33.3 {<9.98}	
Dibenzofuran	ug/kg	--	--	--	--	<166 {<33.2}	<167 {<33.3}	<332 {<66.5}	<333 {<66.5}	
Diethyl phthalate	ug/kg	--	--	--	--	<166 {<33.2}	<167 {<33.3}	<332 {<66.5}	<333 {<66.5}	
Dimethyl phthalate	ug/kg	--	--	--	--	<166 {<33.2}	<167 {<33.3}	<332 {<66.5}	<333 {<66.5}	
Di-n-butyl phthalate	ug/kg	--	--	--	--	<166 {<33.2}	<167 {<33.3}	<332 {<66.5}	<333 {<66.5}	
Di-n-octyl phthalate	ug/kg	--	--	--	--	<166 {<33.2}	<167 {<33.3}	<332 {<66.5}	<333 {<66.5}	
Diphenylamine	ug/kg	--	--	--	--	<166 {<33.2}	<167 {<33.3}	<332 {<66.5}	<333 {<66.5}	
Fluoranthene	ug/kg	--	--	--	--	<16.6 {<4.99}	<16.7 {<5}	<33.2 {<9.97}	<33.3 {<9.98}	
Fluorene	ug/kg	--	--	--	--	<16.6 {<4.99}	<16.7 {<5}	<33.2 {<9.97}	<33.3 {<9.98}	
Hexachlorobenzene	ug/kg	--	--	2,600	--	<166 {<33.2}	<167 {<33.3}	<332 {<66.5}	<333 {<66.5}	
Hexachlorobutadiene	ug/kg	--	--	10,000	--	<166 {<33.2}	<167 {<33.3}	<332 {<66.5}	<333 {<66.5}	
Hexachlorocyclopentadiene	ug/kg	--	--	--	--	<166 {<33.2}	<167 {<33.3}	<332 {<66.5}	<333 {<66.5}	
Hexachloroethane	ug/kg	--	--	60,000	--	<166 {<33.2}	<167 {<33.3}	<332 {<66.5}	<333 {<66.5}	
Indeno(1,2,3-cd)pyrene	ug/kg	--	--	--	--	<16.6 {<4.99}	<16.7 {<5}	<33.2 {<9.97}	<33.3 {<9.98}	
Isophorone	ug/kg	--	--	--	--	<166 {<33.2}	<167 {<33.3}	<332 {<66.5}	<333 {<66.5}	
Naphthalene	ug/kg	--	--	--	--	<16.6 {<4.99}	<16.7 {<5}	<33.2 {<9.97}	<33.3 {<9.98}	
Nitrobenzene	ug/kg	--	--	40,000	--	<166 {<33.2}	<167 {<33.3}	<332 {<66.5}	<333 {<66.5}	
n-Nitrosodimethylamine	ug/kg	--	--	--	--	<166 {<33.2}	<167 {<33.3}	<332 {<66.5}	<333 {<66.5}	
n-Nitroso-di-n-propylamine	ug/kg	--	--	--	--	<166 {<33.2}	<167 {<33.3}	<332 {<66.5}	<333 {<66.5}	
p-(Dimethylamino)azobenzene	ug/kg	--	--	--	--	<166 {<33.2}	<167 {<33.3}	<332 {<66.5}	<333 {<66.5}	
Pentachlorophenol	ug/kg	17,000	17,000	2,000,000	--	<166 {<41.6}	75.5 J {<41.7}	<332 {<83.1}	<333 {<83.1}	
Phenanthrene	ug/kg	--	--	--	--	<16.6 {<4.99}	<16.7 {<5}	<33.2 {<9.97}	<33.3 {<9.98}	
Phenol	ug/kg	--	--	--	--	<166 {<33.2}	<167 {<33.3}	<332 {<66.5}	<333 {<66.5}	
Pyrene	ug/kg	--	--	--	--	<16.6 {<4.99}	<16.7 {<5}	<33.2 {<9.97}	<33.3 {<9.98}	
Pyridine	ug/kg	--	--	--	--	<166 {<33.2}	<167 {<33.3}	<332 {<66.5}	<333 {<66.5}	
RADIONUCLIDES	--	--	--	--	--	R	R	R	R	

INTERIM SOURCE REMOVAL ACTION (ISRA) - OUTFALL 009

**WASTE CHARACTERIZATION SAMPLE RESULTS – B1-1 AND B1-2
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

H - Analytical holding time was exceeded.

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.

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.

SU - Standard Units