

## **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.**

**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}

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				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	--	--	--	--	--	--	--	--	--	--	--
Benidine	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	--	--	--	--	--	--	--	--	--	--	--

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				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**

**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>
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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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>
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).