

WASTE CHARACTERIZATION: IN-SITU SOIL LOCATED AT ISRA AREA II PLANNED EXCAVATION LOX-1B-1

Introduction

This report presents supporting detailed information relating to the October 13, 2010 in-situ characterization of prospective soil wastes at the planned ISRA excavation LOX-1B-1 in SSFL Area II.

Background

Soil to be excavated from designated locations in accordance with the ISRA Workplan for SSFL Area II was characterized prior to excavation. A step-by-step approach was followed to accomplish the in-situ characterization. The first step was to review available historical activity and chemical usage information, as well as existing analytical data from past soil sampling in the area. The objective was to identify all substances that could have an impact on determining whether soil in the planned excavation footprint was hazardous or not.

Once potential impacts to the soil were identified, the next step was to develop a random sampling plan for each planned excavation footprint. Samples were collected according to the plan and analyzed by a state certified laboratory. Analytical results provided by the laboratory were evaluated to determine whether any regulated substances were present at concentrations exceeding regulatory thresholds governing waste management. Furthermore, the results were also evaluated to assure adequacy for waste characterization purposes based upon the guidelines presented in U.S. EPA SW-846. If the number of samples was not sufficient, additional samples would be collected and analyzed. In lieu of further sampling, the soil could be characterized as hazardous.

The review of historical information and existing analytical data relevant to planned excavation LOX-1B-1 was based largely on the Group 2 RFI results. Evaluation of these data and other sources of relevant information suggested that Regulated Metals, Petroleum Hydrocarbons (TPH), and Volatile Organic Compounds (VOC) should be addressed in the LOX-1B-1 excavation footprint. A random sampling plan was developed for collection of seven (7) samples from the planned excavation footprint. The samples were analyzed for CAM 17 metals, TPH, and VOCs. All samples were collected, contained, and handled according to field practice requirements in SW-846.

Results

Analytical results for the LOX-1B-1 planned excavation area are presented in TestAmerica report ITJ1356 issued on 10/20/10. Regulated metals were detected, but in no case exceeded any applicable regulatory thresholds. With respect to hazardous waste regulations, Chromium was the most significant detection, with concentrations ranging from 19 mg/kg to 28 mg/kg. Lead was detected at a maximum concentration of 19 mg/kg. Both metals were below the California 10 X STLC hazardous waste threshold of 50 ppm. Only trace concentrations of TPH were detected. C10 - C40 Petroleum Hydrocarbons were detected at concentrations ranging from 15 mg/kg to 22 mg/kg. TPH itself is not directly regulated and does not begin to affect waste disposal until concentrations attain 100 mg/kg. Despite very low Method Detection Limits, no VOCs were detected.

Determination

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

Is Not a Listed Waste (analytical results and generator knowledge)

Is Not ignitable (generator knowledge)

Is Not corrosive (generator knowledge)

Is Not reactive (generator knowledge)

Is Not toxic (analytical results and generator knowledge)

Is Not Extremely or Acutely Hazardous Waste

Does not exceed any RCRA or Title 22 characteristic thresholds

Is Not subject to the Prop. 65 listing









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 SSFL Area II LOX-1B-1 is NON-HAZARDOUS.

Outfall 009 Waste Characterization Sample Locations for LOX-1B-1

Base Map Legend

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

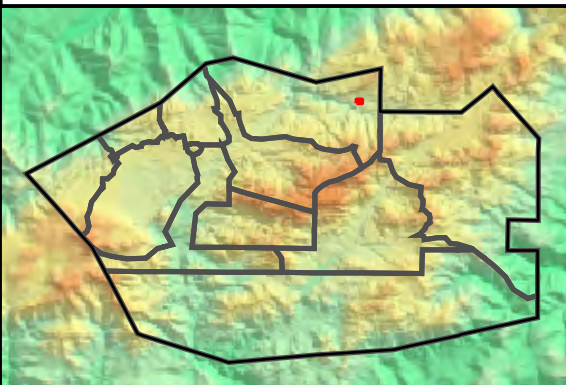
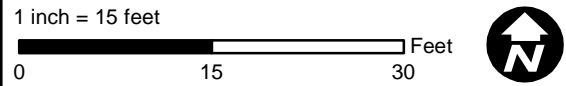
Base Map Legend

-  ISRA Excavation Boundary
-  Waste Characterization Sample Location

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_Working_LOX-1-B1_SampleLocations_WC.mxd Date: Nov 05, 2010



INTERIM SOURCE REMOVAL ACTION (ISRA) - OUTFALL 009

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

		Object Name: Sample Name: Collection Date: Sample Depth (feet):			LXWC0005 LXWC0005S001 10/13/2010 0.2 - 0.8	LXWC0006 LXWC0006S001 10/13/2010 0.8 - 1.3	LXWC0007 LXWC0007S001 10/13/2010 1.2 - 1.7	LXWC0008 LXWC0008S001 10/13/2010 0.1 - 0.3	LXWC0009 LXWC0009S001 10/13/2010 1.4 - 1.9	LXWC0010 LXWC0010S001 10/13/2010 0.1 - 0.3	LXWC0011 LXWC0011S001 10/13/2010 0 - 0.4
ANALYTE	UNITS	TTLIC	WET Leachate Testing Trigger ^a	TCLP Leachate Testing Trigger ^b	RESULT ^c	RESULT ^c	RESULT ^c	RESULT ^c	RESULT ^c	RESULT ^c	RESULT ^c
METALS											
Antimony	mg/kg	500	150	--	<0.88	1.1 J	0.96 J	1 J	0.9 J	0.96 J	1.1 J
Arsenic	mg/kg	500	50	100	5.4	7.1	5.2	4.7	5.2	6.8	6.6
Barium	mg/kg	10,000	1,000	2,000	70	91	83	66	62	87	89
Beryllium	mg/kg	75	7.5	--	0.52	0.67	0.61	0.52	0.59	0.61	0.71
Cadmium	mg/kg	100	10	20	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Chromium	mg/kg	500	50	100	16	28	24	19	23	21	26
Cobalt	mg/kg	8,000	800	--	4.5	8.5	5.7	5.2	5.5	5.3	7.6
Copper	mg/kg	2,500	250	--	11	14	11	8.1	16	20	13
Lead	mg/kg	1,000	50	100	18	8.1	6.1	4.3	8.6	19	7.7
Mercury	mg/kg	20	2	4	0.024	0.014 J	<0.012	<0.012	<0.012	0.014 J	0.012 J
Molybdenum	mg/kg	3,500	3,500	--	0.38 J	0.56 J	0.44 J	<0.2	0.47 J	0.48 J	0.37 J
Nickel	mg/kg	2,000	200	--	9.6 B	21 B	19 B	15 B	19 B	13 B	21 B
Selenium	mg/kg	100	10	20	<1	<0.99	<1	<0.99	<0.99	<0.98	<0.98
Silver	mg/kg	500	50	100	<0.8	<0.79	<0.8	<0.79	<0.79	<0.78	<0.78
Thallium	mg/kg	700	70	--	<0.8	<0.79	<0.8	<0.79	<0.79	<0.78	<0.78
Vanadium	mg/kg	2,400	240	--	26	46	37	33	34	30	40
Zinc	mg/kg	5,000	2,500	--	57	59	47	46	55	67	53
TPH											
Gasoline Range Organics (C6-C12)	mg/kg	--	--	--	<0.37 {<0.14}	<0.37 {<0.14}	<0.37 {<0.14}	<0.37 {<0.14}	<0.39 {<0.15}	<0.38 {<0.14}	<0.4 {<0.15}
EFH (C10 - C24)	mg/kg	--	--	--	<5 {<3.5}	<5 {<3.5}	4.9 J	<5 {<3.5}	<5 {<3.5}	4.2 J	<5 {<3.5}
EFH (C25 - C40)	mg/kg	--	--	--	12 B	<5 {<3.5}	13 B	<5 {<3.5}	<5 {<3.5}	18 B	<5 {<3.5}
EFH (C10 - C40)	mg/kg	--	--	--	15 B	<5 {<3.5}	18 B	<5 {<3.5}	<5 {<3.5}	22 B	<5 {<3.5}
VOCs											
1,1,1,2-Tetrachloroethane	ug/kg	--	--	--	<2 {<0.57}	<2 {<0.57}	<2 {<0.56}	<2 {<0.56}	<2 {<0.57}	<2 {<0.56}	<2 {<0.57}
1,1,1-Trichloroethane	ug/kg	--	--	--	<1 {<0.7}	<1 {<0.7}	<0.99 {<0.69}	<0.99 {<0.69}	<1 {<0.7}	<0.99 {<0.69}	<1 {<0.7}
1,1,2,2-Tetrachloroethane	ug/kg	--	--	--	<2 {<0.86}	<2 {<0.86}	<2 {<0.85}	<2 {<0.85}	<2 {<0.86}	<2 {<0.85}	<2 {<0.86}
1,1,2-Trichloroethane	ug/kg	--	--	--	<1 {<0.87}	<1 {<0.87}	<0.99 {<0.86}	<0.99 {<0.86}	<1 {<0.87}	<0.99 {<0.86}	<1 {<0.87}
1,1-Dichloroethane	ug/kg	--	--	--	<1 {<0.5}	<1 {<0.5}	<0.99 {<0.49}	<0.99 {<0.5}	<1 {<0.5}	<0.99 {<0.5}	<1 {<0.5}
1,1-Dichloroethene	ug/kg	--	--	14,000	<2 {<0.6}	<2 {<0.6}	<2 {<0.59}	<2 {<0.59}	<2 {<0.6}	<2 {<0.59}	<2 {<0.6}
1,1-Dichloropropene	ug/kg	--	--	--	<1 {<0.4}	<1 {<0.4}	<0.99 {<0.39}	<0.99 {<0.4}	<1 {<0.4}	<0.99 {<0.4}	<1 {<0.4}
1,2,3-Trichlorobenzene	ug/kg	--	--	--	<2 {<1}	<2 {<1}	<2 {<0.99}	<2 {<0.99}	<2 {<1}	<2 {<0.99}	<2 {<1}
1,2,3-Trichloropropane	ug/kg	--	--	--	<2 {<1}	<2 {<1}	<2 {<0.99}	<2 {<0.99}	<2 {<1}	<2 {<0.99}	<2 {<1}
1,2,4-Trichlorobenzene	ug/kg	--	--	--	<2 {<1}	<2 {<1}	<2 {<0.99}	<2 {<0.99}	<2 {<1}	<2 {<0.99}	<2 {<1}
1,2,4-Trimethylbenzene	ug/kg	--	--	--	<1 {<0.78}	<1 {<0.78}	<0.99 {<0.77}	<0.99 {<0.77}	<1 {<0.78}	<0.99 {<0.77}	<1 {<0.78}
1,2-Dibromo-3-chloropropane	ug/kg	--	--	--	<10 {<1.5}	<10 {<1.5}	<9.9 {<1.5}	<9.9 {<1.5}	<10 {<1.5}	<9.9 {<1.5}	<10 {<1.5}

INTERIM SOURCE REMOVAL ACTION (ISRA) - OUTFALL 009

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THE BOEING COMPANY
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		Object Name: Sample Name: Collection Date: Sample Depth (feet):			LXWC0005 LXWC0005S001 10/13/2010 0.2 - 0.8	LXWC0006 LXWC0006S001 10/13/2010 0.8 - 1.3	LXWC0007 LXWC0007S001 10/13/2010 1.2 - 1.7	LXWC0008 LXWC0008S001 10/13/2010 0.1 - 0.3	LXWC0009 LXWC0009S001 10/13/2010 1.4 - 1.9	LXWC0010 LXWC0010S001 10/13/2010 0.1 - 0.3	LXWC0011 LXWC0011S001 10/13/2010 0 - 0.4
ANALYTE	UNITS	TTLIC	WET Leachate Testing Trigger ^a	TCLP Leachate Testing Trigger ^b	RESULT ^c	RESULT ^c	RESULT ^c	RESULT ^c	RESULT ^c	RESULT ^c	RESULT ^c
1,2-Dibromoethane (EDB)	ug/kg	--	--	--	<1 {<0.8}	<1 {<0.8}	<0.99 {<0.79}	<0.99 {<0.79}	<1 {<0.8}	<0.99 {<0.79}	<1 {<0.8}
1,2-Dichlorobenzene	ug/kg	--	--	--	<1 {<0.95}	<1 {<0.95}	<0.99 {<0.94}	<0.99 {<0.94}	<1 {<0.95}	<0.99 {<0.94}	<1 {<0.95}
1,2-Dichloroethane	ug/kg	--	--	10,000	<1 {<0.8}	<1 {<0.8}	<0.99 {<0.79}	<0.99 {<0.79}	<1 {<0.8}	<0.99 {<0.79}	<1 {<0.8}
1,2-Dichloropropane	ug/kg	--	--	--	<1 {<0.8}	<1 {<0.8}	<0.99 {<0.79}	<0.99 {<0.79}	<1 {<0.8}	<0.99 {<0.79}	<1 {<0.8}
1,3,5-Trimethylbenzene	ug/kg	--	--	--	<1 {<0.63}	<1 {<0.63}	<0.99 {<0.62}	<0.99 {<0.62}	<1 {<0.63}	<0.99 {<0.62}	<1 {<0.63}
1,3-Dichlorobenzene	ug/kg	--	--	--	<1 {<0.84}	<1 {<0.84}	<0.99 {<0.83}	<0.99 {<0.83}	<1 {<0.84}	<0.99 {<0.83}	<1 {<0.84}
1,3-Dichloropropane	ug/kg	--	--	--	<1 {<0.63}	<1 {<0.63}	<0.99 {<0.62}	<0.99 {<0.62}	<1 {<0.63}	<0.99 {<0.62}	<1 {<0.63}
1,4-Dichlorobenzene	ug/kg	--	--	--	<1 {<0.94}	<1 {<0.94}	<0.99 {<0.93}	<0.99 {<0.93}	<1 {<0.94}	<0.99 {<0.93}	<1 {<0.94}
2-Butanone (MEK)	ug/kg	--	--	4,000,000	<10 {<6}	<10 {<6}	<9.9 {<5.9}	<9.9 {<5.9}	<10 {<6}	<9.9 {<5.9}	<10 {<6}
2-Hexanone	ug/kg	--	--	--	<10 {<9.1}	<10 {<9.1}	<9.9 {<9}	<9.9 {<9}	<10 {<9.1}	<9.9 {<9}	<10 {<9.1}
4-Methyl-2-pentanone (MIBK)	ug/kg	--	--	--	<5 {<4.5}	<5 {<4.5}	<4.9 {<4.4}	<5 {<4.5}	<5 {<4.5}	<5 {<4.5}	<5 {<4.5}
Acetone	ug/kg	--	--	--	<10 {<8}	<10 {<8}	<9.9 {<7.9}	<9.9 {<7.9}	<10 {<8}	<9.9 {<7.9}	<10 {<8}
Benzene	ug/kg	--	--	10,000	<1 {<0.5}	<1 {<0.5}	<0.99 {<0.49}	<0.99 {<0.5}	<1 {<0.5}	<0.99 {<0.5}	<1 {<0.5}
Bromobenzene	ug/kg	--	--	--	<2 {<0.84}	<2 {<0.84}	<2 {<0.83}	<2 {<0.83}	<2 {<0.84}	<2 {<0.83}	<2 {<0.84}
Bromochloromethane	ug/kg	--	--	--	<2 {<0.9}	<2 {<0.9}	<2 {<0.89}	<2 {<0.89}	<2 {<0.9}	<2 {<0.89}	<2 {<0.9}
Bromodichloromethane	ug/kg	--	--	--	<1 {<0.5}	<1 {<0.5}	<0.99 {<0.49}	<0.99 {<0.5}	<1 {<0.5}	<0.99 {<0.5}	<1 {<0.5}
Bromoform	ug/kg	--	--	--	<2 {<0.8}	<2 {<0.8}	<2 {<0.79}	<2 {<0.79}	<2 {<0.8}	<2 {<0.79}	<2 {<0.8}
Bromomethane	ug/kg	--	--	--	<2 {<0.92}	<2 {<0.92}	<2 {<0.91}	<2 {<0.91}	<2 {<0.92}	<2 {<0.91}	<2 {<0.92}
Carbon Disulfide	ug/kg	--	--	--	<5 {<0.97}	<5 {<0.97}	<4.9 {<0.96}	<5 {<0.96}	<5 {<0.97}	<5 {<0.96}	<5 {<0.97}
Carbon tetrachloride	ug/kg	--	--	10,000	<2 {<0.5}	<2 {<0.5}	<2 {<0.49}	<2 {<0.5}	<2 {<0.5}	<2 {<0.5}	<2 {<0.5}
Chlorobenzene	ug/kg	--	--	2,000,000	<1 {<0.52}	<1 {<0.52}	<0.99 {<0.51}	<0.99 {<0.51}	<1 {<0.52}	<0.99 {<0.51}	<1 {<0.52}
Chloroethane	ug/kg	--	--	--	<2 {<1.5}	<2 {<1.5}	<2 {<1.5}	<2 {<1.5}	<2 {<1.5}	<2 {<1.5}	<2 {<1.5}
Chloroform	ug/kg	--	--	120,000	<1 {<0.5}	<1 {<0.5}	<0.99 {<0.49}	<0.99 {<0.5}	<1 {<0.5}	<0.99 {<0.5}	<1 {<0.5}
Chloromethane	ug/kg	--	--	--	<2 {<1}	<2 {<1}	<2 {<0.99}	<2 {<0.99}	<2 {<1}	<2 {<0.99}	<2 {<1}
cis-1,2-Dichloroethene	ug/kg	--	--	--	<1 {<0.83}	<1 {<0.83}	<0.99 {<0.82}	<0.99 {<0.82}	<1 {<0.83}	<0.99 {<0.82}	<1 {<0.83}
cis-1,3-Dichloropropene	ug/kg	--	--	--	<1 {<0.44}	<1 {<0.44}	<0.99 {<0.43}	<0.99 {<0.44}	<1 {<0.44}	<0.99 {<0.44}	<1 {<0.44}
Dibromochloromethane	ug/kg	--	--	--	<1 {<0.7}	<1 {<0.7}	<0.99 {<0.69}	<0.99 {<0.69}	<1 {<0.7}	<0.99 {<0.69}	<1 {<0.7}
Dibromomethane	ug/kg	--	--	--	<1 {<0.9}	<1 {<0.9}	<0.99 {<0.89}	<0.99 {<0.89}	<1 {<0.9}	<0.99 {<0.89}	<1 {<0.9}
Dichlorodifluoromethane	ug/kg	--	--	--	<5 {<1.5}	<5 {<1.5}	<4.9 {<1.5}	<5 {<1.5}	<5 {<1.5}	<5 {<1.5}	<5 {<1.5}
Ethylbenzene	ug/kg	--	--	--	<1 {<0.5}	<1 {<0.5}	<0.99 {<0.49}	<0.99 {<0.5}	<1 {<0.5}	<0.99 {<0.5}	<1 {<0.5}
Hexachlorobutadiene	ug/kg	--	--	--	<2 {<0.8}	<2 {<0.8}	<2 {<0.79}	<2 {<0.79}	<2 {<0.8}	<2 {<0.79}	<2 {<0.8}
Isopropylbenzene	ug/kg	--	--	--	<1 {<0.54}	<1 {<0.54}	<0.99 {<0.53}	<0.99 {<0.53}	<1 {<0.54}	<0.99 {<0.53}	<1 {<0.54}
m,p-Xylenes	ug/kg	--	--	--	<2 {<0.8}	<2 {<0.8}	<2 {<0.79}	<2 {<0.79}	<2 {<0.8}	<2 {<0.79}	<2 {<0.8}
Methylene chloride	ug/kg	--	--	--	<10 {<6.5}	<10 {<6.5}	<9.9 {<6.4}	<9.9 {<6.4}	<10 {<6.5}	<9.9 {<6.4}	<10 {<6.5}
Methyl-tert-butyl Ether (MTBE)	ug/kg	--	--	--	<2 {<1}	<2 {<1}	<2 {<0.99}	<2 {<0.99}	<2 {<1}	<2 {<0.99}	<2 {<1}
n-Butylbenzene	ug/kg	--	--	--	<2 {<0.72}	<2 {<0.72}	<2 {<0.71}	<2 {<0.71}	<2 {<0.72}	<2 {<0.71}	<2 {<0.72}

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ANALYTE	UNITS	TTLIC	WET Leachate Testing Trigger ^a	TCLP Leachate Testing Trigger ^b	RESULT ^c	RESULT ^c	RESULT ^c	RESULT ^c	RESULT ^c	RESULT ^c	RESULT ^c
n-Propylbenzene	ug/kg	--	--	--	<1 {<0.61}	<1 {<0.61}	<0.99 {<0.6}	<0.99 {<0.6}	<1 {<0.61}	<0.99 {<0.6}	<1 {<0.61}
Naphthalene	ug/kg	--	--	--	<2 {<1.1}	<2 {<1.1}	<2 {<1.1}	<2 {<1.1}	<2 {<1.1}	<2 {<1.1}	<2 {<1.1}
o-Xylene	ug/kg	--	--	--	<1 {<0.5}	<1 {<0.5}	<0.99 {<0.49}	<0.99 {<0.5}	<1 {<0.5}	<0.99 {<0.5}	<1 {<0.5}
p-Isopropyltoluene	ug/kg	--	--	--	<1 {<0.72}	<1 {<0.72}	<0.99 {<0.71}	<0.99 {<0.71}	<1 {<0.72}	<0.99 {<0.71}	<1 {<0.72}
sec-Butylbenzene	ug/kg	--	--	--	<2 {<0.67}	<2 {<0.67}	<2 {<0.66}	<2 {<0.66}	<2 {<0.67}	<2 {<0.66}	<2 {<0.67}
Styrene	ug/kg	--	--	--	<1 {<0.58}	<1 {<0.58}	<0.99 {<0.57}	<0.99 {<0.57}	<1 {<0.58}	<0.99 {<0.57}	<1 {<0.58}
tert-Butylbenzene	ug/kg	--	--	--	<2 {<0.62}	<2 {<0.62}	<2 {<0.61}	<2 {<0.61}	<2 {<0.62}	<2 {<0.61}	<2 {<0.62}
Tetrachloroethene	ug/kg	--	--	14,000	<1 {<0.49}	<1 {<0.49}	<0.99 {<0.48}	<0.99 {<0.49}	<1 {<0.49}	<0.99 {<0.49}	<1 {<0.49}
Toluene	ug/kg	--	--	--	<1 {<0.5}	<1 {<0.5}	<0.99 {<0.49}	<0.99 {<0.5}	<1 {<0.5}	<0.99 {<0.5}	<1 {<0.5}
trans-1,2-Dichloroethene	ug/kg	--	--	--	<1 {<0.7}	<1 {<0.7}	<0.99 {<0.69}	<0.99 {<0.69}	<1 {<0.7}	<0.99 {<0.69}	<1 {<0.7}
trans-1,3-Dichloropropene	ug/kg	--	--	--	<1 {<0.61}	<1 {<0.61}	<0.99 {<0.6}	<0.99 {<0.6}	<1 {<0.61}	<0.99 {<0.6}	<1 {<0.61}
Trichloroethene	ug/kg	2,040,000	2,040,000	10,000	<1 {<0.5}	<1 {<0.5}	<0.99 {<0.49}	<0.99 {<0.5}	<1 {<0.5}	<0.99 {<0.5}	<1 {<0.5}
Trichlorofluoromethane	ug/kg	--	--	--	<2 {<0.54}	<2 {<0.54}	<2 {<0.53}	<2 {<0.53}	<2 {<0.54}	<2 {<0.53}	<2 {<0.54}
Vinyl acetate	ug/kg	--	--	--	<5 {<2.5}	<5 {<2.5}	<4.9 {<2.5}	<5 {<2.5}	<5 {<2.5}	<5 {<2.5}	<5 {<2.5}
Vinyl chloride	ug/kg	--	--	4,000	<2 {<0.91}	<2 {<0.91}	<2 {<0.9}	<2 {<0.9}	<2 {<0.91}	<2 {<0.9}	<2 {<0.91}
RADIONUCLIDES	--	--	--	--	R	R	R	R	R	R	R

INTERIM SOURCE REMOVAL ACTION (ISRA) - OUTFALL 009

**WASTE CHARACTERIZATION SAMPLE RESULTS – LOX
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.

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

WASTE CHARACTERIZATION: IN-SITU SOIL LOCATED AT ISRA AREA II PLANNED EXCAVATION LOX-1B-2

Introduction

This report presents supporting detailed information relating to the October 11 through October 12, 2010 in-situ characterization of prospective soil wastes at the planned ISRA excavation LOX-1B-2 in SSFL Area II.

Background

Soil to be excavated from designated locations in accordance with the ISRA Workplan for SSFL Area II was characterized prior to excavation. A step-by-step approach was followed to accomplish the in-situ characterization. The first step was to review available historical activity and chemical usage information, as well as existing analytical data from past soil sampling in the area. The objective was to identify all substances that could have an impact on determining whether soil in the planned excavation footprint was hazardous or not.

Once potential impacts to the soil were identified, the next step was to develop a random sampling plan for each planned excavation footprint. Samples were collected according to the plan and analyzed by a state certified laboratory. Analytical results provided by the laboratory were evaluated to determine whether any regulated substances were present at concentrations exceeding regulatory thresholds governing waste management. Furthermore, the results were also evaluated to assure adequacy for waste characterization purposes based upon the guidelines presented in U.S. EPA SW-846. If the number of samples was not sufficient, additional samples would be collected and analyzed. In lieu of further sampling, the soil could be characterized as hazardous.

The review of historical information and existing analytical data relevant to planned excavation LOX-1B-2 was based largely on the Group 2 RFI results. Evaluation of these data and other sources of relevant information suggested that Regulated Metals, Petroleum Hydrocarbons (TPH), and Volatile Organic Compounds (VOC) should be addressed in the LOX-1B-2 excavation footprint. A random sampling plan was developed for collection of eight (8) samples from the planned excavation footprint. The samples were analyzed for CAM 17 metals, TPH, and VOCs. All samples were collected, contained, and handled according to field practice requirements in SW-846.

Results

Analytical results for the LOX-1B-2 planned excavation area are presented in TestAmerica reports ITJ1144, issued on 10/18/10, and ITJ1207, issued on 10/20/10. Regulated metals were detected, but in no case exceeded any applicable regulatory thresholds. With respect to hazardous waste regulations, Chromium was the most significant detection, with concentrations ranging from 19 mg/kg to 27 mg/kg. Lead was detected at a maximum concentration of 11 mg/kg. Both metals were below the California 10 X STLC hazardous waste threshold of 50 ppm. Low concentrations of TPH were detected. C10 - C40 Petroleum Hydrocarbons concentrations ranged from nondetect to 130 mg/kg. TPH itself is not directly regulated and does not begin to affect waste disposal until concentrations attain 100 mg/kg. However, the 100 mg/kg limit relates to Subtitle D (MSW) landfill acceptance of gasoline and diesel impacted soils. The Petroleum fraction driving the elevated concentration at LOX-1B-1 is in the C25 - C40 range,

which is in the Oil range. The Subtitle D landfill acceptance limit for oil impacted soil is 1,000 mg/kg. Despite very low Method Detection Limits, no VOCs were detected.

Determination

According to analytical results and generator knowledge, the soil in the planned excavation footprint of SSFL Area II LOX-1B-2:

Is Not a Listed Waste (analytical results and generator knowledge)

Is Not ignitable (generator knowledge)

Is Not corrosive (generator knowledge)

Is Not reactive (generator knowledge)

Is Not toxic (analytical results and generator knowledge)

Is Not Extremely or Acutely Hazardous Waste

Does not exceed any RCRA or Title 22 characteristic thresholds









Is Not subject to the Prop. 65 listing



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 SSFL Area II LOX-1B-2 is NON-HAZARDOUS.

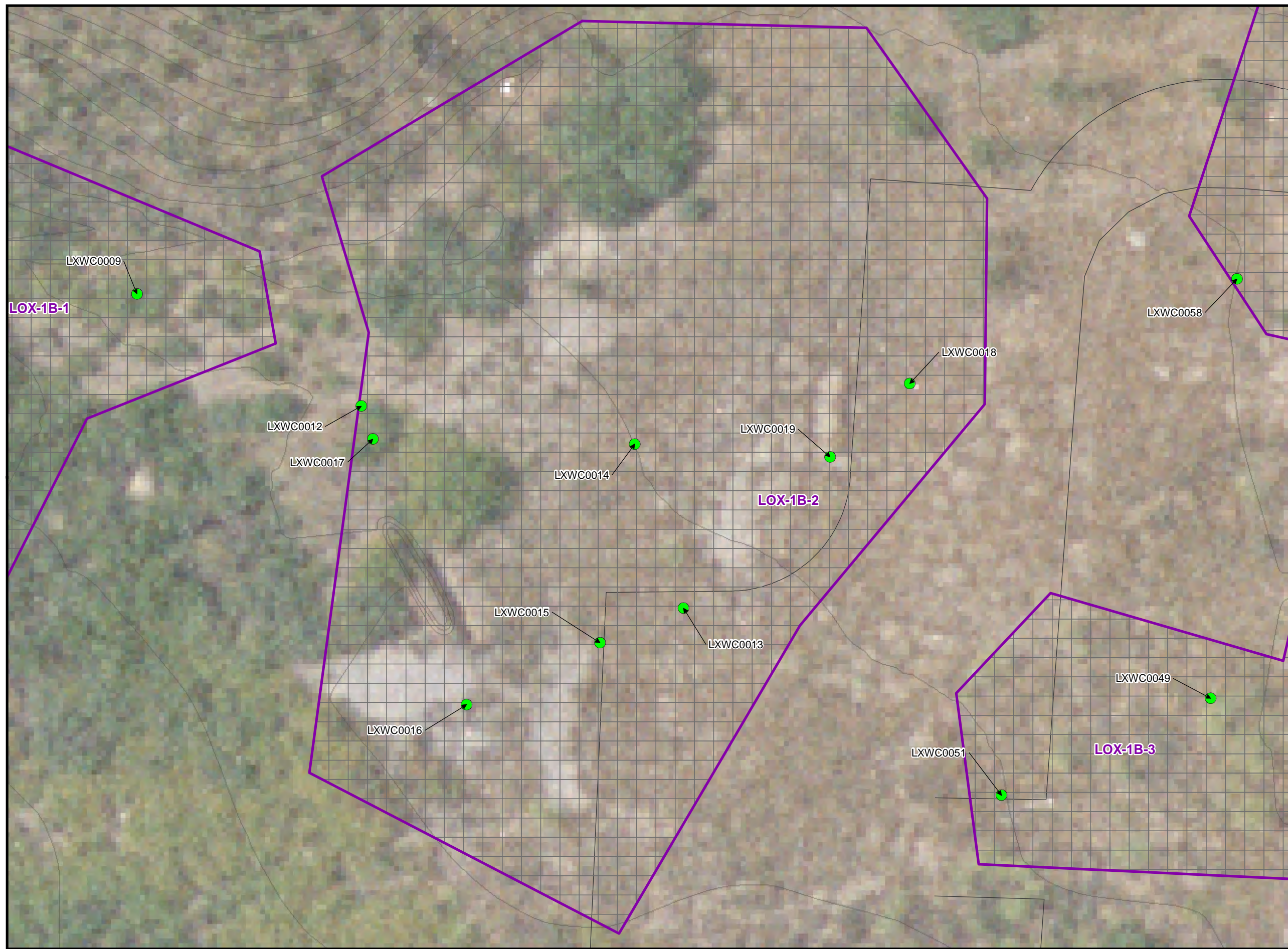
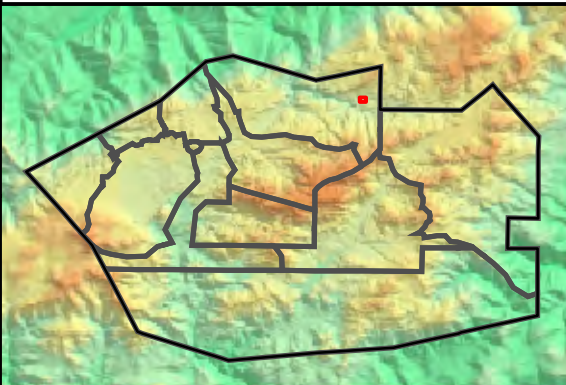
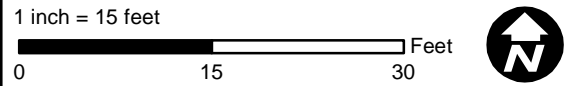
Outfall 009 Waste Characterization Sample Locations for LOX-1B-2

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

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

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

Document: ISRA_Plots_Working_LOX-1-B2_SampleLocations_WC.mxd Date: Nov 05, 2010



SANTA SUSANA FIELD LABORATORY

FIGURE 1

INTERIM SOURCE REMOVAL ACTION (ISRA) - OUTFALL 009

**WASTE CHARACTERIZATION SAMPLE RESULTS – LOX-1B-2
THE BOEING COMPANY
SANTA SUSANA FIELD LABORATORY**

		Object Name: Sample Name: Collection Date: Sample Depth (feet):			LXWC0012 LXWC0012S001 10/12/2010 1.3 - 1.8	LXWC0013 LXWC0013S001 10/12/2010 1.1 - 1.6	LXWC0014 LXWC0014S001 10/12/2010 1.3 - 1.8	LXWC0015 LXWC0015S001 10/12/2010 0.3 - 0.8	LXWC0016 LXWC0016S001 10/12/2010 0.8 - 1.3	LXWC0017 LXWC0017S001 10/12/2010 0 - 0.4	LXWC0018 LXWC0018S001 10/11/2010 0.7 - 1.2	LXWC0019 LXWC0019S001 10/11/2010 0 - 0.3
ANALYTE	UNITS	TTLIC	WET Leachate Testing Trigger ^a	TCLP Leachate Testing Trigger ^b	RESULT ^c	RESULT ^c	RESULT ^c	RESULT ^c	RESULT ^c	RESULT ^c	RESULT ^c	RESULT ^c
METALS												
Antimony	mg/kg	500	150	--	<0.87	<0.87	<0.87	<0.87	<0.88	<0.88	<0.87	1.5 J
Arsenic	mg/kg	500	50	100	4	5.7	5.7	5.1	4.7	5.8	6.6	5.4
Barium	mg/kg	10,000	1,000	2,000	63	75	88	85	77	92	69	89
Beryllium	mg/kg	75	7.5	--	0.42 J	0.53	0.57	0.54	0.47 J	0.39 J	0.55	0.52
Cadmium	mg/kg	100	10	20	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Chromium	mg/kg	500	50	100	20	24	25	27	24	25	19	25
Cobalt	mg/kg	8,000	800	--	5.3	5.6	6.6	6.1	5.6	5.2	5.4	6.2
Copper	mg/kg	2,500	250	--	7.4	8.3	9.8	9.6	9.2	8.4	7.3	15
Lead	mg/kg	1,000	50	100	4.9	4.9	6.2	6.4	5.1	4.6	4.9	11
Mercury	mg/kg	20	2	4	<0.012	<0.012	<0.012	<0.012	0.17	<0.012	<0.012	<0.012
Molybdenum	mg/kg	3,500	3,500	--	0.86 J	0.71 J	0.64 J	1.2 J	2	0.65 J	0.51 J	1.9 J
Nickel	mg/kg	2,000	200	--	13	16	18	19	17	18	12	17
Selenium	mg/kg	100	10	20	<0.99	<0.99	<0.99	<0.99	<1	<1	<0.99	<0.99
Silver	mg/kg	500	50	100	<0.79	<0.79	<0.79	<0.79	<0.8	<0.8	<0.79	<0.79
Thallium	mg/kg	700	70	--	2.9 J	1 J	1.2 J	1.5 J	1.1 J	1.7 J	0.92 J	2 J
Vanadium	mg/kg	2,400	240	--	31	36	37	38	34	39	33	37
Zinc	mg/kg	5,000	2,500	--	34 B	37 B	42 B	39 B	40 B	43 B	44 B	52 B
TPH												
Gasoline Range Organics (C6-C12)	mg/kg	--	--	--	<0.38 {<0.14}	<0.39 {<0.15}	<0.39 {<0.14}	<0.39 {<0.15}	<0.39 {<0.15}	<0.39 {<0.15}	<0.4 {<0.15}	<0.39 {<0.15}
EFH (C10 - C24)	mg/kg	--	--	--	<5 {<3.5}	<5 {<3.5}	<5 {<3.5}	<5 {<3.5}	<5 {<3.5}	<5 {<3.5}	<5 {<3.5}	14
EFH (C25 - C40)	mg/kg	--	--	--	<5 {<3.5}	15	<5 {<3.5}	<5 {<3.5}	5.8	<5 {<3.5}	3.8 J	120
EFH (C10 - C40)	mg/kg	--	--	--	<5 {<3.5}	16	<5 {<3.5}	<5 {<3.5}	6.8	<5 {<3.5}	4.3 J	130
VOCs												
1,1,1,2-Tetrachloroethane	ug/kg	--	--	--	<2 {<0.57}	<2 {<0.57}	<2 {<0.56}	<2 {<0.56}	<2 {<0.57}	<2 {<0.57}	<2 {<0.57}	<2 {<0.57}
1,1,1-Trichloroethane	ug/kg	--	--	--	<0.99 {<0.69}	<1 {<0.7}	<0.99 {<0.69}	<0.98 {<0.69}	<0.99 {<0.7}	<0.99 {<0.7}	<1 {<0.7}	<1 {<0.7}
1,1,2,2-Tetrachloroethane	ug/kg	--	--	--	<2 {<0.85}	<2 {<0.86}	<2 {<0.85}	<2 {<0.84}	<2 {<0.85}	<2 {<0.85}	<2 {<0.86}	<2 {<0.86}
1,1,2-Trichloroethane	ug/kg	--	--	--	<0.99 {<0.86}	<1 {<0.87}	<0.99 {<0.86}	<0.98 {<0.85}	<0.99 {<0.86}	<0.99 {<0.86}	<1 {<0.87}	<1 {<0.87}
1,1-Dichloroethane	ug/kg	--	--	--	<0.99 {<0.5}	<1 {<0.5}	<0.99 {<0.5}	<0.98 {<0.49}	<0.99 {<0.5}	<0.99 {<0.5}	<1 {<0.5}	<1 {<0.5}
1,1-Dichloroethene	ug/kg	--	--	14,000	<2 {<0.6}	<2 {<0.6}	<2 {<0.59}	<2 {<0.59}	<2 {<0.6}	<2 {<0.6}	<2 {<0.6}	<2 {<0.6}
1,1-Dichloropropene	ug/kg	--	--	--	<0.99 {<0.4}	<1 {<0.4}	<0.99 {<0.4}	<0.98 {<0.39}	<0.99 {<0.4}	<0.99 {<0.4}	<1 {<0.4}	<1 {<0.4}
1,2,3-Trichlorobenzene	ug/kg	--	--	--	<2 {<0.99}	<2 {<1}	<2 {<0.99}	<2 {<0.98}	<2 {<0.99}	<2 {<0.99}	<2 {<1}	<2 {<1}
1,2,3-Trichloropropane	ug/kg	--	--	--	<2 {<0.99}	<2 {<1}	<2 {<0.99}	<2 {<0.98}	<2 {<0.99}	<2 {<0.99}	<2 {<1}	<2 {<1}
1,2,4-Trichlorobenzene	ug/kg	--	--	--	<2 {<0.99}	<2 {<1}	<2 {<0.99}	<2 {<0.98}	<2 {<0.99}	<2 {<0.99}	<2 {<1}	<2 {<1}
1,2,4-Trimethylbenzene	ug/kg	--	--	--	<0.99 {<0.77}	<1 {<0.78}	<0.99 {<0.77}	<0.98 {<0.77}	<0.99 {<0.78}	<0.99 {<0.78}	<1 {<0.78}	<1 {<0.78}
1,2-Dibromo-3-chloropropane	ug/kg	--	--	--	<9.9 {<1.5}	<10 {<1.5}	<9.9 {<1.5}	<9.8 {<1.5}	<9.9 {<1.5}	<9.9 {<1.5}	<10 {<1.5}	<10 {<1.5}

INTERIM SOURCE REMOVAL ACTION (ISRA) - OUTFALL 009

WASTE CHARACTERIZATION SAMPLE RESULTS – LOX-1B-2
THE BOEING COMPANY
SANTA SUSANA FIELD LABORATORY

		Object Name: Sample Name: Collection Date: Sample Depth (feet):			LXWC0012 LXWC0012S001 10/12/2010 1.3 - 1.8	LXWC0013 LXWC0013S001 10/12/2010 1.1 - 1.6	LXWC0014 LXWC0014S001 10/12/2010 1.3 - 1.8	LXWC0015 LXWC0015S001 10/12/2010 0.3 - 0.8	LXWC0016 LXWC0016S001 10/12/2010 0.8 - 1.3	LXWC0017 LXWC0017S001 10/12/2010 0 - 0.4	LXWC0018 LXWC0018S001 10/11/2010 0.7 - 1.2	LXWC0019 LXWC0019S001 10/11/2010 0 - 0.3
ANALYTE	UNITS	TCLC	WET Leachate Testing Trigger ^a	TCLP Leachate Testing Trigger ^b	RESULT ^c	RESULT ^c	RESULT ^c	RESULT ^c	RESULT ^c	RESULT ^c	RESULT ^c	RESULT ^c
1,2-Dibromoethane (EDB)	ug/kg	--	--	--	<0.99 {<0.79}	<1 {<0.8}	<0.99 {<0.79}	<0.98 {<0.79}	<0.99 {<0.8}	<0.99 {<0.8}	<1 {<0.8}	<1 {<0.8}
1,2-Dichlorobenzene	ug/kg	--	--	--	<0.99 {<0.94}	<1 {<0.95}	<0.99 {<0.94}	<0.98 {<0.93}	<0.99 {<0.94}	<0.99 {<0.94}	<1 {<0.95}	<1 {<0.95}
1,2-Dichloroethane	ug/kg	--	--	10,000	<0.99 {<0.79}	<1 {<0.8}	<0.99 {<0.79}	<0.98 {<0.79}	<0.99 {<0.8}	<0.99 {<0.8}	<1 {<0.8}	<1 {<0.8}
1,2-Dichloropropane	ug/kg	--	--	--	<0.99 {<0.79}	<1 {<0.8}	<0.99 {<0.79}	<0.98 {<0.79}	<0.99 {<0.8}	<0.99 {<0.8}	<1 {<0.8}	<1 {<0.8}
1,3,5-Trimethylbenzene	ug/kg	--	--	--	<0.99 {<0.62}	<1 {<0.63}	<0.99 {<0.62}	<0.98 {<0.62}	<0.99 {<0.63}	<0.99 {<0.63}	<1 {<0.63}	<1 {<0.63}
1,3-Dichlorobenzene	ug/kg	--	--	--	<0.99 {<0.83}	<1 {<0.84}	<0.99 {<0.83}	<0.98 {<0.83}	<0.99 {<0.83}	<0.99 {<0.83}	<1 {<0.84}	<1 {<0.84}
1,3-Dichloropropane	ug/kg	--	--	--	<0.99 {<0.62}	<1 {<0.63}	<0.99 {<0.62}	<0.98 {<0.62}	<0.99 {<0.63}	<0.99 {<0.63}	<1 {<0.63}	<1 {<0.63}
1,4-Dichlorobenzene	ug/kg	--	--	--	<0.99 {<0.93}	<1 {<0.94}	<0.99 {<0.93}	<0.98 {<0.92}	<0.99 {<0.93}	<0.99 {<0.93}	<1 {<0.94}	<1 {<0.94}
2-Butanone (MEK)	ug/kg	--	--	4,000,000	<9.9 {<6}	<10 {<6}	<9.9 {<5.9}	<9.8 {<5.9}	<9.9 {<6}	<9.9 {<6}	<10 {<6}	<10 {<6}
2-Hexanone	ug/kg	--	--	--	<9.9 {<9}	<10 {<9.1}	<9.9 {<9}	<9.8 {<8.9}	<9.9 {<9}	<9.9 {<9}	<10 {<9.1}	<10 {<9.1}
4-Methyl-2-pentanone (MIBK)	ug/kg	--	--	--	<5 {<4.5}	<5 {<4.5}	<5 {<4.5}	<4.9 {<4.4}	<5 {<4.5}	<5 {<4.5}	<5 {<4.5}	<5 {<4.5}
Acetone	ug/kg	--	--	--	<9.9 {<7.9}	<10 {<8}	<9.9 {<7.9}	<9.8 {<7.9}	<9.9 {<8}	<9.9 {<8}	<10 {<8}	<10 {<8}
Benzene	ug/kg	--	--	10,000	<0.99 {<0.5}	<1 {<0.5}	<0.99 {<0.5}	<0.98 {<0.49}	<0.99 {<0.5}	<0.99 {<0.5}	<1 {<0.5}	<1 {<0.5}
Bromobenzene	ug/kg	--	--	--	<2 {<0.83}	<2 {<0.84}	<2 {<0.83}	<2 {<0.83}	<2 {<0.83}	<2 {<0.83}	<2 {<0.84}	<2 {<0.84}
Bromochloromethane	ug/kg	--	--	--	<2 {<0.89}	<2 {<0.9}	<2 {<0.89}	<2 {<0.88}	<2 {<0.89}	<2 {<0.89}	<2 {<0.9}	<2 {<0.9}
Bromodichloromethane	ug/kg	--	--	--	<0.99 {<0.5}	<1 {<0.5}	<0.99 {<0.5}	<0.98 {<0.49}	<0.99 {<0.5}	<0.99 {<0.5}	<1 {<0.5}	<1 {<0.5}
Bromoform	ug/kg	--	--	--	<2 {<0.79}	<2 {<0.8}	<2 {<0.79}	<2 {<0.79}	<2 {<0.8}	<2 {<0.8}	<2 {<0.8}	<2 {<0.8}
Bromomethane	ug/kg	--	--	--	<2 {<0.91}	<2 {<0.92}	<2 {<0.91}	<2 {<0.9}	<2 {<0.91}	<2 {<0.91}	<2 {<0.92}	<2 {<0.92}
Carbon Disulfide	ug/kg	--	--	--	<5 {<0.96}	<5 {<0.97}	<5 {<0.96}	<4.9 {<0.95}	<5 {<0.96}	<5 {<0.96}	<5 {<0.97}	<5 {<0.97}
Carbon tetrachloride	ug/kg	--	--	10,000	<2 {<0.5}	<2 {<0.5}	<2 {<0.5}	<2 {<0.49}	<2 {<0.5}	<2 {<0.5}	<2 {<0.5}	<2 {<0.5}
Chlorobenzene	ug/kg	--	--	2,000,000	<0.99 {<0.52}	<1 {<0.52}	<0.99 {<0.51}	<0.98 {<0.51}	<0.99 {<0.52}	<0.99 {<0.52}	<1 {<0.52}	<1 {<0.52}
Chloroethane	ug/kg	--	--	--	<2 {<1.5}	<2 {<1.5}	<2 {<1.5}	<2 {<1.5}	<2 {<1.5}	<2 {<1.5}	<2 {<1.5}	<2 {<1.5}
Chloroform	ug/kg	--	--	120,000	<0.99 {<0.5}	<1 {<0.5}	<0.99 {<0.5}	<0.98 {<0.49}	<0.99 {<0.5}	<0.99 {<0.5}	<1 {<0.5}	<1 {<0.5}
Chloromethane	ug/kg	--	--	--	<2 {<0.99}	<2 {<1}	<2 {<0.99}	<2 {<0.98}	<2 {<0.99}	<2 {<0.99}	<2 {<1}	<2 {<1}
cis-1,2-Dichloroethene	ug/kg	--	--	--	<0.99 {<0.82}	<1 {<0.83}	<0.99 {<0.82}	<0.98 {<0.82}	<0.99 {<0.83}	<0.99 {<0.83}	<1 {<0.83}	<1 {<0.83}
cis-1,3-Dichloropropene	ug/kg	--	--	--	<0.99 {<0.44}	<1 {<0.44}	<0.99 {<0.44}	<0.98 {<0.43}	<0.99 {<0.44}	<0.99 {<0.44}	<1 {<0.44}	<1 {<0.44}
Dibromochloromethane	ug/kg	--	--	--	<0.99 {<0.69}	<1 {<0.7}	<0.99 {<0.69}	<0.98 {<0.69}	<0.99 {<0.7}	<0.99 {<0.7}	<1 {<0.7}	<1 {<0.7}
Dibromomethane	ug/kg	--	--	--	<0.99 {<0.89}	<1 {<0.9}	<0.99 {<0.89}	<0.98 {<0.88}	<0.99 {<0.89}	<0.99 {<0.89}	<1 {<0.9}	<1 {<0.9}
Dichlorodifluoromethane	ug/kg	--	--	--	<5 {<1.5}	<5 {<1.5}	<5 {<1.5}	<4.9 {<1.5}	<5 {<1.5}	<5 {<1.5}	<5 {<1.5}	<5 {<1.5}
Ethylbenzene	ug/kg	--	--	--	<0.99 {<0.5}	<1 {<0.5}	<0.99 {<0.5}	<0.98 {<0.49}	<0.99 {<0.5}	<0.99 {<0.5}	<1 {<0.5}	<1 {<0.5}
Hexachlorobutadiene	ug/kg	--	--	--	<2 {<0.79}	<2 {<0.8}	<2 {<0.79}	<2 {<0.79}	<2 {<0.8}	<2 {<0.8}	<2 {<0.8}	<2 {<0.8}
Isopropylbenzene	ug/kg	--	--	--	<0.99 {<0.54}	<1 {<0.54}	<0.99 {<0.53}	<0.98 {<0.53}	<0.99 {<0.54}	<0.99 {<0.54}	<1 {<0.54}	<1 {<0.54}
m,p-Xylenes	ug/kg	--	--	--	<2 {<0.79}	<2 {<0.8}	<2 {<0.79}	<2 {<0.79}	<2 {<0.8}	<2 {<0.8}	<2 {<0.8}	<2 {<0.8}
Methylene chloride	ug/kg	--	--	--	<9.9 {<6.4}	<10 {<6.5}	<9.9 {<6.4}	<9.8 {<6.4}	<9.9 {<6.5}	<9.9 {<6.5}	<10 {<6.5}	<10 {<6.5}
Methyl-tert-butyl Ether (MTBE)	ug/kg	--	--	--	<2 {<0.99}	<2 {<1}	<2 {<0.99}	<2 {<0.98}	<2 {<0.99}	<2 {<0.99}	<2 {<1}	<2 {<1}
n-Butylbenzene	ug/kg	--	--	--	<2 {<0.71}	<2 {<0.72}	<2 {<0.71}	<2 {<0.71}	<2 {<0.72}	<2 {<0.72}	<2 {<0.72}	<2 {<0.72}

INTERIM SOURCE REMOVAL ACTION (ISRA) - OUTFALL 009

WASTE CHARACTERIZATION SAMPLE RESULTS – LOX-1B-2
THE BOEING COMPANY
SANTA SUSANA FIELD LABORATORY

		Object Name: Sample Name: Collection Date: Sample Depth (feet):			LXWC0012 LXWC0012S001 10/12/2010 1.3 - 1.8	LXWC0013 LXWC0013S001 10/12/2010 1.1 - 1.6	LXWC0014 LXWC0014S001 10/12/2010 1.3 - 1.8	LXWC0015 LXWC0015S001 10/12/2010 0.3 - 0.8	LXWC0016 LXWC0016S001 10/12/2010 0.8 - 1.3	LXWC0017 LXWC0017S001 10/12/2010 0 - 0.4	LXWC0018 LXWC0018S001 10/11/2010 0.7 - 1.2	LXWC0019 LXWC0019S001 10/11/2010 0 - 0.3
ANALYTE	UNITS	TTLIC	WET Leachate Testing Trigger ^a	TCLP Leachate Testing Trigger ^b	RESULT ^c	RESULT ^c	RESULT ^c	RESULT ^c	RESULT ^c	RESULT ^c	RESULT ^c	RESULT ^c
n-Propylbenzene	ug/kg	--	--	--	<0.99 {<0.61}	<1 {<0.61}	<0.99 {<0.6}	<0.98 {<0.6}	<0.99 {<0.61}	<0.99 {<0.61}	<1 {<0.61}	<1 {<0.61}
Naphthalene	ug/kg	--	--	--	<2 {<1.1}	<2 {<1.1}	<2 {<1.1}	<2 {<1.1}	<2 {<1.1}	<2 {<1.1}	<2 {<1.1}	<2 {<1.1}
o-Xylene	ug/kg	--	--	--	<0.99 {<0.5}	<1 {<0.5}	<0.99 {<0.5}	<0.98 {<0.49}	<0.99 {<0.5}	<0.99 {<0.5}	<1 {<0.5}	<1 {<0.5}
p-Isopropyltoluene	ug/kg	--	--	--	<0.99 {<0.71}	<1 {<0.72}	<0.99 {<0.71}	<0.98 {<0.71}	<0.99 {<0.72}	<0.99 {<0.72}	<1 {<0.72}	<1 {<0.72}
sec-Butylbenzene	ug/kg	--	--	--	<2 {<0.66}	<2 {<0.67}	<2 {<0.66}	<2 {<0.66}	<2 {<0.67}	<2 {<0.67}	<2 {<0.67}	<2 {<0.67}
Styrene	ug/kg	--	--	--	<0.99 {<0.58}	<1 {<0.58}	<0.99 {<0.57}	<0.98 {<0.57}	<0.99 {<0.58}	<0.99 {<0.58}	<1 {<0.58}	<1 {<0.58}
tert-Butylbenzene	ug/kg	--	--	--	<2 {<0.62}	<2 {<0.62}	<2 {<0.61}	<2 {<0.61}	<2 {<0.62}	<2 {<0.62}	<2 {<0.62}	<2 {<0.62}
Tetrachloroethene	ug/kg	--	--	14,000	<0.99 {<0.49}	<1 {<0.49}	<0.99 {<0.49}	<0.98 {<0.48}	<0.99 {<0.49}	<0.99 {<0.49}	<1 {<0.49}	<1 {<0.49}
Toluene	ug/kg	--	--	--	<0.99 {<0.5}	<1 {<0.5}	<0.99 {<0.5}	<0.98 {<0.49}	<0.99 {<0.5}	<0.99 {<0.5}	<1 {<0.5}	<1 {<0.5}
trans-1,2-Dichloroethene	ug/kg	--	--	--	<0.99 {<0.69}	<1 {<0.7}	<0.99 {<0.69}	<0.98 {<0.69}	<0.99 {<0.7}	<0.99 {<0.7}	<1 {<0.7}	<1 {<0.7}
trans-1,3-Dichloropropene	ug/kg	--	--	--	<0.99 {<0.61}	<1 {<0.61}	<0.99 {<0.6}	<0.98 {<0.6}	<0.99 {<0.61}	<0.99 {<0.61}	<1 {<0.61}	<1 {<0.61}
Trichloroethene	ug/kg	2,040,000	2,040,000	10,000	<0.99 {<0.5}	<1 {<0.5}	<0.99 {<0.5}	<0.98 {<0.49}	<0.99 {<0.5}	<0.99 {<0.5}	<1 {<0.5}	<1 {<0.5}
Trichlorofluoromethane	ug/kg	--	--	--	<2 {<0.54}	<2 {<0.54}	<2 {<0.53}	<2 {<0.53}	<2 {<0.54}	<2 {<0.54}	<2 {<0.54}	<2 {<0.54}
Vinyl acetate	ug/kg	--	--	--	<5 {<2.5}	<5 {<2.5}	<5 {<2.5}	<4.9 {<2.5}	<5 {<2.5}	<5 {<2.5}	<5 {<2.5}	<5 {<2.5}
Vinyl chloride	ug/kg	--	--	4,000	<2 {<0.9}	<2 {<0.91}	<2 {<0.9}	<2 {<0.89}	<2 {<0.9}	<2 {<0.9}	<2 {<0.91}	<2 {<0.91}
RADIONUCLIDES	--	--	--	--	R	R	R	R	R	R	R	R

INTERIM SOURCE REMOVAL ACTION (ISRA) - OUTFALL 009

**WASTE CHARACTERIZATION SAMPLE RESULTS – LOX
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.

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

WASTE CHARACTERIZATION: IN-SITU SOIL LOCATED AT ISRA AREA II PLANNED EXCAVATION LOX-1B-3

Introduction

This report presents supporting detailed information relating to the October 8 through October 12, 2010 in-situ characterization of prospective soil wastes at the planned ISRA excavation LOX-1B-3 in SSFL Area II.

Background

Soil to be excavated from designated locations in accordance with the ISRA Workplan for SSFL Area II was characterized prior to excavation. A step-by-step approach was followed to accomplish the in-situ characterization. The first step was to review available historical activity and chemical usage information, as well as existing analytical data from past soil sampling in the area. The objective was to identify all substances that could have an impact on determining whether soil in the planned excavation footprint was hazardous or not.

Once potential impacts to the soil were identified, the next step was to develop a random sampling plan for each planned excavation footprint. Samples were collected according to the plan and analyzed by a state certified laboratory. Analytical results provided by the laboratory were evaluated to determine whether any regulated substances were present at concentrations exceeding regulatory thresholds governing waste management. Furthermore, the results were also evaluated to assure adequacy for waste characterization purposes based upon the guidelines presented in U.S. EPA SW-846. If the number of samples was not sufficient, additional samples would be collected and analyzed. In lieu of further sampling, the soil could be characterized as hazardous.

The review of historical information and existing analytical data relevant to planned excavation LOX-1B-3 was based largely on the Group 2 RFI results. Evaluation of these data and other sources of relevant information suggested that Regulated Metals, pH, Petroleum Hydrocarbons (TPH), and Volatile Organic Compounds (VOC) should be addressed in the LOX-1B-3 excavation footprint. A random sampling plan was developed for collection of forty (40) total samples. As the planned excavation was extremely large and highly irregular in shape, there was concern that sample collection point clustering would exclude some part the excavation footprint from the assessment. This was monitored and the distribution of sample collection points was determined to be acceptable. The samples were analyzed for CAM 17 metals, pH, TPH, and VOCs. All samples were collected, contained, and handled according to field practice requirements in SW-846.

Results

Analytical results for the LOX-1B-3 planned excavation area are presented in TestAmerica reports ITJ0982, issued on 10/18/10, ITJ1147, issued on 10/22/10, ITJ1209, issued on 11/4/10, and ITJ1354 issued on 10/20/10. Regulated metals were detected. Applicable regulatory thresholds for Chromium were exceeded in three cases at concentrations of 50 mg/kg, 97 mg/kg, and 410 mg/kg. As the 10 X STLC threshold of 50 ppm was exceeded by these samples, the California Waste Extraction Test (WET) was conducted as required to determine leaching characteristics. Additionally, the 20 X TCLP threshold of 100 ppm was also exceeded by one of the samples, requiring the analysis using the RCRA TCLP leachate test. The WET resulted in leachate concentrations of 0.58 mg/L and 1.0 mg/L for samples exhibiting the lower

total Chromium concentrations. Both of these samples were below the STLC limit for Chromium of 5 mg/L. The TCLP result for the sample with the higher Chromium concentration (i.e., 410 mg/kg) was 0.17 mg/L, below the TCLP limit for Chromium of 5 mg/L. The WET result for this sample was 22 mg/L, well in excess of the STLC limit. However, if the proportion of Hexavalent Chromium can be partitioned from the Trivalent Chromium contribution, the WET limit for the latter is 560 mg/L, while that for the Hexavalent Chromium remains at 5 mg/L. Further analysis of the sample in question was performed with a resulting WET concentration for Hexavalent Chromium of 0.022 mg/L, below the applicable STLC limit.

Applicable regulatory thresholds for Lead were also exceeded in six cases. The elevated Lead concentrations were observed at 51 mg/kg, 60 mg/kg, 83 mg/kg, 88 mg/kg, 130 mg/kg, and 350 mg/kg. WET and TCLP leachate tests were performed as required on these samples, and four of the samples exhibited leachate concentrations below the regulatory limits for STLC and TCLP, both of which are 5 mg/L. The samples with lower total Lead concentrations yielded WET results of 4.4 mg/L, 2.4 mg/L, 2.8 mg/L, 1.6 mg/L, respectively. At 3.5 mg/L and 0.058 mg/L, leachate concentrations were below the TCLP limit for the two remaining samples with total concentrations of 130 ppm and 350 ppm. However, these samples exhibited Lead concentrations above the STLC limit at 52 mg/L and 22 mg/L, respectively.

Somewhat elevated concentrations of TPH were detected. C10 - C40 Petroleum Hydrocarbons concentrations ranged from non-detect to 400 mg/kg. TPH itself is not directly regulated and does not begin to affect waste disposal until concentrations attain 100 mg/kg. However, the 100 mg/kg limit relates to Subtitle D (MSW) landfill acceptance of gasoline and diesel impacted soils. The Petroleum fraction driving the elevated concentration at LOX-1B-3 is in the C25 - C40 range, which is in the Oil range. The Subtitle D landfill acceptance limit for oil impacted soil is 1,000 mg/kg.

The pH obtained for the soil samples demonstrated a slightly alkaline character. A maximum pH of 9.49 was obtained, which is well below the 12.5 pH limit for hazardous waste.

Methylene Chloride was the most visible VOC that was detected. MDLs were satisfactorily low for waste characterization purposes. All Methylene Chloride detections were "J-flagged" and ranged between 0.0065 mg/kg and 0.0094 mg/kg in a total of 11 samples. The substance was reported to be present in the laboratory Method Blank. Methylene Chloride is regulated under RCRA when it is a spent solvent. However, the very low concentrations that were detected and its widespread use as a solvent in analytical laboratories provides strong evidence that the reported detections are not actually related to the soil samples themselves. Rather, the Methylene Chloride appears to be related to laboratory activities.

One other VOC was detected. A single sample exhibited Trichloroethene, a solvent that may have been used in the area, at 0.0045 mg/kg. No other instances of Trichloroethene were detected in any of the LOX-1B-3 samples. The MDLs for Trichloroethene ranged from 0.00048 mg/kg to 0.00052 mg/kg.

Determination

Soil Impacted Trichloroethene

As a spent solvent, Trichloroethene is a RCRA-Listed hazardous waste. In this case, Trichloroethene is identified as either a F001 or F002 hazardous waste, depending upon whether its use as a solvent was related to degreasing or to other purposes. Both F001 and

F002 are listed based on toxicity. When environmental media is measurably impacted with a toxicity listed spent solvent, the U.S. EPA "Contained-in Policy" states that the media is itself a hazardous waste regardless of the contaminant concentration. The one sample exhibiting Trichloroethene was located in the northwest portion of LOX-1B-3, on the western perimeter of the planned excavation. In accordance with the Contained-in Policy, soil in this area will be hazardous waste when it is excavated for disposal.

Three sample collection points nearest the Trichloroethene location to the east were used to identify a boundary for soil that will be managed as F-Listed upon excavation. As described above, no Trichloroethene was detected in samples collected at these points. Using the three sample collection points as a reference, a diagonal line is established that segregates the entire northwest corner of LOX-1B-3 from the remainder of the excavation footprint. The identified section is referred to as the LOX-1B-3 Northwest Area.

The soil in the SSFL Area II LOX-1B-3 Northwest Area is RCRA F001/F002 HAZARDOUS.

Lead Impacted Soil

Two samples exhibited WET leachate results that exceeded the STLC limit for Lead. One of these samples was located in the northeast corner of LOX-1B-3, while the other was located in the southern end of the excavation footprint protrusion which extends south from the central area of the footprint. When excavated for disposal, the soil associated with these two samples is California only hazardous waste.

Four sample collection points nearest the northeast Lead impacted location to the west were used to identify a boundary for soil that will be managed as California hazardous upon excavation. All of the samples from these collection points exhibited Lead concentrations well below applicable hazardous waste thresholds. Using the four sample collection points as a reference, an arc is established that segregates the entire northeast corner of LOX-1B-3 from the remainder of the excavation footprint. Soil in this area will be managed as hazardous waste. The identified section is referred to as the LOX-1B-3 Northeast Area.

The entire protrusion which extends south from the central area of the footprint was identified for segregation from the main body of LOX-1B-3 where the two sections meet. Soil in this area will be managed as hazardous waste. The identified section is referred to as the LOX-1B-3 Southern Middle Area.

The soil in the SSFL Area II LOX-1B-3 Northeast Area and in the LOX-1B-3 Southern Middle Area is California Only HAZARDOUS for Lead.

Below Threshold Soil

Samples collected from the LOX-1B-3 main excavation body and the west end southern-extending leg (excluding LOX-1B-3 Northwest, Northeast, and Southern Middle Areas) did not exceed regulatory thresholds. A total of 31 samples apply to this portion of the excavation footprint. According to analytical results and generator knowledge, the soil here:

- 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
- 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 SSFL Area II LOX-1B-3 main excavation body and west end southern-extending leg is NON-HAZARDOUS.

**Outfall 009
Waste Characterization
Sample Locations for LOX-1B-3**

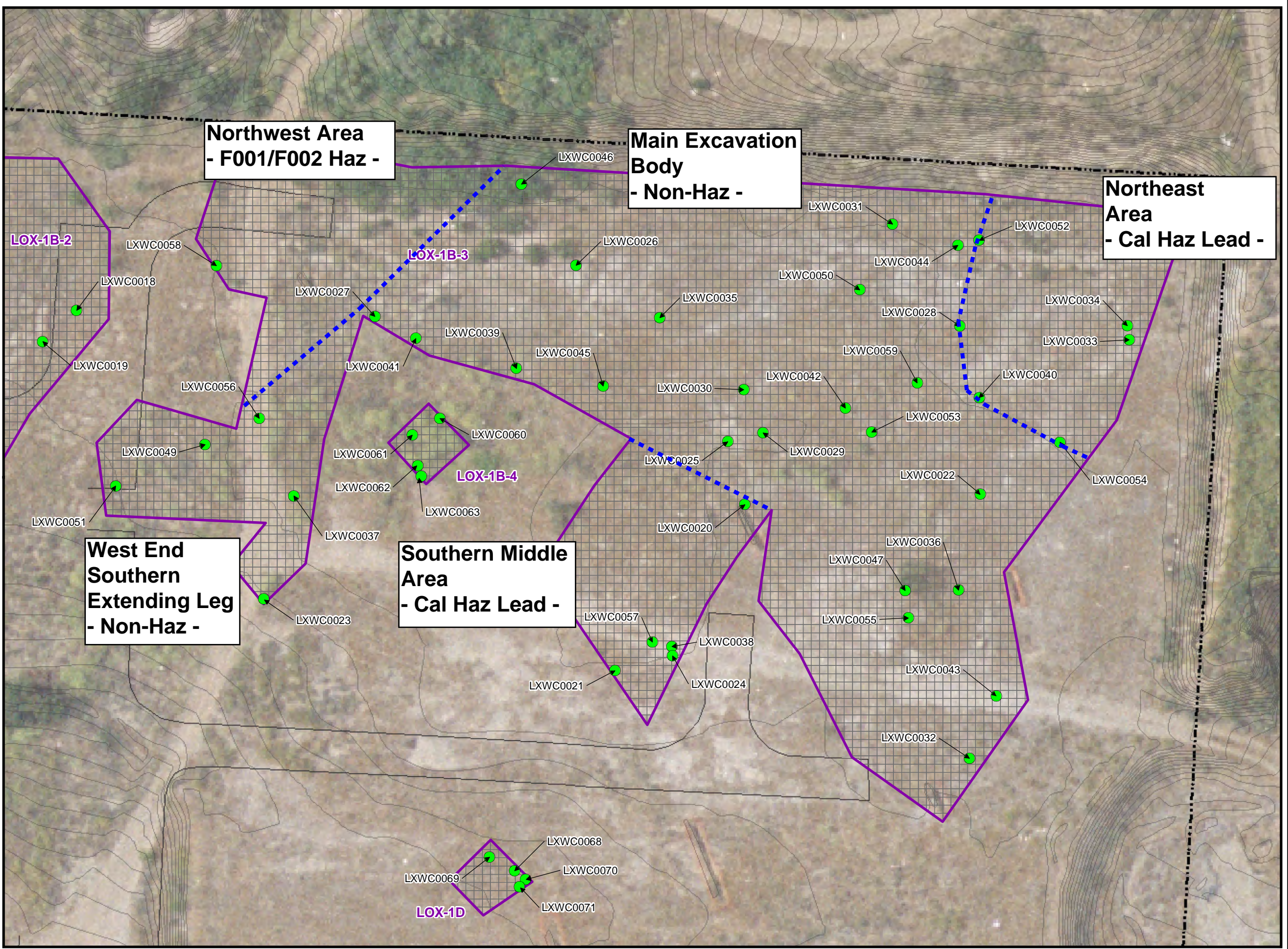
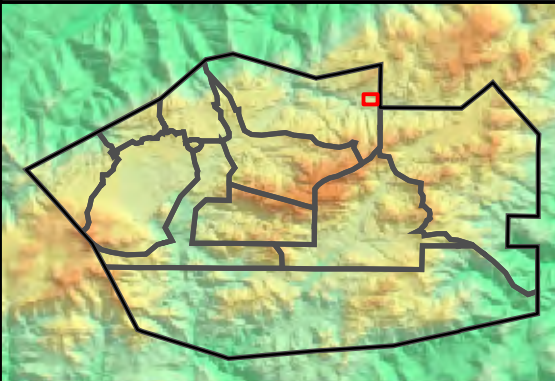
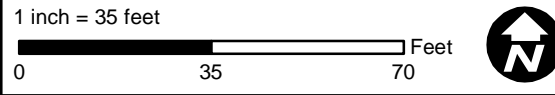
- Base Map Legend**
- Administrative Area Boundary
 - RFI Site Boundary
 - Report Group Boundary
 - NPDES Outfall
 - A/C Paving
 - Drainage
 - Non Jurisdictional Surface Water Pathway
 - Surface Water Divide

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

Note:

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

Document: ISRA_Plots_Working_LOX-1-B3_SampleLocations_WC.mxd Date: Nov 05, 2010



SANTA SUSANA FIELD LABORATORY

FIGURE 1

INTERIM SOURCE REMOVAL ACTION (ISRA) - OUTFALL 009

WASTE CHARACTERIZATION SAMPLE RESULTS – LOX-1B-3
 THE BOEING COMPANY
 SANTA SUSANA FIELD LABORATORY

							Object Name:	LXWC0020	LXWC0021	LXWC0022	LXWC0023	LXWC0024	LXWC0025	LXWC0026	LXWC0027
							Sample Name:	LXWC0020S001	LXWC0021S001	LXWC0022S001	LXWC0023S001	LXWC0024S001	LXWC0025S001	LXWC0026S001	LXWC0027S001
							Collection Date:	10/13/2010	10/8/2010	10/11/2010	10/8/2010	10/8/2010	10/13/2010	10/11/2010	10/11/2010
							Sample Depth (feet):	0.1 - 0.3	0.1 - 0.6	0 - 0.6	0.7 - 1.2	0.4 - 0.9	0.5 - 1	0.3 - 0.8	0.8 - 1.3
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	RESULT ^c	RESULT ^c
METALS															
Antimony	mg/kg	500	150	--	--	--	2.9 J	1.5 J	1.8 J	1.3 J	1.1 J	<0.86	<1.8	<1.8	<1.8
Arsenic	mg/kg	500	50	100	--	--	4.6	5.3	4.1	5.7	4.9	5.1	3.3 J	5.2	5.2
Barium	mg/kg	10,000	1,000	2,000	--	--	170	81	82	95	84	59	47	100	100
Beryllium	mg/kg	75	7.5	--	--	--	1	0.51	0.42 J	0.63	0.46 J	0.57	<0.4	0.48 J	0.48 J
Cadmium	mg/kg	100	10	20	--	--	<0.2	<0.2	<0.4	<0.2	<0.2	<0.2	<0.4	<0.4	<0.4
Chromium	mg/kg	500	50	100	--	--	25	22	23	26	24	18	12	26	26
Chromium, WET	mg/L	--	--	--	560	--	--	--	--	--	--	--	--	--	--
Chromium, TCLP	mg/L	--	--	--	--	5	--	--	--	--	--	--	--	--	--
Chromium (Hexavalent), WET	mg/L	--	--	--	5	--	--	--	--	--	--	--	--	--	--
Cobalt	mg/kg	8,000	800	--	--	--	7.3	5.2	5.8	6.1	5.1	4.5	4	5.9	5.9
Copper	mg/kg	2,500	250	--	--	--	27	9.5	13	12	21	20	10	12	12
Lead	mg/kg	1,000	50	100	--	--	35	8.3	7.7	8.2	15	8.1	7	6.1	6.1
Lead, WET	mg/L	--	--	--	5	--	--	--	--	--	--	--	--	--	--
Lead, TCLP	mg/L	--	--	--	--	5	--	--	--	--	--	--	--	--	--
Mercury	mg/kg	20	2	4	--	--	0.012 J	<0.012	<0.012	<0.012	0.033	<0.012	<0.012	<0.012	<0.012
Molybdenum	mg/kg	3,500	3,500	--	--	--	<0.2	0.94 J	1.7 J	1.5 J	1.7 J	0.2 J	1.1 J	0.68 J	0.68 J
Nickel	mg/kg	2,000	200	--	--	--	16 B	17	18	18	18	13 B	8.1	18	18
Selenium	mg/kg	100	10	20	--	--	<1	<0.99	<2	<0.98	<0.98	<0.98	3.7 JB	2.3 JB	2.3 JB
Silver	mg/kg	500	50	100	--	--	<0.8	<0.79	<1.6	<0.78	<0.78	<0.78	<1.6	<1.6	<1.6
Thallium	mg/kg	700	70	--	--	--	<0.8	1.3 J	1.7 J	1.2 J	<0.78	<0.78	2.2 J	2.3 J	2.3 J
Vanadium	mg/kg	2,400	240	--	--	--	38	34	35	39	32	29	20	42	42
Zinc	mg/kg	5,000	2,500	--	--	--	140 B	45	53 B	55	67	50 B	53 B	50 B	50 B
GENERAL CHEMISTRY															
pH	SU	--	--	--	--	--	8.54	8.19	8.23	8.38	7.95	8.31	9.49	7.9	7.9
TPH															
Gasoline Range Organics (C6-C12)	mg/kg	--	--	--	--	--	<0.39 {<0.15}	<0.4 {<0.15}	<0.4 {<0.15}	<0.39 {<0.15}	<0.38 {<0.14}	<0.38 {<0.14}	<0.38 {<0.14}	<0.38 {<0.14}	<0.38 {<0.14}
EFH (C10 - C24)	mg/kg	--	--	--	--	--	<5 {<3.5}	<5 {<3.5}	<5 {<3.5}	<5 {<3.5}	10	<5 {<3.5}	31	<5 {<3.5}	<5 {<3.5}
EFH (C25 - C40)	mg/kg	--	--	--	--	--	12 B	<5 {<3.5}	17	<5 {<3.5}	61	<5 {<3.5}	78	3.8 J	3.8 J
EFH (C10 - C40)	mg/kg	--	--	--	--	--	14 B	<5 {<3.5}	20	<5 {<3.5}	71	<5 {<3.5}	110	4.5 J	4.5 J
VOCs															
1,1,1,2-Tetrachloroethane	ug/kg	--	--	--	--	--	<2 {<0.57}	<2 {<0.56}	<2 {<0.57}	<2 {<0.56}	<2 {<0.56}	<2 {<0.56}	<2 {<0.56}	<2 {<0.57}	<2 {<0.57}
1,1,1-Trichloroethane	ug/kg	--	--	--	--	--	<1 {<0.7}	<0.98 {<0.69}	<1 {<0.7}	<0.98 {<0.69}	<0.98 {<0.69}	<0.99 {<0.69}	<1 {<0.7}	<1 {<0.7}	<1 {<0.7}
1,1,2,2-Tetrachloroethane	ug/kg	--	--	--	--	--	<2 {<0.86}	<2 {<0.85}	<2 {<0.86}	<2 {<0.85}	<2 {<0.85}	<2 {<0.85}	<2 {<0.86}	<2 {<0.86}	<2 {<0.86}
1,1,2-Trichloroethane	ug/kg	--	--	--	--	--	<1 {<0.87}	<0.98 {<0.86}	<1 {<0.87}	<0.98 {<0.86}	<0.98 {<0.86}	<0.99 {<0.86}	<1 {<0.87}	<1 {<0.87}	<1 {<0.87}
1,1-Dichloroethane	ug/kg	--	--	--	--	--	<1 {<0.5}	<0.98 {<0.49}	<1 {<0.5}	<0.98 {<0.49}	<0.98 {<0.49}	<0.99 {<0.5}	<1 {<0.5}	<1 {<0.5}	<1 {<0.5}
1,1-Dichloroethene	ug/kg	--	--	14,000	--	--	<2 {<0.6}	<2 {<0.59}	<2 {<0.6}	<2 {<0.59}	<2 {<0.59}	<2 {<0.59}	<2 {<0.6}	<2 {<0.6}	<2 {<0.6}

INTERIM SOURCE REMOVAL ACTION (ISRA) - OUTFALL 009

WASTE CHARACTERIZATION SAMPLE RESULTS – LOX-1B-3

THE BOEING COMPANY

SANTA SUSANA FIELD LABORATORY

							Object Name:	LXWC0020	LXWC0021	LXWC0022	LXWC0023	LXWC0024	LXWC0025	LXWC0026	LXWC0027
							Sample Name:	LXWC0020S001	LXWC0021S001	LXWC0022S001	LXWC0023S001	LXWC0024S001	LXWC0025S001	LXWC0026S001	LXWC0027S001
							Collection Date:	10/13/2010	10/8/2010	10/11/2010	10/8/2010	10/8/2010	10/13/2010	10/11/2010	10/11/2010
							Sample Depth (feet):	0.1 - 0.3	0.1 - 0.6	0 - 0.6	0.7 - 1.2	0.4 - 0.9	0.5 - 1	0.3 - 0.8	0.8 - 1.3
ANALYTE	UNITS	TTLC	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	RESULT ^c	
1,1-Dichloropropene	ug/kg	--	--	--	--	--	<1 {<0.4}	<0.98 {<0.39}	<1 {<0.4}	<0.98 {<0.39}	<0.98 {<0.39}	<0.99 {<0.4}	<1 {<0.4}	<1 {<0.4}	
1,2,3-Trichlorobenzene	ug/kg	--	--	--	--	--	<2 {<1}	<2 {<0.98}	<2 {<1}	<2 {<0.98}	<2 {<0.98}	<2 {<0.99}	<2 {<1}	<2 {<1}	
1,2,3-Trichloropropane	ug/kg	--	--	--	--	--	<2 {<1}	<2 {<0.98}	<2 {<1}	<2 {<0.98}	<2 {<0.98}	<2 {<0.99}	<2 {<1}	<2 {<1}	
1,2,4-Trichlorobenzene	ug/kg	--	--	--	--	--	<2 {<1}	<2 {<0.98}	<2 {<1}	<2 {<0.98}	<2 {<0.98}	<2 {<0.99}	<2 {<1}	<2 {<1}	
1,2,4-Trimethylbenzene	ug/kg	--	--	--	--	--	<1 {<0.78}	<0.98 {<0.77}	<1 {<0.78}	<0.98 {<0.77}	<0.98 {<0.77}	<0.99 {<0.77}	<1 {<0.78}	<1 {<0.78}	
1,2-Dibromo-3-chloropropane	ug/kg	--	--	--	--	--	<10 {<1.5}	<9.8 {<1.5}	<10 {<1.5}	<9.8 {<1.5}	<9.8 {<1.5}	<9.9 {<1.5}	<10 {<1.5}	<10 {<1.5}	
1,2-Dibromoethane (EDB)	ug/kg	--	--	--	--	--	<1 {<0.8}	<0.98 {<0.79}	<1 {<0.8}	<0.98 {<0.79}	<0.98 {<0.79}	<0.99 {<0.79}	<1 {<0.8}	<1 {<0.8}	
1,2-Dichlorobenzene	ug/kg	--	--	--	--	--	<1 {<0.95}	<0.98 {<0.94}	<1 {<0.95}	<0.98 {<0.94}	<0.98 {<0.94}	<0.99 {<0.94}	<1 {<0.95}	<1 {<0.95}	
1,2-Dichloroethane	ug/kg	--	--	10,000	--	--	<1 {<0.8}	<0.98 {<0.79}	<1 {<0.8}	<0.98 {<0.79}	<0.98 {<0.79}	<0.99 {<0.79}	<1 {<0.8}	<1 {<0.8}	
1,2-Dichloropropane	ug/kg	--	--	--	--	--	<1 {<0.8}	<0.98 {<0.79}	<1 {<0.8}	<0.98 {<0.79}	<0.98 {<0.79}	<0.99 {<0.79}	<1 {<0.8}	<1 {<0.8}	
1,3,5-Trimethylbenzene	ug/kg	--	--	--	--	--	<1 {<0.63}	<0.98 {<0.62}	<1 {<0.63}	<0.98 {<0.62}	<0.98 {<0.62}	<0.99 {<0.62}	<1 {<0.63}	<1 {<0.63}	
1,3-Dichlorobenzene	ug/kg	--	--	--	--	--	<1 {<0.84}	<0.98 {<0.83}	<1 {<0.84}	<0.98 {<0.83}	<0.98 {<0.83}	<0.99 {<0.83}	<1 {<0.84}	<1 {<0.84}	
1,3-Dichloropropane	ug/kg	--	--	--	--	--	<1 {<0.63}	<0.98 {<0.62}	<1 {<0.63}	<0.98 {<0.62}	<0.98 {<0.62}	<0.99 {<0.62}	<1 {<0.63}	<1 {<0.63}	
1,4-Dichlorobenzene	ug/kg	--	--	--	--	--	<1 {<0.94}	<0.98 {<0.93}	<1 {<0.94}	<0.98 {<0.93}	<0.98 {<0.93}	<0.99 {<0.93}	<1 {<0.94}	<1 {<0.94}	
2-Butanone (MEK)	ug/kg	--	--	4,000,000	--	--	<10 {<6}	<9.8 {<5.9}	<10 {<6}	<9.8 {<5.9}	<9.8 {<5.9}	<9.9 {<5.9}	<10 {<6}	<10 {<6}	
2-Hexanone	ug/kg	--	--	--	--	--	<10 {<9.1}	<9.8 {<9}	<10 {<9.1}	<9.8 {<9}	<9.8 {<9}	<9.9 {<9}	<10 {<9.1}	<10 {<9.1}	
4-Methyl-2-pentanone (MIBK)	ug/kg	--	--	--	--	--	<5 {<4.5}	<4.9 {<4.4}	<5 {<4.5}	<4.9 {<4.4}	<4.9 {<4.4}	<5 {<4.5}	<5 {<4.5}	<5 {<4.5}	
Acetone	ug/kg	--	--	--	--	--	<10 {<8}	<9.8 {<7.9}	<10 {<8}	<9.8 {<7.9}	<9.8 {<7.9}	<9.9 {<7.9}	<10 {<8}	<10 {<8}	
Benzene	ug/kg	--	--	10,000	--	--	<1 {<0.5}	<0.98 {<0.49}	<1 {<0.5}	<0.98 {<0.49}	<0.98 {<0.49}	<0.99 {<0.5}	<1 {<0.5}	<1 {<0.5}	
Bromobenzene	ug/kg	--	--	--	--	--	<2 {<0.84}	<2 {<0.83}	<2 {<0.84}	<2 {<0.83}	<2 {<0.83}	<2 {<0.83}	<2 {<0.84}	<2 {<0.84}	
Bromochloromethane	ug/kg	--	--	--	--	--	<2 {<0.9}	<2 {<0.89}	<2 {<0.9}	<2 {<0.89}	<2 {<0.89}	<2 {<0.89}	<2 {<0.9}	<2 {<0.9}	
Bromodichloromethane	ug/kg	--	--	--	--	--	<1 {<0.5}	<0.98 {<0.49}	<1 {<0.5}	<0.98 {<0.49}	<0.98 {<0.49}	<0.99 {<0.5}	<1 {<0.5}	<1 {<0.5}	
Bromoform	ug/kg	--	--	--	--	--	<2 {<0.8}	<2 {<0.79}	<2 {<0.8}	<2 {<0.79}	<2 {<0.79}	<2 {<0.79}	<2 {<0.8}	<2 {<0.8}	
Bromomethane	ug/kg	--	--	--	--	--	<2 {<0.92}	<2 {<0.91}	<2 {<0.92}	<2 {<0.91}	<2 {<0.91}	<2 {<0.91}	<2 {<0.92}	<2 {<0.92}	
Carbon Disulfide	ug/kg	--	--	--	--	--	<5 {<0.97}	<4.9 {<0.95}	<5 {<0.97}	<4.9 {<0.95}	<4.9 {<0.95}	<5 {<0.96}	<5 {<0.97}	<5 {<0.97}	
Carbon tetrachloride	ug/kg	--	--	10,000	--	--	<2 {<0.5}	<2 {<0.49}	<2 {<0.5}	<2 {<0.49}	<2 {<0.49}	<2 {<0.5}	<2 {<0.5}	<2 {<0.5}	
Chlorobenzene	ug/kg	--	--	2,000,000	--	--	<1 {<0.52}	<0.98 {<0.51}	<1 {<0.52}	<0.98 {<0.51}	<0.98 {<0.51}	<0.99 {<0.51}	<1 {<0.52}	<1 {<0.52}	
Chloroethane	ug/kg	--	--	--	--	--	<2 {<1.5}	<2 {<1.5}	<2 {<1.5}	<2 {<1.5}	<2 {<1.5}	<2 {<1.5}	<2 {<1.5}	<2 {<1.5}	
Chloroform	ug/kg	--	--	120,000	--	--	<1 {<0.5}	<0.98 {<0.49}	<1 {<0.5}	<0.98 {<0.49}	<0.98 {<0.49}	<0.99 {<0.5}	<1 {<0.5}	<1 {<0.5}	
Chloromethane	ug/kg	--	--	--	--	--	<2 {<1}	<2 {<0.98}	<2 {<1}	<2 {<0.98}	<2 {<0.98}	<2 {<0.99}	<2 {<1}	<2 {<1}	
cis-1,2-Dichloroethene	ug/kg	--	--	--	--	--	<1 {<0.83}	<0.98 {<0.82}	<1 {<0.83}	<0.98 {<0.82}	<0.98 {<0.82}	<0.99 {<0.82}	<1 {<0.83}	<1 {<0.83}	
cis-1,3-Dichloropropene	ug/kg	--	--	--	--	--	<1 {<0.44}	<0.98 {<0.43}	<1 {<0.44}	<0.98 {<0.43}	<0.98 {<0.43}	<0.99 {<0.44}	<1 {<0.44}	<1 {<0.44}	
Dibromochloromethane	ug/kg	--	--	--	--	--	<1 {<0.7}	<0.98 {<0.69}	<1 {<0.7}	<0.98 {<0.69}	<0.98 {<0.69}	<0.99 {<0.69}	<1 {<0.7}	<1 {<0.7}	
Dibromomethane	ug/kg	--	--	--	--	--	<1 {<0.9}	<0.98 {<0.89}	<1 {<0.9}	<0.98 {<0.89}	<0.98 {<0.89}	<0.99 {<0.89}	<1 {<0.9}	<1 {<0.9}	
Dichlorodifluoromethane	ug/kg	--	--	--	--	--	<5 {<1.5}	<4.9 {<1.5}	<5 {<1.5}	<4.9 {<1.5}	<4.9 {<1.5}	<5 {<1.5}	<5 {<1.5}	<5 {<1.5}	
Ethylbenzene	ug/kg	--	--	--	--	--	<1 {<0.5}	<0.98 {<0.49}	<1 {<0.5}	<0.98 {<0.49}	<0.98 {<0.49}	<0.99 {<0.5}	<1 {<0.5}	<1 {<0.5}	
Hexachlorobutadiene	ug/kg	--	--	--	--	--	<2 {<0.8}	<2 {<0.79}	<2 {<0.8}	<2 {<0.79}	<2 {<0.79}	<2 {<0.79}	<2 {<0.8}	<2 {<0.8}	

INTERIM SOURCE REMOVAL ACTION (ISRA) - OUTFALL 009

WASTE CHARACTERIZATION SAMPLE RESULTS – LOX-1B-3
 THE BOEING COMPANY
 SANTA SUSANA FIELD LABORATORY

							Object Name:	LXWC0020	LXWC0021	LXWC0022	LXWC0023	LXWC0024	LXWC0025	LXWC0026	LXWC0027
							Sample Name:	LXWC0020S001	LXWC0021S001	LXWC0022S001	LXWC0023S001	LXWC0024S001	LXWC0025S001	LXWC0026S001	LXWC0027S001
							Collection Date:	10/13/2010	10/8/2010	10/11/2010	10/8/2010	10/8/2010	10/13/2010	10/11/2010	10/11/2010
							Sample Depth (feet):	0.1 - 0.3	0.1 - 0.6	0 - 0.6	0.7 - 1.2	0.4 - 0.9	0.5 - 1	0.3 - 0.8	0.8 - 1.3
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	RESULT ^c	
Isopropylbenzene	ug/kg	--	--	--	--	--	<1 {<0.54}	<0.98 {<0.53}	<1 {<0.54}	<0.98 {<0.53}	<0.98 {<0.53}	<0.99 {<0.53}	<1 {<0.54}	<1 {<0.54}	
m,p-Xylenes	ug/kg	--	--	--	--	--	<2 {<0.8}	<2 {<0.79}	<2 {<0.8}	<2 {<0.79}	<2 {<0.79}	<2 {<0.79}	<2 {<0.8}	<2 {<0.8}	
Methylene chloride	ug/kg	--	--	--	--	--	<10 {<6.5}	7.4 JB	<10 {<6.5}	6.5 JB	7.3 JB	<9.9 {<6.4}	<10 {<6.5}	<10 {<6.5}	
Methyl-tert-butyl Ether (MTBE)	ug/kg	--	--	--	--	--	<2 {<1}	<2 {<0.98}	<2 {<1}	<2 {<0.98}	<2 {<0.98}	<2 {<0.99}	<2 {<1}	<2 {<1}	
n-Butylbenzene	ug/kg	--	--	--	--	--	<2 {<0.72}	<2 {<0.71}	<2 {<0.72}	<2 {<0.71}	<2 {<0.71}	<2 {<0.71}	<2 {<0.72}	<2 {<0.72}	
n-Propylbenzene	ug/kg	--	--	--	--	--	<1 {<0.61}	<0.98 {<0.6}	<1 {<0.61}	<0.98 {<0.6}	<0.98 {<0.6}	<0.99 {<0.6}	<1 {<0.61}	<1 {<0.61}	
Naphthalene	ug/kg	--	--	--	--	--	<2 {<1.1}	<2 {<1.1}	<2 {<1.1}	<2 {<1.1}	<2 {<1.1}	<2 {<1.1}	<2 {<1.1}	<2 {<1.1}	
o-Xylene	ug/kg	--	--	--	--	--	<1 {<0.5}	<0.98 {<0.49}	<1 {<0.5}	<0.98 {<0.49}	<0.98 {<0.49}	<0.99 {<0.5}	<1 {<0.5}	<1 {<0.5}	
p-Isopropyltoluene	ug/kg	--	--	--	--	--	<1 {<0.72}	<0.98 {<0.71}	<1 {<0.72}	<0.98 {<0.71}	<0.98 {<0.71}	<0.99 {<0.71}	<1 {<0.72}	<1 {<0.72}	
sec-Butylbenzene	ug/kg	--	--	--	--	--	<2 {<0.67}	<2 {<0.66}	<2 {<0.67}	<2 {<0.66}	<2 {<0.66}	<2 {<0.66}	<2 {<0.67}	<2 {<0.67}	
Styrene	ug/kg	--	--	--	--	--	<1 {<0.58}	<0.98 {<0.57}	<1 {<0.58}	<0.98 {<0.57}	<0.98 {<0.57}	<0.99 {<0.57}	<1 {<0.58}	<1 {<0.58}	
tert-Butylbenzene	ug/kg	--	--	--	--	--	<2 {<0.62}	<2 {<0.61}	<2 {<0.62}	<2 {<0.61}	<2 {<0.61}	<2 {<0.61}	<2 {<0.62}	<2 {<0.62}	
Tetrachloroethene	ug/kg	--	--	14,000	--	--	<1 {<0.49}	<0.98 {<0.48}	<1 {<0.49}	<0.98 {<0.48}	<0.98 {<0.48}	<0.99 {<0.49}	<1 {<0.49}	<1 {<0.49}	
Toluene	ug/kg	--	--	--	--	--	<1 {<0.5}	<0.98 {<0.49}	<1 {<0.5}	<0.98 {<0.49}	<0.98 {<0.49}	<0.99 {<0.5}	<1 {<0.5}	<1 {<0.5}	
trans-1,2-Dichloroethene	ug/kg	--	--	--	--	--	<1 {<0.7}	<0.98 {<0.69}	<1 {<0.7}	<0.98 {<0.69}	<0.98 {<0.69}	<0.99 {<0.69}	<1 {<0.7}	<1 {<0.7}	
trans-1,3-Dichloropropene	ug/kg	--	--	--	--	--	<1 {<0.61}	<0.98 {<0.6}	<1 {<0.61}	<0.98 {<0.6}	<0.98 {<0.6}	<0.99 {<0.6}	<1 {<0.61}	<1 {<0.61}	
Trichloroethene	ug/kg	2,040,000	2,040,000	10,000	--	--	<1 {<0.5}	<0.98 {<0.49}	<1 {<0.5}	<0.98 {<0.49}	<0.98 {<0.49}	<0.99 {<0.5}	<1 {<0.5}	<1 {<0.5}	
Trichlorofluoromethane	ug/kg	--	--	--	--	--	<2 {<0.54}	<2 {<0.53}	<2 {<0.54}	<2 {<0.53}	<2 {<0.53}	<2 {<0.53}	<2 {<0.54}	<2 {<0.54}	
Vinyl acetate	ug/kg	--	--	--	--	--	<5 {<2.5}	<4.9 {<2.5}	<5 {<2.5}	<4.9 {<2.5}	<4.9 {<2.5}	<5 {<2.5}	<5 {<2.5}	<5 {<2.5}	
Vinyl chloride	ug/kg	--	--	4,000	--	--	<2 {<0.91}	<2 {<0.9}	<2 {<0.91}	<2 {<0.9}	<2 {<0.9}	<2 {<0.9}	<2 {<0.91}	<2 {<0.91}	
RADIONUCLIDES	--	--	--	--	--	--	R	R	R	R	R	R	R	R	

INTERIM SOURCE REMOVAL ACTION (ISRA) - OUTFALL 009

**WASTE CHARACTERIZATION SAMPLE RESULTS – LOX-1B-3
THE BOEING COMPANY
SANTA SUSANA FIELD LABORATORY**

ANALYTE	UNITS	TTLIC	WET Leachate Testing Trigger ^a	TCLP Leachate Testing Trigger ^b	STLC	TCLP	Object Name:	LXWC0028	LXWC0029	LXWC0030	LXWC0031	LXWC0032	LXWC0033	LXWC0034	LXWC0035
							Sample Name:	LXWC0028S001	LXWC0029S001	LXWC0030S001	LXWC0031S001	LXWC0032S001	LXWC0033S001	LXWC0034S001	LXWC0035S001
							Collection Date:	10/12/2010	10/13/2010	10/12/2010	10/12/2010	10/11/2010	10/11/2010	10/11/2010	10/12/2010
							Sample Depth (feet):	0 - 0.3	1.4 - 1.9	0 - 0.3	0.9 - 1.1	0.9 - 1.3	0.5 - 1	0.2 - 0.8	0.6 - 1.1
							RESULT ^c	RESULT ^c	RESULT ^c	RESULT ^c	RESULT ^c	RESULT ^c	RESULT ^c	RESULT ^c	RESULT ^c
METALS															
Antimony	mg/kg	500	150	--	--	--	0.97 J	1.2 J	1.3 J	21	<1.7	<1.8	<1.7	<0.87	
Arsenic	mg/kg	500	50	100	--	--	5.7	5.9	4.8	4.7	7.5	5.7	5.2	4.7	
Barium	mg/kg	10,000	1,000	2,000	--	--	68	70	81	87	94	60	60	75	
Beryllium	mg/kg	75	7.5	--	--	--	0.3 J	0.69	0.36 J	0.25 J	0.45 J	<0.4	0.41 J	0.47 J	
Cadmium	mg/kg	100	10	20	--	--	0.22 J	<0.2	0.21 J	1.1	<0.39	0.85 J	2	<0.2	
Chromium	mg/kg	500	50	100	--	--	32	22	17	410	30	18	18	18	
Chromium, WET	mg/L	--	--	--	560	--	--	--	--	22	--	--	--	--	
Chromium, TCLP	mg/L	--	--	--	--	5	--	--	--	0.17	--	--	--	--	
Chromium (Hexavalent), WET	mg/L	--	--	--	5	--	--	--	--	0.022	--	--	--	--	
Cobalt	mg/kg	8,000	800	--	--	--	5.1	6.7	4.5	5.7	6.8	5	4.5	5.2	
Copper	mg/kg	2,500	250	--	--	--	23	21	39	70	15	46	49	26	
Lead	mg/kg	1,000	50	100	--	--	30	8.9	23	60	9.2	130	51	12	
Lead, WET	mg/L	--	--	--	5	--	--	--	--	2.4	--	52	4.4	--	
Lead, TCLP	mg/L	--	--	--	--	5	--	--	--	--	--	3.5	--	--	
Mercury	mg/kg	20	2	4	--	--	<0.012	<0.012	0.064	0.013 J	<0.012	0.29	1	<0.012	
Molybdenum	mg/kg	3,500	3,500	--	--	--	3.3	0.31 J	3.9	36	1.5 J	1.6 J	3.3 J	2	
Nickel	mg/kg	2,000	200	--	--	--	12	19 B	11	13	27	12	14	12	
Selenium	mg/kg	100	10	20	--	--	<0.99	<0.98	<0.98	<1	5 B	2.9 JB	<2	<0.99	
Silver	mg/kg	500	50	100	--	--	<0.79	<0.78	<0.78	<0.8	<1.6	<1.6	<1.6	<0.79	
Thallium	mg/kg	700	70	--	--	--	1.6 J	<0.78	2.5 J	1.2 J	2.4 J	<1.6	2.7 J	<0.79	
Vanadium	mg/kg	2,400	240	--	--	--	30	35	28	29	40	28	24	31	
Zinc	mg/kg	5,000	2,500	--	--	--	75	63 B	79	600	58 B	86 B	99 B	160	
GENERAL CHEMISTRY															
pH	SU	--	--	--	--	--	8.04	8.02	7.93	8.04	8.55	7.95	7.84	8.51	
TPH															
Gasoline Range Organics (C6-C12)	mg/kg	--	--	--	--	--	<0.37 {<0.14}	<0.37 {<0.14}	<0.39 {<0.15}	<0.38 {<0.14}	<0.38 {<0.14}	<0.38 {<0.14}	<0.38 {<0.14}	<0.37 {<0.14}	
EFH (C10 - C24)	mg/kg	--	--	--	--	--	<5 {<3.5}	<5 {<3.5}	4.4 J	<5 {<3.5}	<5 {<3.5}	<5 {<3.5}	3.6 J	<5 {<3.5}	
EFH (C25 - C40)	mg/kg	--	--	--	--	--	7	<5 {<3.5}	34	16	7	4 J	16	<5 {<3.5}	
EFH (C10 - C40)	mg/kg	--	--	--	--	--	8.3	<5 {<3.5}	38	19	8	6.1	19	<5 {<3.5}	
VOCs															
1,1,1,2-Tetrachloroethane	ug/kg	--	--	--	--	--	<2 {<0.57}	<2 {<0.57}	<2 {<0.57}	<2 {<0.57}	<2 {<0.57}	<2 {<0.57}	<2 {<0.57}	<2 {<0.57}	
1,1,1-Trichloroethane	ug/kg	--	--	--	--	--	<1 {<0.7}	<0.99 {<0.7}	<1 {<0.7}	<1 {<0.7}	<1 {<0.7}	<1 {<0.7}	<1 {<0.7}	<1 {<0.7}	
1,1,2,2-Tetrachloroethane	ug/kg	--	--	--	--	--	<2 {<0.86}	<2 {<0.85}	<2 {<0.86}	<2 {<0.86}	<2 {<0.86}	<2 {<0.86}	<2 {<0.86}	<2 {<0.86}	
1,1,2-Trichloroethane	ug/kg	--	--	--	--	--	<1 {<0.87}	<0.99 {<0.86}	<1 {<0.87}	<1 {<0.87}	<1 {<0.87}	<1 {<0.87}	<1 {<0.87}	<1 {<0.87}	
1,1-Dichloroethane	ug/kg	--	--	--	--	--	<1 {<0.5}	<0.99 {<0.5}	<1 {<0.5}	<1 {<0.5}	<1 {<0.5}	<1 {<0.5}	<1 {<0.5}	<1 {<0.5}	
1,1-Dichloroethene	ug/kg	--	--	14,000	--	--	<2 {<0.6}	<2 {<0.6}	<2 {<0.6}	<2 {<0.6}	<2 {<0.6}	<2 {<0.6}	<2 {<0.6}	<2 {<0.6}	

INTERIM SOURCE REMOVAL ACTION (ISRA) - OUTFALL 009

WASTE CHARACTERIZATION SAMPLE RESULTS – LOX-1B-3
 THE BOEING COMPANY
 SANTA SUSANA FIELD LABORATORY

ANALYTE	UNITS	TTLIC	WET Leachate Testing Trigger ^a	TCLP Leachate Testing Trigger ^b	STLC	TCLP	Object Name: Sample Name: Collection Date: Sample Depth (feet):	LXWC0028 LXWC0028S001 10/12/2010 0 - 0.3	LXWC0029 LXWC0029S001 10/13/2010 1.4 - 1.9	LXWC0030 LXWC0030S001 10/12/2010 0 - 0.3	LXWC0031 LXWC0031S001 10/12/2010 0.9 - 1.1	LXWC0032 LXWC0032S001 10/11/2010 0.9 - 1.3	LXWC0033 LXWC0033S001 10/11/2010 0.5 - 1	LXWC0034 LXWC0034S001 10/11/2010 0.2 - 0.8	LXWC0035 LXWC0035S001 10/12/2010 0.6 - 1.1
							RESULT ^c	RESULT ^c	RESULT ^c	RESULT ^c	RESULT ^c	RESULT ^c	RESULT ^c		
1,1-Dichloropropene	ug/kg	--	--	--	--	--	<1 {<0.4}	<0.99 {<0.4}	<1 {<0.4}	<1 {<0.4}	<1 {<0.4}	<1 {<0.4}	<1 {<0.4}	<1 {<0.4}	<1 {<0.4}
1,2,3-Trichlorobenzene	ug/kg	--	--	--	--	--	<2 {<1}	<2 {<0.99}	<2 {<1}	<2 {<1}	<2 {<1}	<2 {<1}	<2 {<1}	<2 {<1}	<2 {<1}
1,2,3-Trichloropropane	ug/kg	--	--	--	--	--	<2 {<1}	<2 {<0.99}	<2 {<1}	<2 {<1}	<2 {<1}	<2 {<1}	<2 {<1}	<2 {<1}	<2 {<1}
1,2,4-Trichlorobenzene	ug/kg	--	--	--	--	--	<2 {<1}	<2 {<0.99}	<2 {<1}	<2 {<1}	<2 {<1}	<2 {<1}	<2 {<1}	<2 {<1}	<2 {<1}
1,2,4-Trimethylbenzene	ug/kg	--	--	--	--	--	<1 {<0.78}	<0.99 {<0.78}	<1 {<0.78}	<1 {<0.78}	<1 {<0.78}	<1 {<0.78}	<1 {<0.78}	<1 {<0.78}	<1 {<0.78}
1,2-Dibromo-3-chloropropane	ug/kg	--	--	--	--	--	<10 {<1.5}	<9.9 {<1.5}	<10 {<1.5}	<10 {<1.5}	<10 {<1.5}	<10 {<1.5}	<10 {<1.5}	<10 {<1.5}	<10 {<1.5}
1,2-Dibromoethane (EDB)	ug/kg	--	--	--	--	--	<1 {<0.8}	<0.99 {<0.8}	<1 {<0.8}	<1 {<0.8}	<1 {<0.8}	<1 {<0.8}	<1 {<0.8}	<1 {<0.8}	<1 {<0.8}
1,2-Dichlorobenzene	ug/kg	--	--	--	--	--	<1 {<0.95}	<0.99 {<0.94}	<1 {<0.95}	<1 {<0.95}	<1 {<0.95}	<1 {<0.95}	<1 {<0.95}	<1 {<0.95}	<1 {<0.95}
1,2-Dichloroethane	ug/kg	--	--	10,000	--	--	<1 {<0.8}	<0.99 {<0.8}	<1 {<0.8}	<1 {<0.8}	<1 {<0.8}	<1 {<0.8}	<1 {<0.8}	<1 {<0.8}	<1 {<0.8}
1,2-Dichloropropane	ug/kg	--	--	--	--	--	<1 {<0.8}	<0.99 {<0.8}	<1 {<0.8}	<1 {<0.8}	<1 {<0.8}	<1 {<0.8}	<1 {<0.8}	<1 {<0.8}	<1 {<0.8}
1,3,5-Trimethylbenzene	ug/kg	--	--	--	--	--	<1 {<0.63}	<0.99 {<0.63}	<1 {<0.63}	<1 {<0.63}	<1 {<0.63}	<1 {<0.63}	<1 {<0.63}	<1 {<0.63}	<1 {<0.63}
1,3-Dichlorobenzene	ug/kg	--	--	--	--	--	<1 {<0.84}	<0.99 {<0.83}	<1 {<0.84}	<1 {<0.84}	<1 {<0.84}	<1 {<0.84}	<1 {<0.84}	<1 {<0.84}	<1 {<0.84}
1,3-Dichloropropane	ug/kg	--	--	--	--	--	<1 {<0.63}	<0.99 {<0.63}	<1 {<0.63}	<1 {<0.63}	<1 {<0.63}	<1 {<0.63}	<1 {<0.63}	<1 {<0.63}	<1 {<0.63}
1,4-Dichlorobenzene	ug/kg	--	--	--	--	--	<1 {<0.94}	<0.99 {<0.93}	<1 {<0.94}	<1 {<0.94}	<1 {<0.94}	<1 {<0.94}	<1 {<0.94}	<1 {<0.94}	<1 {<0.94}
2-Butanone (MEK)	ug/kg	--	--	4,000,000	--	--	<10 {<6}	<9.9 {<6}	<10 {<6}	<10 {<6}	<10 {<6}	<10 {<6}	<10 {<6}	<10 {<6}	<10 {<6}
2-Hexanone	ug/kg	--	--	--	--	--	<10 {<9.1}	<9.9 {<9}	<10 {<9.1}	<10 {<9.1}	<10 {<9.1}	<10 {<9.1}	<10 {<9.1}	<10 {<9.1}	<10 {<9.1}
4-Methyl-2-pentanone (MIBK)	ug/kg	--	--	--	--	--	<5 {<4.5}	<5 {<4.5}	<5 {<4.5}	<5 {<4.5}	<5 {<4.5}	<5 {<4.5}	<5 {<4.5}	<5 {<4.5}	<5 {<4.5}
Acetone	ug/kg	--	--	--	--	--	<10 {<8}	<9.9 {<8}	<10 {<8}	<10 {<8}	<10 {<8}	<10 {<8}	<10 {<8}	<10 {<8}	<10 {<8}
Benzene	ug/kg	--	--	10,000	--	--	<1 {<0.5}	<0.99 {<0.5}	<1 {<0.5}	<1 {<0.5}	<1 {<0.5}	<1 {<0.5}	<1 {<0.5}	<1 {<0.5}	<1 {<0.5}
Bromobenzene	ug/kg	--	--	--	--	--	<2 {<0.84}	<2 {<0.83}	<2 {<0.84}	<2 {<0.84}	<2 {<0.84}	<2 {<0.84}	<2 {<0.84}	<2 {<0.84}	<2 {<0.84}
Bromochloromethane	ug/kg	--	--	--	--	--	<2 {<0.9}	<2 {<0.89}	<2 {<0.9}	<2 {<0.9}	<2 {<0.9}	<2 {<0.9}	<2 {<0.9}	<2 {<0.9}	<2 {<0.9}
Bromodichloromethane	ug/kg	--	--	--	--	--	<1 {<0.5}	<0.99 {<0.5}	<1 {<0.5}	<1 {<0.5}	<1 {<0.5}	<1 {<0.5}	<1 {<0.5}	<1 {<0.5}	<1 {<0.5}
Bromoform	ug/kg	--	--	--	--	--	<2 {<0.8}	<2 {<0.8}	<2 {<0.8}	<2 {<0.8}	<2 {<0.8}	<2 {<0.8}	<2 {<0.8}	<2 {<0.8}	<2 {<0.8}
Bromomethane	ug/kg	--	--	--	--	--	<2 {<0.92}	<2 {<0.91}	<2 {<0.92}	<2 {<0.92}	<2 {<0.92}	<2 {<0.92}	<2 {<0.92}	<2 {<0.92}	<2 {<0.92}
Carbon Disulfide	ug/kg	--	--	--	--	--	<5 {<0.97}	<5 {<0.96}	<5 {<0.97}	<5 {<0.97}	<5 {<0.97}	<5 {<0.97}	<5 {<0.97}	<5 {<0.97}	<5 {<0.97}
Carbon tetrachloride	ug/kg	--	--	10,000	--	--	<2 {<0.5}	<2 {<0.5}	<2 {<0.5}	<2 {<0.5}	<2 {<0.5}	<2 {<0.5}	<2 {<0.5}	<2 {<0.5}	<2 {<0.5}
Chlorobenzene	ug/kg	--	--	2,000,000	--	--	<1 {<0.52}	<0.99 {<0.52}	<1 {<0.52}	<1 {<0.52}	<1 {<0.52}	<1 {<0.52}	<1 {<0.52}	<1 {<0.52}	<1 {<0.52}
Chloroethane	ug/kg	--	--	--	--	--	<2 {<1.5}	<2 {<1.5}	<2 {<1.5}	<2 {<1.5}	<2 {<1.5}	<2 {<1.5}	<2 {<1.5}	<2 {<1.5}	<2 {<1.5}
Chloroform	ug/kg	--	--	120,000	--	--	<1 {<0.5}	<0.99 {<0.5}	<1 {<0.5}	<1 {<0.5}	<1 {<0.5}	<1 {<0.5}	<1 {<0.5}	<1 {<0.5}	<1 {<0.5}
Chloromethane	ug/kg	--	--	--	--	--	<2 {<1}	<2 {<0.99}	<2 {<1}	<2 {<1}	<2 {<1}	<2 {<1}	<2 {<1}	<2 {<1}	<2 {<1}
cis-1,2-Dichloroethene	ug/kg	--	--	--	--	--	<1 {<0.83}	<0.99 {<0.83}	<1 {<0.83}	<1 {<0.83}	<1 {<0.83}	<1 {<0.83}	<1 {<0.83}	<1 {<0.83}	<1 {<0.83}
cis-1,3-Dichloropropene	ug/kg	--	--	--	--	--	<1 {<0.44}	<0.99 {<0.44}	<1 {<0.44}	<1 {<0.44}	<1 {<0.44}	<1 {<0.44}	<1 {<0.44}	<1 {<0.44}	<1 {<0.44}
Dibromochloromethane	ug/kg	--	--	--	--	--	<1 {<0.7}	<0.99 {<0.7}	<1 {<0.7}	<1 {<0.7}	<1 {<0.7}	<1 {<0.7}	<1 {<0.7}	<1 {<0.7}	<1 {<0.7}
Dibromomethane	ug/kg	--	--	--	--	--	<1 {<0.9}	<0.99 {<0.89}	<1 {<0.9}	<1 {<0.9}	<1 {<0.9}	<1 {<0.9}	<1 {<0.9}	<1 {<0.9}	<1 {<0.9}
Dichlorodifluoromethane	ug/kg	--	--	--	--	--	<5 {<1.5}	<5 {<1.5}	<5 {<1.5}	<5 {<1.5}	<5 {<1.5}	<5 {<1.5}	<5 {<1.5}	<5 {<1.5}	<5 {<1.5}
Ethylbenzene	ug/kg	--	--	--	--	--	<1 {<0.5}	<0.99 {<0.5}	<1 {<0.5}	<1 {<0.5}	<1 {<0.5}	<1 {<0.5}	<1 {<0.5}	<1 {<0.5}	<1 {<0.5}
Hexachlorobutadiene	ug/kg	--	--	--	--	--	<2 {<0.8}	<2 {<0.8}	<2 {<0.8}	<2 {<0.8}	<2 {<0.8}	<2 {<0.8}	<2 {<0.8}	<2 {<0.8}	<2 {<0.8}

INTERIM SOURCE REMOVAL ACTION (ISRA) - OUTFALL 009

WASTE CHARACTERIZATION SAMPLE RESULTS – LOX-1B-3
 THE BOEING COMPANY
 SANTA SUSANA FIELD LABORATORY

							Object Name:	LXWC0028	LXWC0029	LXWC0030	LXWC0031	LXWC0032	LXWC0033	LXWC0034	LXWC0035
							Sample Name:	LXWC0028S001	LXWC0029S001	LXWC0030S001	LXWC0031S001	LXWC0032S001	LXWC0033S001	LXWC0034S001	LXWC0035S001
							Collection Date:	10/12/2010	10/13/2010	10/12/2010	10/12/2010	10/11/2010	10/11/2010	10/11/2010	10/12/2010
							Sample Depth (feet):	0 - 0.3	1.4 - 1.9	0 - 0.3	0.9 - 1.1	0.9 - 1.3	0.5 - 1	0.2 - 0.8	0.6 - 1.1
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	RESULT ^c	
Isopropylbenzene	ug/kg	--	--	--	--	--	<1 {<0.54}	<0.99 {<0.54}	<1 {<0.54}	<1 {<0.54}	<1 {<0.54}	<1 {<0.54}	<1 {<0.54}	<1 {<0.54}	
m,p-Xylenes	ug/kg	--	--	--	--	--	<2 {<0.8}	<2 {<0.8}	<2 {<0.8}	<2 {<0.8}	<2 {<0.8}	<2 {<0.8}	<2 {<0.8}	<2 {<0.8}	
Methylene chloride	ug/kg	--	--	--	--	--	<10 {<6.5}	<9.9 {<6.5}	<10 {<6.5}	<10 {<6.5}	<10 {<6.5}	<10 {<6.5}	<10 {<6.5}	<10 {<6.5}	
Methyl-tert-butyl Ether (MTBE)	ug/kg	--	--	--	--	--	<2 {<1}	<2 {<0.99}	<2 {<1}	<2 {<1}	<2 {<1}	<2 {<1}	<2 {<1}	<2 {<1}	
n-Butylbenzene	ug/kg	--	--	--	--	--	<2 {<0.72}	<2 {<0.72}	<2 {<0.72}	<2 {<0.72}	<2 {<0.72}	<2 {<0.72}	<2 {<0.72}	<2 {<0.72}	
n-Propylbenzene	ug/kg	--	--	--	--	--	<1 {<0.61}	<0.99 {<0.61}	<1 {<0.61}	<1 {<0.61}	<1 {<0.61}	<1 {<0.61}	<1 {<0.61}	<1 {<0.61}	
Naphthalene	ug/kg	--	--	--	--	--	<2 {<1.1}	<2 {<1.1}	<2 {<1.1}	<2 {<1.1}	<2 {<1.1}	<2 {<1.1}	<2 {<1.1}	<2 {<1.1}	
o-Xylene	ug/kg	--	--	--	--	--	<1 {<0.5}	<0.99 {<0.5}	<1 {<0.5}	<1 {<0.5}	<1 {<0.5}	<1 {<0.5}	<1 {<0.5}	<1 {<0.5}	
p-Isopropyltoluene	ug/kg	--	--	--	--	--	<1 {<0.72}	<0.99 {<0.72}	<1 {<0.72}	<1 {<0.72}	<1 {<0.72}	<1 {<0.72}	<1 {<0.72}	<1 {<0.72}	
sec-Butylbenzene	ug/kg	--	--	--	--	--	<2 {<0.67}	<2 {<0.67}	<2 {<0.67}	<2 {<0.67}	<2 {<0.67}	<2 {<0.67}	<2 {<0.67}	<2 {<0.67}	
Styrene	ug/kg	--	--	--	--	--	<1 {<0.58}	<0.99 {<0.58}	<1 {<0.58}	<1 {<0.58}	<1 {<0.58}	<1 {<0.58}	<1 {<0.58}	<1 {<0.58}	
tert-Butylbenzene	ug/kg	--	--	--	--	--	<2 {<0.62}	<2 {<0.62}	<2 {<0.62}	<2 {<0.62}	<2 {<0.62}	<2 {<0.62}	<2 {<0.62}	<2 {<0.62}	
Tetrachloroethene	ug/kg	--	--	14,000	--	--	<1 {<0.49}	<0.99 {<0.49}	<1 {<0.49}	<1 {<0.49}	<1 {<0.49}	<1 {<0.49}	<1 {<0.49}	<1 {<0.49}	
Toluene	ug/kg	--	--	--	--	--	<1 {<0.5}	<0.99 {<0.5}	<1 {<0.5}	<1 {<0.5}	<1 {<0.5}	<1 {<0.5}	<1 {<0.5}	<1 {<0.5}	
trans-1,2-Dichloroethene	ug/kg	--	--	--	--	--	<1 {<0.7}	<0.99 {<0.7}	<1 {<0.7}	<1 {<0.7}	<1 {<0.7}	<1 {<0.7}	<1 {<0.7}	<1 {<0.7}	
trans-1,3-Dichloropropene	ug/kg	--	--	--	--	--	<1 {<0.61}	<0.99 {<0.61}	<1 {<0.61}	<1 {<0.61}	<1 {<0.61}	<1 {<0.61}	<1 {<0.61}	<1 {<0.61}	
Trichloroethene	ug/kg	2,040,000	2,040,000	10,000	--	--	<1 {<0.5}	<0.99 {<0.5}	<1 {<0.5}	<1 {<0.5}	<1 {<0.5}	<1 {<0.5}	<1 {<0.5}	<1 {<0.5}	
Trichlorofluoromethane	ug/kg	--	--	--	--	--	<2 {<0.54}	<2 {<0.54}	<2 {<0.54}	<2 {<0.54}	<2 {<0.54}	<2 {<0.54}	<2 {<0.54}	<2 {<0.54}	
Vinyl acetate	ug/kg	--	--	--	--	--	<5 {<2.5}	<5 {<2.5}	<5 {<2.5}	<5 {<2.5}	<5 {<2.5}	<5 {<2.5}	<5 {<2.5}	<5 {<2.5}	
Vinyl chloride	ug/kg	--	--	4,000	--	--	<2 {<0.91}	<2 {<0.9}	<2 {<0.91}	<2 {<0.91}	<2 {<0.91}	<2 {<0.91}	<2 {<0.91}	<2 {<0.91}	
RADIONUCLIDES	--	--	--	--	--	--	R	R	R	R	R	R	R	R	

INTERIM SOURCE REMOVAL ACTION (ISRA) - OUTFALL 009

**WASTE CHARACTERIZATION SAMPLE RESULTS – LOX-1B-3
THE BOEING COMPANY
SANTA SUSANA FIELD LABORATORY**

							Object Name:	LXWC0036	LXWC0037	LXWC0038	LXWC0039	LXWC0040	LXWC0041	LXWC0042	LXWC0043
							Sample Name:	LXWC0036S001	LXWC0037S001	LXWC0038S001	LXWC0039S001	LXWC0040S001	LXWC0041S001	LXWC0042S001	LXWC0043S001
							Collection Date:	10/11/2010	10/8/2010	10/8/2010	10/12/2010	10/12/2010	10/11/2010	10/12/2010	10/11/2010
							Sample Depth (feet):	0.3 - 0.7	0.3 - 0.8	0.2 - 0.7	0.9 - 1.4	0.5 - 1	1 - 1.5	0 - 0.3	0.3 - 0.7
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	RESULT ^c	
METALS															
Antimony	mg/kg	500	150	--	--	--	<1.8	1.4 J	1.3 J	<0.87	<0.87	<1.8	1.5 J	<1.7	
Arsenic	mg/kg	500	50	100	--	--	3.5 J	5.7	4.4	5.4	6.1	6.5	6.1	4.8	
Barium	mg/kg	10,000	1,000	2,000	--	--	63	100	72	90	74	100	87	64	
Beryllium	mg/kg	75	7.5	--	--	--	0.45 J	0.62	0.38 J	0.54	0.49 J	0.57 J	0.36 J	<0.39	
Cadmium	mg/kg	100	10	20	--	--	<0.4	<0.2	<0.2	<0.2	<0.2	<0.4	0.55	<0.39	
Chromium	mg/kg	500	50	100	--	--	22	26	22	25	22	30	22	19	
Chromium, WET	mg/L	--	--	--	560	--	--	--	--	--	--	--	--	--	
Chromium, TCLP	mg/L	--	--	--	--	5	--	--	--	--	--	--	--	--	
Chromium (Hexavalent), WET	mg/L	--	--	--	5	--	--	--	--	--	--	--	--	--	
Cobalt	mg/kg	8,000	800	--	--	--	5.7	5.6	5.8	6.1	5.9	6.2	5	5.5	
Copper	mg/kg	2,500	250	--	--	--	10	28	14	30	8.9	56	70	11	
Lead	mg/kg	1,000	50	100	--	--	5.5	11	24	28	5.7	42	88	8.4	
Lead, WET	mg/L	--	--	--	5	--	--	--	--	--	--	--	1.6	--	
Lead, TCLP	mg/L	--	--	--	--	5	--	--	--	--	--	--	--	--	
Mercury	mg/kg	20	2	4	--	--	<0.012	0.016 J	0.014 J	0.05	<0.012	<0.012	0.027	<0.012	
Molybdenum	mg/kg	3,500	3,500	--	--	--	0.85 J	1.2 J	2 J	2.2	1.5 J	1.4 J	2.3	1.7 J	
Nickel	mg/kg	2,000	200	--	--	--	17	18	17	16	15	18	12	15	
Selenium	mg/kg	100	10	20	--	--	<2	<0.99	<1	<0.99	<0.99	3.4 JB	<0.99	4.4 B	
Silver	mg/kg	500	50	100	--	--	<1.6	<0.79	<0.8	<0.79	<0.79	<1.6	<0.79	<1.6	
Thallium	mg/kg	700	70	--	--	--	3 J	1.3 J	<0.8	3.2 J	<0.79	2.4 J	<0.79	2.2 J	
Vanadium	mg/kg	2,400	240	--	--	--	36	38	31	37	35	41	30	31	
Zinc	mg/kg	5,000	2,500	--	--	--	52 B	63	86	73	37	90 B	140	50 B	
GENERAL CHEMISTRY															
pH	SU	--	--	--	--	--	8.66	8.21	8.41	8.32	8.21	8.27	8.17	8.56	
TPH															
Gasoline Range Organics (C6-C12)	mg/kg	--	--	--	--	--	<0.39 {<0.14}	<0.39 {<0.15}	<0.38 {<0.14}	<0.39 {<0.15}	<0.38 {<0.14}	<0.39 {<0.15}	<0.37 {<0.14}	<0.39 {<0.15}	
EFH (C10 - C24)	mg/kg	--	--	--	--	--	<5 {<3.5}	<5 {<3.5}	<5 {<3.5}	<5 {<3.5}	<5 {<3.5}	5.6	7.5	<5 {<3.5}	
EFH (C25 - C40)	mg/kg	--	--	--	--	--	<5 {<3.5}	19	14	21	<5 {<3.5}	50	44	5.9	
EFH (C10 - C40)	mg/kg	--	--	--	--	--	<5 {<3.5}	22	16	24	<5 {<3.5}	56	51	6.6	
VOCs															
1,1,1,2-Tetrachloroethane	ug/kg	--	--	--	--	--	<2 {<0.57}	<2 {<0.56}	<2 {<0.57}	<2 {<0.57}	<2 {<0.57}	<2 {<0.57}	<2 {<0.57}	<2 {<0.57}	
1,1,1-Trichloroethane	ug/kg	--	--	--	--	--	<1 {<0.7}	<0.98 {<0.69}	<1 {<0.7}	<1 {<0.7}	<1 {<0.7}	<1 {<0.7}	<0.99 {<0.7}	<1 {<0.7}	
1,1,2,2-Tetrachloroethane	ug/kg	--	--	--	--	--	<2 {<0.86}	<2 {<0.84}	<2 {<0.86}	<2 {<0.86}	<2 {<0.86}	<2 {<0.86}	<2 {<0.85}	<2 {<0.86}	
1,1,2-Trichloroethane	ug/kg	--	--	--	--	--	<1 {<0.87}	<0.98 {<0.85}	<1 {<0.87}	<1 {<0.87}	<1 {<0.87}	<1 {<0.87}	<0.99 {<0.86}	<1 {<0.87}	
1,1-Dichloroethane	ug/kg	--	--	--	--	--	<1 {<0.5}	<0.98 {<0.49}	<1 {<0.5}	<1 {<0.5}	<1 {<0.5}	<1 {<0.5}	<0.99 {<0.5}	<1 {<0.5}	
1,1-Dichloroethene	ug/kg	--	--	14,000	--	--	<2 {<0.6}	<2 {<0.59}	<2 {<0.6}	<2 {<0.6}	<2 {<0.6}	<2 {<0.6}	<2 {<0.6}	<2 {<0.6}	

INTERIM SOURCE REMOVAL ACTION (ISRA) - OUTFALL 009

WASTE CHARACTERIZATION SAMPLE RESULTS – LOX-1B-3
 THE BOEING COMPANY
 SANTA SUSANA FIELD LABORATORY

							Object Name:	LXWC0036	LXWC0037	LXWC0038	LXWC0039	LXWC0040	LXWC0041	LXWC0042	LXWC0043
							Sample Name:	LXWC0036S001	LXWC0037S001	LXWC0038S001	LXWC0039S001	LXWC0040S001	LXWC0041S001	LXWC0042S001	LXWC0043S001
							Collection Date:	10/11/2010	10/8/2010	10/8/2010	10/12/2010	10/12/2010	10/11/2010	10/12/2010	10/11/2010
							Sample Depth (feet):	0.3 - 0.7	0.3 - 0.8	0.2 - 0.7	0.9 - 1.4	0.5 - 1	1 - 1.5	0 - 0.3	0.3 - 0.7
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	RESULT ^c	
Isopropylbenzene	ug/kg	--	--	--	--	--	<1 {<0.54}	<0.98 {<0.53}	<1 {<0.54}	<1 {<0.54}	<1 {<0.54}	<1 {<0.54}	<1 {<0.54}	<0.99 {<0.54}	<1 {<0.54}
m,p-Xylenes	ug/kg	--	--	--	--	--	<2 {<0.8}	<2 {<0.79}	<2 {<0.8}	<2 {<0.8}	<2 {<0.8}	<2 {<0.8}	<2 {<0.8}	<2 {<0.8}	<2 {<0.8}
Methylene chloride	ug/kg	--	--	--	--	--	<10 {<6.5}	8.3 JB	<10 {<6.5}	<10 {<6.5}	<10 {<6.5}	<10 {<6.5}	<10 {<6.5}	<9.9 {<6.5}	<10 {<6.5}
Methyl-tert-butyl Ether (MTBE)	ug/kg	--	--	--	--	--	<2 {<1}	<2 {<0.98}	<2 {<1}	<2 {<1}	<2 {<1}	<2 {<1}	<2 {<1}	<2 {<0.99}	<2 {<1}
n-Butylbenzene	ug/kg	--	--	--	--	--	<2 {<0.72}	<2 {<0.71}	<2 {<0.72}	<2 {<0.72}	<2 {<0.72}	<2 {<0.72}	<2 {<0.72}	<2 {<0.72}	<2 {<0.72}
n-Propylbenzene	ug/kg	--	--	--	--	--	<1 {<0.61}	<0.98 {<0.6}	<1 {<0.61}	<1 {<0.61}	<1 {<0.61}	<1 {<0.61}	<1 {<0.61}	<0.99 {<0.61}	<1 {<0.61}
Naphthalene	ug/kg	--	--	--	--	--	<2 {<1.1}	<2 {<1.1}	<2 {<1.1}	<2 {<1.1}	<2 {<1.1}	<2 {<1.1}	<2 {<1.1}	<2 {<1.1}	<2 {<1.1}
o-Xylene	ug/kg	--	--	--	--	--	<1 {<0.5}	<0.98 {<0.49}	<1 {<0.5}	<1 {<0.5}	<1 {<0.5}	<1 {<0.5}	<1 {<0.5}	<0.99 {<0.5}	<1 {<0.5}
p-Isopropyltoluene	ug/kg	--	--	--	--	--	<1 {<0.72}	<0.98 {<0.71}	<1 {<0.72}	<1 {<0.72}	<1 {<0.72}	<1 {<0.72}	<1 {<0.72}	<0.99 {<0.72}	<1 {<0.72}
sec-Butylbenzene	ug/kg	--	--	--	--	--	<2 {<0.67}	<2 {<0.66}	<2 {<0.67}	<2 {<0.67}	<2 {<0.67}	<2 {<0.67}	<2 {<0.67}	<2 {<0.67}	<2 {<0.67}
Styrene	ug/kg	--	--	--	--	--	<1 {<0.58}	<0.98 {<0.57}	<1 {<0.58}	<1 {<0.58}	<1 {<0.58}	<1 {<0.58}	<1 {<0.58}	<0.99 {<0.58}	<1 {<0.58}
tert-Butylbenzene	ug/kg	--	--	--	--	--	<2 {<0.62}	<2 {<0.61}	<2 {<0.62}	<2 {<0.62}	<2 {<0.62}	<2 {<0.62}	<2 {<0.62}	<2 {<0.62}	<2 {<0.62}
Tetrachloroethene	ug/kg	--	--	14,000	--	--	<1 {<0.49}	<0.98 {<0.48}	<1 {<0.49}	<1 {<0.49}	<1 {<0.49}	<1 {<0.49}	<1 {<0.49}	<0.99 {<0.49}	<1 {<0.49}
Toluene	ug/kg	--	--	--	--	--	<1 {<0.5}	<0.98 {<0.49}	<1 {<0.5}	<1 {<0.5}	<1 {<0.5}	<1 {<0.5}	<1 {<0.5}	<0.99 {<0.5}	<1 {<0.5}
trans-1,2-Dichloroethene	ug/kg	--	--	--	--	--	<1 {<0.7}	<0.98 {<0.69}	<1 {<0.7}	<1 {<0.7}	<1 {<0.7}	<1 {<0.7}	<1 {<0.7}	<0.99 {<0.7}	<1 {<0.7}
trans-1,3-Dichloropropene	ug/kg	--	--	--	--	--	<1 {<0.61}	<0.98 {<0.6}	<1 {<0.61}	<1 {<0.61}	<1 {<0.61}	<1 {<0.61}	<1 {<0.61}	<0.99 {<0.61}	<1 {<0.61}
Trichloroethene	ug/kg	2,040,000	2,040,000	10,000	--	--	<1 {<0.5}	<0.98 {<0.49}	<1 {<0.5}	<1 {<0.5}	<1 {<0.5}	<1 {<0.5}	<1 {<0.5}	<0.99 {<0.5}	<1 {<0.5}
Trichlorofluoromethane	ug/kg	--	--	--	--	--	<2 {<0.54}	<2 {<0.53}	<2 {<0.54}	<2 {<0.54}	<2 {<0.54}	<2 {<0.54}	<2 {<0.54}	<2 {<0.54}	<2 {<0.54}
Vinyl acetate	ug/kg	--	--	--	--	--	<5 {<2.5}	<4.9 {<2.5}	<5 {<2.5}	<5 {<2.5}	<5 {<2.5}	<5 {<2.5}	<5 {<2.5}	<5 {<2.5}	<5 {<2.5}
Vinyl chloride	ug/kg	--	--	4,000	--	--	<2 {<0.91}	<2 {<0.89}	<2 {<0.91}	<2 {<0.91}	<2 {<0.91}	<2 {<0.91}	<2 {<0.91}	<2 {<0.9}	<2 {<0.91}
RADIONUCLIDES	--	--	--	--	--	--	R	R	R	R	R	R	R	R	R

INTERIM SOURCE REMOVAL ACTION (ISRA) - OUTFALL 009

WASTE CHARACTERIZATION SAMPLE RESULTS – LOX-1B-3
 THE BOEING COMPANY
 SANTA SUSANA FIELD LABORATORY

							Object Name:	LXWC0044	LXWC0045	LXWC0046	LXWC0047	LXWC0048	LXWC0049	LXWC0050	LXWC0051
							Sample Name:	LXWC0044S001	LXWC0045S001	LXWC0046S001	LXWC0047S001	LXWC0048S001	LXWC0049S001	LXWC0050S001	LXWC0051S001
							Collection Date:	10/12/2010	10/12/2010	10/11/2010	10/11/2010	10/13/2010	10/8/2010	10/12/2010	10/11/2010
							Sample Depth (feet):	0 - 0.3	0 - 0.5	0.5 - 1	0.4 - 0.9	0.2 - 0.7	1.3 - 1.8	0 - 0.3	0.7 - 1.2
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	RESULT ^c	
METALS															
Antimony	mg/kg	500	150	--	--	--	<0.87	1.2 J	<1.7	2.9 J	1.7 J	1.2 J	0.95 J	<1.7	
Arsenic	mg/kg	500	50	100	--	--	3.7	5.7	5.5	5.2	4.7	5.4	3.8	5	
Barium	mg/kg	10,000	1,000	2,000	--	--	64	100	95	100	110	100	87	89	
Beryllium	mg/kg	75	7.5	--	--	--	0.2 J	0.48 J	0.49 J	0.47 J	0.75	0.6	<0.2	0.49 J	
Cadmium	mg/kg	100	10	20	--	--	<0.2	0.54	<0.39	<0.39	<0.2	<0.2	0.5	<0.39	
Chromium	mg/kg	500	50	100	--	--	50	29	25	27	23	26	97	23	
Chromium, WET	mg/L	--	--	--	560	--	0.58	--	--	--	--	--	1	--	
Chromium, TCLP	mg/L	--	--	--	--	5	--	--	--	--	--	--	--	--	
Chromium (Hexavalent), WET	mg/L	--	--	--	5	--	--	--	--	--	--	--	--	--	
Cobalt	mg/kg	8,000	800	--	--	--	4.5	6.1	7.1	5.7	7	6.1	5.3	5.7	
Copper	mg/kg	2,500	250	--	--	--	21	89	41	41	20	66	70	9.7	
Lead	mg/kg	1,000	50	100	--	--	23	46	10	29	19	11	83	5.9	
Lead, WET	mg/L	--	--	--	5	--	--	--	--	--	--	--	2.8	--	
Lead, TCLP	mg/L	--	--	--	--	5	--	--	--	--	--	--	--	--	
Mercury	mg/kg	20	2	4	--	--	<0.012	0.018 J	<0.012	<0.012	0.034	<0.012	<0.012	<0.012	
Molybdenum	mg/kg	3,500	3,500	--	--	--	1.3 J	1.5 J	1 J	2.6 J	<0.2	0.89 J	2	1.3 J	
Nickel	mg/kg	2,000	200	--	--	--	9.2	16	18	19	17 B	18	9.7	17	
Selenium	mg/kg	100	10	20	--	--	<0.99	<1	5.8 B	<2	<1	<1	<0.99	5.2 B	
Silver	mg/kg	500	50	100	--	--	<0.79	<0.8	<1.6	<1.6	<0.8	<0.8	<0.79	<1.6	
Thallium	mg/kg	700	70	--	--	--	<0.79	2.8 J	1.7 J	<1.6	<0.8	0.99 J	1.3 J	2.7 J	
Vanadium	mg/kg	2,400	240	--	--	--	29	39	36	35	38	40	30	37	
Zinc	mg/kg	5,000	2,500	--	--	--	76	230	54 B	97 B	130 B	60	210	44 B	
GENERAL CHEMISTRY															
pH	SU	--	--	--	--	--	7.67	8.31	7.27	8.42	8.94	8.18	7.87	8.41	
TPH															
Gasoline Range Organics (C6-C12)	mg/kg	--	--	--	--	--	<0.39 {<0.14}	<0.38 {<0.14}	<0.38 {<0.14}	<0.39 {<0.15}	<0.37 {<0.14}	<0.39 {<0.15}	<0.37 {<0.14}	<0.38 {<0.14}	
EFH (C10 - C24)	mg/kg	--	--	--	--	--	71	12	6.7	<5 {<3.5}	<5 {<3.5}	<5 {<3.5}	49	<10 {<7}	
EFH (C25 - C40)	mg/kg	--	--	--	--	--	330	81	21	9.6	8.5 B	36	69	<10 {<7}	
EFH (C10 - C40)	mg/kg	--	--	--	--	--	400	93	28	11	10 B	39	120	<10 {<7}	
VOCs															
1,1,1,2-Tetrachloroethane	ug/kg	--	--	--	--	--	<2 {<0.57}	<2 {<0.57}	<2 {<0.57}	<2 {<0.58}	<2 {<0.57}	<2 {<0.56}	<2 {<0.56}	<1.9 {<0.55}	
1,1,1-Trichloroethane	ug/kg	--	--	--	--	--	<1 {<0.7}	<1 {<0.7}	<1 {<0.71}	<1 {<0.71}	<1 {<0.7}	<0.99 {<0.69}	<0.98 {<0.69}	<0.97 {<0.68}	
1,1,2,2-Tetrachloroethane	ug/kg	--	--	--	--	--	<2 {<0.86}	<2 {<0.86}	<2 {<0.87}	<2 {<0.88}	<2 {<0.86}	<2 {<0.85}	<2 {<0.85}	<1.9 {<0.83}	
1,1,2-Trichloroethane	ug/kg	--	--	--	--	--	<1 {<0.87}	<1 {<0.87}	<1 {<0.88}	<1 {<0.89}	<1 {<0.87}	<0.99 {<0.86}	<0.98 {<0.86}	<0.97 {<0.84}	
1,1-Dichloroethane	ug/kg	--	--	--	--	--	<1 {<0.5}	<1 {<0.5}	<1 {<0.5}	<1 {<0.51}	<1 {<0.5}	<0.99 {<0.49}	<0.98 {<0.49}	<0.97 {<0.48}	
1,1-Dichloroethene	ug/kg	--	--	14,000	--	--	<2 {<0.6}	<2 {<0.6}	<2 {<0.6}	<2 {<0.61}	<2 {<0.6}	<2 {<0.59}	<2 {<0.59}	<1.9 {<0.58}	

INTERIM SOURCE REMOVAL ACTION (ISRA) - OUTFALL 009

WASTE CHARACTERIZATION SAMPLE RESULTS – LOX-1B-3
 THE BOEING COMPANY
 SANTA SUSANA FIELD LABORATORY

				Object Name:			LXWC0044	LXWC0045	LXWC0046	LXWC0047	LXWC0048	LXWC0049	LXWC0050	LXWC0051
				Sample Name:			LXWC0044S001	LXWC0045S001	LXWC0046S001	LXWC0047S001	LXWC0048S001	LXWC0049S001	LXWC0050S001	LXWC0051S001
				Collection Date:			10/12/2010	10/12/2010	10/11/2010	10/11/2010	10/13/2010	10/8/2010	10/12/2010	10/11/2010
				Sample Depth (feet):			0 - 0.3	0 - 0.5	0.5 - 1	0.4 - 0.9	0.2 - 0.7	1.3 - 1.8	0 - 0.3	0.7 - 1.2
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	RESULT ^c
Isopropylbenzene	ug/kg	--	--	--	--	--	<1 {<0.54}	<1 {<0.54}	<1 {<0.54}	<1 {<0.55}	<1 {<0.54}	<0.99 {<0.53}	<0.98 {<0.53}	<0.97 {<0.52}
m,p-Xylenes	ug/kg	--	--	--	--	--	<2 {<0.8}	<2 {<0.8}	<2 {<0.81}	<2 {<0.82}	<2 {<0.8}	<2 {<0.79}	<2 {<0.79}	<1.9 {<0.78}
Methylene chloride	ug/kg	--	--	--	--	--	<10 {<6.5}	<10 {<6.5}	6.6 J	7.3 J	<10 {<6.5}	9.1 JB	<9.8 {<6.4}	<10 {<6.5}
Methyl-tert-butyl Ether (MTBE)	ug/kg	--	--	--	--	--	<2 {<1}	<2 {<1}	<2 {<1}	<2 {<1}	<2 {<1}	<2 {<0.99}	<2 {<0.98}	<1.9 {<0.97}
n-Butylbenzene	ug/kg	--	--	--	--	--	<2 {<0.72}	<2 {<0.72}	<2 {<0.73}	<2 {<0.73}	<2 {<0.72}	<2 {<0.71}	<2 {<0.71}	<1.9 {<0.7}
n-Propylbenzene	ug/kg	--	--	--	--	--	<1 {<0.61}	<1 {<0.61}	<1 {<0.61}	<1 {<0.62}	<1 {<0.61}	<0.99 {<0.6}	<0.98 {<0.6}	<0.97 {<0.59}
Naphthalene	ug/kg	--	--	--	--	--	<2 {<1.1}	<2 {<1.1}	<2 {<1.1}	<2 {<1.1}	<2 {<1.1}	<2 {<1.1}	<2 {<1.1}	<1.9 {<1.1}
o-Xylene	ug/kg	--	--	--	--	--	<1 {<0.5}	<1 {<0.5}	<1 {<0.5}	<1 {<0.51}	<1 {<0.5}	<0.99 {<0.49}	<0.98 {<0.49}	<0.97 {<0.48}
p-Isopropyltoluene	ug/kg	--	--	--	--	--	<1 {<0.72}	<1 {<0.72}	<1 {<0.73}	<1 {<0.73}	<1 {<0.72}	<0.99 {<0.71}	<0.98 {<0.71}	<0.97 {<0.7}
sec-Butylbenzene	ug/kg	--	--	--	--	--	<2 {<0.67}	<2 {<0.67}	<2 {<0.68}	<2 {<0.68}	<2 {<0.67}	<2 {<0.66}	<2 {<0.66}	<1.9 {<0.65}
Styrene	ug/kg	--	--	--	--	--	<1 {<0.58}	<1 {<0.58}	<1 {<0.58}	<1 {<0.59}	<1 {<0.58}	<0.99 {<0.57}	<0.98 {<0.57}	<0.97 {<0.56}
tert-Butylbenzene	ug/kg	--	--	--	--	--	<2 {<0.62}	<2 {<0.62}	<2 {<0.62}	<2 {<0.63}	<2 {<0.62}	<2 {<0.61}	<2 {<0.61}	<1.9 {<0.6}
Tetrachloroethene	ug/kg	--	--	14,000	--	--	<1 {<0.49}	<1 {<0.49}	<1 {<0.49}	<1 {<0.5}	<1 {<0.49}	<0.99 {<0.48}	<0.98 {<0.48}	<0.97 {<0.47}
Toluene	ug/kg	--	--	--	--	--	<1 {<0.5}	<1 {<0.5}	<1 {<0.5}	<1 {<0.51}	<1 {<0.5}	<0.99 {<0.49}	<0.98 {<0.49}	<0.97 {<0.48}
trans-1,2-Dichloroethene	ug/kg	--	--	--	--	--	<1 {<0.7}	<1 {<0.7}	<1 {<0.71}	<1 {<0.71}	<1 {<0.7}	<0.99 {<0.69}	<0.98 {<0.69}	<0.97 {<0.68}
trans-1,3-Dichloropropene	ug/kg	--	--	--	--	--	<1 {<0.61}	<1 {<0.61}	<1 {<0.61}	<1 {<0.62}	<1 {<0.61}	<0.99 {<0.6}	<0.98 {<0.6}	<0.97 {<0.59}
Trichloroethene	ug/kg	2,040,000	2,040,000	10,000	--	--	<1 {<0.5}	<1 {<0.5}	<1 {<0.5}	<1 {<0.51}	<1 {<0.5}	<0.99 {<0.49}	<0.98 {<0.49}	<0.97 {<0.48}
Trichlorofluoromethane	ug/kg	--	--	--	--	--	<2 {<0.54}	<2 {<0.54}	<2 {<0.54}	<2 {<0.55}	<2 {<0.54}	<2 {<0.53}	<2 {<0.53}	<1.9 {<0.52}
Vinyl acetate	ug/kg	--	--	--	--	--	<5 {<2.5}	<5 {<2.5}	<5 {<2.5}	<5.1 {<2.6}	<5 {<2.5}	<4.9 {<2.5}	<4.9 {<2.5}	<4.8 {<2.4}
Vinyl chloride	ug/kg	--	--	4,000	--	--	<2 {<0.91}	<2 {<0.91}	<2 {<0.92}	<2 {<0.93}	<2 {<0.91}	<2 {<0.9}	<2 {<0.9}	<1.9 {<0.88}
RADIONUCLIDES	--	--	--	--	--	--	R	R	R	R	R	R	R	R

INTERIM SOURCE REMOVAL ACTION (ISRA) - OUTFALL 009

**WASTE CHARACTERIZATION SAMPLE RESULTS – LOX-1B-3
THE BOEING COMPANY
SANTA SUSANA FIELD LABORATORY**

							Object Name:	LXWC0052	LXWC0053	LXWC0054	LXWC0055	LXWC0056	LXWC0057	LXWC0058	LXWC0059
							Sample Name:	LXWC0052S001	LXWC0053S001	LXWC0054S001	LXWC0055S001	LXWC0056S001	LXWC0057S001	LXWC0058S001	LXWC0059S001
							Collection Date:	10/12/2010	10/12/2010	10/11/2010	10/11/2010	10/11/2010	10/8/2010	10/11/2010	10/12/2010
							Sample Depth (feet):	0 - 0.4	0.8 - 1.2	1 - 1.5	0.4 - 0.8	0.3 - 0.8	0.1 - 0.3	0.1 - 0.6	0.2 - 0.7
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	RESULT ^c	
METALS															
Antimony	mg/kg	500	150	--	--	--	<0.87	1.5 J	<1.7	2.6 J	2.1 J	1.6 J	<1.7	<0.88	
Arsenic	mg/kg	500	50	100	--	--	1.9 J	4.3	5.6	7.3	5.7	4.9	5.4	5.9	
Barium	mg/kg	10,000	1,000	2,000	--	--	68	94	59	100	98	100	110	91	
Beryllium	mg/kg	75	7.5	--	--	--	<0.2	0.37 J	0.48 J	0.57 J	0.51 J	0.52	0.66 J	0.54	
Cadmium	mg/kg	100	10	20	--	--	<0.2	0.35 J	<0.4	<0.39	<0.4	0.25 J	<0.39	<0.2	
Chromium	mg/kg	500	50	100	--	--	17	22	16	30	28	23	30	26	
Chromium, WET	mg/L	--	--	--	560	--	--	--	--	--	--	--	--	--	
Chromium, TCLP	mg/L	--	--	--	--	5	--	--	--	--	--	--	--	--	
Chromium (Hexavalent), WET	mg/L	--	--	--	5	--	--	--	--	--	--	--	--	--	
Cobalt	mg/kg	8,000	800	--	--	--	4.9	6.3	4.8	6.9	6	5.9	7.4	5.5	
Copper	mg/kg	2,500	250	--	--	--	13	46	7.3	36	110	20	12	12	
Lead	mg/kg	1,000	50	100	--	--	5.9	29	4.8	20	11	350	6.5	7.6	
Lead, WET	mg/L	--	--	--	5	--	--	--	--	--	--	22	--	--	
Lead, TCLP	mg/L	--	--	--	--	5	--	--	--	--	--	0.058 J	--	--	
Mercury	mg/kg	20	2	4	--	--	0.014 J	0.17	<0.012	<0.012	<0.012	<0.012	<0.012	<0.012	
Molybdenum	mg/kg	3,500	3,500	--	--	--	0.76 J	3.8	1.1 J	2.5 J	1.1 J	1.9 J	0.7 J	0.43 J	
Nickel	mg/kg	2,000	200	--	--	--	6.3	20	11	21	18	19	22	17	
Selenium	mg/kg	100	10	20	--	--	<0.99	<1	4.4 B	2.1 JB	4.1 B	<1	7.1 B	<1	
Silver	mg/kg	500	50	100	--	--	<0.79	3.4	<1.6	<1.6	<1.6	<0.8	<1.6	<0.8	
Thallium	mg/kg	700	70	--	--	--	<0.79	<0.8	2.7 J	3.1 J	<1.6	<0.8	2.4 J	1.5 J	
Vanadium	mg/kg	2,400	240	--	--	--	30	31	27	42	40	32	42	40	
Zinc	mg/kg	5,000	2,500	--	--	--	34	170	48 B	100 B	63 B	73	55 B	48	
GENERAL CHEMISTRY															
pH	SU	--	--	--	--	--	6.98	8.25	8.07	8.9	8.14	8.01	7.52	8.26	
TPH															
Gasoline Range Organics (C6-C12)	mg/kg	--	--	--	--	--	<0.37 {<0.14}	<0.37 {<0.14}	<0.38 {<0.14}	<0.39 {<0.14}	<0.4 {<0.15}	<0.38 {<0.14}	<0.39 {<0.15}	<0.38 {<0.14}	
EFH (C10 - C24)	mg/kg	--	--	--	--	--	<5 {<3.5}	<5 {<3.5}	<5 {<3.5}	<5 {<3.5}	4.2 J	4.5 J	<5 {<3.5}	<5 {<3.5}	
EFH (C25 - C40)	mg/kg	--	--	--	--	--	<5 {<3.5}	6.3 B	<5 {<3.5}	13	46	24	6.4	<5 {<3.5}	
EFH (C10 - C40)	mg/kg	--	--	--	--	--	<5 {<3.5}	7.8 B	<5 {<3.5}	16	50	29	8	<5 {<3.5}	
VOCs															
1,1,1,2-Tetrachloroethane	ug/kg	--	--	--	--	--	<2 {<0.57}	<2 {<0.56}	<2.1 {<0.59}	<2 {<0.56}	<2 {<0.57}	<2 {<0.56}	<2 {<0.57}	<2 {<0.56}	
1,1,1-Trichloroethane	ug/kg	--	--	--	--	--	<0.99 {<0.69}	<0.99 {<0.69}	<1 {<0.72}	<0.99 {<0.69}	<1 {<0.7}	<0.99 {<0.69}	<1 {<0.7}	<0.99 {<0.69}	
1,1,2,2-Tetrachloroethane	ug/kg	--	--	--	--	--	<2 {<0.85}	<2 {<0.85}	<2.1 {<0.89}	<2 {<0.85}	<2 {<0.86}	<2 {<0.85}	<2 {<0.86}	<2 {<0.85}	
1,1,2-Trichloroethane	ug/kg	--	--	--	--	--	<0.99 {<0.86}	<0.99 {<0.86}	<1 {<0.9}	<0.99 {<0.86}	<1 {<0.87}	<0.99 {<0.86}	<1 {<0.87}	<0.99 {<0.86}	
1,1-Dichloroethane	ug/kg	--	--	--	--	--	<0.99 {<0.5}	<0.99 {<0.5}	<1 {<0.52}	<0.99 {<0.49}	<1 {<0.5}	<0.99 {<0.49}	<1 {<0.5}	<0.99 {<0.49}	
1,1-Dichloroethene	ug/kg	--	--	14,000	--	--	<2 {<0.6}	<2 {<0.59}	<2.1 {<0.62}	<2 {<0.59}	<2 {<0.6}	<2 {<0.59}	<2 {<0.6}	<2 {<0.59}	

INTERIM SOURCE REMOVAL ACTION (ISRA) - OUTFALL 009

**WASTE CHARACTERIZATION SAMPLE RESULTS – LOX-1B-3
THE BOEING COMPANY
SANTA SUSANA FIELD LABORATORY**

ANALYTE	UNITS	TTLIC	WET Leachate Testing Trigger ^a	TCLP Leachate Testing Trigger ^b	STLC	TCLP	Object Name:	LXWC0052	LXWC0053	LXWC0054	LXWC0055	LXWC0056	LXWC0057	LXWC0058	LXWC0059
							Sample Name:	LXWC0052S001	LXWC0053S001	LXWC0054S001	LXWC0055S001	LXWC0056S001	LXWC0057S001	LXWC0058S001	LXWC0059S001
Collection Date:							10/12/2010	10/12/2010	10/11/2010	10/11/2010	10/11/2010	10/8/2010	10/11/2010	10/12/2010	
Sample Depth (feet):							0 - 0.4	0.8 - 1.2	1 - 1.5	0.4 - 0.8	0.3 - 0.8	0.1 - 0.3	0.1 - 0.6	0.2 - 0.7	
							RESULT ^c	RESULT ^c	RESULT ^c	RESULT ^c	RESULT ^c	RESULT ^c	RESULT ^c	RESULT ^c	
1,1-Dichloropropene	ug/kg	--	--	--	--	--	<0.99 {<0.4}	<0.99 {<0.4}	<1 {<0.41}	<0.99 {<0.4}	<1 {<0.4}	<0.99 {<0.4}	<1 {<0.4}	<0.99 {<0.4}	
1,2,3-Trichlorobenzene	ug/kg	--	--	--	--	--	<2 {<0.99}	<2 {<0.99}	<2.1 {<1}	<2 {<0.99}	<2 {<1}	<2 {<0.99}	<2 {<1}	<2 {<0.99}	
1,2,3-Trichloropropane	ug/kg	--	--	--	--	--	<2 {<0.99}	<2 {<0.99}	<2.1 {<1}	<2 {<0.99}	<2 {<1}	<2 {<0.99}	<2 {<1}	<2 {<0.99}	
1,2,4-Trichlorobenzene	ug/kg	--	--	--	--	--	<2 {<0.99}	<2 {<0.99}	<2.1 {<1}	<2 {<0.99}	<2 {<1}	<2 {<0.99}	<2 {<1}	<2 {<0.99}	
1,2,4-Trimethylbenzene	ug/kg	--	--	--	--	--	<0.99 {<0.77}	<0.99 {<0.77}	<1 {<0.81}	<0.99 {<0.77}	<1 {<0.78}	<0.99 {<0.77}	<1 {<0.78}	<0.99 {<0.77}	
1,2-Dibromo-3-chloropropane	ug/kg	--	--	--	--	--	<9.9 {<1.5}	<9.9 {<1.5}	<10 {<1.5}	<9.9 {<1.5}	<10 {<1.5}	<9.9 {<1.5}	<10 {<1.5}	<9.9 {<1.5}	
1,2-Dibromoethane (EDB)	ug/kg	--	--	--	--	--	<0.99 {<0.79}	<0.99 {<0.79}	<1 {<0.83}	<0.99 {<0.79}	<1 {<0.8}	<0.99 {<0.79}	<1 {<0.8}	<0.99 {<0.79}	
1,2-Dichlorobenzene	ug/kg	--	--	--	--	--	<0.99 {<0.94}	<0.99 {<0.94}	<1 {<0.98}	<0.99 {<0.94}	<1 {<0.95}	<0.99 {<0.94}	<1 {<0.95}	<0.99 {<0.94}	
1,2-Dichloroethane	ug/kg	--	--	10,000	--	--	<0.99 {<0.79}	<0.99 {<0.79}	<1 {<0.83}	<0.99 {<0.79}	<1 {<0.8}	<0.99 {<0.79}	<1 {<0.8}	<0.99 {<0.79}	
1,2-Dichloropropane	ug/kg	--	--	--	--	--	<0.99 {<0.79}	<0.99 {<0.79}	<1 {<0.83}	<0.99 {<0.79}	<1 {<0.8}	<0.99 {<0.79}	<1 {<0.8}	<0.99 {<0.79}	
1,3,5-Trimethylbenzene	ug/kg	--	--	--	--	--	<0.99 {<0.62}	<0.99 {<0.62}	<1 {<0.65}	<0.99 {<0.62}	<1 {<0.63}	<0.99 {<0.62}	<1 {<0.63}	<0.99 {<0.62}	
1,3-Dichlorobenzene	ug/kg	--	--	--	--	--	<0.99 {<0.83}	<0.99 {<0.83}	<1 {<0.87}	<0.99 {<0.83}	<1 {<0.84}	<0.99 {<0.83}	<1 {<0.84}	<0.99 {<0.83}	
1,3-Dichloropropane	ug/kg	--	--	--	--	--	<0.99 {<0.62}	<0.99 {<0.62}	<1 {<0.65}	<0.99 {<0.62}	<1 {<0.63}	<0.99 {<0.62}	<1 {<0.63}	<0.99 {<0.62}	
1,4-Dichlorobenzene	ug/kg	--	--	--	--	--	<0.99 {<0.93}	<0.99 {<0.93}	<1 {<0.97}	<0.99 {<0.93}	<1 {<0.94}	<0.99 {<0.93}	<1 {<0.94}	<0.99 {<0.93}	
2-Butanone (MEK)	ug/kg	--	--	4,000,000	--	--	<9.9 {<6}	<9.9 {<5.9}	<10 {<6.2}	<9.9 {<5.9}	<10 {<6}	<9.9 {<5.9}	<10 {<6}	<9.9 {<5.9}	
2-Hexanone	ug/kg	--	--	--	--	--	<9.9 {<9}	<9.9 {<9}	<10 {<9.4}	<9.9 {<9}	<10 {<9.1}	<9.9 {<9}	<10 {<9.1}	<9.9 {<9}	
4-Methyl-2-pentanone (MIBK)	ug/kg	--	--	--	--	--	<5 {<4.5}	<5 {<4.5}	<5.2 {<4.6}	<4.9 {<4.4}	<5 {<4.5}	<4.9 {<4.4}	<5 {<4.5}	<4.9 {<4.4}	
Acetone	ug/kg	--	--	--	--	--	<9.9 {<7.9}	<9.9 {<7.9}	<10 {<8.3}	<9.9 {<7.9}	<10 {<8}	<9.9 {<7.9}	<10 {<8}	<9.9 {<7.9}	
Benzene	ug/kg	--	--	10,000	--	--	<0.99 {<0.5}	<0.99 {<0.5}	<1 {<0.52}	<0.99 {<0.49}	<1 {<0.5}	<0.99 {<0.49}	<1 {<0.5}	<0.99 {<0.49}	
Bromobenzene	ug/kg	--	--	--	--	--	<2 {<0.83}	<2 {<0.83}	<2.1 {<0.87}	<2 {<0.83}	<2 {<0.84}	<2 {<0.83}	<2 {<0.84}	<2 {<0.83}	
Bromochloromethane	ug/kg	--	--	--	--	--	<2 {<0.89}	<2 {<0.89}	<2.1 {<0.93}	<2 {<0.89}	<2 {<0.9}	<2 {<0.89}	<2 {<0.9}	<2 {<0.89}	
Bromodichloromethane	ug/kg	--	--	--	--	--	<0.99 {<0.5}	<0.99 {<0.5}	<1 {<0.52}	<0.99 {<0.49}	<1 {<0.5}	<0.99 {<0.49}	<1 {<0.5}	<0.99 {<0.49}	
Bromoform	ug/kg	--	--	--	--	--	<2 {<0.79}	<2 {<0.79}	<2.1 {<0.83}	<2 {<0.79}	<2 {<0.8}	<2 {<0.79}	<2 {<0.8}	<2 {<0.79}	
Bromomethane	ug/kg	--	--	--	--	--	<2 {<0.91}	<2 {<0.91}	<2.1 {<0.95}	<2 {<0.91}	<2 {<0.92}	<2 {<0.91}	<2 {<0.92}	<2 {<0.91}	
Carbon Disulfide	ug/kg	--	--	--	--	--	<5 {<0.96}	<5 {<0.96}	<5.2 {<1}	<4.9 {<0.96}	<5 {<0.97}	<4.9 {<0.96}	<5 {<0.97}	<4.9 {<0.96}	
Carbon tetrachloride	ug/kg	--	--	10,000	--	--	<2 {<0.5}	<2 {<0.5}	<2.1 {<0.52}	<2 {<0.49}	<2 {<0.5}	<2 {<0.49}	<2 {<0.5}	<2 {<0.49}	
Chlorobenzene	ug/kg	--	--	2,000,000	--	--	<0.99 {<0.52}	<0.99 {<0.51}	<1 {<0.54}	<0.99 {<0.51}	<1 {<0.52}	<0.99 {<0.51}	<1 {<0.52}	<0.99 {<0.51}	
Chloroethane	ug/kg	--	--	--	--	--	<2 {<1.5}	<2 {<1.5}	<2.1 {<1.5}	<2 {<1.5}	<2 {<1.5}	<2 {<1.5}	<2 {<1.5}	<2 {<1.5}	
Chloroform	ug/kg	--	--	120,000	--	--	<0.99 {<0.5}	<0.99 {<0.5}	<1 {<0.52}	<0.99 {<0.49}	<1 {<0.5}	<0.99 {<0.49}	<1 {<0.5}	<0.99 {<0.49}	
Chloromethane	ug/kg	--	--	--	--	--	<2 {<0.99}	<2 {<0.99}	<2.1 {<1}	<2 {<0.99}	<2 {<1}	<2 {<0.99}	<2 {<1}	<2 {<0.99}	
cis-1,2-Dichloroethene	ug/kg	--	--	--	--	--	<0.99 {<0.82}	<0.99 {<0.82}	<1 {<0.86}	<0.99 {<0.82}	<1 {<0.83}	<0.99 {<0.82}	<1 {<0.83}	<0.99 {<0.82}	
cis-1,3-Dichloropropene	ug/kg	--	--	--	--	--	<0.99 {<0.44}	<0.99 {<0.44}	<1 {<0.45}	<0.99 {<0.43}	<1 {<0.44}	<0.99 {<0.43}	<1 {<0.44}	<0.99 {<0.43}	
Dibromochloromethane	ug/kg	--	--	--	--	--	<0.99 {<0.69}	<0.99 {<0.69}	<1 {<0.72}	<0.99 {<0.69}	<1 {<0.7}	<0.99 {<0.69}	<1 {<0.7}	<0.99 {<0.69}	
Dibromomethane	ug/kg	--	--	--	--	--	<0.99 {<0.89}	<0.99 {<0.89}	<1 {<0.93}	<0.99 {<0.89}	<1 {<0.9}	<0.99 {<0.89}	<1 {<0.9}	<0.99 {<0.89}	
Dichlorodifluoromethane	ug/kg	--	--	--	--	--	<5 {<1.5}	<5 {<1.5}	<5.2 {<1.5}	<4.9 {<1.5}	<5 {<1.5}	<4.9 {<1.5}	<5 {<1.5}	<4.9 {<1.5}	
Ethylbenzene	ug/kg	--	--	--	--	--	<0.99 {<0.5}	<0.99 {<0.5}	<1 {<0.52}	<0.99 {<0.49}	<1 {<0.5}	<0.99 {<0.49}	<1 {<0.5}	<0.99 {<0.49}	
Hexachlorobutadiene	ug/kg	--	--	--	--	--	<2 {<0.79}	<2 {<0.79}	<2.1 {<0.83}	<2 {<0.79}	<2 {<0.8}	<2 {<0.79}	<2 {<0.8}	<2 {<0.79}	

INTERIM SOURCE REMOVAL ACTION (ISRA) - OUTFALL 009

WASTE CHARACTERIZATION SAMPLE RESULTS – LOX-1B-3
 THE BOEING COMPANY
 SANTA SUSANA FIELD LABORATORY

				Object Name:			LXWC0052	LXWC0053	LXWC0054	LXWC0055	LXWC0056	LXWC0057	LXWC0058	LXWC0059
				Sample Name:			LXWC0052S001	LXWC0053S001	LXWC0054S001	LXWC0055S001	LXWC0056S001	LXWC0057S001	LXWC0058S001	LXWC0059S001
				Collection Date:			10/12/2010	10/12/2010	10/11/2010	10/11/2010	10/11/2010	10/8/2010	10/11/2010	10/12/2010
				Sample Depth (feet):			0 - 0.4	0.8 - 1.2	1 - 1.5	0.4 - 0.8	0.3 - 0.8	0.1 - 0.3	0.1 - 0.6	0.2 - 0.7
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	RESULT ^c
Isopropylbenzene	ug/kg	--	--	--	--	--	<0.99 {<0.54}	<0.99 {<0.53}	<1 {<0.56}	<0.99 {<0.53}	<1 {<0.54}	<0.99 {<0.53}	<1 {<0.54}	<0.99 {<0.53}
m,p-Xylenes	ug/kg	--	--	--	--	--	<2 {<0.79}	<2 {<0.79}	<2.1 {<0.83}	<2 {<0.79}	<2 {<0.8}	<2 {<0.79}	<2 {<0.8}	<2 {<0.79}
Methylene chloride	ug/kg	--	--	--	--	--	<9.9 {<6.4}	<9.9 {<6.4}	7.4 J	7.2 J	8.7 J	<9.9 {<6.4}	9.4 J	<9.9 {<6.4}
Methyl-tert-butyl Ether (MTBE)	ug/kg	--	--	--	--	--	<2 {<0.99}	<2 {<0.99}	<2.1 {<1}	<2 {<0.99}	<2 {<1}	<2 {<0.99}	<2 {<1}	<2 {<0.99}
n-Butylbenzene	ug/kg	--	--	--	--	--	<2 {<0.71}	<2 {<0.71}	<2.1 {<0.74}	<2 {<0.71}	<2 {<0.72}	<2 {<0.71}	<2 {<0.72}	<2 {<0.71}
n-Propylbenzene	ug/kg	--	--	--	--	--	<0.99 {<0.61}	<0.99 {<0.6}	<1 {<0.63}	<0.99 {<0.6}	<1 {<0.61}	<0.99 {<0.6}	<1 {<0.61}	<0.99 {<0.6}
Naphthalene	ug/kg	--	--	--	--	--	<2 {<1.1}	<2 {<1.1}	<2.1 {<1.1}	<2 {<1.1}	<2 {<1.1}	<2 {<1.1}	<2 {<1.1}	<2 {<1.1}
o-Xylene	ug/kg	--	--	--	--	--	<0.99 {<0.5}	<0.99 {<0.5}	<1 {<0.52}	<0.99 {<0.49}	<1 {<0.5}	<0.99 {<0.49}	<1 {<0.5}	<0.99 {<0.49}
p-Isopropyltoluene	ug/kg	--	--	--	--	--	<0.99 {<0.71}	<0.99 {<0.71}	<1 {<0.74}	<0.99 {<0.71}	<1 {<0.72}	<0.99 {<0.71}	<1 {<0.72}	<0.99 {<0.71}
sec-Butylbenzene	ug/kg	--	--	--	--	--	<2 {<0.66}	<2 {<0.66}	<2.1 {<0.69}	<2 {<0.66}	<2 {<0.67}	<2 {<0.66}	<2 {<0.67}	<2 {<0.66}
Styrene	ug/kg	--	--	--	--	--	<0.99 {<0.58}	<0.99 {<0.57}	<1 {<0.6}	<0.99 {<0.57}	<1 {<0.58}	<0.99 {<0.57}	<1 {<0.58}	<0.99 {<0.57}
tert-Butylbenzene	ug/kg	--	--	--	--	--	<2 {<0.62}	<2 {<0.61}	<2.1 {<0.64}	<2 {<0.61}	<2 {<0.62}	<2 {<0.61}	<2 {<0.62}	<2 {<0.61}
Tetrachloroethene	ug/kg	--	--	14,000	--	--	<0.99 {<0.49}	<0.99 {<0.49}	<1 {<0.51}	<0.99 {<0.48}	<1 {<0.49}	<0.99 {<0.48}	<1 {<0.49}	<0.99 {<0.48}
Toluene	ug/kg	--	--	--	--	--	<0.99 {<0.5}	<0.99 {<0.5}	<1 {<0.52}	<0.99 {<0.49}	<1 {<0.5}	<0.99 {<0.49}	<1 {<0.5}	<0.99 {<0.49}
trans-1,2-Dichloroethene	ug/kg	--	--	--	--	--	<0.99 {<0.69}	<0.99 {<0.69}	<1 {<0.72}	<0.99 {<0.69}	<1 {<0.7}	<0.99 {<0.69}	<1 {<0.7}	<0.99 {<0.69}
trans-1,3-Dichloropropene	ug/kg	--	--	--	--	--	<0.99 {<0.61}	<0.99 {<0.6}	<1 {<0.63}	<0.99 {<0.6}	<1 {<0.61}	<0.99 {<0.6}	<1 {<0.61}	<0.99 {<0.6}
Trichloroethene	ug/kg	2,040,000	2,040,000	10,000	--	--	<0.99 {<0.5}	<0.99 {<0.5}	<1 {<0.52}	<0.99 {<0.49}	<1 {<0.5}	<0.99 {<0.49}	4.5	<0.99 {<0.49}
Trichlorofluoromethane	ug/kg	--	--	--	--	--	<2 {<0.54}	<2 {<0.53}	<2.1 {<0.56}	<2 {<0.53}	<2 {<0.54}	<2 {<0.53}	<2 {<0.54}	<2 {<0.53}
Vinyl acetate	ug/kg	--	--	--	--	--	<5 {<2.5}	<5 {<2.5}	<5.2 {<2.6}	<4.9 {<2.5}	<5 {<2.5}	<4.9 {<2.5}	<5 {<2.5}	<4.9 {<2.5}
Vinyl chloride	ug/kg	--	--	4,000	--	--	<2 {<0.9}	<2 {<0.9}	<2.1 {<0.94}	<2 {<0.9}	<2 {<0.91}	<2 {<0.9}	<2 {<0.91}	<2 {<0.9}
RADIONUCLIDES	--	--	--	--	--	--	R	R	R	R	R	R	R	R

INTERIM SOURCE REMOVAL ACTION (ISRA) - OUTFALL 009

**WASTE CHARACTERIZATION SAMPLE RESULTS – LOX
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.

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

WASTE CHARACTERIZATION: IN-SITU DEBRIS STOCKPILE LOCATED AT THE ISRA AREA II LOX EXCAVATION SITE

Introduction

Multiple, small debris piles were relocated from the ISRA Area II LOX excavation site to a nearby location that would not impede work progress. This report presents supporting detailed information relating to the August 1, 2013 in-situ characterization of the stockpiled debris, which consists of soil intermixed with sandstone (approximately 40%), broken up asphalt (approximately 5%), small pieces of concrete (approximately 5%), and small amounts of vegetation and metal (approximately 8% total). Asphalt, concrete, and sandstone pieces were generally no larger than approximately two-feet in diameter. The debris piles were consolidated into a stockpile measuring approximately forty-feet by sixty-feet and eight to nine-feet in height.

Background

Samples of the stockpile were collected according to a random sampling plan and analyzed by a state certified laboratory. Analytical results provided by the laboratory were evaluated to determine whether any regulated substances were present at concentrations exceeding regulatory thresholds governing waste management. Furthermore, the results were also evaluated to assure adequacy for waste characterization purposes based upon the guidelines presented in U.S. EPA SW-846. Based on this evaluation, the number of samples was sufficient and it was not necessary to collect any additional samples.

The analyte suite for sample analysis was based on the initial characterization of the area where the debris piles were originally situated. This data and prior testing of similar materials at SSFL indicated that testing should target Regulated Metals, Polychlorinated Biphenyls (PCB), Petroleum Fuel Hydrocarbons (TPH), and Semi-Volatile Organic Compounds (SVOC). The sample plan called for collection of six (6) samples from the stockpile at randomly determined depths. All samples were analyzed for CAM 17 metals, PCBs, TPH, and SVOCs. All samples were collected, contained, and handled according to field practice requirements in SW-846.

Results

Analytical results for the debris stockpile are presented in GEL Laboratories, LLC. report 330817, issued on 8/9/13. Regulated metals were detected, but in no case exceeded any applicable regulatory thresholds. With respect to hazardous waste regulations, Chromium was the most significant detection, with a mean of 13.07 mg/kg and concentrations ranging from 10.8 mg/kg to 15.8 mg/kg. Lead was detected at a maximum concentration of 23.1 mg/kg, but exhibited a mean of 10.08 mg/kg. These metals were below the California 10 X STLC hazardous waste threshold of 50 ppm, which applies to both of them.

Low concentrations of PCBs were detected. Aroclor 1254 was detected ranging between ND and 0.0139 mg/kg. Aroclor 1260 was also detected, with a range of ND to 0.0127 mg/kg. These detections compare to the California 10 X STLC threshold and the TSCA action level, both of which are at 50 parts per million. Petroleum Fuel Hydrocarbons were also detected at low concentrations. In the general total Extractible Fuel Hydrocarbon range of C11 – C30, detections ranged from 11.5 mg/kg to 106.23 mg/kg. This breaks out to a maximum concentration of 85.8 mg/kg in the general Diesel Range Organics C11 – C20 carbon range, and a maximum concentration of 103 mg/kg in the general Oil Range Organics C20 – C30

carbon range. Gasoline Range Organics (C8 – C11) were not detected. Despite acceptably low Method Detection Limits, no SVOCs were detected.

Determination

According to analytical results and generator knowledge, the material in the LOX debris stockpile:

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

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 LOX debris stockpile is NON-HAZARDOUS.

INTERIM SOURCE REMOVAL ACTION (ISRA) - OUTFALL 009

**WASTE CHARACTERIZATION RESULTS - LOX DEBRIS PILE
THE BOEING COMPANY
SANTA SUSANA FIELD LABORATORY**

		Object Name: Sample Name: Collection Date: Sample Depth (feet bgs):			LOXDRS LOXDRS_S1 8/1/2013 5.5 - 6.0	LOXDRS LOXDRS_S2 8/1/2013 0.5 - 1.0	LOXDRS LOXDRS_S3 8/1/2013 2.5 - 3.0	LOXDRS LOXDRS_S4 8/1/2013 3.5 - 4.0	LOXDRS LOXDRS_S5 8/1/2013 1.5 - 2.0	LOXDRS LOXDRS_S6 8/1/2013 4.5 - 5.0
ANALYTE	UNITS	TCLC	WET Leachate Testing Trigger ^a	TCLP Leachate Testing Trigger ^b	RESULT ^c	RESULT ^c	RESULT ^c	RESULT ^c	RESULT ^c	RESULT ^c
METALS										
Antimony	mg/kg	500	150	--	1.82	1.91	1.93	1.96	1.69	1.73
Arsenic	mg/kg	500	50	100	1.76	1.72	2.76	2.76	3.91	1.35
Barium	mg/kg	10000	1000	2000	67.9	52.2	60.3	60.3	50	62.1
Beryllium	mg/kg	75	7.5	--	0.523	0.369	0.407	0.488	0.442	0.329
Cadmium	mg/kg	100	10	20	< 0.0988	< 0.0954	0.198	< 0.0967	< 0.0977	0.172
Chromium	mg/kg	500	50	100	15.8	11.5	15.6	13.5	11.2	10.8
Cobalt	mg/kg	8000	800	--	6.61	5.61	5.72	5.59	5.18	5.45
Copper	mg/kg	2500	250	--	10.6	9.09	9.27	7.19	10	9.89
Lead	mg/kg	1000	50	100	6.43	10.6	8.16	5.18	23.1	6.99
Mercury	mg/kg	20	2	4	< 0.00387	< 0.00357	0.00962	< 0.00387	< 0.00362	0.00526
Molybdenum	mg/kg	3500	3500	--	0.636	0.678	0.727	0.669	0.702	0.594
Nickel	mg/kg	2000	200	--	11.7	8.29	10.3	9.03	7.32	7.69
Selenium	mg/kg	100	10	20	< 0.494	< 0.477	< 0.475	< 2.42	< 0.488	< 0.486
Silver	mg/kg	500	50	100	1.61	1.23	1.41	1.36	1.28	1.34
Thallium	mg/kg	700	70	--	3.33	2.64	3.03	2.72	2.12	2.89
Vanadium	mg/kg	2400	240	--	29.9	21	23.8	23.4	21	23.2
Zinc	mg/kg	5000	2500	--	52	45.1	52.8	47.9	44.5	50.2
TPH										
EFH (>C8 - C11)	mg/kg	--	--	--	< 2.74	< 0.546	< 2.74	< 0.546	< 0.547	< 0.545
EFH (>C11 - C14)	mg/kg	--	--	--	< 2.74	< 0.546	< 2.74	< 0.546	< 0.547	< 0.545
EFH (>C14 - C20)	mg/kg	--	--	--	3.23	2.28	4.26	2.16	2.28	1.62
EFH (>C20 - C30)	mg/kg	--	--	--	103	27.4	85.8	16	9.22	35.8
PCBs										
Aroclor 1016	ug/kg	50000	50000	--	< 5.52	< 5.5	< 5.51	< 1.11	< 1.11	< 5.55
Aroclor 1221	ug/kg	50000	50000	--	< 5.52	< 5.5	< 5.51	< 1.11	< 1.11	< 5.55
Aroclor 1232	ug/kg	50000	50000	--	< 5.52	< 5.5	< 5.51	< 1.11	< 1.11	< 5.55
Aroclor 1242	ug/kg	50000	50000	--	< 5.52	< 5.5	< 5.51	< 1.11	< 1.11	< 5.55
Aroclor 1248	ug/kg	50000	50000	--	< 5.52	< 5.5	< 5.51	< 1.11	< 1.11	< 5.55
Aroclor 1254	ug/kg	50000	50000	--	13.9	< 5.5	13.4	6.42	3.86	< 5.55
Aroclor 1260	ug/kg	50000	50000	--	10.9	12.7	10.3	4.69	3.23	< 5.55

INTERIM SOURCE REMOVAL ACTION (ISRA) - OUTFALL 009

**WASTE CHARACTERIZATION RESULTS - LOX DEBRIS PILE
THE BOEING COMPANY
SANTA SUSANA FIELD LABORATORY**

		Object Name: Sample Name: Collection Date: Sample Depth (feet bgs):			LOXDRS LOXDRS_S1 8/1/2013 5.5 - 6.0	LOXDRS LOXDRS_S2 8/1/2013 0.5 - 1.0	LOXDRS LOXDRS_S3 8/1/2013 2.5 - 3.0	LOXDRS LOXDRS_S4 8/1/2013 3.5 - 4.0	LOXDRS LOXDRS_S5 8/1/2013 1.5 - 2.0	LOXDRS LOXDRS_S6 8/1/2013 4.5 - 5.0
ANALYTE	UNITS	TTLIC	WET Leachate Testing Trigger ^a	TCLP Leachate Testing Trigger ^b	RESULT ^c	RESULT ^c	RESULT ^c	RESULT ^c	RESULT ^c	RESULT ^c
Aroclor 1262	ug/kg	50000	50000	--	< 5.52	< 5.5	< 5.51	< 1.11	< 1.11	< 5.55
Aroclor 1268	ug/kg	50000	50000	--	< 5.52	< 5.5	< 5.51	< 1.11	< 1.11	< 5.55
Aroclor 5432	ug/kg	--	--	--	< 16.6	< 16.5	< 16.6	< 3.33	< 3.33	< 16.7
Aroclor 5442	ug/kg	--	--	--	< 16.6	< 16.5	< 16.6	< 3.33	< 3.33	< 16.7
Aroclor 5460	ug/kg	--	--	--	< 16.6	< 16.5	< 16.6	< 3.33	< 3.33	< 16.7
SVOCs										
1,1'-Biphenyl	ug/kg	--	--	--	< 990	< 99	< 99.4	< 99.5	< 98.4	< 497
1,2,4-Trichlorobenzene	ug/kg	--	--	--	< 990	< 99	< 99.4	< 99.5	< 98.4	< 497
1,2-Dichlorobenzene	ug/kg	--	--	--	< 990	< 99	< 99.4	< 99.5	< 98.4	< 497
1,2-Diphenylhydrazine	ug/kg	--	--	--	< 990	< 99	< 99.4	< 99.5	< 98.4	< 497
1,3-Dichlorobenzene	ug/kg	--	--	--	< 990	< 99	< 99.4	< 99.5	< 98.4	< 497
1,4-Dichlorobenzene	ug/kg	--	--	150000	< 990	< 99	< 99.4	< 99.5	< 98.4	< 497
1-Methylnaphthalene	ug/kg	--	--	--	< 99	< 9.9	< 9.94	< 9.95	< 9.84	< 49.7
1-Naphthylamine	ug/kg	--	--	--	< 990	< 99	< 99.4	< 99.5	< 98.4	< 497
2,4,5-Trichlorophenol	ug/kg	--	--	8000000	< 990	< 99	< 99.4	< 99.5	< 98.4	< 497
2,4,6-Trichlorophenol	ug/kg	--	--	40000	< 990	< 99	< 99.4	< 99.5	< 98.4	< 497
2,4-Dichlorophenol	ug/kg	--	--	--	< 990	< 99	< 99.4	< 99.5	< 98.4	< 497
2,4-Dimethylphenol	ug/kg	--	--	--	< 990	< 99	< 99.4	< 99.5	< 98.4	< 497
2,4-Dinitrophenol	ug/kg	--	--	--	< 990	< 99	< 99.4	< 99.5	< 98.4	< 497
2,4-Dinitrotoluene	ug/kg	--	--	2600	< 990	< 99	< 99.4	< 99.5	< 98.4	< 497
2,6-Dinitrotoluene	ug/kg	--	--	--	< 990	< 99	< 99.4	< 99.5	< 98.4	< 497
2-Chloronaphthalene	ug/kg	--	--	--	< 99	< 9.9	< 9.94	< 9.95	< 9.84	< 49.7
2-Chlorophenol	ug/kg	--	--	--	< 990	< 99	< 99.4	< 99.5	< 98.4	< 497
2-Methyl-4,6-dinitrophenol	ug/kg	--	--	--	< 990	< 99	< 99.4	< 99.5	< 98.4	< 497
2-Methylnaphthalene	ug/kg	--	--	--	< 99	< 9.9	< 9.94	< 9.95	< 9.84	< 49.7
2-Naphthylamine	ug/kg	--	--	--	< 990	< 99	< 99.4	< 99.5	< 98.4	< 497
2-Nitrophenol	ug/kg	--	--	--	< 990	< 99	< 99.4	< 99.5	< 98.4	< 497
3,3'-Dichlorobenzidine	ug/kg	--	--	--	< 990	< 99	< 99.4	< 99.5	< 98.4	< 497
3,5-Dimethylphenol	ug/kg	--	--	--	< 990	< 99	< 99.4	< 99.5	< 98.4	< 497
4-Aminobiphenyl	ug/kg	--	--	--	< 990	< 99	< 99.4	< 99.5	< 98.4	< 497
4-Bromophenylphenylether	ug/kg	--	--	--	< 990	< 99	< 99.4	< 99.5	< 98.4	< 497

INTERIM SOURCE REMOVAL ACTION (ISRA) - OUTFALL 009

**WASTE CHARACTERIZATION RESULTS - LOX DEBRIS PILE
THE BOEING COMPANY
SANTA SUSANA FIELD LABORATORY**

		Object Name: Sample Name: Collection Date: Sample Depth (feet bgs):			LOXDRS LOXDRS_S1 8/1/2013 5.5 - 6.0	LOXDRS LOXDRS_S2 8/1/2013 0.5 - 1.0	LOXDRS LOXDRS_S3 8/1/2013 2.5 - 3.0	LOXDRS LOXDRS_S4 8/1/2013 3.5 - 4.0	LOXDRS LOXDRS_S5 8/1/2013 1.5 - 2.0	LOXDRS LOXDRS_S6 8/1/2013 4.5 - 5.0
ANALYTE	UNITS	TTLIC	WET Leachate Testing Trigger ^a	TCLP Leachate Testing Trigger ^b	RESULT ^c	RESULT ^c	RESULT ^c	RESULT ^c	RESULT ^c	RESULT ^c
4-Chloro-3-methylphenol	ug/kg	--	--	--	< 1320	< 132	< 133	< 133	< 131	< 663
4-Chloroaniline	ug/kg	--	--	--	< 990	< 99	< 99.4	< 99.5	< 98.4	< 497
4-Chlorophenylphenylether	ug/kg	--	--	--	< 990	< 99	< 99.4	< 99.5	< 98.4	< 497
4-Nitrophenol	ug/kg	--	--	--	< 990	< 99	< 99.4	< 99.5	< 98.4	< 497
Acenaphthene	ug/kg	--	--	--	< 99	< 9.9	< 9.94	< 9.95	< 9.84	< 49.7
Acenaphthylene	ug/kg	--	--	--	< 99	< 9.9	< 9.94	< 9.95	< 9.84	< 49.7
Acetophenone	ug/kg	--	--	--	< 990	< 99	< 99.4	< 99.5	< 98.4	< 497
Aniline	ug/kg	--	--	--	< 990	< 99	< 99.4	< 99.5	< 98.4	< 497
Anthracene	ug/kg	--	--	--	< 99	< 9.9	< 9.94	< 9.95	< 9.84	< 49.7
Atrazine	ug/kg	--	--	--	< 1320	< 132	< 133	< 133	< 131	< 663
Benzaldehyde	ug/kg	--	--	--	< 990	< 99	< 99.4	< 99.5	< 98.4	< 497
Benidine	ug/kg	--	--	--	< 990	< 99	< 99.4	< 99.5	< 98.4	< 497
Benzo(a)anthracene	ug/kg	--	--	--	< 99	< 9.9	< 9.94	< 9.95	< 9.84	< 49.7
Benzo(a)pyrene	ug/kg	--	--	--	< 99	< 9.9	< 9.94	< 9.95	< 9.84	< 49.7
Benzo(b)fluoranthene	ug/kg	--	--	--	< 99	< 9.9	< 9.94	< 9.95	< 9.84	< 49.7
Benzo(ghi)perylene	ug/kg	--	--	--	< 99	< 9.9	< 9.94	< 9.95	< 9.84	< 49.7
Benzo(k)fluoranthene	ug/kg	--	--	--	< 99	< 9.9	< 9.94	< 9.95	< 9.84	< 49.7
Benzoic acid	ug/kg	--	--	--	< 1650	< 165	< 166	< 166	< 164	< 828
Benzyl alcohol	ug/kg	--	--	--	< 990	< 99	< 99.4	< 99.5	< 98.4	< 497
bis(2-Chloroethoxy)methane	ug/kg	--	--	--	< 990	< 99	< 99.4	< 99.5	< 98.4	< 497
Bis(2-chloroethyl)ether	ug/kg	--	--	--	< 990	< 99	< 99.4	< 99.5	< 98.4	< 497
bis(2-Chloroisopropyl)ether	ug/kg	--	--	--	< 990	< 99	< 99.4	< 99.5	< 98.4	< 497
bis(2-Ethylhexyl)phthalate	ug/kg	--	--	--	< 990	< 99	< 99.4	< 99.5	< 98.4	< 497
Butyl benzyl phthalate	ug/kg	--	--	--	< 990	< 99	< 99.4	< 99.5	< 98.4	< 497
Caprolactam	ug/kg	--	--	--	< 990	< 99	< 99.4	< 99.5	< 98.4	< 497
Carbazole	ug/kg	--	--	--	< 99	< 9.9	< 9.94	< 9.95	< 9.84	< 49.7
Chrysene	ug/kg	--	--	--	< 99	< 9.9	< 9.94	< 9.95	< 9.84	< 49.7
Dibenz(a,h)anthracene	ug/kg	--	--	--	< 99	< 9.9	< 9.94	< 9.95	< 9.84	< 49.7
Dibenzofuran	ug/kg	--	--	--	< 990	< 99	< 99.4	< 99.5	< 98.4	< 497
Diethylphthalate	ug/kg	--	--	--	< 990	< 99	< 99.4	< 99.5	< 98.4	< 497
Dimethylphthalate	ug/kg	--	--	--	< 990	< 99	< 99.4	< 99.5	< 98.4	< 497

INTERIM SOURCE REMOVAL ACTION (ISRA) - OUTFALL 009

**WASTE CHARACTERIZATION RESULTS - LOX DEBRIS PILE
THE BOEING COMPANY
SANTA SUSANA FIELD LABORATORY**

		Object Name: Sample Name: Collection Date: Sample Depth (feet bgs):			LOXDRS LOXDRS_S1 8/1/2013 5.5 - 6.0	LOXDRS LOXDRS_S2 8/1/2013 0.5 - 1.0	LOXDRS LOXDRS_S3 8/1/2013 2.5 - 3.0	LOXDRS LOXDRS_S4 8/1/2013 3.5 - 4.0	LOXDRS LOXDRS_S5 8/1/2013 1.5 - 2.0	LOXDRS LOXDRS_S6 8/1/2013 4.5 - 5.0
ANALYTE	UNITS	TTLIC	WET Leachate Testing Trigger ^a	TCLP Leachate Testing Trigger ^b	RESULT ^c	RESULT ^c	RESULT ^c	RESULT ^c	RESULT ^c	RESULT ^c
Di-n-butylphthalate	ug/kg	--	--	--	< 990	< 99	< 99.4	< 99.5	< 98.4	< 497
Di-n-octylphthalate	ug/kg	--	--	--	< 990	< 99	< 99.4	< 99.5	< 98.4	< 497
Diphenylamine	ug/kg	--	--	--	< 990	< 99	< 99.4	< 99.5	< 98.4	< 497
Fluoranthene	ug/kg	--	--	--	< 99	< 9.9	< 9.94	< 9.95	< 9.84	< 49.7
Fluorene	ug/kg	--	--	--	< 99	< 9.9	< 9.94	< 9.95	< 9.84	< 49.7
Hexachlorobenzene	ug/kg	--	--	2600	< 990	< 99	< 99.4	< 99.5	< 98.4	< 497
Hexachlorobutadiene	ug/kg	--	--	10000	< 990	< 99	< 99.4	< 99.5	< 98.4	< 497
Hexachlorocyclopentadiene	ug/kg	--	--	--	< 990	< 99	< 99.4	< 99.5	< 98.4	< 497
Hexachloroethane	ug/kg	--	--	60000	< 990	< 99	< 99.4	< 99.5	< 98.4	< 497
Indeno(1,2,3-cd)pyrene	ug/kg	--	--	--	< 99	< 9.9	< 9.94	< 9.95	< 9.84	< 49.7
Isophorone	ug/kg	--	--	--	< 990	< 99	< 99.4	< 99.5	< 98.4	< 497
m,p-Cresols	ug/kg	--	--	4000000	< 990	< 99	< 99.4	< 99.5	< 98.4	< 497
m-Nitroaniline	ug/kg	--	--	--	< 990	< 99	< 99.4	< 99.5	< 98.4	< 497
Naphthalene	ug/kg	--	--	--	< 99	< 9.9	< 9.94	< 9.95	< 9.84	< 49.7
Nitrobenzene	ug/kg	--	--	40000	< 990	< 99	< 99.4	< 99.5	< 98.4	< 497
N-Methyl-N-nitrosomethylamine	ug/kg	--	--	--	< 990	< 99	< 99.4	< 99.5	< 98.4	< 497
N-Nitrosodipropylamine	ug/kg	--	--	--	< 990	< 99	< 99.4	< 99.5	< 98.4	< 497
o-Cresol	ug/kg	--	--	4000000	< 990	< 99	< 99.4	< 99.5	< 98.4	< 497
o-Nitroaniline	ug/kg	--	--	--	< 1090	< 109	< 109	< 109	< 108	< 547
p-(Dimethylamino)azobenzene	ug/kg	--	--	--	< 990	< 99	< 99.4	< 99.5	< 98.4	< 497
Pentachlorophenol	ug/kg	17000	17000	2000000	< 990	< 99	< 99.4	< 99.5	< 98.4	< 497
Phenanthrene	ug/kg	--	--	--	< 99	< 9.9	< 9.94	< 9.95	< 9.84	< 49.7
Phenol	ug/kg	--	--	--	< 990	< 99	< 99.4	< 99.5	< 98.4	< 497
p-Nitroaniline	ug/kg	--	--	--	< 990	< 99	< 99.4	< 99.5	< 98.4	< 497
Pyrene	ug/kg	--	--	--	< 99	< 9.9	< 9.94	< 9.95	< 9.84	< 49.7
Pyridine	ug/kg	--	--	--	< 990	< 99	< 99.4	< 99.5	< 98.4	< 497
RADIONUCLIDES	--	--	--	--	R	R	R	R	R	R

INTERIM SOURCE REMOVAL ACTION (ISRA) - OUTFALL 009

**WASTE CHARACTERIZATION RESULTS - LOX DEBRIS PILE
THE BOEING COMPANY
SANTA SUSANA FIELD LABORATORY**

		Object Name: Sample Name: Collection Date: Sample Depth (feet bgs):			LOXDRS LOXDRS_S1 8/1/2013 5.5 - 6.0	LOXDRS LOXDRS_S2 8/1/2013 0.5 - 1.0	LOXDRS LOXDRS_S3 8/1/2013 2.5 - 3.0	LOXDRS LOXDRS_S4 8/1/2013 3.5 - 4.0	LOXDRS LOXDRS_S5 8/1/2013 1.5 - 2.0	LOXDRS LOXDRS_S6 8/1/2013 4.5 - 5.0
ANALYTE	UNITS	TTLIC	WET Leachate Testing Trigger ^a	TCLP Leachate Testing Trigger ^b	RESULT ^c	RESULT ^c	RESULT ^c	RESULT ^c	RESULT ^c	RESULT ^c

Notes:

--" - not applicable

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

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

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

^c Waste characterization sample results not validated

µg/kg - micrograms per kilogram

mg/kg - milligrams per kilogram

mg/L - milligrams per liter

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

ISRA 009, Area II
LOX (All Chem., Radionuclides < LUT)
Soil Sampling for Radionuclides
and Waste Certification

Introduction

This data package provides the laboratory results of the samples taken at the LOX site in Area II. Soil sample locations are shown in Appendix 1 for the various sub-areas, LOX-1A, LOX-1B-1, LOX-1B-2, LOX-1B-3, LOX-1B-4, LOX-1C and LX-1D. Soil sample results were compared to the draft provisional DTSC look-up table (LUT) values in order to determine if soil exceeds background as required for the NASA/DTSC Administrative Order on Consent (AOC)¹.

Methodology

A total of 84 samples were taken in 79 locations at the LOX area for waste characterization. All except one location exhibited no elevated concentrations of radionuclides above background. One location (LXWC0076 in LOX-1B-3) exhibited confirmed elevated concentrations of radionuclides above background. This location is identified by the pink shaded area in the figure for LOX-1B-3 in Appendix 1. A separate waste certification² has been prepared for the >LUT soil and this soil will be sent to a LLRW disposal facility.

Samples discussed below apply to waste with radionuclides less than the LUTs. Samples taken in 2010, 2011 and 2013 for waste disposal characterization were analyzed for strontium-90, tritium and/or gamma emitting radionuclides by gamma spectroscopy, using an off-site laboratory³. Minimum detectable concentrations (MDC) for cesium-137 and strontium-90 were 0.037 pCi/g and 0.047 pCi/g respectively. The gamma spectroscopy library also included the following contaminants-of-concern: Na-22, K-40, Mn-54, Co-60, Cs-134, Eu-152, Eu-154, Th-228, Th-232, U-235, U-238 and Am-241. The samples taken in 2013 were analyzed for isotopic uranium using alpha spectroscopy.

NASA and DTSC have signed an AOC that requires soils on Area II and portions of Area I to be cleaned up to background⁴. The USEPA has characterized local radionuclide background⁵ in soil and has

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

² Boeing, "ISRA 009, Area II, LOX (Non-Hazardous, Radionuclides > LUT), Soil Sampling for Radionuclides and Waste Certification", May 20, 2013.

³ Boeing, "ISRA Soil Management Plan", Attachment A, "ISRA Sampling for Radionuclides", July 2009.

⁴ Page 5, Section 2.1 of the AOC states, "The cleanup of soils at the Site [Area II and portions of Area I] shall result in the end state of the Site after cleanup to be consistent with "background." That is, at the completion of the cleanup, no contaminants shall remain in the soil above local background levels, with the exception of the exercise of the exemptions that are specifically expressed in the AIP. All response actions taken pursuant to this Order shall be performed so as to accomplish this objective, in full compliance with the terms and conditions detailed in the AIP, and in accordance with workplans that have been submitted to and approved by DTSC. Similarly, to the extent any radiological materials are determined to be present at this portion of the Site, the cleanup of soils at the Site contaminated with radiological materials shall result in no radiological contaminants remaining in the soil above local background levels, with the exception of the exercise of the same exemptions expressed in the AIP."

⁵ USEPA, "Final Radiological Background Study Report, Santa Susana Field Laboratory, Ventura County, California", October 2011.

published preliminary radiological trigger levels (RTL) based on the higher of background threshold values (BTV) or minimum detectable concentrations (MDC)⁶.

On August 23, 2012, DTSC sent NASA a letter regarding excavation of ISRA soil⁷. In the letter, DTSC stated,

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

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

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

USEPA issued revised RTLs⁸ in December 2012 which were, in general, higher than the original RTLs. USEPA also issued laboratory specific radiological reference concentrations (RRC) in December 2012⁹. Subsequently, DTSC issued draft provisional LUTs¹⁰ for 16 radionuclides in January 2013, which in general matched the revised RTLs for those radionuclides whose RTLs were derived from BTVs¹¹ (for example cesium-137 and uranium-238). The draft provisional LUTs subset also matched exactly the lower of the two lab-specific RRCs. Consistent with DTSC’s intent in issuing draft provisional LUTs for interim remedial action implementation, LOX data is compared to draft provisional LUTs and sample MDCs to determine compliance with the DTSC/NASA AOC.

Results

Appendix 2 shows the soil radionuclide data for the samples taken at the LOX compared to the draft provisional LUTs and sample MDCs. Four samples initially indicated concentrations above the LUT (cesium-137 in LXWC0031 and LXWC0050, uranium-235 in LXWC0069 and uranium-238 in LXWC0064), however subsequent re-sampling in the same locations did not confirm the original LUT exceedances. All confirmed concentrations are below the draft provisional LUTs and/or less than the sample MDC and therefore comply with the NASA/DTSC AOC and are classified as not contaminated above background.

⁶ USEPA, “Technical Memorandum, Radiological Trigger Levels, Santa Susana Field Laboratory Site, Area IV Radiological Study”, December 12, 2011.

⁷ DTSC, “Management and Disposal of Radionuclide-impacted Soil Excavated for Interim Source Removal Actions on NASA Property, Santa Susana Field Laboratory, Ventura County, California”, August 23, 2012

⁸ USEPA, “Attachment A – Original and Corrected Radiological Trigger Levels - Development and Use of Radiological Reference Concentrations”, Appendix K of “Final Radiological Characterization of Soils - Area IV and Northern Buffer Zone”, December 21, 2012.

⁹ USEPA, “Attachment B - Radiological Reference Concentrations - Development and Use of Radiological Reference Concentrations”, Appendix K of “Final Radiological Characterization of Soils - Area IV and Northern Buffer Zone”, December 21, 2012.

¹⁰ DTSC, “Development of the Draft Provisional Radiological Look-Up Table”, DTSC Public Meeting, Chatsworth, California, January 30, 2013.

¹¹ A notable exception was strontium-90 with a BTV of 0.075 pCi/g, an original RTL of 0.485 pCi/g, a revised RTL of 0.645 pCi/g, lab specific RRCs of 1.07 and 0.117 pCi/g and a draft provisional LUT of 0.117 pCi/g.

Conclusions

With the exception of the >LUT soil identified at LXWC0076 in LOX-1B-3, all remaining excavated soil from the LOX area is released for disposal with no radiological restrictions.









Soil exceeding LUT, identified at LXWC0076 in LOX-1B-3 will be sent to a LLRW disposal facility.



A handwritten signature in cursive script that reads "Phil Rutherford".

Phil Rutherford
Manager, Health, Safety & Radiation Services

Appendix 1
LOX Sampling Locations

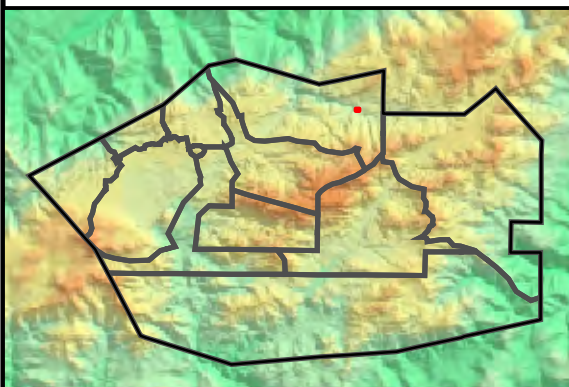
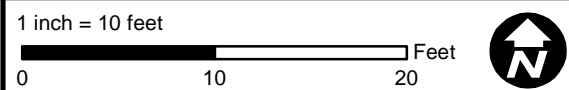
Outfall 009 Waste Characterization Sample Locations for LOX-1A

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









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



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

Document: ISRA_Plots_Working_LOX-1-A_SampleLocations_WC.mxd Date: Nov 05, 2010



Outfall 009 Waste Characterization Sample Locations for LOX-1B-1

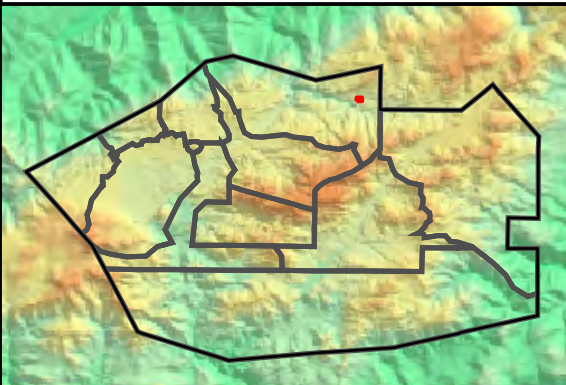
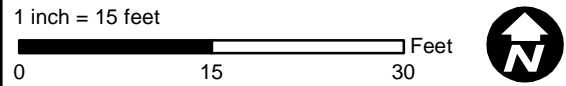
- Base Map Legend**
-  Administrative Area Boundary
 -  Drainage
 -  RFI Site Boundary
 -  Non Jurisdictional Surface Water Pathway
 -  Report Group Boundary
 -  Surface Water Divide
 -  NPDES Outfall
 -  A/C Paving

- 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.

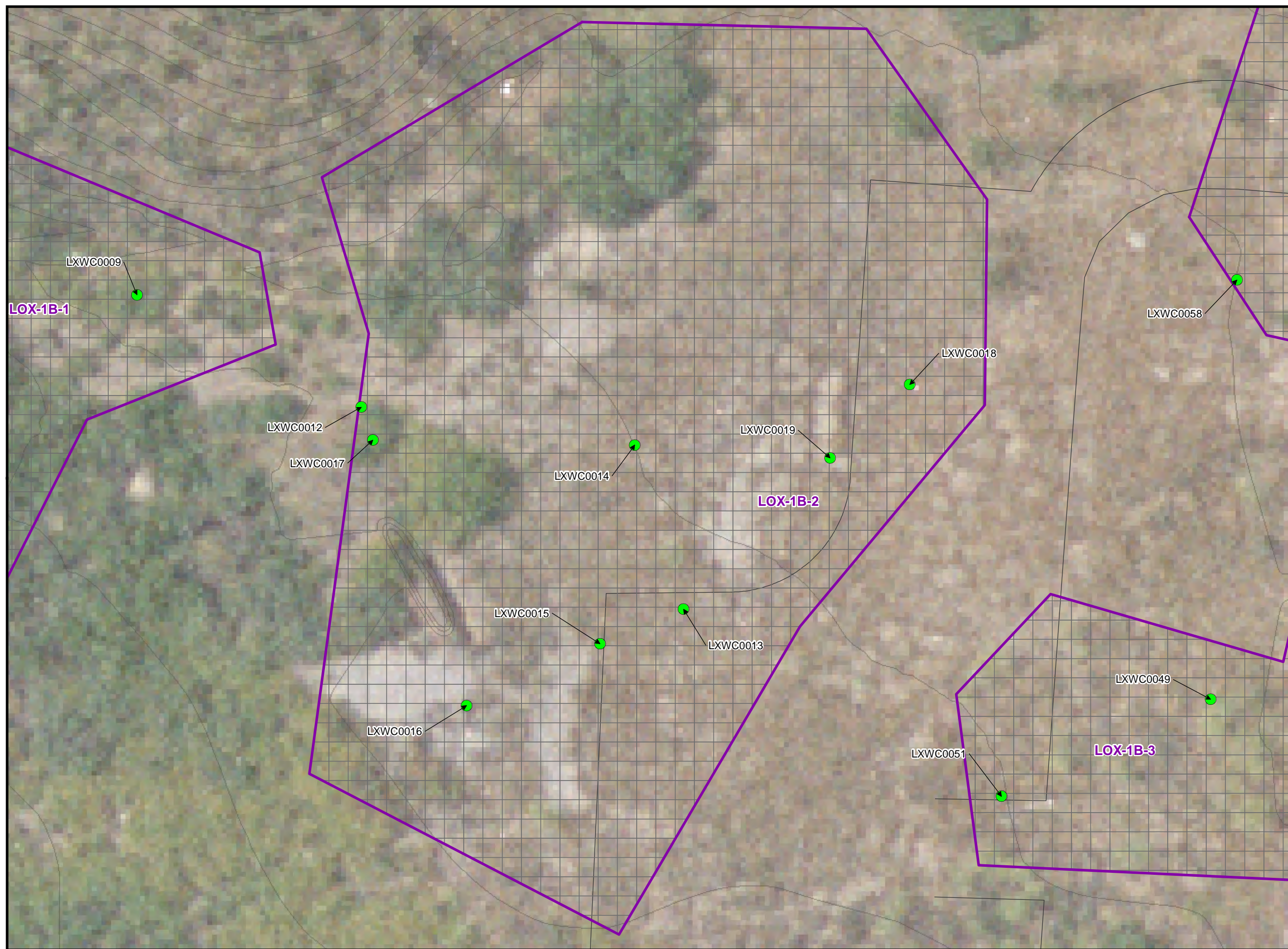
Document: ISRA_Plots_Working_LOX-1-B1_SampleLocations_WC.mxd Date: Nov 05, 2010



Outfall 009 Waste Characterization Sample Locations for LOX-1B-2

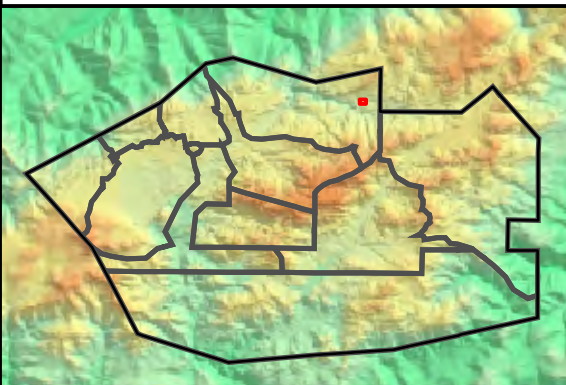
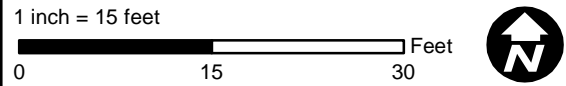
- Base Map Legend**
- Administrative Area Boundary
 - RFI Site Boundary
 - Report Group Boundary
 - NPDES Outfall
 - A/C Paving
 - Drainage
 - Non Jurisdictional Surface Water Pathway
 - Surface Water Divide

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



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

Document: ISRA_Plots_Working_LOX-1-B2_SampleLocations_WC.mxd Date: Nov 05, 2010



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

FIGURE 1

Outfall 009 Waste Characterization Sample Locations for LOX-1B-3

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

- Base Map Legend**
- ISRA Excavation Boundary

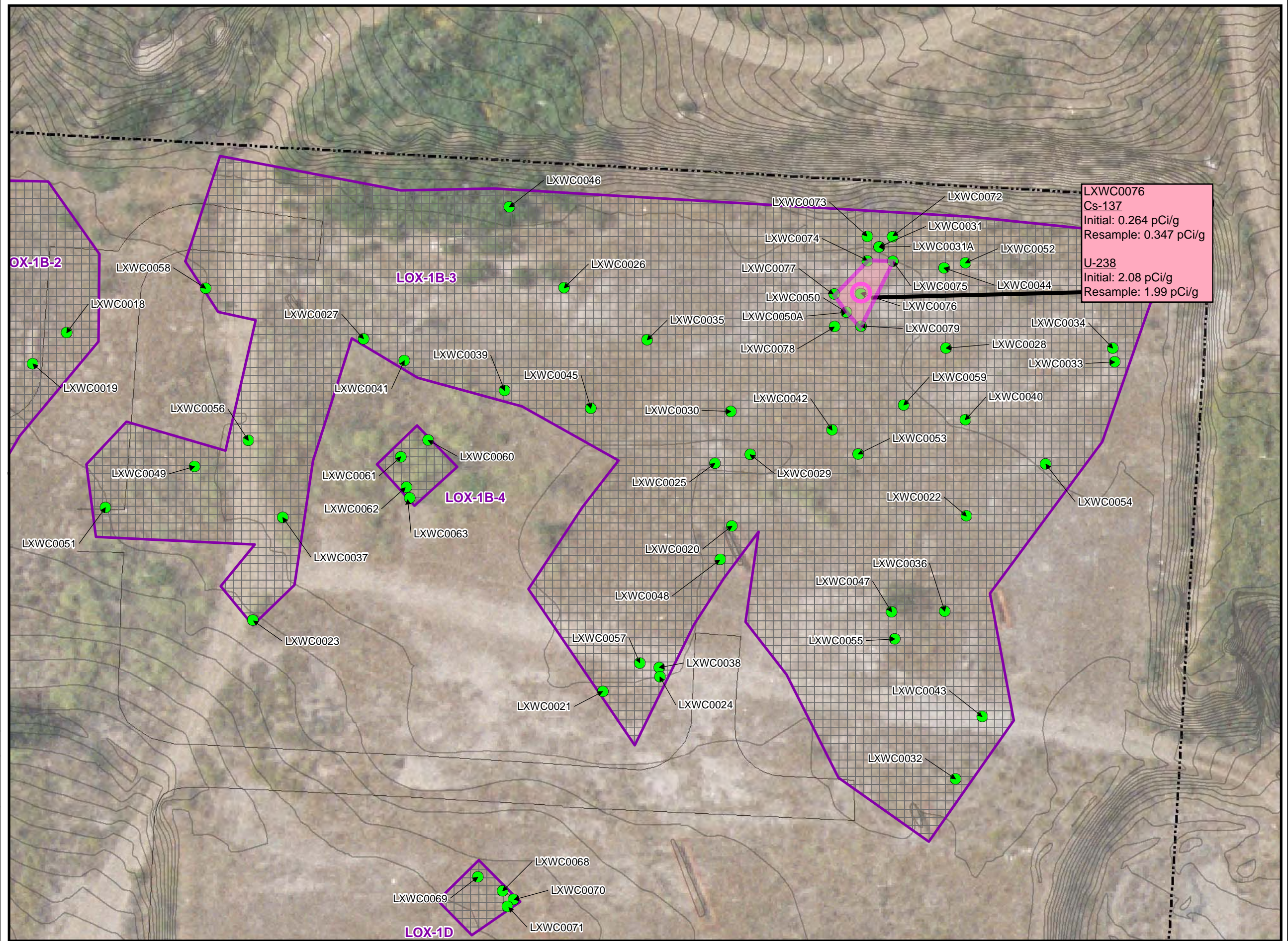
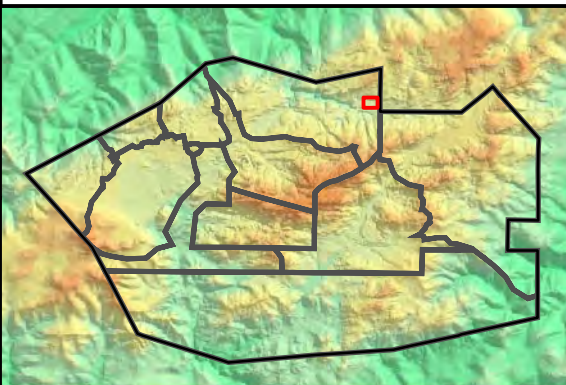
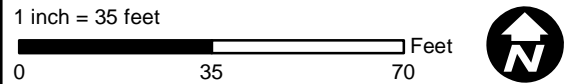
Notes:

	<u>DTSC LUT</u>
Cs-137:	0.225 pCi/g
U-235:	0.152 pCi/g
U-238:	1.96 pCi/g

- Resampling confirmed the initial radionuclide result that met or exceeded the trigger level.
- Boundary of non-hazardous soil with radionuclides above LUT value.

- 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_Working_LOX-1-B3_SampleLocations_WC.mxd Date: Feb 16, 2011



Outfall 009 Waste Characterization Sample Locations for LOX-1C

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

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

Notes:

	<u>DTSC LUT</u>
Cs-137:	0.225 pCi/g
U-235:	0.152 pCi/g
U-238:	1.96 pCi/g

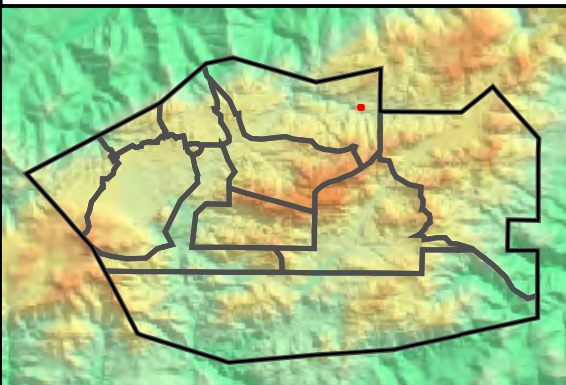
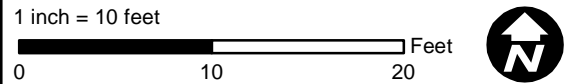
Resampling did not confirm initial radionuclide result that exceeded the LUT value.

Step-out sample location; sample not analyzed because resampling did not confirm initial radionuclide result that exceeded the LUT value.

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_Working_LOX-1-C_SampleLocations_WC.mxd Date: Nov 05, 2010





LXWC0064 (U-238)
Initial: 3.48 pCi/g
Resample: 0.757 pCi/g

Outfall 009 Waste Characterization Sample Locations for LOX-1D

Base Map Legend


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


Base Map Legend

-  ISRA Excavation Boundary
-  Waste Characterization Sample Location

Notes:

	<u>DTSC LUT</u>
Cs-137:	0.225 pCi/g
U-235:	0.152 pCi/g
U-238:	1.96 pCi/g

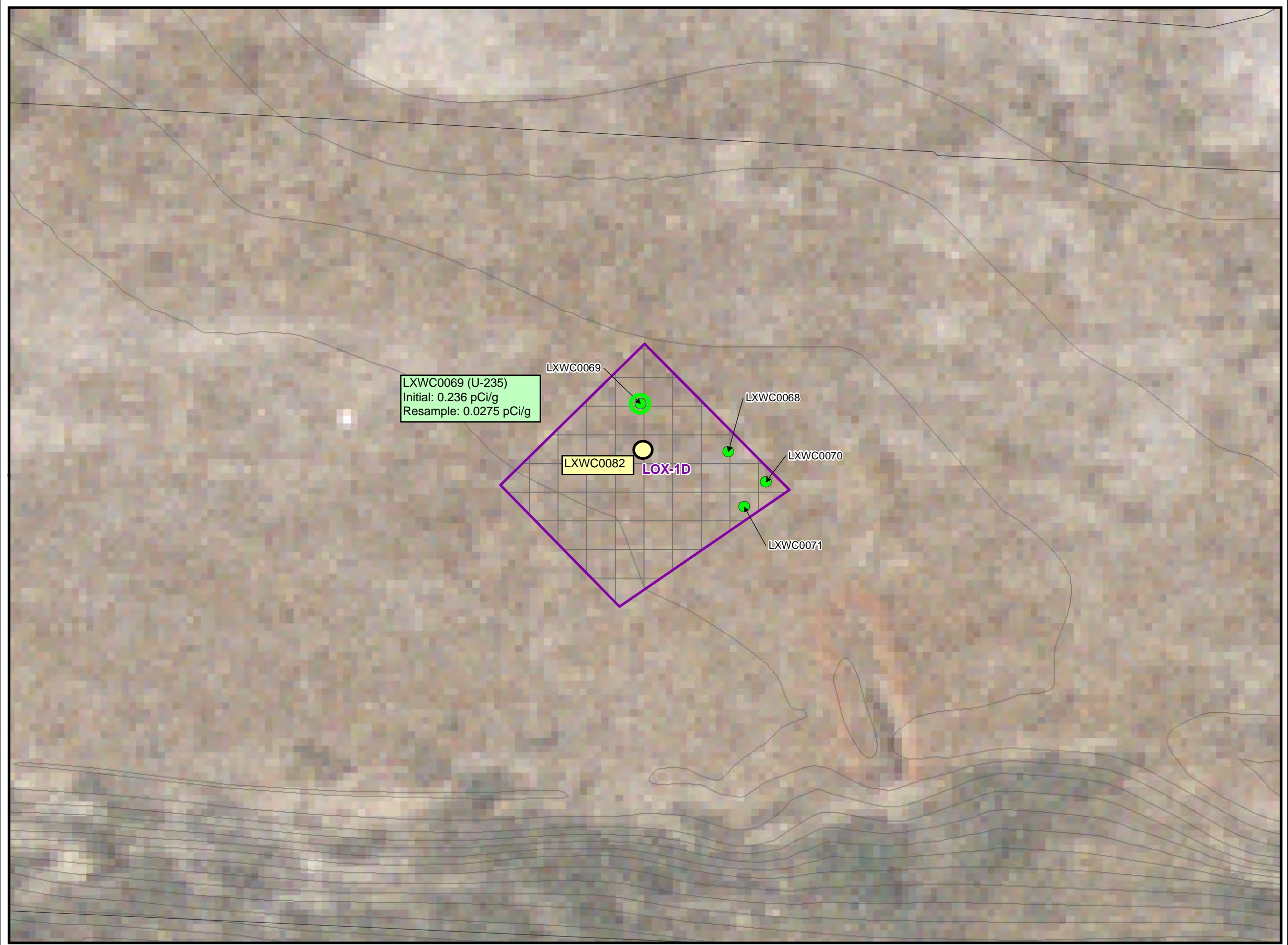
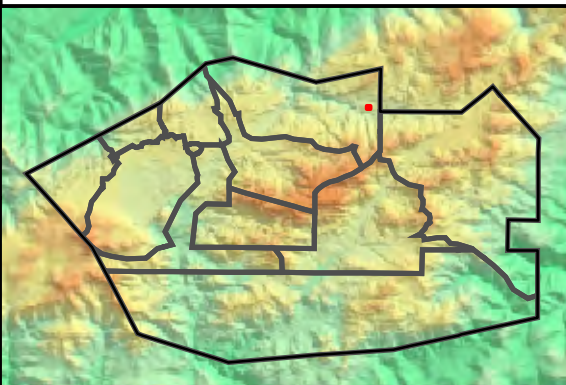
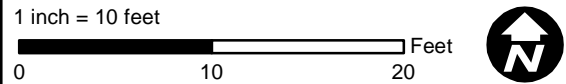
 Resampling did not confirm initial radionuclide result that exceeded the LUT value.

 Step-out sample location; sample not analyzed because resampling did not confirm initial radionuclide result that exceeded the LUT value.

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_Working_LOX-1-D_SampleLocations_WC.mxd Date: Nov 05, 2010



Appendix 2
LOX (All Chem, Below LUT) Radionuclide Results

LOX NASA ISRA Soil Data
All Chem, Radionuclides < LUT (pCi/g)

Sampling Date	Sampling Location (General)	Sampling Location (Specific)	Sample Serial Number	Media Type	Isotope	Activity	Error (+/-)	MDC	DTSC LUT	LUT Source	Activity > LUT ?	Activity > MDC ?	Detected Activity	Detected Activity > LUT ?	Non-detect Activity	Non-detect Activity > LUT ?	MDC > LUT ?	Ratio of MDC to LUT	Units	Error Type	Analysis Protocol	Analysis Organization	Comments	Document	Status
10/13/2010	LOX-1A	LXWC0001	LXWC0001S001	Soil	Americium-241	-0.252	0.166	0.297	0.0386	MDC	-	-	-	-	-0.252	-	YES	7.69	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264660	Waste
10/13/2010	LOX-1A	LXWC0002	LXWC0002S001	Soil	Americium-241	-0.0134	0.071	0.12	0.0386	MDC	-	-	-	-	-0.0134	-	YES	3.11	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264660	Waste
10/13/2010	LOX-1A	LXWC0003	LXWC0003S001	Soil	Americium-241	0.0138	0.0924	0.163	0.0386	MDC	-	-	-	-	0.0138	-	YES	4.22	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264660	Waste
10/13/2010	LOX-1A	LXWC0004	LXWC0004S001	Soil	Americium-241	0.0198	0.0601	0.104	0.0386	MDC	-	-	-	-	0.0198	-	YES	2.69	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264660	Waste
10/13/2010	LOX-1B-1	LXWC0005	LXWC0005S001	Soil	Americium-241	0.0795	0.104	0.182	0.0386	MDC	YES	-	-	-	0.0795	YES	YES	4.72	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264664	Waste
10/13/2010	LOX-1B-1	LXWC0006	LXWC0006S001	Soil	Americium-241	0.052	0.0873	0.152	0.0386	MDC	YES	-	-	-	0.052	YES	YES	3.94	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264664	Waste
10/13/2010	LOX-1B-1	LXWC0007	LXWC0007S001	Soil	Americium-241	0.0695	0.072	0.123	0.0386	MDC	YES	-	-	-	0.0695	YES	YES	3.19	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264664	Waste
10/13/2010	LOX-1B-1	LXWC0008	LXWC0008S001	Soil	Americium-241	0.117	0.0942	0.17	0.0386	MDC	YES	-	-	-	0.117	YES	YES	4.40	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264664	Waste
10/13/2010	LOX-1B-1	LXWC0009	LXWC0009S001	Soil	Americium-241	0.00814	0.0273	0.0467	0.0386	MDC	-	-	-	-	0.00814	-	YES	1.21	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264664	Waste
10/13/2010	LOX-1B-1	LXWC0010	LXWC0010S001	Soil	Americium-241	0.0109	0.113	0.194	0.0386	MDC	-	-	-	-	0.0109	-	YES	5.03	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264664	Waste
10/13/2010	LOX-1B-1	LXWC0011	LXWC0011S001	Soil	Americium-241	0.0539	0.0808	0.137	0.0386	MDC	YES	-	-	-	0.0539	YES	YES	3.55	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264664	Waste
10/12/2010	LOX-1B-2	LXWC0012	LXWC0012S001	Soil	Americium-241	0.0331	0.0344	0.0622	0.0386	MDC	-	-	-	-	0.0331	-	YES	1.61	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264562	Waste
10/12/2010	LOX-1B-2	LXWC0013	LXWC0013S001	Soil	Americium-241	0.0463	0.086	0.151	0.0386	MDC	YES	-	-	-	0.0463	YES	YES	3.91	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264562	Waste
10/12/2010	LOX-1B-2	LXWC0014	LXWC0014S001	Soil	Americium-241	-0.026	0.101	0.176	0.0386	MDC	-	-	-	-	-0.026	-	YES	4.56	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264562	Waste
10/12/2010	LOX-1B-2	LXWC0015	LXWC0015S001	Soil	Americium-241	0.0115	0.025	0.0432	0.0386	MDC	-	-	-	-	0.0115	-	YES	1.12	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264562	Waste
10/12/2010	LOX-1B-2	LXWC0016	LXWC0016S001	Soil	Americium-241	0.0302	0.0598	0.101	0.0386	MDC	-	-	-	-	0.0302	-	YES	2.62	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264562	Waste
10/12/2010	LOX-1B-2	LXWC0017	LXWC0017S001	Soil	Americium-241	0.0948	0.168	0.29	0.0386	MDC	YES	-	-	-	0.0948	YES	YES	7.51	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264562	Waste
10/11/2010	LOX-1B-2	LXWC0018	LXWC0018S001	Soil	Americium-241	-0.0155	0.0594	0.101	0.0386	MDC	-	-	-	-	-0.0155	-	YES	2.62	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264499	Waste
10/11/2010	LOX-1B-2	LXWC0019	LXWC0019S001	Soil	Americium-241	0.0623	0.0867	0.154	0.0386	MDC	YES	-	-	-	0.0623	YES	YES	3.99	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264499	Waste
10/13/2010	LOX-1B-3	LXWC0020	LXWC0020S001	Soil	Americium-241	0.129	0.0919	0.16	0.0386	MDC	YES	-	-	-	0.129	YES	YES	4.15	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264661	Waste
10/8/2010	LOX-1B-3	LXWC0021	LXWC0021S001	Soil	Americium-241	0.0572	0.0939	0.169	0.0386	MDC	YES	-	-	-	0.0572	YES	YES	4.38	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264402	Waste
10/11/2010	LOX-1B-3	LXWC0022	LXWC0022S001	Soil	Americium-241	-0.0211	0.179	0.298	0.0386	MDC	-	-	-	-	-0.0211	-	YES	7.72	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264490	Waste
10/8/2010	LOX-1B-3	LXWC0023	LXWC0023S001	Soil	Americium-241	0.0135	0.0268	0.0454	0.0386	MDC	-	-	-	-	0.0135	-	YES	1.18	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264402	Waste
10/8/2010	LOX-1B-3	LXWC0024	LXWC0024S001	Soil	Americium-241	0.0788	0.105	0.174	0.0386	MDC	YES	-	-	-	0.0788	YES	YES	4.51	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264402	Waste
10/13/2010	LOX-1B-3	LXWC0025	LXWC0025S001	Soil	Americium-241	-0.101	0.172	0.319	0.0386	MDC	-	-	-	-	-0.101	-	YES	8.26	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264661	Waste
10/11/2010	LOX-1B-3	LXWC0026	LXWC0026S001	Soil	Americium-241	0.0412	0.0927	0.166	0.0386	MDC	YES	-	-	-	0.0412	YES	YES	4.30	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264490	Waste
10/11/2010	LOX-1B-3	LXWC0027	LXWC0027S001	Soil	Americium-241	0.0203	0.0733	0.125	0.0386	MDC	-	-	-	-	0.0203	-	YES	3.24	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264490	Waste
10/12/2010	LOX-1B-3	LXWC0028	LXWC0028S001	Soil	Americium-241	0.167	0.177	0.305	0.0386	MDC	YES	-	-	-	0.167	YES	YES	7.90	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264559	Waste
10/13/2010	LOX-1B-3	LXWC0029	LXWC0029S001	Soil	Americium-241	0.0755	0.0889	0.156	0.0386	MDC	YES	-	-	-	0.0755	YES	YES	4.04	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264661	Waste
10/12/2010	LOX-1B-3	LXWC0030	LXWC0030S001	Soil	Americium-241	-0.0914	0.121	0.223	0.0386	MDC	-	-	-	-	-0.0914	-	YES	5.78	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264559	Waste
1/7/2011	LOX-1B-3	LXWC0031	LXWC0031AS001	Soil	Americium-241	0.0765	0.0798	0.146	0.0386	MDC	YES	-	-	-	0.0765	YES	YES	3.78	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL	Re-sample	270159	Waste
10/12/2010	LOX-1B-3	LXWC0031	LXWC0031S001	Soil	Americium-241	-0.0566	0.111	0.183	0.0386	MDC	-	-	-	-	-0.0566	-	YES	4.74	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL	Re-sampled	264559	Waste
10/11/2010	LOX-1B-3	LXWC0032	LXWC0032S001	Soil	Americium-241	0.0245	0.0698	0.119	0.0386	MDC	-	-	-	-	0.0245	-	YES	3.08	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264490	Waste
10/11/2010	LOX-1B-3	LXWC0033	LXWC0033S001	Soil	Americium-241	0.071	0.055	0.0966	0.0386	MDC	YES	-	-	-	0.071	YES	YES	2.50	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264490	Waste
10/11/2010	LOX-1B-3	LXWC0034	LXWC0034S001	Soil	Americium-241	0.0449	0.0594	0.101	0.0386	MDC	YES	-	-	-	0.0449	YES	YES	2.62	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264490	Waste
10/12/2010	LOX-1B-3	LXWC0035	LXWC0035S001	Soil	Americium-241	-0.0118	0.0597	0.102	0.0386	MDC	-	-	-	-	-0.0118	-	YES	2.64	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264559	Waste
10/11/2010	LOX-1B-3	LXWC0036	LXWC0036S001	Soil	Americium-241	0.0718	0.0982	0.175	0.0386	MDC	YES	-	-	-	0.0718	YES	YES	4.53	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264490	Waste
10/8/2010	LOX-1B-3	LXWC0037	LXWC0037S001	Soil	Americium-241	-0.32	0.17	0.296	0.0386	MDC	-	-	-	-	-0.32	-	YES	7.67	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264402	Waste
10/8/2010	LOX-1B-3	LXWC0038	LXWC0038S001	Soil	Americium-241	0.056	0.0642	0.124	0.0386	MDC	YES	-	-	-	0.056	YES	YES	3.21	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264402	Waste
10/12/2010	LOX-1B-3	LXWC0039	LXWC0039S001	Soil	Americium-241	0.0596	0.0965	0.17	0.0386	MDC	YES	-	-	-	0.0596	YES	YES	4.40	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264559	Waste
10/12/2010	LOX-1B-3	LXWC0040	LXWC0040S001	Soil	Americium-241	0.0681	0.0658	0.112	0.0386	MDC	YES	-	-	-	0.0681	YES	YES	2.90	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264559	Waste
10/11/2010	LOX-1B-3	LXWC0041	LXWC0041S001	Soil	Americium-241	0.0947	0.102	0.173	0.0386	MDC	YES	-	-	-	0.0947	YES	YES	4.48	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264490	Waste
10/12/2010	LOX-1B-3	LXWC0042	LXWC0042S001	Soil	Americium-241	0.0468	0.0771	0.132	0.0386	MDC	YES	-	-	-	0.0468	YES	YES	3.42	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264559	Waste
10/11/2010	LOX-1B-3	LXWC0043	LXWC0043S001	Soil	Americium-241	-0.00504	0.0822	0.135	0.0386	MDC	-	-	-	-	-0.00504	-	YES	3.50	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264490	Waste
10/12/2010	LOX-1B-3	LXWC0044	LXWC0044S001	Soil	Americium-241	0.0632	0.0554	0.096	0.0386	MDC	YES	-	-	-	0.0632	YES	YES	2.49	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264559	Waste
10/12/2010	LOX-1B-3	LXWC0045	LXWC0045S001	Soil	Americium-241	0.00143	0.0266	0.0444	0.0386	MDC	-	-	-	-	0.00143	-	YES	1.15	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264559	Waste
10/11/2010	LOX-1B-3	LXWC0046	LXWC0046S001	Soil	Americium-241	0.113	0.168	0.291	0.0386	MDC	YES	-	-	-	0.113	YES	YES	7.54	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264490	Waste
10/11/2010	LOX-1B-3	LXWC0047	LXWC0047S001	Soil	Americium-241	-0.0154	0.0273	0.0445	0.0386	MDC	-	-	-	-	-0.0154	-	YES	1.15	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264490	Waste
10/13/2010	LOX-1B-3	LXWC0048	LXWC0048S001	Soil	Americium-241	-0.102	0.164	0.302	0.0386	MDC	-	-	-	-	-0.102	-	YES	7.82	pCi/g	2 sigma	DOE HASL 300, 4.5				

LOX NASA ISRA Soil Data
All Chem, Radionuclides < LUT (pCi/g)

Sampling Date	Sampling Location (General)	Sampling Location (Specific)	Sample Serial Number	Media Type	Isotope	Activity	Error (+/-)	MDC	DTSC LUT	LUT Source	Activity > LUT ?	Activity > MDC ?	Detected Activity	Detected Activity > LUT ?	Non-detect Activity	Non-detect Activity > LUT ?	MDC > LUT ?	Ratio of MDC to LUT	Units	Error Type	Analysis Protocol	Analysis Organization	Comments	Document	Status
10/13/2010	LOX-1B-1	LXWC0005	LXWC0005S001	Soil	Cesium-134	0.0581	0.0539	0.0597	0.0431	MDC	YES	-	-	-	0.0581	YES	YES	1.39	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264664	Waste
10/13/2010	LOX-1B-1	LXWC0006	LXWC0006S001	Soil	Cesium-134	0	0.0405	0.0547	0.0431	MDC	-	-	-	-	0	-	YES	1.27	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264664	Waste
10/13/2010	LOX-1B-1	LXWC0007	LXWC0007S001	Soil	Cesium-134	0	0.0338	0.0514	0.0431	MDC	-	-	-	-	0	-	YES	1.19	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264664	Waste
10/13/2010	LOX-1B-1	LXWC0008	LXWC0008S001	Soil	Cesium-134	0	0.0326	0.039	0.0431	MDC	-	-	-	-	0	-	-	0.90	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264664	Waste
10/13/2010	LOX-1B-1	LXWC0009	LXWC0009S001	Soil	Cesium-134	0	0.0344	0.053	0.0431	MDC	-	-	-	-	0	-	YES	1.23	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264664	Waste
10/13/2010	LOX-1B-1	LXWC0010	LXWC0010S001	Soil	Cesium-134	0	0.0476	0.065	0.0431	MDC	-	-	-	-	0	-	YES	1.51	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264664	Waste
10/13/2010	LOX-1B-1	LXWC0011	LXWC0011S001	Soil	Cesium-134	0	0.0346	0.0493	0.0431	MDC	-	-	-	-	0	-	YES	1.14	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264664	Waste
10/12/2010	LOX-1B-2	LXWC0012	LXWC0012S001	Soil	Cesium-134	0	0.0464	0.0675	0.0431	MDC	-	-	-	-	0	-	YES	1.57	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264562	Waste
10/12/2010	LOX-1B-2	LXWC0013	LXWC0013S001	Soil	Cesium-134	0	0.0307	0.0528	0.0431	MDC	-	-	-	-	0	-	YES	1.23	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264562	Waste
10/12/2010	LOX-1B-2	LXWC0014	LXWC0014S001	Soil	Cesium-134	0	0.0509	0.0647	0.0431	MDC	-	-	-	-	0	-	YES	1.50	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264562	Waste
10/12/2010	LOX-1B-2	LXWC0015	LXWC0015S001	Soil	Cesium-134	0	0.0281	0.049	0.0431	MDC	-	-	-	-	0	-	YES	1.14	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264562	Waste
10/12/2010	LOX-1B-2	LXWC0016	LXWC0016S001	Soil	Cesium-134	0	0.0298	0.0463	0.0431	MDC	-	-	-	-	0	-	YES	1.07	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264562	Waste
10/12/2010	LOX-1B-2	LXWC0017	LXWC0017S001	Soil	Cesium-134	0.0555	0.0568	0.0578	0.0431	MDC	YES	-	-	-	0.0555	YES	YES	1.34	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264562	Waste
10/11/2010	LOX-1B-2	LXWC0018	LXWC0018S001	Soil	Cesium-134	0	0.0326	0.0457	0.0431	MDC	-	-	-	-	0	-	YES	1.06	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264499	Waste
10/11/2010	LOX-1B-2	LXWC0019	LXWC0019S001	Soil	Cesium-134	0	0.0411	0.0574	0.0431	MDC	-	-	-	-	0	-	YES	1.33	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264499	Waste
10/13/2010	LOX-1B-3	LXWC0020	LXWC0020S001	Soil	Cesium-134	0	0.0319	0.0541	0.0431	MDC	-	-	-	-	0	-	YES	1.26	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264661	Waste
10/8/2010	LOX-1B-3	LXWC0021	LXWC0021S001	Soil	Cesium-134	0	0.035	0.0619	0.0431	MDC	-	-	-	-	0	-	YES	1.44	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264402	Waste
10/11/2010	LOX-1B-3	LXWC0022	LXWC0022S001	Soil	Cesium-134	0.0364	0.0493	0.0539	0.0431	MDC	-	-	-	-	0.0364	-	YES	1.25	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264490	Waste
10/8/2010	LOX-1B-3	LXWC0023	LXWC0023S001	Soil	Cesium-134	0	0.0478	0.0542	0.0431	MDC	-	-	-	-	0	-	YES	1.26	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264402	Waste
10/8/2010	LOX-1B-3	LXWC0024	LXWC0024S001	Soil	Cesium-134	0	0.0422	0.0567	0.0431	MDC	-	-	-	-	0	-	YES	1.32	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264402	Waste
10/13/2010	LOX-1B-3	LXWC0025	LXWC0025S001	Soil	Cesium-134	0	0.0413	0.0605	0.0431	MDC	-	-	-	-	0	-	YES	1.40	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264661	Waste
10/11/2010	LOX-1B-3	LXWC0026	LXWC0026S001	Soil	Cesium-134	0.0495	0.0418	0.0571	0.0431	MDC	YES	-	-	-	0.0495	YES	YES	1.32	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264490	Waste
10/11/2010	LOX-1B-3	LXWC0027	LXWC0027S001	Soil	Cesium-134	0	0.0318	0.0441	0.0431	MDC	-	-	-	-	0	-	YES	1.02	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264490	Waste
10/12/2010	LOX-1B-3	LXWC0028	LXWC0028S001	Soil	Cesium-134	0	0.0435	0.0596	0.0431	MDC	-	-	-	-	0	-	YES	1.38	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264559	Waste
10/13/2010	LOX-1B-3	LXWC0029	LXWC0029S001	Soil	Cesium-134	0	0.0411	0.0563	0.0431	MDC	-	-	-	-	0	-	YES	1.31	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264661	Waste
10/12/2010	LOX-1B-3	LXWC0030	LXWC0030S001	Soil	Cesium-134	0	0.0315	0.0563	0.0431	MDC	-	-	-	-	0	-	YES	1.31	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264559	Waste
1/7/2011	LOX-1B-3	LXWC0031	LXWC0031AS001	Soil	Cesium-134	0	0.025	0.0336	0.0431	MDC	-	-	-	-	0	-	-	0.78	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL	Re-sample	270159	Waste
10/12/2010	LOX-1B-3	LXWC0031	LXWC0031S001	Soil	Cesium-134	0	0.0471	0.061	0.0431	MDC	-	-	-	-	0	-	YES	1.42	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL	Re-sampled	264559	Waste
10/11/2010	LOX-1B-3	LXWC0032	LXWC0032S001	Soil	Cesium-134	0	0.0418	0.0511	0.0431	MDC	-	-	-	-	0	-	YES	1.19	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264490	Waste
10/11/2010	LOX-1B-3	LXWC0033	LXWC0033S001	Soil	Cesium-134	0	0.0366	0.0475	0.0431	MDC	-	-	-	-	0	-	YES	1.10	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264490	Waste
10/11/2010	LOX-1B-3	LXWC0034	LXWC0034S001	Soil	Cesium-134	0	0.0372	0.05	0.0431	MDC	-	-	-	-	0	-	YES	1.16	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264490	Waste
10/12/2010	LOX-1B-3	LXWC0035	LXWC0035S001	Soil	Cesium-134	0	0.0411	0.0513	0.0431	MDC	-	-	-	-	0	-	YES	1.19	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264559	Waste
10/11/2010	LOX-1B-3	LXWC0036	LXWC0036S001	Soil	Cesium-134	0	0.0299	0.0439	0.0431	MDC	-	-	-	-	0	-	YES	1.02	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264490	Waste
10/8/2010	LOX-1B-3	LXWC0037	LXWC0037S001	Soil	Cesium-134	0	0.0553	0.0591	0.0431	MDC	-	-	-	-	0	-	YES	1.37	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264402	Waste
10/8/2010	LOX-1B-3	LXWC0038	LXWC0038S001	Soil	Cesium-134	0	0.0269	0.0436	0.0431	MDC	-	-	-	-	0	-	YES	1.01	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264402	Waste
10/12/2010	LOX-1B-3	LXWC0039	LXWC0039S001	Soil	Cesium-134	0	0.0301	0.041	0.0431	MDC	-	-	-	-	0	-	-	0.95	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264559	Waste
10/12/2010	LOX-1B-3	LXWC0040	LXWC0040S001	Soil	Cesium-134	0	0.0355	0.0473	0.0431	MDC	-	-	-	-	0	-	YES	1.10	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264559	Waste
10/11/2010	LOX-1B-3	LXWC0041	LXWC0041S001	Soil	Cesium-134	0	0.0353	0.0555	0.0431	MDC	-	-	-	-	0	-	YES	1.29	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264490	Waste
10/12/2010	LOX-1B-3	LXWC0042	LXWC0042S001	Soil	Cesium-134	0	0.0315	0.0489	0.0431	MDC	-	-	-	-	0	-	YES	1.13	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264559	Waste
10/11/2010	LOX-1B-3	LXWC0043	LXWC0043S001	Soil	Cesium-134	0	0.0407	0.0511	0.0431	MDC	-	-	-	-	0	-	YES	1.19	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264490	Waste
10/12/2010	LOX-1B-3	LXWC0044	LXWC0044S001	Soil	Cesium-134	0.0481	0.0359	0.0485	0.0431	MDC	YES	-	-	-	0.0481	YES	YES	1.13	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264559	Waste
10/12/2010	LOX-1B-3	LXWC0045	LXWC0045S001	Soil	Cesium-134	0	0.0348	0.0502	0.0431	MDC	-	-	-	-	0	-	YES	1.16	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264559	Waste
10/11/2010	LOX-1B-3	LXWC0046	LXWC0046S001	Soil	Cesium-134	0	0.0338	0.0565	0.0431	MDC	-	-	-	-	0	-	YES	1.31	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264490	Waste
10/11/2010	LOX-1B-3	LXWC0047	LXWC0047S001	Soil	Cesium-134	0	0.0386	0.0546	0.0431	MDC	-	-	-	-	0	-	YES	1.27	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264490	Waste
10/13/2010	LOX-1B-3	LXWC0048	LXWC0048S001	Soil	Cesium-134	0	0.0463	0.0609	0.0431	MDC	-	-	-	-	0	-	YES	1.41	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264661	Waste
10/8/2010	LOX-1B-3	LXWC0049	LXWC0049S001	Soil	Cesium-134	0	0.0475	0.0628	0.0431	MDC	-	-	-	-	0	-	YES	1.46	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264402	Waste
1/7/2011	LOX-1B-3	LXWC0050	LXWC0050AS001	Soil	Cesium-134	0	0.033	0.0421	0.0431	MDC	-	-	-	-	0	-	-	0.98	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL	Re-sample	270159	Waste
10/12/2010	LOX-1B-3	LXWC0050	LXWC0050S001	Soil	Cesium-134	0	0.0308	0.0593	0.0431	MDC	-	-	-	-	0	-	YES	1.38	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL	Re-sampled	264559	Waste
10/11/2010	LOX-1B-3	LXWC0051	LXWC0051S001	Soil	Cesium-134	0	0.0343	0.0525	0.0431	MDC	-	-	-	-	0	-	YES	1.22	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264490	Waste
10/12/2010	LOX-1B-3	LXWC0052	LXWC0052S001	Soil	Cesium-134	0	0.0554	0.0606	0.0431	MDC	-	-	-	-	0	-	YES	1.41	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264559	Waste
10/12/2010	LOX-1B-3	LXWC0053	LXWC0053S001	Soil	Cesium-134	0	0.0286	0.0479	0.0431	MDC	-	-	-	-	0	-	YES	1.11	pCi/g	2 sigma					

LOX NASA ISRA Soil Data
All Chem, Radionuclides < LUT (pCi/g)

Sampling Date	Sampling Location (General)	Sampling Location (Specific)	Sample Serial Number	Media Type	Isotope	Activity	Error (+/-)	MDC	DTSC LUT	LUT Source	Activity > LUT ?	Activity > MDC ?	Detected Activity	Detected Activity > LUT ?	Non-detect Activity	Non-detect Activity > LUT ?	MDC > LUT ?	Ratio of MDC to LUT	Units	Error Type	Analysis Protocol	Analysis Organization	Comments	Document	Status
10/13/2010	LOX-1B-1	LXWC0009	LXWC0009S001	Soil	Cesium-137	0.024	0.0357	0.0361	0.225	BTV	-	-	-	-	0.024	-	-	0.16	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264664	Waste
10/13/2010	LOX-1B-1	LXWC0010	LXWC0010S001	Soil	Cesium-137	0.135	0.0396	0.0429	0.225	BTV	-	YES	0.135	-	-	-	-	0.19	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264664	Waste
10/13/2010	LOX-1B-1	LXWC0011	LXWC0011S001	Soil	Cesium-137	-0.00425	0.019	0.0324	0.225	BTV	-	-	-	-	-0.00425	-	-	0.14	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264664	Waste
10/12/2010	LOX-1B-2	LXWC0012	LXWC0012S001	Soil	Cesium-137	-0.000285	0.0278	0.0473	0.225	BTV	-	-	-	-	-0.000285	-	-	0.21	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264562	Waste
10/12/2010	LOX-1B-2	LXWC0013	LXWC0013S001	Soil	Cesium-137	0.0032	0.0205	0.0363	0.225	BTV	-	-	-	-	0.0032	-	-	0.16	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264562	Waste
10/12/2010	LOX-1B-2	LXWC0014	LXWC0014S001	Soil	Cesium-137	-0.00388	0.0248	0.0424	0.225	BTV	-	-	-	-	-0.00388	-	-	0.19	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264562	Waste
10/12/2010	LOX-1B-2	LXWC0015	LXWC0015S001	Soil	Cesium-137	0.00336	0.0296	0.0358	0.225	BTV	-	-	-	-	0.00336	-	-	0.16	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264562	Waste
10/12/2010	LOX-1B-2	LXWC0016	LXWC0016S001	Soil	Cesium-137	-0.0158	0.0184	0.031	0.225	BTV	-	-	-	-	-0.0158	-	-	0.14	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264562	Waste
10/12/2010	LOX-1B-2	LXWC0017	LXWC0017S001	Soil	Cesium-137	-0.00537	0.0252	0.0428	0.225	BTV	-	-	-	-	-0.00537	-	-	0.19	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264562	Waste
10/11/2010	LOX-1B-2	LXWC0018	LXWC0018S001	Soil	Cesium-137	-2.95E-05	0.0171	0.0298	0.225	BTV	-	-	-	-	-0.0000295	-	-	0.13	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264499	Waste
10/11/2010	LOX-1B-2	LXWC0019	LXWC0019S001	Soil	Cesium-137	0.00676	0.0205	0.037	0.225	BTV	-	-	-	-	0.00676	-	-	0.16	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264499	Waste
10/13/2010	LOX-1B-3	LXWC0020	LXWC0020S001	Soil	Cesium-137	-0.0095	0.0232	0.0393	0.225	BTV	-	-	-	-	-0.0095	-	-	0.17	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264661	Waste
10/8/2010	LOX-1B-3	LXWC0021	LXWC0021S001	Soil	Cesium-137	0.0183	0.0228	0.0412	0.225	BTV	-	-	-	-	0.0183	-	-	0.18	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264402	Waste
10/11/2010	LOX-1B-3	LXWC0022	LXWC0022S001	Soil	Cesium-137	0.0261	0.0339	0.0415	0.225	BTV	-	-	-	-	0.0261	-	-	0.18	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264490	Waste
10/8/2010	LOX-1B-3	LXWC0023	LXWC0023S001	Soil	Cesium-137	-0.0178	0.0252	0.0439	0.225	BTV	-	-	-	-	-0.0178	-	-	0.20	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264402	Waste
10/8/2010	LOX-1B-3	LXWC0024	LXWC0024S001	Soil	Cesium-137	-0.0218	0.0229	0.0385	0.225	BTV	-	-	-	-	-0.0218	-	-	0.17	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264402	Waste
10/13/2010	LOX-1B-3	LXWC0025	LXWC0025S001	Soil	Cesium-137	0.00744	0.027	0.0469	0.225	BTV	-	-	-	-	0.00744	-	-	0.21	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264661	Waste
10/11/2010	LOX-1B-3	LXWC0026	LXWC0026S001	Soil	Cesium-137	0.032	0.0243	0.0447	0.225	BTV	-	-	-	-	0.032	-	-	0.20	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264490	Waste
10/11/2010	LOX-1B-3	LXWC0027	LXWC0027S001	Soil	Cesium-137	-0.0133	0.0173	0.0291	0.225	BTV	-	-	-	-	-0.0133	-	-	0.13	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264490	Waste
10/12/2010	LOX-1B-3	LXWC0028	LXWC0028S001	Soil	Cesium-137	0.0763	0.0372	0.0444	0.225	BTV	-	YES	0.0763	-	-	-	-	0.20	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264559	Waste
10/13/2010	LOX-1B-3	LXWC0029	LXWC0029S001	Soil	Cesium-137	0.0228	0.0212	0.0394	0.225	BTV	-	-	-	-	0.0228	-	-	0.18	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264661	Waste
10/12/2010	LOX-1B-3	LXWC0030	LXWC0030S001	Soil	Cesium-137	0.0397	0.0323	0.0372	0.225	BTV	-	YES	0.0397	-	-	-	-	0.17	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264559	Waste
1/7/2011	LOX-1B-3	LXWC0031	LXWC0031AS001	Soil	Cesium-137	-0.0058	0.0132	0.0233	0.225	BTV	-	-	-	-	-0.0058	-	-	0.10	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL	Re-sample	270159	Waste
10/12/2010	LOX-1B-3	LXWC0031	LXWC0031S001	Soil	Cesium-137	0.34	0.0542	0.0455	0.225	BTV	YES	YES	0.34	YES	-	-	-	0.20	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL	Re-sampled	264559	Waste
10/11/2010	LOX-1B-3	LXWC0032	LXWC0032S001	Soil	Cesium-137	0.0161	0.0214	0.0385	0.225	BTV	-	-	-	-	0.0161	-	-	0.17	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264490	Waste
10/11/2010	LOX-1B-3	LXWC0033	LXWC0033S001	Soil	Cesium-137	0.033	0.0276	0.0329	0.225	BTV	-	YES	0.033	-	-	-	-	0.15	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264490	Waste
10/11/2010	LOX-1B-3	LXWC0034	LXWC0034S001	Soil	Cesium-137	0.192	0.037	0.0349	0.225	BTV	-	YES	0.192	-	-	-	-	0.16	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264490	Waste
10/12/2010	LOX-1B-3	LXWC0035	LXWC0035S001	Soil	Cesium-137	0	0.0576	0.0331	0.225	BTV	-	-	-	-	0	-	-	0.15	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264559	Waste
10/11/2010	LOX-1B-3	LXWC0036	LXWC0036S001	Soil	Cesium-137	0.00248	0.0153	0.0276	0.225	BTV	-	-	-	-	0.00248	-	-	0.12	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264490	Waste
10/8/2010	LOX-1B-3	LXWC0037	LXWC0037S001	Soil	Cesium-137	-0.00795	0.0282	0.0473	0.225	BTV	-	-	-	-	-0.00795	-	-	0.21	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264402	Waste
10/8/2010	LOX-1B-3	LXWC0038	LXWC0038S001	Soil	Cesium-137	0.0101	0.0172	0.0306	0.225	BTV	-	-	-	-	0.0101	-	-	0.14	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264402	Waste
10/12/2010	LOX-1B-3	LXWC0039	LXWC0039S001	Soil	Cesium-137	0	0.0205	0.0302	0.225	BTV	-	-	-	-	0	-	-	0.13	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264559	Waste
10/12/2010	LOX-1B-3	LXWC0040	LXWC0040S001	Soil	Cesium-137	-0.0115	0.017	0.0293	0.225	BTV	-	-	-	-	-0.0115	-	-	0.13	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264559	Waste
10/11/2010	LOX-1B-3	LXWC0041	LXWC0041S001	Soil	Cesium-137	0.0801	0.0342	0.0407	0.225	BTV	-	YES	0.0801	-	-	-	-	0.18	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264490	Waste
10/12/2010	LOX-1B-3	LXWC0042	LXWC0042S001	Soil	Cesium-137	0.0699	0.0329	0.0314	0.225	BTV	-	YES	0.0699	-	-	-	-	0.14	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264559	Waste
10/11/2010	LOX-1B-3	LXWC0043	LXWC0043S001	Soil	Cesium-137	0.0175	0.0201	0.0361	0.225	BTV	-	-	-	-	0.0175	-	-	0.16	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264490	Waste
10/12/2010	LOX-1B-3	LXWC0044	LXWC0044S001	Soil	Cesium-137	0.0944	0.0382	0.0333	0.225	BTV	-	YES	0.0944	-	-	-	-	0.15	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264559	Waste
10/12/2010	LOX-1B-3	LXWC0045	LXWC0045S001	Soil	Cesium-137	0.0757	0.0337	0.0373	0.225	BTV	-	YES	0.0757	-	-	-	-	0.17	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264559	Waste
10/11/2010	LOX-1B-3	LXWC0046	LXWC0046S001	Soil	Cesium-137	0.00166	0.0272	0.0411	0.225	BTV	-	-	-	-	0.00166	-	-	0.18	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264490	Waste
10/11/2010	LOX-1B-3	LXWC0047	LXWC0047S001	Soil	Cesium-137	0.0373	0.0364	0.0374	0.225	BTV	-	-	-	-	0.0373	-	-	0.17	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264490	Waste
10/13/2010	LOX-1B-3	LXWC0048	LXWC0048S001	Soil	Cesium-137	0.00521	0.0408	0.0444	0.225	BTV	-	-	-	-	0.00521	-	-	0.20	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264661	Waste
10/8/2010	LOX-1B-3	LXWC0049	LXWC0049S001	Soil	Cesium-137	0.00128	0.023	0.0405	0.225	BTV	-	-	-	-	0.00128	-	-	0.18	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264402	Waste
1/7/2011	LOX-1B-3	LXWC0050	LXWC0050AS001	Soil	Cesium-137	0.146	0.0349	0.0315	0.225	BTV	-	YES	0.146	-	-	-	-	0.14	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL	Re-sample	270159	Waste
10/12/2010	LOX-1B-3	LXWC0050	LXWC0050S001	Soil	Cesium-137	0.287	0.0652	0.0405	0.225	BTV	YES	YES	0.287	YES	-	-	-	0.18	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL	Re-sampled	264559	Waste
10/11/2010	LOX-1B-3	LXWC0051	LXWC0051S001	Soil	Cesium-137	-0.00738	0.02	0.0347	0.225	BTV	-	-	-	-	-0.00738	-	-	0.15	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264490	Waste
10/12/2010	LOX-1B-3	LXWC0052	LXWC0052S001	Soil	Cesium-137	0.00733	0.0237	0.0421	0.225	BTV	-	-	-	-	0.00733	-	-	0.19	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264559	Waste
10/12/2010	LOX-1B-3	LXWC0053	LXWC0053S001	Soil	Cesium-137	0.0414	0.026	0.0378	0.225	BTV	-	YES	0.0414	-	-	-	-	0.17	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264559	Waste
10/11/2010	LOX-1B-3	LXWC0054	LXWC0054S001	Soil	Cesium-137	0.00879	0.0233	0.0401	0.225	BTV	-	-	-	-	0.00879	-	-	0.18	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264490	Waste
10/11/2010	LOX-1B-3	LXWC0055	LXWC0055S001	Soil	Cesium-137	0.0139	0.028	0.0362	0.225	BTV	-	-	-	-	0.0139	-	-	0.16	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264490	Waste
10/11/2010	LOX-1B-3	LXWC0056	LXWC0056																						

LOX NASA ISRA Soil Data
All Chem, Radionuclides < LUT (pCi/g)

Sampling Date	Sampling Location (General)	Sampling Location (Specific)	Sample Serial Number	Media Type	Isotope	Activity	Error (+/-)	MDC	DTSC LUT	LUT Source	Activity > LUT ?	Activity > MDC ?	Detected Activity	Detected Activity > LUT ?	Non-detect Activity	Non-detect Activity > LUT ?	MDC > LUT ?	Ratio of MDC to LUT	Units	Error Type	Analysis Protocol	Analysis Organization	Comments	Document	Status
10/12/2010	LOX-1B-2	LXWC0013	LXWC0013S001	Soil	Cobalt-60	-0.00312	0.0199	0.0338	0.0363	MDC	-	-	-	-	-0.00312	-	-	0.93	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264562	Waste
10/12/2010	LOX-1B-2	LXWC0014	LXWC0014S001	Soil	Cobalt-60	-0.0106	0.0276	0.0458	0.0363	MDC	-	-	-	-	-0.0106	-	YES	1.26	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264562	Waste
10/12/2010	LOX-1B-2	LXWC0015	LXWC0015S001	Soil	Cobalt-60	-0.00175	0.0197	0.0337	0.0363	MDC	-	-	-	-	-0.00175	-	-	0.93	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264562	Waste
10/12/2010	LOX-1B-2	LXWC0016	LXWC0016S001	Soil	Cobalt-60	-0.00583	0.0179	0.0299	0.0363	MDC	-	-	-	-	-0.00583	-	-	0.82	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264562	Waste
10/12/2010	LOX-1B-2	LXWC0017	LXWC0017S001	Soil	Cobalt-60	-0.0116	0.0235	0.0377	0.0363	MDC	-	-	-	-	-0.0116	-	YES	1.04	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264562	Waste
10/11/2010	LOX-1B-2	LXWC0018	LXWC0018S001	Soil	Cobalt-60	0.0115	0.0175	0.0312	0.0363	MDC	-	-	-	-	0.0115	-	-	0.86	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264499	Waste
10/11/2010	LOX-1B-2	LXWC0019	LXWC0019S001	Soil	Cobalt-60	-0.00244	0.021	0.0355	0.0363	MDC	-	-	-	-	-0.00244	-	-	0.98	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264499	Waste
10/13/2010	LOX-1B-3	LXWC0020	LXWC0020S001	Soil	Cobalt-60	0.00437	0.0242	0.0419	0.0363	MDC	-	-	-	-	0.00437	-	YES	1.15	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264661	Waste
10/8/2010	LOX-1B-3	LXWC0021	LXWC0021S001	Soil	Cobalt-60	0.00989	0.0257	0.0454	0.0363	MDC	-	-	-	-	0.00989	-	YES	1.25	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264402	Waste
10/11/2010	LOX-1B-3	LXWC0022	LXWC0022S001	Soil	Cobalt-60	0.00324	0.0241	0.0408	0.0363	MDC	-	-	-	-	0.00324	-	YES	1.12	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264490	Waste
10/8/2010	LOX-1B-3	LXWC0023	LXWC0023S001	Soil	Cobalt-60	-0.00413	0.0195	0.0328	0.0363	MDC	-	-	-	-	-0.00413	-	-	0.90	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264402	Waste
10/8/2010	LOX-1B-3	LXWC0024	LXWC0024S001	Soil	Cobalt-60	-0.00365	0.0245	0.0404	0.0363	MDC	-	-	-	-	-0.00365	-	YES	1.11	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264402	Waste
10/13/2010	LOX-1B-3	LXWC0025	LXWC0025S001	Soil	Cobalt-60	0.0175	0.0265	0.0466	0.0363	MDC	-	-	-	-	0.0175	-	YES	1.28	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264661	Waste
10/11/2010	LOX-1B-3	LXWC0026	LXWC0026S001	Soil	Cobalt-60	0.0135	0.0267	0.0476	0.0363	MDC	-	-	-	-	0.0135	-	YES	1.31	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264490	Waste
10/11/2010	LOX-1B-3	LXWC0027	LXWC0027S001	Soil	Cobalt-60	0.00873	0.0188	0.033	0.0363	MDC	-	-	-	-	0.00873	-	-	0.91	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264490	Waste
10/12/2010	LOX-1B-3	LXWC0028	LXWC0028S001	Soil	Cobalt-60	0.00882	0.0245	0.0424	0.0363	MDC	-	-	-	-	0.00882	-	YES	1.17	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264559	Waste
10/13/2010	LOX-1B-3	LXWC0029	LXWC0029S001	Soil	Cobalt-60	-0.00652	0.0224	0.0373	0.0363	MDC	-	-	-	-	-0.00652	-	YES	1.03	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264661	Waste
10/12/2010	LOX-1B-3	LXWC0030	LXWC0030S001	Soil	Cobalt-60	0.00356	0.0236	0.041	0.0363	MDC	-	-	-	-	0.00356	-	YES	1.13	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264559	Waste
1/7/2011	LOX-1B-3	LXWC0031	LXWC0031A001	Soil	Cobalt-60	-0.00966	0.0149	0.0242	0.0363	MDC	-	-	-	-	-0.00966	-	-	0.67	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL	Re-sample	270159	Waste
10/12/2010	LOX-1B-3	LXWC0031	LXWC0031S001	Soil	Cobalt-60	0.0093	0.0259	0.0451	0.0363	MDC	-	-	-	-	0.0093	-	YES	1.24	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL	Re-sampled	264559	Waste
10/11/2010	LOX-1B-3	LXWC0032	LXWC0032S001	Soil	Cobalt-60	-0.0125	0.0205	0.0334	0.0363	MDC	-	-	-	-	-0.0125	-	-	0.92	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264490	Waste
10/11/2010	LOX-1B-3	LXWC0033	LXWC0033S001	Soil	Cobalt-60	-0.00493	0.0185	0.0316	0.0363	MDC	-	-	-	-	-0.00493	-	-	0.87	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264490	Waste
10/11/2010	LOX-1B-3	LXWC0034	LXWC0034S001	Soil	Cobalt-60	0.0125	0.0186	0.0335	0.0363	MDC	-	-	-	-	0.0125	-	-	0.92	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264490	Waste
10/12/2010	LOX-1B-3	LXWC0035	LXWC0035S001	Soil	Cobalt-60	-0.00572	0.0221	0.037	0.0363	MDC	-	-	-	-	-0.00572	-	YES	1.02	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264559	Waste
10/11/2010	LOX-1B-3	LXWC0036	LXWC0036S001	Soil	Cobalt-60	0.00555	0.0166	0.0289	0.0363	MDC	-	-	-	-	0.00555	-	-	0.80	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264490	Waste
10/8/2010	LOX-1B-3	LXWC0037	LXWC0037S001	Soil	Cobalt-60	0.00807	0.0246	0.0422	0.0363	MDC	-	-	-	-	0.00807	-	YES	1.16	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264402	Waste
10/8/2010	LOX-1B-3	LXWC0038	LXWC0038S001	Soil	Cobalt-60	0.00418	0.0176	0.0305	0.0363	MDC	-	-	-	-	0.00418	-	-	0.84	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264402	Waste
10/12/2010	LOX-1B-3	LXWC0039	LXWC0039S001	Soil	Cobalt-60	-0.0152	0.0173	0.0275	0.0363	MDC	-	-	-	-	-0.0152	-	-	0.76	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264559	Waste
10/12/2010	LOX-1B-3	LXWC0040	LXWC0040S001	Soil	Cobalt-60	0.0214	0.0187	0.0342	0.0363	MDC	-	-	-	-	0.0214	-	-	0.94	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264559	Waste
10/11/2010	LOX-1B-3	LXWC0041	LXWC0041S001	Soil	Cobalt-60	-0.0118	0.0212	0.0337	0.0363	MDC	-	-	-	-	-0.0118	-	-	0.93	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264490	Waste
10/12/2010	LOX-1B-3	LXWC0042	LXWC0042S001	Soil	Cobalt-60	-0.0105	0.0188	0.0308	0.0363	MDC	-	-	-	-	-0.0105	-	-	0.85	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264559	Waste
10/11/2010	LOX-1B-3	LXWC0043	LXWC0043S001	Soil	Cobalt-60	0.001	0.0205	0.0345	0.0363	MDC	-	-	-	-	0.001	-	-	0.95	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264490	Waste
10/12/2010	LOX-1B-3	LXWC0044	LXWC0044S001	Soil	Cobalt-60	0.00208	0.0173	0.0303	0.0363	MDC	-	-	-	-	0.00208	-	-	0.83	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264559	Waste
10/12/2010	LOX-1B-3	LXWC0045	LXWC0045S001	Soil	Cobalt-60	0.0166	0.0212	0.0387	0.0363	MDC	-	-	-	-	0.0166	-	YES	1.07	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264559	Waste
10/11/2010	LOX-1B-3	LXWC0046	LXWC0046S001	Soil	Cobalt-60	0.00306	0.0231	0.0393	0.0363	MDC	-	-	-	-	0.00306	-	YES	1.08	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264490	Waste
10/11/2010	LOX-1B-3	LXWC0047	LXWC0047S001	Soil	Cobalt-60	0.00582	0.0209	0.0367	0.0363	MDC	-	-	-	-	0.00582	-	YES	1.01	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264490	Waste
10/13/2010	LOX-1B-3	LXWC0048	LXWC0048S001	Soil	Cobalt-60	0.0204	0.0279	0.0492	0.0363	MDC	-	-	-	-	0.0204	-	YES	1.36	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264661	Waste
10/8/2010	LOX-1B-3	LXWC0049	LXWC0049S001	Soil	Cobalt-60	0.00236	0.0228	0.0391	0.0363	MDC	-	-	-	-	0.00236	-	YES	1.08	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264402	Waste
1/7/2011	LOX-1B-3	LXWC0050	LXWC0050A001	Soil	Cobalt-60	-0.0051	0.0177	0.0292	0.0363	MDC	-	-	-	-	-0.0051	-	-	0.80	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL	Re-sample	270159	Waste
10/12/2010	LOX-1B-3	LXWC0050	LXWC0050S001	Soil	Cobalt-60	-0.00922	0.0259	0.042	0.0363	MDC	-	-	-	-	-0.00922	-	YES	1.16	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL	Re-sampled	264559	Waste
10/11/2010	LOX-1B-3	LXWC0051	LXWC0051S001	Soil	Cobalt-60	0.00869	0.0225	0.0393	0.0363	MDC	-	-	-	-	0.00869	-	YES	1.08	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264490	Waste
10/12/2010	LOX-1B-3	LXWC0052	LXWC0052S001	Soil	Cobalt-60	-0.0145	0.0225	0.0354	0.0363	MDC	-	-	-	-	-0.0145	-	-	0.98	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264559	Waste
10/12/2010	LOX-1B-3	LXWC0053	LXWC0053S001	Soil	Cobalt-60	0.0181	0.0198	0.0358	0.0363	MDC	-	-	-	-	0.0181	-	-	0.99	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264559	Waste
10/11/2010	LOX-1B-3	LXWC0054	LXWC0054S001	Soil	Cobalt-60	0.00638	0.0222	0.0391	0.0363	MDC	-	-	-	-	0.00638	-	YES	1.08	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264490	Waste
10/11/2010	LOX-1B-3	LXWC0055	LXWC0055S001	Soil	Cobalt-60	0.0112	0.0214	0.0381	0.0363	MDC	-	-	-	-	0.0112	-	YES	1.05	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264490	Waste
10/11/2010	LOX-1B-3	LXWC0056	LXWC0056S001	Soil	Cobalt-60	-0.000982	0.0244	0.041	0.0363	MDC	-	-	-	-	-0.000982	-	YES	1.13	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264490	Waste
10/8/2010	LOX-1B-3	LXWC0057	LXWC0057S001	Soil	Cobalt-60	0.00387	0.0221	0.0382	0.0363	MDC	-	-	-	-	0.00387	-	YES	1.05	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264402	Waste
10/11/2010	LOX-1B-3	LXWC0058	LXWC0058S001	Soil	Cobalt-60	0.000812	0.022	0.0376	0.0363	MDC	-	-	-	-	0.000812	-	YES	1.04	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264490	Waste
10/12/2010	LOX-1B-3	LXWC0059	LXWC0059S001	Soil	Cobalt-60	-0.00686	0.0229	0.0382	0.0363	MDC	-	-	-	-	-0.00686	-	YES								

LOX NASA ISRA Soil Data
All Chem, Radionuclides < LUT (pCi/g)

Sampling Date	Sampling Location (General)	Sampling Location (Specific)	Sample Serial Number	Media Type	Isotope	Activity	Error (+/-)	MDC	DTSC LUT	LUT Source	Activity > LUT ?	Activity > MDC ?	Detected Activity	Detected Activity > LUT ?	Non-detect Activity	Non-detect Activity > LUT ?	MDC > LUT ?	Ratio of MDC to LUT	Units	Error Type	Analysis Protocol	Analysis Organization	Comments	Document	Status
10/12/2010	LOX-1B-2	LXWC0017	LXWC0017S001	Soil	Europium-152	-0.0207	0.0738	0.108	0.0739	MDC	-	-	-	-	-0.0207	-	YES	1.46	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264562	Waste
10/11/2010	LOX-1B-2	LXWC0018	LXWC0018S001	Soil	Europium-152	0.0265	0.0458	0.0784	0.0739	MDC	-	-	-	-	0.0265	-	YES	1.06	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264499	Waste
10/11/2010	LOX-1B-2	LXWC0019	LXWC0019S001	Soil	Europium-152	0.00597	0.0568	0.0899	0.0739	MDC	-	-	-	-	0.00597	-	YES	1.22	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264499	Waste
10/13/2010	LOX-1B-3	LXWC0020	LXWC0020S001	Soil	Europium-152	-0.0709	0.0651	0.0966	0.0739	MDC	-	-	-	-	-0.0709	-	YES	1.31	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264661	Waste
10/8/2010	LOX-1B-3	LXWC0021	LXWC0021S001	Soil	Europium-152	-0.00241	0.065	0.1	0.0739	MDC	-	-	-	-	-0.00241	-	YES	1.35	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264402	Waste
10/11/2010	LOX-1B-3	LXWC0022	LXWC0022S001	Soil	Europium-152	-0.0297	0.0724	0.11	0.0739	MDC	-	-	-	-	-0.0297	-	YES	1.49	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264490	Waste
10/8/2010	LOX-1B-3	LXWC0023	LXWC0023S001	Soil	Europium-152	0.00191	0.0518	0.0836	0.0739	MDC	-	-	-	-	0.00191	-	YES	1.13	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264402	Waste
10/8/2010	LOX-1B-3	LXWC0024	LXWC0024S001	Soil	Europium-152	0.00665	0.0903	0.11	0.0739	MDC	-	-	-	-	0.00665	-	YES	1.49	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264402	Waste
10/13/2010	LOX-1B-3	LXWC0025	LXWC0025S001	Soil	Europium-152	-0.0811	0.08	0.117	0.0739	MDC	-	-	-	-	-0.0811	-	YES	1.58	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264661	Waste
10/11/2010	LOX-1B-3	LXWC0026	LXWC0026S001	Soil	Europium-152	-0.0487	0.065	0.0956	0.0739	MDC	-	-	-	-	-0.0487	-	YES	1.29	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264490	Waste
10/11/2010	LOX-1B-3	LXWC0027	LXWC0027S001	Soil	Europium-152	-0.0276	0.0527	0.0842	0.0739	MDC	-	-	-	-	-0.0276	-	YES	1.14	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264490	Waste
10/12/2010	LOX-1B-3	LXWC0028	LXWC0028S001	Soil	Europium-152	0.028	0.0916	0.116	0.0739	MDC	-	-	-	-	0.028	-	YES	1.57	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264559	Waste
10/13/2010	LOX-1B-3	LXWC0029	LXWC0029S001	Soil	Europium-152	-0.0184	0.0613	0.0941	0.0739	MDC	-	-	-	-	-0.0184	-	YES	1.27	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264661	Waste
10/12/2010	LOX-1B-3	LXWC0030	LXWC0030S001	Soil	Europium-152	-0.0196	0.0556	0.0938	0.0739	MDC	-	-	-	-	-0.0196	-	YES	1.27	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264559	Waste
1/7/2011	LOX-1B-3	LXWC0031	LXWC0031AS001	Soil	Europium-152	1.59E-05	0.0438	0.0627	0.0739	MDC	-	-	-	-	0.0000159	-	YES	0.85	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL	Re-sample	270159	Waste
10/12/2010	LOX-1B-3	LXWC0031	LXWC0031S001	Soil	Europium-152	-0.0151	0.073	0.111	0.0739	MDC	-	-	-	-	-0.0151	-	YES	1.50	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL	Re-sampled	264559	Waste
10/11/2010	LOX-1B-3	LXWC0032	LXWC0032S001	Soil	Europium-152	-0.00639	0.0613	0.0847	0.0739	MDC	-	-	-	-	-0.00639	-	YES	1.15	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264490	Waste
10/11/2010	LOX-1B-3	LXWC0033	LXWC0033S001	Soil	Europium-152	0.0568	0.0518	0.0861	0.0739	MDC	-	-	-	-	0.0568	-	YES	1.17	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264490	Waste
10/11/2010	LOX-1B-3	LXWC0034	LXWC0034S001	Soil	Europium-152	-0.0221	0.054	0.0863	0.0739	MDC	-	-	-	-	-0.0221	-	YES	1.17	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264490	Waste
10/12/2010	LOX-1B-3	LXWC0035	LXWC0035S001	Soil	Europium-152	-0.00397	0.054	0.0891	0.0739	MDC	-	-	-	-	-0.00397	-	YES	1.21	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264559	Waste
10/11/2010	LOX-1B-3	LXWC0036	LXWC0036S001	Soil	Europium-152	0.0202	0.0565	0.074	0.0739	MDC	-	-	-	-	0.0202	-	YES	1.00	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264490	Waste
10/8/2010	LOX-1B-3	LXWC0037	LXWC0037S001	Soil	Europium-152	-0.02	0.0854	0.114	0.0739	MDC	-	-	-	-	-0.02	-	YES	1.54	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264402	Waste
10/8/2010	LOX-1B-3	LXWC0038	LXWC0038S001	Soil	Europium-152	0.00219	0.0657	0.0813	0.0739	MDC	-	-	-	-	0.00219	-	YES	1.10	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264402	Waste
10/12/2010	LOX-1B-3	LXWC0039	LXWC0039S001	Soil	Europium-152	-0.00558	0.05	0.0754	0.0739	MDC	-	-	-	-	-0.00558	-	YES	1.02	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264559	Waste
10/12/2010	LOX-1B-3	LXWC0040	LXWC0040S001	Soil	Europium-152	-0.0535	0.0514	0.0798	0.0739	MDC	-	-	-	-	-0.0535	-	YES	1.08	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264559	Waste
10/11/2010	LOX-1B-3	LXWC0041	LXWC0041S001	Soil	Europium-152	-0.0336	0.0691	0.105	0.0739	MDC	-	-	-	-	-0.0336	-	YES	1.42	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264490	Waste
10/12/2010	LOX-1B-3	LXWC0042	LXWC0042S001	Soil	Europium-152	-0.00647	0.0721	0.0875	0.0739	MDC	-	-	-	-	-0.00647	-	YES	1.18	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264559	Waste
10/11/2010	LOX-1B-3	LXWC0043	LXWC0043S001	Soil	Europium-152	-0.0175	0.0499	0.0794	0.0739	MDC	-	-	-	-	-0.0175	-	YES	1.07	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264490	Waste
10/12/2010	LOX-1B-3	LXWC0044	LXWC0044S001	Soil	Europium-152	0.0535	0.0523	0.0863	0.0739	MDC	-	-	-	-	0.0535	-	YES	1.17	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264559	Waste
10/12/2010	LOX-1B-3	LXWC0045	LXWC0045S001	Soil	Europium-152	-0.0612	0.0486	0.0802	0.0739	MDC	-	-	-	-	-0.0612	-	YES	1.09	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264559	Waste
10/11/2010	LOX-1B-3	LXWC0046	LXWC0046S001	Soil	Europium-152	0.00816	0.102	0.108	0.0739	MDC	-	-	-	-	0.00816	-	YES	1.46	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264490	Waste
10/11/2010	LOX-1B-3	LXWC0047	LXWC0047S001	Soil	Europium-152	-0.0278	0.0567	0.0822	0.0739	MDC	-	-	-	-	-0.0278	-	YES	1.11	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264490	Waste
10/13/2010	LOX-1B-3	LXWC0048	LXWC0048S001	Soil	Europium-152	0.00251	0.0801	0.117	0.0739	MDC	-	-	-	-	0.00251	-	YES	1.58	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264661	Waste
10/8/2010	LOX-1B-3	LXWC0049	LXWC0049S001	Soil	Europium-152	0.0082	0.0688	0.101	0.0739	MDC	-	-	-	-	0.0082	-	YES	1.37	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264402	Waste
1/7/2011	LOX-1B-3	LXWC0050	LXWC0050AS001	Soil	Europium-152	-0.0479	0.0524	0.0741	0.0739	MDC	-	-	-	-	-0.0479	-	YES	1.00	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL	Re-sample	270159	Waste
10/12/2010	LOX-1B-3	LXWC0050	LXWC0050S001	Soil	Europium-152	-0.0344	0.0765	0.116	0.0739	MDC	-	-	-	-	-0.0344	-	YES	1.57	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL	Re-sampled	264559	Waste
10/11/2010	LOX-1B-3	LXWC0051	LXWC0051S001	Soil	Europium-152	-0.02	0.056	0.0921	0.0739	MDC	-	-	-	-	-0.02	-	YES	1.25	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264490	Waste
10/12/2010	LOX-1B-3	LXWC0052	LXWC0052S001	Soil	Europium-152	-0.0198	0.0686	0.096	0.0739	MDC	-	-	-	-	-0.0198	-	YES	1.30	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264559	Waste
10/12/2010	LOX-1B-3	LXWC0053	LXWC0053S001	Soil	Europium-152	0.00177	0.0515	0.0875	0.0739	MDC	-	-	-	-	0.00177	-	YES	1.18	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264559	Waste
10/11/2010	LOX-1B-3	LXWC0054	LXWC0054S001	Soil	Europium-152	-0.0349	0.0602	0.0915	0.0739	MDC	-	-	-	-	-0.0349	-	YES	1.24	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264490	Waste
10/11/2010	LOX-1B-3	LXWC0055	LXWC0055S001	Soil	Europium-152	-0.0572	0.0545	0.0843	0.0739	MDC	-	-	-	-	-0.0572	-	YES	1.14	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264490	Waste
10/11/2010	LOX-1B-3	LXWC0056	LXWC0056S001	Soil	Europium-152	0.0379	0.0677	0.108	0.0739	MDC	-	-	-	-	0.0379	-	YES	1.46	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264490	Waste
10/8/2010	LOX-1B-3	LXWC0057	LXWC0057S001	Soil	Europium-152	0.0935	0.0589	0.0987	0.0739	MDC	YES	-	-	-	0.0935	YES	YES	1.34	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264402	Waste
10/11/2010	LOX-1B-3	LXWC0058	LXWC0058S001	Soil	Europium-152	-0.027	0.0582	0.097	0.0739	MDC	-	-	-	-	-0.027	-	YES	1.31	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264490	Waste
10/12/2010	LOX-1B-3	LXWC0059	LXWC0059S001	Soil	Europium-152	-0.0251	0.0586	0.0944	0.0739	MDC	-	-	-	-	-0.0251	-	YES	1.28	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264559	Waste
10/8/2010	LOX-1B-4	LXWC0060	LXWC0060S001	Soil	Europium-152	-0.00644	0.0462	0.0795	0.0739	MDC	-	-	-	-	-0.00644	-	YES	1.08	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264404	Waste
10/8/2010	LOX-1B-4	LXWC0061	LXWC0061S001	Soil	Europium-152	0.0325	0.0481	0.079	0.0739	MDC	-	-	-	-	0.0325	-	YES	1.07	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264404	Waste
10/8/2010	LOX-1B-4	LXWC0062	LXWC0062S001	Soil	Europium-152	-0.0195	0.0552	0.0861	0.0739	MDC	-	-	-	-	-0.0195	-	YES	1.17	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264404	Waste
10/8/2010	LOX-1B-4	LXWC0063	LXWC0063S001	Soil	Europium-152	-0.00139	0.0549	0.0883	0.0739	MDC	-	-	-	-	-0.00139	-	YES	1							

LOX NASA ISRA Soil Data
All Chem, Radionuclides < LUT (pCi/g)

Sampling Date	Sampling Location (General)	Sampling Location (Specific)	Sample Serial Number	Media Type	Isotope	Activity	Error (+/-)	MDC	DTSC LUT	LUT Source	Activity > LUT ?	Activity > MDC ?	Detected Activity	Detected Activity > LUT ?	Non-detect Activity	Non-detect Activity > LUT ?	MDC > LUT ?	Ratio of MDC to LUT	Units	Error Type	Analysis Protocol	Analysis Organization	Comments	Document	Status
10/8/2010	LOX-1B-3	LXWC0021	LXWC0021S001	Soil	Europium-154	0.0451	0.0829	0.148	0.198	MDC	-	-	-	-	0.0451	-	-	0.75	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264402	Waste
10/11/2010	LOX-1B-3	LXWC0022	LXWC0022S001	Soil	Europium-154	-0.0172	0.075	0.124	0.198	MDC	-	-	-	-	-0.0172	-	-	0.63	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264490	Waste
10/8/2010	LOX-1B-3	LXWC0023	LXWC0023S001	Soil	Europium-154	-0.00194	0.0687	0.119	0.198	MDC	-	-	-	-	-0.00194	-	-	0.60	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264402	Waste
10/8/2010	LOX-1B-3	LXWC0024	LXWC0024S001	Soil	Europium-154	0.0399	0.075	0.13	0.198	MDC	-	-	-	-	0.0399	-	-	0.66	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264402	Waste
10/13/2010	LOX-1B-3	LXWC0025	LXWC0025S001	Soil	Europium-154	0.0393	0.0842	0.146	0.198	MDC	-	-	-	-	0.0393	-	-	0.74	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264661	Waste
10/11/2010	LOX-1B-3	LXWC0026	LXWC0026S001	Soil	Europium-154	0.0577	0.0867	0.156	0.198	MDC	-	-	-	-	0.0577	-	-	0.79	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264490	Waste
10/11/2010	LOX-1B-3	LXWC0027	LXWC0027S001	Soil	Europium-154	-0.0502	0.0597	0.0978	0.198	MDC	-	-	-	-	-0.0502	-	-	0.49	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264490	Waste
10/12/2010	LOX-1B-3	LXWC0028	LXWC0028S001	Soil	Europium-154	0.00474	0.0837	0.142	0.198	MDC	-	-	-	-	0.00474	-	-	0.72	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264559	Waste
10/13/2010	LOX-1B-3	LXWC0029	LXWC0029S001	Soil	Europium-154	0.015	0.0709	0.123	0.198	MDC	-	-	-	-	0.015	-	-	0.62	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264661	Waste
10/12/2010	LOX-1B-3	LXWC0030	LXWC0030S001	Soil	Europium-154	-0.0365	0.0769	0.128	0.198	MDC	-	-	-	-	-0.0365	-	-	0.65	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264559	Waste
1/7/2011	LOX-1B-3	LXWC0031	LXWC0031AS001	Soil	Europium-154	-0.000938	0.0487	0.0836	0.198	MDC	-	-	-	-	-0.000938	-	-	0.42	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL	Re-sample	270159	Waste
10/12/2010	LOX-1B-3	LXWC0031	LXWC0031S001	Soil	Europium-154	-0.006	0.0779	0.132	0.198	MDC	-	-	-	-	-0.006	-	-	0.67	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL	Re-sampled	264559	Waste
10/11/2010	LOX-1B-3	LXWC0032	LXWC0032S001	Soil	Europium-154	-0.0512	0.0624	0.101	0.198	MDC	-	-	-	-	-0.0512	-	-	0.51	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264490	Waste
10/11/2010	LOX-1B-3	LXWC0033	LXWC0033S001	Soil	Europium-154	-0.00853	0.0605	0.105	0.198	MDC	-	-	-	-	-0.00853	-	-	0.53	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264490	Waste
10/11/2010	LOX-1B-3	LXWC0034	LXWC0034S001	Soil	Europium-154	-0.0148	0.058	0.0979	0.198	MDC	-	-	-	-	-0.0148	-	-	0.49	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264490	Waste
10/12/2010	LOX-1B-3	LXWC0035	LXWC0035S001	Soil	Europium-154	0.0221	0.0678	0.119	0.198	MDC	-	-	-	-	0.0221	-	-	0.60	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264559	Waste
10/11/2010	LOX-1B-3	LXWC0036	LXWC0036S001	Soil	Europium-154	-0.0229	0.0552	0.0922	0.198	MDC	-	-	-	-	-0.0229	-	-	0.47	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264490	Waste
10/8/2010	LOX-1B-3	LXWC0037	LXWC0037S001	Soil	Europium-154	0.0454	0.0857	0.149	0.198	MDC	-	-	-	-	0.0454	-	-	0.75	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264402	Waste
10/8/2010	LOX-1B-3	LXWC0038	LXWC0038S001	Soil	Europium-154	-0.0906	0.0604	0.0948	0.198	MDC	-	-	-	-	-0.0906	-	-	0.48	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264402	Waste
10/12/2010	LOX-1B-3	LXWC0039	LXWC0039S001	Soil	Europium-154	0.00371	0.0552	0.0946	0.198	MDC	-	-	-	-	0.00371	-	-	0.48	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264559	Waste
10/12/2010	LOX-1B-3	LXWC0040	LXWC0040S001	Soil	Europium-154	-0.0119	0.0666	0.11	0.198	MDC	-	-	-	-	-0.0119	-	-	0.56	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264559	Waste
10/11/2010	LOX-1B-3	LXWC0041	LXWC0041S001	Soil	Europium-154	-0.0248	0.0724	0.119	0.198	MDC	-	-	-	-	-0.0248	-	-	0.60	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264490	Waste
10/12/2010	LOX-1B-3	LXWC0042	LXWC0042S001	Soil	Europium-154	-0.0645	0.0613	0.0987	0.198	MDC	-	-	-	-	-0.0645	-	-	0.50	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264559	Waste
10/11/2010	LOX-1B-3	LXWC0043	LXWC0043S001	Soil	Europium-154	0.0471	0.07	0.123	0.198	MDC	-	-	-	-	0.0471	-	-	0.62	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264490	Waste
10/12/2010	LOX-1B-3	LXWC0044	LXWC0044S001	Soil	Europium-154	0.00499	0.0584	0.103	0.198	MDC	-	-	-	-	0.00499	-	-	0.52	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264559	Waste
10/12/2010	LOX-1B-3	LXWC0045	LXWC0045S001	Soil	Europium-154	0.00473	0.0683	0.119	0.198	MDC	-	-	-	-	0.00473	-	-	0.60	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264559	Waste
10/11/2010	LOX-1B-3	LXWC0046	LXWC0046S001	Soil	Europium-154	0.0555	0.0724	0.129	0.198	MDC	-	-	-	-	0.0555	-	-	0.65	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264490	Waste
10/11/2010	LOX-1B-3	LXWC0047	LXWC0047S001	Soil	Europium-154	-0.0545	0.0671	0.109	0.198	MDC	-	-	-	-	-0.0545	-	-	0.55	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264490	Waste
10/13/2010	LOX-1B-3	LXWC0048	LXWC0048S001	Soil	Europium-154	0.0355	0.0859	0.148	0.198	MDC	-	-	-	-	0.0355	-	-	0.75	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264661	Waste
10/8/2010	LOX-1B-3	LXWC0049	LXWC0049S001	Soil	Europium-154	0.00963	0.0713	0.123	0.198	MDC	-	-	-	-	0.00963	-	-	0.62	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264402	Waste
1/7/2011	LOX-1B-3	LXWC0050	LXWC0050AS001	Soil	Europium-154	-0.0303	0.0554	0.0906	0.198	MDC	-	-	-	-	-0.0303	-	-	0.46	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL	Re-sample	270159	Waste
10/12/2010	LOX-1B-3	LXWC0050	LXWC0050S001	Soil	Europium-154	-0.0707	0.0871	0.137	0.198	MDC	-	-	-	-	-0.0707	-	-	0.69	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL	Re-sampled	264559	Waste
10/11/2010	LOX-1B-3	LXWC0051	LXWC0051S001	Soil	Europium-154	-0.00799	0.0743	0.126	0.198	MDC	-	-	-	-	-0.00799	-	-	0.64	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264490	Waste
10/12/2010	LOX-1B-3	LXWC0052	LXWC0052S001	Soil	Europium-154	-0.0173	0.0754	0.126	0.198	MDC	-	-	-	-	-0.0173	-	-	0.64	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264559	Waste
10/12/2010	LOX-1B-3	LXWC0053	LXWC0053S001	Soil	Europium-154	-0.0582	0.0661	0.102	0.198	MDC	-	-	-	-	-0.0582	-	-	0.52	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264559	Waste
10/11/2010	LOX-1B-3	LXWC0054	LXWC0054S001	Soil	Europium-154	-0.0224	0.0685	0.116	0.198	MDC	-	-	-	-	-0.0224	-	-	0.59	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264490	Waste
10/11/2010	LOX-1B-3	LXWC0055	LXWC0055S001	Soil	Europium-154	-0.068	0.0699	0.111	0.198	MDC	-	-	-	-	-0.068	-	-	0.56	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264490	Waste
10/11/2010	LOX-1B-3	LXWC0056	LXWC0056S001	Soil	Europium-154	0.0263	0.0775	0.135	0.198	MDC	-	-	-	-	0.0263	-	-	0.68	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264490	Waste
10/8/2010	LOX-1B-3	LXWC0057	LXWC0057S001	Soil	Europium-154	0.0446	0.0723	0.129	0.198	MDC	-	-	-	-	0.0446	-	-	0.65	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264402	Waste
10/11/2010	LOX-1B-3	LXWC0058	LXWC0058S001	Soil	Europium-154	-0.035	0.0693	0.114	0.198	MDC	-	-	-	-	-0.035	-	-	0.58	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264490	Waste
10/12/2010	LOX-1B-3	LXWC0059	LXWC0059S001	Soil	Europium-154	-0.0159	0.0709	0.12	0.198	MDC	-	-	-	-	-0.0159	-	-	0.61	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264559	Waste
10/8/2010	LOX-1B-4	LXWC0060	LXWC0060S001	Soil	Europium-154	-0.0346	0.0571	0.0917	0.198	MDC	-	-	-	-	-0.0346	-	-	0.46	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264404	Waste
10/8/2010	LOX-1B-4	LXWC0061	LXWC0061S001	Soil	Europium-154	-0.0334	0.0579	0.0975	0.198	MDC	-	-	-	-	-0.0334	-	-	0.49	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264404	Waste
10/8/2010	LOX-1B-4	LXWC0062	LXWC0062S001	Soil	Europium-154	-0.0387	0.0702	0.116	0.198	MDC	-	-	-	-	-0.0387	-	-	0.59	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264404	Waste
10/8/2010	LOX-1B-4	LXWC0063	LXWC0063S001	Soil	Europium-154	0.00728	0.0691	0.119	0.198	MDC	-	-	-	-	0.00728	-	-	0.60	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264404	Waste
10/13/2010	LOX-1C	LXWC0064	LXWC0064S001	Soil	Europium-154	0.0214	0.0847	0.146	0.198	MDC	-	-	-	-	0.0214	-	-	0.74	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264667	Waste
10/13/2010	LOX-1C	LXWC0065	LXWC0065S001	Soil	Europium-154	0.0125	0.0731	0.127	0.198	MDC	-	-	-	-	0.0125	-	-	0.64	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264667	Waste
10/13/2010	LOX-1C	LXWC0066	LXWC0066S001	Soil	Europium-154	0.0207	0.0706	0.123	0.198	MDC	-	-	-	-	0.0207	-	-	0.62	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264667	Waste
10/13/2010	LOX-1C	LXWC0067	LXWC0067S001	Soil	Europium-154	-0.116	0.0758	0.11	0.198	MDC	-	-	-	-	-0.116	-	-	0.56	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264667	Waste
10/8/2010	LOX-1D	LXWC0068	LXWC0068S001																						

LOX NASA ISRA Soil Data
All Chem, Radionuclides < LUT (pCi/g)

Sampling Date	Sampling Location (General)	Sampling Location (Specific)	Sample Serial Number	Media Type	Isotope	Activity	Error (+/-)	MDC	DTSC LUT	LUT Source	Activity > LUT ?	Activity > MDC ?	Detected Activity	Detected Activity > LUT ?	Non-detect Activity	Non-detect Activity > LUT ?	MDC > LUT ?	Ratio of MDC to LUT	Units	Error Type	Analysis Protocol	Analysis Organization	Comments	Document	Status
10/13/2010	LOX-1B-3	LXWC0025	LXWC0025S001	Soil	Manganese-54	0.00451	0.0245	0.0432	-	-	-	-	-	-	0.00451	-	-	-	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264661	Waste
10/11/2010	LOX-1B-3	LXWC0026	LXWC0026S001	Soil	Manganese-54	0.00261	0.0236	0.0418	-	-	-	-	-	-	0.00261	-	-	-	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264490	Waste
10/11/2010	LOX-1B-3	LXWC0027	LXWC0027S001	Soil	Manganese-54	0.00633	0.0186	0.033	-	-	-	-	-	-	0.00633	-	-	-	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264490	Waste
10/12/2010	LOX-1B-3	LXWC0028	LXWC0028S001	Soil	Manganese-54	0.00574	0.0231	0.0411	-	-	-	-	-	-	0.00574	-	-	-	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264559	Waste
10/13/2010	LOX-1B-3	LXWC0029	LXWC0029S001	Soil	Manganese-54	0.0154	0.022	0.0393	-	-	-	-	-	-	0.0154	-	-	-	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264661	Waste
10/12/2010	LOX-1B-3	LXWC0030	LXWC0030S001	Soil	Manganese-54	0.00462	0.0237	0.0414	-	-	-	-	-	-	0.00462	-	-	-	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264559	Waste
1/7/2011	LOX-1B-3	LXWC0031	LXWC0031AS001	Soil	Manganese-54	0.00601	0.0145	0.0259	-	-	-	-	-	-	0.00601	-	-	-	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL	Re-sample	270159	Waste
10/12/2010	LOX-1B-3	LXWC0031	LXWC0031S001	Soil	Manganese-54	0.00633	0.0235	0.0406	-	-	-	-	-	-	0.00633	-	-	-	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL	Re-sampled	264559	Waste
10/11/2010	LOX-1B-3	LXWC0032	LXWC0032S001	Soil	Manganese-54	0.015	0.0252	0.0367	-	-	-	-	-	-	0.015	-	-	-	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264490	Waste
10/11/2010	LOX-1B-3	LXWC0033	LXWC0033S001	Soil	Manganese-54	-0.00777	0.0229	0.0339	-	-	-	-	-	-	-0.00777	-	-	-	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264490	Waste
10/11/2010	LOX-1B-3	LXWC0034	LXWC0034S001	Soil	Manganese-54	3.63E-06	0.019	0.0325	-	-	-	-	-	-	3.63E-06	-	-	-	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264490	Waste
10/12/2010	LOX-1B-3	LXWC0035	LXWC0035S001	Soil	Manganese-54	0	0.025	0.0311	-	-	-	-	-	-	0	-	-	-	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264559	Waste
10/11/2010	LOX-1B-3	LXWC0036	LXWC0036S001	Soil	Manganese-54	0.0046	0.0174	0.0305	-	-	-	-	-	-	0.0046	-	-	-	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264490	Waste
10/8/2010	LOX-1B-3	LXWC0037	LXWC0037S001	Soil	Manganese-54	0.00183	0.0248	0.0434	-	-	-	-	-	-	0.00183	-	-	-	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264402	Waste
10/8/2010	LOX-1B-3	LXWC0038	LXWC0038S001	Soil	Manganese-54	-0.00916	0.0176	0.0304	-	-	-	-	-	-	-0.00916	-	-	-	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264402	Waste
10/12/2010	LOX-1B-3	LXWC0039	LXWC0039S001	Soil	Manganese-54	0.00318	0.0172	0.03	-	-	-	-	-	-	0.00318	-	-	-	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264559	Waste
10/12/2010	LOX-1B-3	LXWC0040	LXWC0040S001	Soil	Manganese-54	0.0185	0.0182	0.0335	-	-	-	-	-	-	0.0185	-	-	-	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264559	Waste
10/11/2010	LOX-1B-3	LXWC0041	LXWC0041S001	Soil	Manganese-54	0.014	0.0226	0.0407	-	-	-	-	-	-	0.014	-	-	-	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264490	Waste
10/12/2010	LOX-1B-3	LXWC0042	LXWC0042S001	Soil	Manganese-54	0.0196	0.0204	0.0322	-	-	-	-	-	-	0.0196	-	-	-	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264559	Waste
10/11/2010	LOX-1B-3	LXWC0043	LXWC0043S001	Soil	Manganese-54	0.0269	0.0258	0.0335	-	-	-	-	-	-	0.0269	-	-	-	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264490	Waste
10/12/2010	LOX-1B-3	LXWC0044	LXWC0044S001	Soil	Manganese-54	0.00552	0.0178	0.0315	-	-	-	-	-	-	0.00552	-	-	-	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264559	Waste
10/12/2010	LOX-1B-3	LXWC0045	LXWC0045S001	Soil	Manganese-54	0.00927	0.0207	0.0369	-	-	-	-	-	-	0.00927	-	-	-	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264559	Waste
10/11/2010	LOX-1B-3	LXWC0046	LXWC0046S001	Soil	Manganese-54	0.0183	0.0223	0.041	-	-	-	-	-	-	0.0183	-	-	-	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264490	Waste
10/11/2010	LOX-1B-3	LXWC0047	LXWC0047S001	Soil	Manganese-54	0.00542	0.0215	0.038	-	-	-	-	-	-	0.00542	-	-	-	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264490	Waste
10/13/2010	LOX-1B-3	LXWC0048	LXWC0048S001	Soil	Manganese-54	0.00616	0.0247	0.0436	-	-	-	-	-	-	0.00616	-	-	-	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264661	Waste
10/8/2010	LOX-1B-3	LXWC0049	LXWC0049S001	Soil	Manganese-54	-0.00394	0.0243	0.0412	-	-	-	-	-	-	-0.00394	-	-	-	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264402	Waste
1/7/2011	LOX-1B-3	LXWC0050	LXWC0050AS001	Soil	Manganese-54	-0.0111	0.0204	0.0288	-	-	-	-	-	-	-0.0111	-	-	-	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL	Re-sample	270159	Waste
10/12/2010	LOX-1B-3	LXWC0050	LXWC0050S001	Soil	Manganese-54	0.0227	0.0246	0.0401	-	-	-	-	-	-	0.0227	-	-	-	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL	Re-sampled	264559	Waste
10/11/2010	LOX-1B-3	LXWC0051	LXWC0051S001	Soil	Manganese-54	-0.0126	0.0218	0.0361	-	-	-	-	-	-	-0.0126	-	-	-	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264490	Waste
10/12/2010	LOX-1B-3	LXWC0052	LXWC0052S001	Soil	Manganese-54	-0.019	0.024	0.0386	-	-	-	-	-	-	-0.019	-	-	-	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264559	Waste
10/12/2010	LOX-1B-3	LXWC0053	LXWC0053S001	Soil	Manganese-54	-0.00902	0.0193	0.033	-	-	-	-	-	-	-0.00902	-	-	-	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264559	Waste
10/11/2010	LOX-1B-3	LXWC0054	LXWC0054S001	Soil	Manganese-54	0.000793	0.0221	0.0385	-	-	-	-	-	-	0.000793	-	-	-	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264490	Waste
10/11/2010	LOX-1B-3	LXWC0055	LXWC0055S001	Soil	Manganese-54	0.0128	0.0244	0.0371	-	-	-	-	-	-	0.0128	-	-	-	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264490	Waste
10/11/2010	LOX-1B-3	LXWC0056	LXWC0056S001	Soil	Manganese-54	0.009	0.0238	0.0416	-	-	-	-	-	-	0.009	-	-	-	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264490	Waste
10/8/2010	LOX-1B-3	LXWC0057	LXWC0057S001	Soil	Manganese-54	0.0146	0.0221	0.0392	-	-	-	-	-	-	0.0146	-	-	-	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264402	Waste
10/11/2010	LOX-1B-3	LXWC0058	LXWC0058S001	Soil	Manganese-54	-0.000841	0.022	0.0376	-	-	-	-	-	-	-0.000841	-	-	-	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264490	Waste
10/12/2010	LOX-1B-3	LXWC0059	LXWC0059S001	Soil	Manganese-54	0.0136	0.021	0.0374	-	-	-	-	-	-	0.0136	-	-	-	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264559	Waste
10/8/2010	LOX-1B-4	LXWC0060	LXWC0060S001	Soil	Manganese-54	-0.00157	0.0179	0.0317	-	-	-	-	-	-	-0.00157	-	-	-	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264404	Waste
10/8/2010	LOX-1B-4	LXWC0061	LXWC0061S001	Soil	Manganese-54	-0.00114	0.0174	0.0304	-	-	-	-	-	-	-0.00114	-	-	-	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264404	Waste
10/8/2010	LOX-1B-4	LXWC0062	LXWC0062S001	Soil	Manganese-54	0.01	0.0217	0.0385	-	-	-	-	-	-	0.01	-	-	-	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264404	Waste
10/8/2010	LOX-1B-4	LXWC0063	LXWC0063S001	Soil	Manganese-54	0.0313	0.0252	0.0335	-	-	-	-	-	-	0.0313	-	-	-	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264404	Waste
10/13/2010	LOX-1C	LXWC0064	LXWC0064S001	Soil	Manganese-54	-0.00527	0.0255	0.0424	-	-	-	-	-	-	-0.00527	-	-	-	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264667	Waste
10/13/2010	LOX-1C	LXWC0065	LXWC0065S001	Soil	Manganese-54	-0.00799	0.0232	0.0389	-	-	-	-	-	-	-0.00799	-	-	-	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264667	Waste
10/13/2010	LOX-1C	LXWC0066	LXWC0066S001	Soil	Manganese-54	-0.013	0.0211	0.0349	-	-	-	-	-	-	-0.013	-	-	-	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264667	Waste
10/13/2010	LOX-1C	LXWC0067	LXWC0067S001	Soil	Manganese-54	-0.00942	0.0223	0.0381	-	-	-	-	-	-	-0.00942	-	-	-	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264667	Waste
10/8/2010	LOX-1D	LXWC0068	LXWC0068S001	Soil	Manganese-54	-0.0163	0.0204	0.0332	-	-	-	-	-	-	-0.0163	-	-	-	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264405	Waste
10/8/2010	LOX-1D	LXWC0069	LXWC0069S001	Soil	Manganese-54	0.011	0.0212	0.0389	-	-	-	-	-	-	0.011	-	-	-	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264405	Waste
10/8/2010	LOX-1D	LXWC0070	LXWC0070S001	Soil	Manganese-54	-0.00174	0.0228	0.0385	-	-	-	-	-	-	-0.00174	-	-	-	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264405	Waste
10/8/2010	LOX-1D	LXWC0071	LXWC0071S001	Soil	Manganese-54	0.0106	0.0246	0.0432	-	-	-	-	-	-	0.0106	-	-	-	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264405	Waste
1/7/2011	LOX-1B-3	LXWC0072	LXWC0072S001	Soil	Manganese-54	-0.0105	0.017	0.0289	-	-	-	-	-	-	-0.0105	-	-	-	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL	LXWC0031 Steput #1	270159	Waste
1/7/2011	LOX-1B-3	LXWC0073	LXWC0073S001	Soil	Manganese-54	0.0102	0.0234	0.0422	-	-	-	-	-	-	0.0102	-	-	-	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL	LXWC0031 Steput #2	270159	Waste
1/7/2011	LOX-1B-3	LXWC0074	LXWC0074S001	Soil	Manganese-54	0.00278	0.0142	0.025	-	-</															

LOX NASA ISRA Soil Data
All Chem, Radionuclides < LUT (pCi/g)

Sampling Date	Sampling Location (General)	Sampling Location (Specific)	Sample Serial Number	Media Type	Isotope	Activity	Error (+/-)	MDC	DTSC LUT	LUT Source	Activity > LUT ?	Activity > MDC ?	Detected Activity	Detected Activity > LUT ?	Non-detect Activity	Non-detect Activity > LUT ?	MDC > LUT ?	Ratio of MDC to LUT	Units	Error Type	Analysis Protocol	Analysis Organization	Comments	Document	Status
10/13/2010	LOX-1B-3	LXWC0029	LXWC0029S001	Soil	Potassium-40	22.6	2.24	0.32	35.5	BTV	-	YES	22.6	-	-	-	-	0.01	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264661	Waste
10/12/2010	LOX-1B-3	LXWC0030	LXWC0030S001	Soil	Potassium-40	21.7	2.24	0.345	35.5	BTV	-	YES	21.7	-	-	-	-	0.01	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264559	Waste
1/7/2011	LOX-1B-3	LXWC0031	LXWC0031AS001	Soil	Potassium-40	18.7	1.91	0.212	35.5	BTV	-	YES	18.7	-	-	-	-	0.01	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL	Re-sample	270159	Waste
10/12/2010	LOX-1B-3	LXWC0031	LXWC0031S001	Soil	Potassium-40	21.3	2.23	0.316	35.5	BTV	-	YES	21.3	-	-	-	-	0.01	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL	Re-sampled	264559	Waste
10/11/2010	LOX-1B-3	LXWC0032	LXWC0032S001	Soil	Potassium-40	20.6	1.99	0.274	35.5	BTV	-	YES	20.6	-	-	-	-	0.01	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264490	Waste
10/11/2010	LOX-1B-3	LXWC0033	LXWC0033S001	Soil	Potassium-40	22.3	2.47	0.252	35.5	BTV	-	YES	22.3	-	-	-	-	0.01	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264490	Waste
10/11/2010	LOX-1B-3	LXWC0034	LXWC0034S001	Soil	Potassium-40	22.3	2.27	0.272	35.5	BTV	-	YES	22.3	-	-	-	-	0.01	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264490	Waste
10/12/2010	LOX-1B-3	LXWC0035	LXWC0035S001	Soil	Potassium-40	20.7	2.04	0.349	35.5	BTV	-	YES	20.7	-	-	-	-	0.01	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264559	Waste
10/11/2010	LOX-1B-3	LXWC0036	LXWC0036S001	Soil	Potassium-40	22	2.25	0.236	35.5	BTV	-	YES	22	-	-	-	-	0.01	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264490	Waste
10/8/2010	LOX-1B-3	LXWC0037	LXWC0037S001	Soil	Potassium-40	20.8	2.26	0.347	35.5	BTV	-	YES	20.8	-	-	-	-	0.01	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264402	Waste
10/8/2010	LOX-1B-3	LXWC0038	LXWC0038S001	Soil	Potassium-40	19.5	1.9	0.233	35.5	BTV	-	YES	19.5	-	-	-	-	0.01	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264402	Waste
10/12/2010	LOX-1B-3	LXWC0039	LXWC0039S001	Soil	Potassium-40	21.9	2.23	0.217	35.5	BTV	-	YES	21.9	-	-	-	-	0.01	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264559	Waste
10/12/2010	LOX-1B-3	LXWC0040	LXWC0040S001	Soil	Potassium-40	21.3	2.26	0.231	35.5	BTV	-	YES	21.3	-	-	-	-	0.01	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264559	Waste
10/11/2010	LOX-1B-3	LXWC0041	LXWC0041S001	Soil	Potassium-40	21.7	2.3	0.274	35.5	BTV	-	YES	21.7	-	-	-	-	0.01	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264490	Waste
10/12/2010	LOX-1B-3	LXWC0042	LXWC0042S001	Soil	Potassium-40	21.5	2.08	0.279	35.5	BTV	-	YES	21.5	-	-	-	-	0.01	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264559	Waste
10/11/2010	LOX-1B-3	LXWC0043	LXWC0043S001	Soil	Potassium-40	24.1	2.27	0.24	35.5	BTV	-	YES	24.1	-	-	-	-	0.01	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264490	Waste
10/12/2010	LOX-1B-3	LXWC0044	LXWC0044S001	Soil	Potassium-40	21.6	2.4	0.275	35.5	BTV	-	YES	21.6	-	-	-	-	0.01	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264559	Waste
10/12/2010	LOX-1B-3	LXWC0045	LXWC0045S001	Soil	Potassium-40	20.6	1.96	0.266	35.5	BTV	-	YES	20.6	-	-	-	-	0.01	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264559	Waste
10/11/2010	LOX-1B-3	LXWC0046	LXWC0046S001	Soil	Potassium-40	21.6	2.31	0.328	35.5	BTV	-	YES	21.6	-	-	-	-	0.01	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264490	Waste
10/11/2010	LOX-1B-3	LXWC0047	LXWC0047S001	Soil	Potassium-40	21.3	2.02	0.296	35.5	BTV	-	YES	21.3	-	-	-	-	0.01	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264490	Waste
10/13/2010	LOX-1B-3	LXWC0048	LXWC0048S001	Soil	Potassium-40	20.9	2.29	0.389	35.5	BTV	-	YES	20.9	-	-	-	-	0.01	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264661	Waste
10/8/2010	LOX-1B-3	LXWC0049	LXWC0049S001	Soil	Potassium-40	20.3	2.11	0.324	35.5	BTV	-	YES	20.3	-	-	-	-	0.01	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264402	Waste
1/7/2011	LOX-1B-3	LXWC0050	LXWC0050AS001	Soil	Potassium-40	19.9	2.05	0.248	35.5	BTV	-	YES	19.9	-	-	-	-	0.01	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL	Re-sample	270159	Waste
10/12/2010	LOX-1B-3	LXWC0050	LXWC0050S001	Soil	Potassium-40	22.3	2.37	0.366	35.5	BTV	-	YES	22.3	-	-	-	-	0.01	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL	Re-sampled	264559	Waste
10/11/2010	LOX-1B-3	LXWC0051	LXWC0051S001	Soil	Potassium-40	18.7	1.95	0.293	35.5	BTV	-	YES	18.7	-	-	-	-	0.01	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264490	Waste
10/12/2010	LOX-1B-3	LXWC0052	LXWC0052S001	Soil	Potassium-40	18.9	2.15	0.248	35.5	BTV	-	YES	18.9	-	-	-	-	0.01	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264559	Waste
10/12/2010	LOX-1B-3	LXWC0053	LXWC0053S001	Soil	Potassium-40	19.2	1.86	0.25	35.5	BTV	-	YES	19.2	-	-	-	-	0.01	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264559	Waste
10/11/2010	LOX-1B-3	LXWC0054	LXWC0054S001	Soil	Potassium-40	22.1	2.26	0.329	35.5	BTV	-	YES	22.1	-	-	-	-	0.01	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264490	Waste
10/11/2010	LOX-1B-3	LXWC0055	LXWC0055S001	Soil	Potassium-40	20.7	2.04	0.28	35.5	BTV	-	YES	20.7	-	-	-	-	0.01	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264490	Waste
10/11/2010	LOX-1B-3	LXWC0056	LXWC0056S001	Soil	Potassium-40	19.4	2.21	0.316	35.5	BTV	-	YES	19.4	-	-	-	-	0.01	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264490	Waste
10/8/2010	LOX-1B-3	LXWC0057	LXWC0057S001	Soil	Potassium-40	18.9	1.9	0.301	35.5	BTV	-	YES	18.9	-	-	-	-	0.01	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264402	Waste
10/11/2010	LOX-1B-3	LXWC0058	LXWC0058S001	Soil	Potassium-40	20.5	2.07	0.271	35.5	BTV	-	YES	20.5	-	-	-	-	0.01	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264490	Waste
10/12/2010	LOX-1B-3	LXWC0059	LXWC0059S001	Soil	Potassium-40	20.4	2.05	0.302	35.5	BTV	-	YES	20.4	-	-	-	-	0.01	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264559	Waste
10/8/2010	LOX-1B-4	LXWC0060	LXWC0060S001	Soil	Potassium-40	19.6	1.88	0.288	35.5	BTV	-	YES	19.6	-	-	-	-	0.01	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264404	Waste
10/8/2010	LOX-1B-4	LXWC0061	LXWC0061S001	Soil	Potassium-40	20.7	2.3	0.243	35.5	BTV	-	YES	20.7	-	-	-	-	0.01	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264404	Waste
10/8/2010	LOX-1B-4	LXWC0062	LXWC0062S001	Soil	Potassium-40	21.1	2.04	0.318	35.5	BTV	-	YES	21.1	-	-	-	-	0.01	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264404	Waste
10/8/2010	LOX-1B-4	LXWC0063	LXWC0063S001	Soil	Potassium-40	20.4	2.12	0.309	35.5	BTV	-	YES	20.4	-	-	-	-	0.01	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264404	Waste
10/13/2010	LOX-1C	LXWC0064	LXWC0064S001	Soil	Potassium-40	20	2.29	0.387	35.5	BTV	-	YES	20	-	-	-	-	0.01	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264667	Waste
10/13/2010	LOX-1C	LXWC0065	LXWC0065S001	Soil	Potassium-40	22.6	2.27	0.331	35.5	BTV	-	YES	22.6	-	-	-	-	0.01	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264667	Waste
10/13/2010	LOX-1C	LXWC0066	LXWC0066S001	Soil	Potassium-40	21.7	2.24	0.294	35.5	BTV	-	YES	21.7	-	-	-	-	0.01	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264667	Waste
10/13/2010	LOX-1C	LXWC0067	LXWC0067S001	Soil	Potassium-40	20.4	2.21	0.338	35.5	BTV	-	YES	20.4	-	-	-	-	0.01	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264667	Waste
10/8/2010	LOX-1D	LXWC0068	LXWC0068S001	Soil	Potassium-40	17.7	1.73	0.267	35.5	BTV	-	YES	17.7	-	-	-	-	0.01	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264405	Waste
10/8/2010	LOX-1D	LXWC0069	LXWC0069S001	Soil	Potassium-40	16.3	1.67	0.289	35.5	BTV	-	YES	16.3	-	-	-	-	0.01	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264405	Waste
10/8/2010	LOX-1D	LXWC0070	LXWC0070S001	Soil	Potassium-40	20.5	2.06	0.296	35.5	BTV	-	YES	20.5	-	-	-	-	0.01	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264405	Waste
10/8/2010	LOX-1D	LXWC0071	LXWC0071S001	Soil	Potassium-40	20.6	2.41	0.353	35.5	BTV	-	YES	20.6	-	-	-	-	0.01	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264405	Waste
1/7/2011	LOX-1B-3	LXWC0072	LXWC0072S001	Soil	Potassium-40	21.6	2.06	0.25	35.5	BTV	-	YES	21.6	-	-	-	-	0.01	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL	LXWC0031 Steppout #1	270159	Waste
1/7/2011	LOX-1B-3	LXWC0073	LXWC0073S001	Soil	Potassium-40	20.3	2.16	0.368	35.5	BTV	-	YES	20.3	-	-	-	-	0.01	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL	LXWC0031 Steppout #2	270159	Waste
1/7/2011	LOX-1B-3	LXWC0074	LXWC0074S001	Soil	Potassium-40	18.9	1.94	0.192	35.5	BTV	-	YES	18.9	-	-	-	-	0.01	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL	LXWC0031 Steppout #3	270159	Waste
1/7/2011	LOX-1B-3	LXWC0075	LXWC0075S001	Soil	Potassium-40	18.5	1.78	0.222	35.5	BTV	-	YES	18.5	-	-	-	-	0.01	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL	LXWC0031 Steppout #4	270159	Waste
1/7/2011	LOX-1B-3	LXWC0077	LXWC0077S001	Soil	Potassium-40	20.9	2.12	0.205	35.5	BTV	-	YES	20.9	-	-	-	-	0.01	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL	LXWC0050 Steppout #2	270159	Waste
1/7/2011	LOX-1B-3	LXWC0078	LXWC0078S001	Soil	Potassium-40	19.3	1.99	0.376</																	

LOX NASA ISRA Soil Data
All Chem, Radionuclides < LUT (pCi/g)

Sampling Date	Sampling Location (General)	Sampling Location (Specific)	Sample Serial Number	Media Type	Isotope	Activity	Error (+/-)	MDC	DTSC LUT	LUT Source	Activity > LUT ?	Activity > MDC ?	Detected Activity	Detected Activity > LUT ?	Non-detect Activity	Non-detect Activity > LUT ?	MDC > LUT ?	Ratio of MDC to LUT	Units	Error Type	Analysis Protocol	Analysis Organization	Comments	Document	Status
10/11/2010	LOX-1B-3	LXWC0032	LXWC0032S001	Soil	Sodium-22	-0.0188	0.0219	0.0353	0.0468	MDC	-	-	-	-	-0.0188	-	-	0.75	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264490	Waste
10/11/2010	LOX-1B-3	LXWC0033	LXWC0033S001	Soil	Sodium-22	-0.00254	0.0214	0.0371	0.0468	MDC	-	-	-	-	-0.00254	-	-	0.79	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264490	Waste
10/11/2010	LOX-1B-3	LXWC0034	LXWC0034S001	Soil	Sodium-22	-0.00612	0.0205	0.0344	0.0468	MDC	-	-	-	-	-0.00612	-	-	0.74	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264490	Waste
10/12/2010	LOX-1B-3	LXWC0035	LXWC0035S001	Soil	Sodium-22	0.00625	0.024	0.042	0.0468	MDC	-	-	-	-	0.00625	-	-	0.90	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264559	Waste
10/11/2010	LOX-1B-3	LXWC0036	LXWC0036S001	Soil	Sodium-22	-0.00786	0.0194	0.0325	0.0468	MDC	-	-	-	-	-0.00786	-	-	0.69	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264490	Waste
10/8/2010	LOX-1B-3	LXWC0037	LXWC0037S001	Soil	Sodium-22	0.011	0.0304	0.0523	0.0468	MDC	-	-	-	-	0.011	-	YES	1.12	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264402	Waste
10/8/2010	LOX-1B-3	LXWC0038	LXWC0038S001	Soil	Sodium-22	-0.0315	0.0212	0.0335	0.0468	MDC	-	-	-	-	-0.0315	-	-	0.72	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264402	Waste
10/12/2010	LOX-1B-3	LXWC0039	LXWC0039S001	Soil	Sodium-22	0.00196	0.0195	0.0334	0.0468	MDC	-	-	-	-	0.00196	-	-	0.71	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264559	Waste
10/12/2010	LOX-1B-3	LXWC0040	LXWC0040S001	Soil	Sodium-22	-0.00444	0.0236	0.039	0.0468	MDC	-	-	-	-	-0.00444	-	-	0.83	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264559	Waste
10/11/2010	LOX-1B-3	LXWC0041	LXWC0041S001	Soil	Sodium-22	-0.0084	0.0255	0.042	0.0468	MDC	-	-	-	-	-0.0084	-	-	0.90	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264490	Waste
10/12/2010	LOX-1B-3	LXWC0042	LXWC0042S001	Soil	Sodium-22	-0.0224	0.0216	0.0348	0.0468	MDC	-	-	-	-	-0.0224	-	-	0.74	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264559	Waste
10/11/2010	LOX-1B-3	LXWC0043	LXWC0043S001	Soil	Sodium-22	0.0172	0.0247	0.0435	0.0468	MDC	-	-	-	-	0.0172	-	-	0.93	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264490	Waste
10/12/2010	LOX-1B-3	LXWC0044	LXWC0044S001	Soil	Sodium-22	0.000957	0.0205	0.0359	0.0468	MDC	-	-	-	-	0.000957	-	-	0.77	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264559	Waste
10/12/2010	LOX-1B-3	LXWC0045	LXWC0045S001	Soil	Sodium-22	0.000941	0.024	0.0416	0.0468	MDC	-	-	-	-	0.000941	-	-	0.89	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264559	Waste
10/11/2010	LOX-1B-3	LXWC0046	LXWC0046S001	Soil	Sodium-22	0.0126	0.0258	0.0452	0.0468	MDC	-	-	-	-	0.0126	-	-	0.97	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264490	Waste
10/11/2010	LOX-1B-3	LXWC0047	LXWC0047S001	Soil	Sodium-22	-0.0188	0.0236	0.0383	0.0468	MDC	-	-	-	-	-0.0188	-	-	0.82	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264490	Waste
10/13/2010	LOX-1B-3	LXWC0048	LXWC0048S001	Soil	Sodium-22	0.0173	0.03	0.0523	0.0468	MDC	-	-	-	-	0.0173	-	YES	1.12	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264661	Waste
10/8/2010	LOX-1B-3	LXWC0049	LXWC0049S001	Soil	Sodium-22	0.00149	0.0253	0.0434	0.0468	MDC	-	-	-	-	0.00149	-	-	0.93	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264402	Waste
1/7/2011	LOX-1B-3	LXWC0050	LXWC0050S001	Soil	Sodium-22	-0.0103	0.0195	0.0319	0.0468	MDC	-	-	-	-	-0.0103	-	-	0.68	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL	Re-sample	270159	Waste
10/12/2010	LOX-1B-3	LXWC0050	LXWC0050S001	Soil	Sodium-22	-0.0238	0.0306	0.0484	0.0468	MDC	-	-	-	-	-0.0238	-	YES	1.03	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL	Re-sampled	264559	Waste
10/11/2010	LOX-1B-3	LXWC0051	LXWC0051S001	Soil	Sodium-22	-0.00357	0.0261	0.0442	0.0468	MDC	-	-	-	-	-0.00357	-	-	0.94	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264490	Waste
10/12/2010	LOX-1B-3	LXWC0052	LXWC0052S001	Soil	Sodium-22	-0.00148	0.0262	0.0442	0.0468	MDC	-	-	-	-	-0.00148	-	-	0.94	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264559	Waste
10/12/2010	LOX-1B-3	LXWC0053	LXWC0053S001	Soil	Sodium-22	-0.0205	0.0232	0.0361	0.0468	MDC	-	-	-	-	-0.0205	-	-	0.77	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264559	Waste
10/11/2010	LOX-1B-3	LXWC0054	LXWC0054S001	Soil	Sodium-22	-0.0169	0.0248	0.0408	0.0468	MDC	-	-	-	-	-0.0169	-	-	0.87	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264490	Waste
10/11/2010	LOX-1B-3	LXWC0055	LXWC0055S001	Soil	Sodium-22	-0.0154	0.0242	0.0396	0.0468	MDC	-	-	-	-	-0.0154	-	-	0.85	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264490	Waste
10/11/2010	LOX-1B-3	LXWC0056	LXWC0056S001	Soil	Sodium-22	0.00863	0.0274	0.0477	0.0468	MDC	-	-	-	-	0.00863	-	YES	1.02	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264490	Waste
10/8/2010	LOX-1B-3	LXWC0057	LXWC0057S001	Soil	Sodium-22	0.00868	0.0257	0.0449	0.0468	MDC	-	-	-	-	0.00868	-	-	0.96	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264402	Waste
10/11/2010	LOX-1B-3	LXWC0058	LXWC0058S001	Soil	Sodium-22	-0.0141	0.0243	0.0397	0.0468	MDC	-	-	-	-	-0.0141	-	-	0.85	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264490	Waste
10/12/2010	LOX-1B-3	LXWC0059	LXWC0059S001	Soil	Sodium-22	-0.00525	0.025	0.0423	0.0468	MDC	-	-	-	-	-0.00525	-	-	0.90	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264559	Waste
10/8/2010	LOX-1B-4	LXWC0060	LXWC0060S001	Soil	Sodium-22	-0.013	0.02	0.0321	0.0468	MDC	-	-	-	-	-0.013	-	-	0.69	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264404	Waste
10/8/2010	LOX-1B-4	LXWC0061	LXWC0061S001	Soil	Sodium-22	-0.0118	0.0204	0.0343	0.0468	MDC	-	-	-	-	-0.0118	-	-	0.73	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264404	Waste
10/8/2010	LOX-1B-4	LXWC0062	LXWC0062S001	Soil	Sodium-22	-0.0123	0.0248	0.0411	0.0468	MDC	-	-	-	-	-0.0123	-	-	0.88	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264404	Waste
10/8/2010	LOX-1B-4	LXWC0063	LXWC0063S001	Soil	Sodium-22	0.00173	0.0244	0.0419	0.0468	MDC	-	-	-	-	0.00173	-	-	0.90	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264404	Waste
10/13/2010	LOX-1C	LXWC0064	LXWC0064S001	Soil	Sodium-22	0.00816	0.0299	0.0516	0.0468	MDC	-	-	-	-	0.00816	-	YES	1.10	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264667	Waste
10/13/2010	LOX-1C	LXWC0065	LXWC0065S001	Soil	Sodium-22	0.00331	0.0257	0.0444	0.0468	MDC	-	-	-	-	0.00331	-	-	0.95	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264667	Waste
10/13/2010	LOX-1C	LXWC0066	LXWC0066S001	Soil	Sodium-22	0.00714	0.0249	0.0434	0.0468	MDC	-	-	-	-	0.00714	-	-	0.93	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264667	Waste
10/13/2010	LOX-1C	LXWC0067	LXWC0067S001	Soil	Sodium-22	-0.0494	0.0273	0.0387	0.0468	MDC	-	-	-	-	-0.0494	-	-	0.83	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264667	Waste
10/8/2010	LOX-1D	LXWC0068	LXWC0068S001	Soil	Sodium-22	-0.0162	0.0217	0.0353	0.0468	MDC	-	-	-	-	-0.0162	-	-	0.75	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264405	Waste
10/8/2010	LOX-1D	LXWC0069	LXWC0069S001	Soil	Sodium-22	0.0096	0.0256	0.0447	0.0468	MDC	-	-	-	-	0.0096	-	-	0.96	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264405	Waste
10/8/2010	LOX-1D	LXWC0070	LXWC0070S001	Soil	Sodium-22	-0.0205	0.0262	0.0423	0.0468	MDC	-	-	-	-	-0.0205	-	-	0.90	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264405	Waste
10/8/2010	LOX-1D	LXWC0071	LXWC0071S001	Soil	Sodium-22	-0.0467	0.0272	0.0406	0.0468	MDC	-	-	-	-	-0.0467	-	-	0.87	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264405	Waste
1/7/2011	LOX-1B-3	LXWC0072	LXWC0072S001	Soil	Sodium-22	-0.0227	0.021	0.0338	0.0468	MDC	-	-	-	-	-0.0227	-	-	0.72	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL	LXWC0031 Stepout #1	270159	Waste
1/7/2011	LOX-1B-3	LXWC0073	LXWC0073S001	Soil	Sodium-22	-0.018	0.0267	0.0438	0.0468	MDC	-	-	-	-	-0.018	-	-	0.94	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL	LXWC0031 Stepout #2	270159	Waste
1/7/2011	LOX-1B-3	LXWC0074	LXWC0074S001	Soil	Sodium-22	-0.015	0.0171	0.0277	0.0468	MDC	-	-	-	-	-0.015	-	-	0.59	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL	LXWC0031 Stepout #3	270159	Waste
1/7/2011	LOX-1B-3	LXWC0075	LXWC0075S001	Soil	Sodium-22	-0.0073	0.0189	0.0314	0.0468	MDC	-	-	-	-	-0.0073	-	-	0.67	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL	LXWC0031 Stepout #4	270159	Waste
1/7/2011	LOX-1B-3	LXWC0077	LXWC0077S001	Soil	Sodium-22	-0.0114	0.0178	0.0294	0.0468	MDC	-	-	-	-	-0.0114	-	-	0.63	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL	LXWC0050 Stepout #2	270159	Waste
1/7/2011	LOX-1B-3	LXWC0078	LXWC0078S001	Soil	Sodium-22	-0.000618	0.0341	0.0593	0.0468	MDC	-	-	-	-	-0.000618	-	YES	1.27	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL	LXWC0050 Stepout #3	270159	Waste
1/7/2011	LOX-1B-3	LXWC0079	LXWC0079S001	Soil	Sodium-22	-0.00687	0.0299	0.0503	0.0468	MDC	-	-	-	-	-0.00687	-	YES	1.07	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL	LXWC0050 Stepout #4	270159	Waste
10/13/2010	LOX-1A	LXWC0001	LXWC0001S001	Soil	Strontium-90	-0.00418	0.0244	0.0485	0.117	MDC	-	-	-	-	-0.00418	-	-	0.41	pCi/g	2 sigma	EPA 905.0 Modified	GEL		264660	W

LOX NASA ISRA Soil Data
All Chem, Radionuclides < LUT (pCi/g)

Sampling Date	Sampling Location (General)	Sampling Location (Specific)	Sample Serial Number	Media Type	Isotope	Activity	Error (+/-)	MDC	DTSC LUT	LUT Source	Activity > LUT ?	Activity > MDC ?	Detected Activity	Detected Activity > LUT ?	Non-detect Activity	Non-detect Activity > LUT ?	MDC > LUT ?	Ratio of MDC to LUT	Units	Error Type	Analysis Protocol	Analysis Organization	Comments	Document	Status
10/8/2010	LOX-1B-3	LXWC0037	LXWC0037S001	Soil	Strontium-90	0.0349	0.0303	0.0487	0.117	MDC	-	-	-	-	0.0349	-	-	0.42	pCi/g	2 sigma	EPA 905.0 Modified	GEL		264402	Waste
10/8/2010	LOX-1B-3	LXWC0038	LXWC0038S001	Soil	Strontium-90	0.0151	0.0267	0.0472	0.117	MDC	-	-	-	-	0.0151	-	-	0.40	pCi/g	2 sigma	EPA 905.0 Modified	GEL		264402	Waste
10/12/2010	LOX-1B-3	LXWC0039	LXWC0039S001	Soil	Strontium-90	0.0216	0.0272	0.0463	0.117	MDC	-	-	-	-	0.0216	-	-	0.40	pCi/g	2 sigma	EPA 905.0 Modified	GEL		264559	Waste
10/12/2010	LOX-1B-3	LXWC0040	LXWC0040S001	Soil	Strontium-90	0.00856	0.0267	0.0493	0.117	MDC	-	-	-	-	0.00856	-	-	0.42	pCi/g	2 sigma	EPA 905.0 Modified	GEL		264559	Waste
10/11/2010	LOX-1B-3	LXWC0041	LXWC0041S001	Soil	Strontium-90	0.0339	0.0297	0.0483	0.117	MDC	-	-	-	-	0.0339	-	-	0.41	pCi/g	2 sigma	EPA 905.0 Modified	GEL		264490	Waste
10/12/2010	LOX-1B-3	LXWC0042	LXWC0042S001	Soil	Strontium-90	0.027	0.023	0.0365	0.117	MDC	-	-	-	-	0.027	-	-	0.31	pCi/g	2 sigma	EPA 905.0 Modified	GEL		264559	Waste
10/11/2010	LOX-1B-3	LXWC0043	LXWC0043S001	Soil	Strontium-90	0.0204	0.0281	0.0479	0.117	MDC	-	-	-	-	0.0204	-	-	0.41	pCi/g	2 sigma	EPA 905.0 Modified	GEL		264490	Waste
10/12/2010	LOX-1B-3	LXWC0044	LXWC0044S001	Soil	Strontium-90	-0.0114	0.0241	0.0467	0.117	MDC	-	-	-	-	-0.0114	-	-	0.40	pCi/g	2 sigma	EPA 905.0 Modified	GEL		264559	Waste
10/12/2010	LOX-1B-3	LXWC0045	LXWC0045S001	Soil	Strontium-90	-0.000872	0.0258	0.0475	0.117	MDC	-	-	-	-	-0.000872	-	-	0.41	pCi/g	2 sigma	EPA 905.0 Modified	GEL		264559	Waste
10/11/2010	LOX-1B-3	LXWC0046	LXWC0046S001	Soil	Strontium-90	0.0267	0.0286	0.0479	0.117	MDC	-	-	-	-	0.0267	-	-	0.41	pCi/g	2 sigma	EPA 905.0 Modified	GEL		264490	Waste
10/11/2010	LOX-1B-3	LXWC0047	LXWC0047S001	Soil	Strontium-90	0.00304	0.0266	0.0486	0.117	MDC	-	-	-	-	0.00304	-	-	0.42	pCi/g	2 sigma	EPA 905.0 Modified	GEL		264490	Waste
10/13/2010	LOX-1B-3	LXWC0048	LXWC0048S001	Soil	Strontium-90	0.0264	0.0282	0.0469	0.117	MDC	-	-	-	-	0.0264	-	-	0.40	pCi/g	2 sigma	EPA 905.0 Modified	GEL		264661	Waste
10/8/2010	LOX-1B-3	LXWC0049	LXWC0049S001	Soil	Strontium-90	0.0208	0.0286	0.0488	0.117	MDC	-	-	-	-	0.0208	-	-	0.42	pCi/g	2 sigma	EPA 905.0 Modified	GEL		264402	Waste
10/12/2010	LOX-1B-3	LXWC0050	LXWC0050S001	Soil	Strontium-90	0.0347	0.0268	0.0426	0.117	MDC	-	-	-	-	0.0347	-	-	0.36	pCi/g	2 sigma	EPA 905.0 Modified	GEL		264559	Waste
10/11/2010	LOX-1B-3	LXWC0051	LXWC0051S001	Soil	Strontium-90	0.0278	0.0296	0.0492	0.117	MDC	-	-	-	-	0.0278	-	-	0.42	pCi/g	2 sigma	EPA 905.0 Modified	GEL		264490	Waste
10/12/2010	LOX-1B-3	LXWC0052	LXWC0052S001	Soil	Strontium-90	0.0323	0.029	0.047	0.117	MDC	-	-	-	-	0.0323	-	-	0.40	pCi/g	2 sigma	EPA 905.0 Modified	GEL		264559	Waste
10/12/2010	LOX-1B-3	LXWC0053	LXWC0053S001	Soil	Strontium-90	0.0214	0.0269	0.0457	0.117	MDC	-	-	-	-	0.0214	-	-	0.39	pCi/g	2 sigma	EPA 905.0 Modified	GEL		264559	Waste
10/11/2010	LOX-1B-3	LXWC0054	LXWC0054S001	Soil	Strontium-90	-0.00401	0.026	0.0488	0.117	MDC	-	-	-	-	-0.00401	-	-	0.42	pCi/g	2 sigma	EPA 905.0 Modified	GEL		264490	Waste
10/11/2010	LOX-1B-3	LXWC0055	LXWC0055S001	Soil	Strontium-90	0.0379	0.0296	0.0481	0.117	MDC	-	-	-	-	0.0379	-	-	0.41	pCi/g	2 sigma	EPA 905.0 Modified	GEL		264490	Waste
10/11/2010	LOX-1B-3	LXWC0056	LXWC0056S001	Soil	Strontium-90	0.00814	0.0258	0.0477	0.117	MDC	-	-	-	-	0.00814	-	-	0.41	pCi/g	2 sigma	EPA 905.0 Modified	GEL		264490	Waste
10/8/2010	LOX-1B-3	LXWC0057	LXWC0057S001	Soil	Strontium-90	0.0166	0.0277	0.0483	0.117	MDC	-	-	-	-	0.0166	-	-	0.41	pCi/g	2 sigma	EPA 905.0 Modified	GEL		264402	Waste
10/11/2010	LOX-1B-3	LXWC0058	LXWC0058S001	Soil	Strontium-90	0.0414	0.0303	0.0481	0.117	MDC	-	-	-	-	0.0414	-	-	0.41	pCi/g	2 sigma	EPA 905.0 Modified	GEL		264490	Waste
10/12/2010	LOX-1B-3	LXWC0059	LXWC0059S001	Soil	Strontium-90	-0.00288	0.0225	0.0463	0.117	MDC	-	-	-	-	-0.00288	-	-	0.40	pCi/g	2 sigma	EPA 905.0 Modified	GEL		264559	Waste
10/8/2010	LOX-1B-4	LXWC0060	LXWC0060S001	Soil	Strontium-90	0.0485	0.0313	0.0485	0.117	MDC	-	-	-	-	0.0485	-	-	0.41	pCi/g	2 sigma	EPA 905.0 Modified	GEL		264404	Waste
10/8/2010	LOX-1B-4	LXWC0061	LXWC0061S001	Soil	Strontium-90	0.0276	0.029	0.0485	0.117	MDC	-	-	-	-	0.0276	-	-	0.41	pCi/g	2 sigma	EPA 905.0 Modified	GEL		264404	Waste
10/8/2010	LOX-1B-4	LXWC0062	LXWC0062S001	Soil	Strontium-90	0.0219	0.0287	0.0488	0.117	MDC	-	-	-	-	0.0219	-	-	0.42	pCi/g	2 sigma	EPA 905.0 Modified	GEL		264404	Waste
10/8/2010	LOX-1B-4	LXWC0063	LXWC0063S001	Soil	Strontium-90	-0.00289	0.0258	0.0479	0.117	MDC	-	-	-	-	-0.00289	-	-	0.41	pCi/g	2 sigma	EPA 905.0 Modified	GEL		264404	Waste
10/13/2010	LOX-1C	LXWC0064	LXWC0064S001	Soil	Strontium-90	0.0194	0.0281	0.0486	0.117	MDC	-	-	-	-	0.0194	-	-	0.42	pCi/g	2 sigma	EPA 905.0 Modified	GEL		264667	Waste
10/13/2010	LOX-1C	LXWC0065	LXWC0065S001	Soil	Strontium-90	0.00106	0.0248	0.0472	0.117	MDC	-	-	-	-	0.00106	-	-	0.40	pCi/g	2 sigma	EPA 905.0 Modified	GEL		264667	Waste
10/13/2010	LOX-1C	LXWC0066	LXWC0066S001	Soil	Strontium-90	0.00927	0.0257	0.0466	0.117	MDC	-	-	-	-	0.00927	-	-	0.40	pCi/g	2 sigma	EPA 905.0 Modified	GEL		264667	Waste
10/13/2010	LOX-1C	LXWC0067	LXWC0067S001	Soil	Strontium-90	-0.0161	0.0233	0.0482	0.117	MDC	-	-	-	-	-0.0161	-	-	0.41	pCi/g	2 sigma	EPA 905.0 Modified	GEL		264667	Waste
10/8/2010	LOX-1D	LXWC0068	LXWC0068S001	Soil	Strontium-90	-0.00563	0.012	0.0216	0.117	MDC	-	-	-	-	-0.00563	-	-	0.18	pCi/g	2 sigma	EPA 905.0 Modified	GEL		264405	Waste
10/8/2010	LOX-1D	LXWC0069	LXWC0069S001	Soil	Strontium-90	0.00125	0.0254	0.0479	0.117	MDC	-	-	-	-	0.00125	-	-	0.41	pCi/g	2 sigma	EPA 905.0 Modified	GEL		264405	Waste
10/8/2010	LOX-1D	LXWC0070	LXWC0070S001	Soil	Strontium-90	0.0118	0.0272	0.0481	0.117	MDC	-	-	-	-	0.0118	-	-	0.41	pCi/g	2 sigma	EPA 905.0 Modified	GEL		264405	Waste
10/8/2010	LOX-1D	LXWC0071	LXWC0071S001	Soil	Strontium-90	0.0189	0.0281	0.0484	0.117	MDC	-	-	-	-	0.0189	-	-	0.41	pCi/g	2 sigma	EPA 905.0 Modified	GEL		264405	Waste
10/13/2010	LOX-1A	LXWC0001	LXWC0001S001	Soil	Thorium-228	1.44	0.187	0.0704	4.27	BTV	-	YES	1.44	-	-	-	-	0.02	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264660	Waste
10/13/2010	LOX-1A	LXWC0002	LXWC0002S001	Soil	Thorium-228	1.23	0.168	0.0497	4.27	BTV	-	YES	1.23	-	-	-	-	0.01	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264660	Waste
10/13/2010	LOX-1A	LXWC0003	LXWC0003S001	Soil	Thorium-228	1.18	0.135	0.0563	4.27	BTV	-	YES	1.18	-	-	-	-	0.01	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264660	Waste
10/13/2010	LOX-1A	LXWC0004	LXWC0004S001	Soil	Thorium-228	1.42	0.154	0.0504	4.27	BTV	-	YES	1.42	-	-	-	-	0.01	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264660	Waste
10/13/2010	LOX-1B-1	LXWC0005	LXWC0005S001	Soil	Thorium-228	1.34	0.152	0.0604	4.27	BTV	-	YES	1.34	-	-	-	-	0.01	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264664	Waste
10/13/2010	LOX-1B-1	LXWC0006	LXWC0006S001	Soil	Thorium-228	1.29	0.139	0.0576	4.27	BTV	-	YES	1.29	-	-	-	-	0.01	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264664	Waste
10/13/2010	LOX-1B-1	LXWC0007	LXWC0007S001	Soil	Thorium-228	1.32	0.138	0.0513	4.27	BTV	-	YES	1.32	-	-	-	-	0.01	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264664	Waste
10/13/2010	LOX-1B-1	LXWC0008	LXWC0008S001	Soil	Thorium-228	1.29	0.135	0.0435	4.27	BTV	-	YES	1.29	-	-	-	-	0.01	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264664	Waste
10/13/2010	LOX-1B-1	LXWC0009	LXWC0009S001	Soil	Thorium-228	1.39	0.168	0.0461	4.27	BTV	-	YES	1.39	-	-	-	-	0.01	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264664	Waste
10/13/2010	LOX-1B-1	LXWC0010	LXWC0010S001	Soil	Thorium-228	1.31	0.155	0.0618	4.27	BTV	-	YES	1.31	-	-	-	-	0.01	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264664	Waste
10/13/2010	LOX-1B-1	LXWC0011	LXWC0011S001	Soil	Thorium-228	1.39	0.172	0.0496	4.27	BTV	-	YES	1.39	-	-	-	-	0.01	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264664	Waste
10/12/2010	LOX-1B-2	LXWC0012	LXWC0012S001	Soil	Thorium-228	1.46	0.161	0.0577	4.27	BTV	-	YES	1.46	-	-	-	-	0.01	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264562	Waste
10/12/2010	LOX-1B-2	LXWC0013	LXWC0013S001	Soil	Thorium-228	1.41	0.147	0.0549	4.27	BTV	-	YES	1.41	-	-	-	-	0.01	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264562	Waste
10/12/2010	LOX-1B-2	LXWC0014	LXWC0014S001	Soil	Thorium-228	1.42	0.16	0.0582	4.27	BTV	-	YES	1.42	-	-	-	-	0.01	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264562	Waste
10/12/2010	LOX-1B-2	LXWC0015	LXWC0015S001	Soil	Thorium-228	1.37	0.164	0.0467	4.27	BTV	-	YES	1.37	-	-	-	-	0.01	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264562	Waste
10/12/2010	LOX-1B-2	LXWC0016	LXWC0016S001	Soil	Thorium-228	1.45	0.152	0.052	4.27	BTV	-	YES	1.45	-	-	-	-	0.01	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264562	Waste
10/12/2010	LOX-1B-2	LXWC0017	LXWC0017S001	Soil	Thorium-228	1.41	0.182	0.0639	4.27	BTV	-	YES</													

LOX NASA ISRA Soil Data
All Chem, Radionuclides < LUT (pCi/g)

Sampling Date	Sampling Location (General)	Sampling Location (Specific)	Sample Serial Number	Media Type	Isotope	Activity	Error (+/-)	MDC	DTSC LUT	LUT Source	Activity > LUT ?	Activity > MDC ?	Detected Activity	Detected Activity > LUT ?	Non-detect Activity	Non-detect Activity > LUT ?	MDC > LUT ?	Ratio of MDC to LUT	Units	Error Type	Analysis Protocol	Analysis Organization	Comments	Document	Status
10/8/2010	LOX-1B-3	LXWC0049	LXWC0049S001	Soil	Thorium-228	1.48	0.164	0.0629	4.27	BTV	-	YES	1.48	-	-	-	-	0.01	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264402	Waste
1/7/2011	LOX-1B-3	LXWC0050	LXWC0050AS001	Soil	Thorium-228	1.6	0.169	0.0473	4.27	BTV	-	YES	1.6	-	-	-	-	0.01	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL	Re-sample	270159	Waste
10/12/2010	LOX-1B-3	LXWC0050	LXWC0050S001	Soil	Thorium-228	1.45	0.187	0.0707	4.27	BTV	-	YES	1.45	-	-	-	-	0.02	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL	Re-sampled	264559	Waste
10/11/2010	LOX-1B-3	LXWC0051	LXWC0051S001	Soil	Thorium-228	1.23	0.144	0.0531	4.27	BTV	-	YES	1.23	-	-	-	-	0.01	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264490	Waste
10/12/2010	LOX-1B-3	LXWC0052	LXWC0052S001	Soil	Thorium-228	1.23	0.144	0.0612	4.27	BTV	-	YES	1.23	-	-	-	-	0.01	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264559	Waste
10/12/2010	LOX-1B-3	LXWC0053	LXWC0053S001	Soil	Thorium-228	1.34	0.194	0.0492	4.27	BTV	-	YES	1.34	-	-	-	-	0.01	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264559	Waste
10/11/2010	LOX-1B-3	LXWC0054	LXWC0054S001	Soil	Thorium-228	1.38	0.163	0.0536	4.27	BTV	-	YES	1.38	-	-	-	-	0.01	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264490	Waste
10/11/2010	LOX-1B-3	LXWC0055	LXWC0055S001	Soil	Thorium-228	1.28	0.139	0.0529	4.27	BTV	-	YES	1.28	-	-	-	-	0.01	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264490	Waste
10/11/2010	LOX-1B-3	LXWC0056	LXWC0056S001	Soil	Thorium-228	1.3	0.151	0.065	4.27	BTV	-	YES	1.3	-	-	-	-	0.02	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264490	Waste
10/8/2010	LOX-1B-3	LXWC0057	LXWC0057S001	Soil	Thorium-228	1.29	0.141	0.0541	4.27	BTV	-	YES	1.29	-	-	-	-	0.01	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264402	Waste
10/11/2010	LOX-1B-3	LXWC0058	LXWC0058S001	Soil	Thorium-228	1.4	0.162	0.0599	4.27	BTV	-	YES	1.4	-	-	-	-	0.01	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264490	Waste
10/12/2010	LOX-1B-3	LXWC0059	LXWC0059S001	Soil	Thorium-228	1.39	0.146	0.0556	4.27	BTV	-	YES	1.39	-	-	-	-	0.01	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264559	Waste
10/8/2010	LOX-1B-4	LXWC0060	LXWC0060S001	Soil	Thorium-228	1.42	0.203	0.0472	4.27	BTV	-	YES	1.42	-	-	-	-	0.01	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264404	Waste
10/8/2010	LOX-1B-4	LXWC0061	LXWC0061S001	Soil	Thorium-228	1.32	0.143	0.0462	4.27	BTV	-	YES	1.32	-	-	-	-	0.01	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264404	Waste
10/8/2010	LOX-1B-4	LXWC0062	LXWC0062S001	Soil	Thorium-228	1.47	0.177	0.0484	4.27	BTV	-	YES	1.47	-	-	-	-	0.01	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264404	Waste
10/8/2010	LOX-1B-4	LXWC0063	LXWC0063S001	Soil	Thorium-228	1.42	0.15	0.052	4.27	BTV	-	YES	1.42	-	-	-	-	0.01	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264404	Waste
10/13/2010	LOX-1C	LXWC0064	LXWC0064S001	Soil	Thorium-228	1.59	0.181	0.0708	4.27	BTV	-	YES	1.59	-	-	-	-	0.02	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264667	Waste
10/13/2010	LOX-1C	LXWC0065	LXWC0065S001	Soil	Thorium-228	1.52	0.173	0.06	4.27	BTV	-	YES	1.52	-	-	-	-	0.01	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264667	Waste
10/13/2010	LOX-1C	LXWC0066	LXWC0066S001	Soil	Thorium-228	1.04	0.123	0.0514	4.27	BTV	-	YES	1.04	-	-	-	-	0.01	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264667	Waste
10/13/2010	LOX-1C	LXWC0067	LXWC0067S001	Soil	Thorium-228	1.12	0.15	0.0624	4.27	BTV	-	YES	1.12	-	-	-	-	0.01	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264667	Waste
10/8/2010	LOX-1D	LXWC0068	LXWC0068S001	Soil	Thorium-228	1.21	0.127	0.0512	4.27	BTV	-	YES	1.21	-	-	-	-	0.01	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264405	Waste
10/8/2010	LOX-1D	LXWC0069	LXWC0069S001	Soil	Thorium-228	1.12	0.126	0.0497	4.27	BTV	-	YES	1.12	-	-	-	-	0.01	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264405	Waste
10/8/2010	LOX-1D	LXWC0070	LXWC0070S001	Soil	Thorium-228	1.38	0.147	0.0573	4.27	BTV	-	YES	1.38	-	-	-	-	0.01	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264405	Waste
10/8/2010	LOX-1D	LXWC0071	LXWC0071S001	Soil	Thorium-228	1.37	0.151	0.0659	4.27	BTV	-	YES	1.37	-	-	-	-	0.02	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264405	Waste
1/7/2011	LOX-1B-3	LXWC0072	LXWC0072S001	Soil	Thorium-228	1.56	0.163	0.0474	4.27	BTV	-	YES	1.56	-	-	-	-	0.01	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL	LXWC0031 Stepout #1	270159	Waste
1/7/2011	LOX-1B-3	LXWC0073	LXWC0073S001	Soil	Thorium-228	1.87	0.207	0.0564	4.27	BTV	-	YES	1.87	-	-	-	-	0.01	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL	LXWC0031 Stepout #2	270159	Waste
1/7/2011	LOX-1B-3	LXWC0074	LXWC0074S001	Soil	Thorium-228	1.36	0.144	0.0389	4.27	BTV	-	YES	1.36	-	-	-	-	0.01	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL	LXWC0031 Stepout #3	270159	Waste
1/7/2011	LOX-1B-3	LXWC0075	LXWC0075S001	Soil	Thorium-228	1.45	0.153	0.0434	4.27	BTV	-	YES	1.45	-	-	-	-	0.01	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL	LXWC0031 Stepout #4	270159	Waste
1/7/2011	LOX-1B-3	LXWC0077	LXWC0077S001	Soil	Thorium-228	1.53	0.162	0.0417	4.27	BTV	-	YES	1.53	-	-	-	-	0.01	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL	LXWC0050 Stepout #2	270159	Waste
1/7/2011	LOX-1B-3	LXWC0078	LXWC0078S001	Soil	Thorium-228	1.62	0.174	0.0478	4.27	BTV	-	YES	1.62	-	-	-	-	0.01	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL	LXWC0050 Stepout #3	270159	Waste
1/7/2011	LOX-1B-3	LXWC0079	LXWC0079S001	Soil	Thorium-228	1.48	0.171	0.0574	4.27	BTV	-	YES	1.48	-	-	-	-	0.01	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL	LXWC0050 Stepout #4	270159	Waste
10/13/2010	LOX-1A	LXWC0001	LXWC0001S001	Soil	Thorium-232	1.39	0.249	0.158	3.44	BTV	-	YES	1.39	-	-	-	-	0.05	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264660	Waste
10/13/2010	LOX-1A	LXWC0002	LXWC0002S001	Soil	Thorium-232	1.37	0.232	0.108	3.44	BTV	-	YES	1.37	-	-	-	-	0.03	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264660	Waste
10/13/2010	LOX-1A	LXWC0003	LXWC0003S001	Soil	Thorium-232	1.19	0.24	0.167	3.44	BTV	-	YES	1.19	-	-	-	-	0.05	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264660	Waste
10/13/2010	LOX-1A	LXWC0004	LXWC0004S001	Soil	Thorium-232	1.6	0.26	0.129	3.44	BTV	-	YES	1.6	-	-	-	-	0.04	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264660	Waste
10/13/2010	LOX-1B-1	LXWC0005	LXWC0005S001	Soil	Thorium-232	1.49	0.28	0.174	3.44	BTV	-	YES	1.49	-	-	-	-	0.05	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264664	Waste
10/13/2010	LOX-1B-1	LXWC0006	LXWC0006S001	Soil	Thorium-232	1.54	0.254	0.122	3.44	BTV	-	YES	1.54	-	-	-	-	0.04	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264664	Waste
10/13/2010	LOX-1B-1	LXWC0007	LXWC0007S001	Soil	Thorium-232	1.57	0.266	0.127	3.44	BTV	-	YES	1.57	-	-	-	-	0.04	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264664	Waste
10/13/2010	LOX-1B-1	LXWC0008	LXWC0008S001	Soil	Thorium-232	1.46	0.255	0.101	3.44	BTV	-	YES	1.46	-	-	-	-	0.03	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264664	Waste
10/13/2010	LOX-1B-1	LXWC0009	LXWC0009S001	Soil	Thorium-232	1.56	0.264	0.125	3.44	BTV	-	YES	1.56	-	-	-	-	0.04	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264664	Waste
10/13/2010	LOX-1B-1	LXWC0010	LXWC0010S001	Soil	Thorium-232	1.46	0.272	0.158	3.44	BTV	-	YES	1.46	-	-	-	-	0.05	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264664	Waste
10/13/2010	LOX-1B-1	LXWC0011	LXWC0011S001	Soil	Thorium-232	1.38	0.224	0.119	3.44	BTV	-	YES	1.38	-	-	-	-	0.03	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264664	Waste
10/12/2010	LOX-1B-2	LXWC0012	LXWC0012S001	Soil	Thorium-232	1.51	0.277	0.156	3.44	BTV	-	YES	1.51	-	-	-	-	0.05	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264562	Waste
10/12/2010	LOX-1B-2	LXWC0013	LXWC0013S001	Soil	Thorium-232	1.68	0.266	0.126	3.44	BTV	-	YES	1.68	-	-	-	-	0.04	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264562	Waste
10/12/2010	LOX-1B-2	LXWC0014	LXWC0014S001	Soil	Thorium-232	1.62	0.291	0.16	3.44	BTV	-	YES	1.62	-	-	-	-	0.05	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264562	Waste
10/12/2010	LOX-1B-2	LXWC0015	LXWC0015S001	Soil	Thorium-232	1.43	0.249	0.137	3.44	BTV	-	YES	1.43	-	-	-	-	0.04	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264562	Waste
10/12/2010	LOX-1B-2	LXWC0016	LXWC0016S001	Soil	Thorium-232	1.45	0.244	0.114	3.44	BTV	-	YES	1.45	-	-	-	-	0.03	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264562	Waste
10/12/2010	LOX-1B-2	LXWC0017	LXWC0017S001	Soil	Thorium-232	1.44	0.246	0.138	3.44	BTV	-	YES	1.44	-	-	-	-	0.04	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264562	Waste
10/11/2010	LOX-1B-2	LXWC0018	LXWC0018S001	Soil	Thorium-232	1.49	0.24	0.107	3.44	BTV	-	YES	1.49	-	-	-	-	0.03	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264499	Waste
10/11/2010	LOX-1B-2	LXWC0019	LXWC0019S001	Soil	Thorium-232	1.51	0.264	0.129	3.44	BTV	-	YES	1.51	-	-	-	-	0.04	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-				

LOX NASA ISRA Soil Data
All Chem, Radionuclides < LUT (pCi/g)

Sampling Date	Sampling Location (General)	Sampling Location (Specific)	Sample Serial Number	Media Type	Isotope	Activity	Error (+/-)	MDC	DTSC LUT	LUT Source	Activity > LUT ?	Activity > MDC ?	Detected Activity	Detected Activity > LUT ?	Non-detect Activity	Non-detect Activity > LUT ?	MDC > LUT ?	Ratio of MDC to LUT	Units	Error Type	Analysis Protocol	Analysis Organization	Comments	Document	Status
10/12/2010	LOX-1B-3	LXWC0052	LXWC0052S001	Soil	Thorium-232	1.29	0.246	0.149	3.44	BTV	-	YES	1.29	-	-	-	-	0.04	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264559	Waste
10/12/2010	LOX-1B-3	LXWC0053	LXWC0053S001	Soil	Thorium-232	1.43	0.239	0.109	3.44	BTV	-	YES	1.43	-	-	-	-	0.03	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264559	Waste
10/11/2010	LOX-1B-3	LXWC0054	LXWC0054S001	Soil	Thorium-232	1.24	0.247	0.129	3.44	BTV	-	YES	1.24	-	-	-	-	0.04	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264490	Waste
10/11/2010	LOX-1B-3	LXWC0055	LXWC0055S001	Soil	Thorium-232	1.53	0.25	0.125	3.44	BTV	-	YES	1.53	-	-	-	-	0.04	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264490	Waste
10/11/2010	LOX-1B-3	LXWC0056	LXWC0056S001	Soil	Thorium-232	1.35	0.253	0.141	3.44	BTV	-	YES	1.35	-	-	-	-	0.04	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264490	Waste
10/8/2010	LOX-1B-3	LXWC0057	LXWC0057S001	Soil	Thorium-232	1.56	0.259	0.124	3.44	BTV	-	YES	1.56	-	-	-	-	0.04	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264402	Waste
10/11/2010	LOX-1B-3	LXWC0058	LXWC0058S001	Soil	Thorium-232	1.4	0.241	0.149	3.44	BTV	-	YES	1.4	-	-	-	-	0.04	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264490	Waste
10/12/2010	LOX-1B-3	LXWC0059	LXWC0059S001	Soil	Thorium-232	1.4	0.239	0.134	3.44	BTV	-	YES	1.4	-	-	-	-	0.04	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264559	Waste
10/8/2010	LOX-1B-4	LXWC0060	LXWC0060S001	Soil	Thorium-232	1.47	0.232	0.109	3.44	BTV	-	YES	1.47	-	-	-	-	0.03	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264404	Waste
10/8/2010	LOX-1B-4	LXWC0061	LXWC0061S001	Soil	Thorium-232	1.46	0.248	0.109	3.44	BTV	-	YES	1.46	-	-	-	-	0.03	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264404	Waste
10/8/2010	LOX-1B-4	LXWC0062	LXWC0062S001	Soil	Thorium-232	1.87	0.301	0.141	3.44	BTV	-	YES	1.87	-	-	-	-	0.04	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264404	Waste
10/8/2010	LOX-1B-4	LXWC0063	LXWC0063S001	Soil	Thorium-232	1.43	0.259	0.127	3.44	BTV	-	YES	1.43	-	-	-	-	0.04	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264404	Waste
10/13/2010	LOX-1C	LXWC0064	LXWC0064S001	Soil	Thorium-232	1.77	0.302	0.158	3.44	BTV	-	YES	1.77	-	-	-	-	0.05	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264667	Waste
10/13/2010	LOX-1C	LXWC0065	LXWC0065S001	Soil	Thorium-232	1.44	0.258	0.134	3.44	BTV	-	YES	1.44	-	-	-	-	0.04	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264667	Waste
10/13/2010	LOX-1C	LXWC0066	LXWC0066S001	Soil	Thorium-232	1.23	0.229	0.119	3.44	BTV	-	YES	1.23	-	-	-	-	0.03	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264667	Waste
10/13/2010	LOX-1C	LXWC0067	LXWC0067S001	Soil	Thorium-232	1.09	0.206	0.165	3.44	BTV	-	YES	1.09	-	-	-	-	0.05	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264667	Waste
10/8/2010	LOX-1D	LXWC0068	LXWC0068S001	Soil	Thorium-232	1.35	0.242	0.116	3.44	BTV	-	YES	1.35	-	-	-	-	0.03	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264405	Waste
10/8/2010	LOX-1D	LXWC0069	LXWC0069S001	Soil	Thorium-232	1.33	0.236	0.133	3.44	BTV	-	YES	1.33	-	-	-	-	0.04	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264405	Waste
10/8/2010	LOX-1D	LXWC0070	LXWC0070S001	Soil	Thorium-232	1.67	0.278	0.134	3.44	BTV	-	YES	1.67	-	-	-	-	0.04	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264405	Waste
10/8/2010	LOX-1D	LXWC0071	LXWC0071S001	Soil	Thorium-232	1.34	0.261	0.151	3.44	BTV	-	YES	1.34	-	-	-	-	0.04	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264405	Waste
1/7/2011	LOX-1B-3	LXWC0072	LXWC0072S001	Soil	Thorium-232	1.46	0.239	0.111	3.44	BTV	-	YES	1.46	-	-	-	-	0.03	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL	LXWC0031 Stepout #1	270159	Waste
1/7/2011	LOX-1B-3	LXWC0073	LXWC0073S001	Soil	Thorium-232	1.5	0.266	0.159	3.44	BTV	-	YES	1.5	-	-	-	-	0.05	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL	LXWC0031 Stepout #2	270159	Waste
1/7/2011	LOX-1B-3	LXWC0074	LXWC0074S001	Soil	Thorium-232	1.19	0.21	0.096	3.44	BTV	-	YES	1.19	-	-	-	-	0.03	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL	LXWC0031 Stepout #3	270159	Waste
1/7/2011	LOX-1B-3	LXWC0075	LXWC0075S001	Soil	Thorium-232	1.3	0.221	0.096	3.44	BTV	-	YES	1.3	-	-	-	-	0.03	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL	LXWC0031 Stepout #4	270159	Waste
1/7/2011	LOX-1B-3	LXWC0077	LXWC0077S001	Soil	Thorium-232	1.45	0.246	0.093	3.44	BTV	-	YES	1.45	-	-	-	-	0.03	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL	LXWC0050 Stepout #2	270159	Waste
1/7/2011	LOX-1B-3	LXWC0078	LXWC0078S001	Soil	Thorium-232	1.21	0.3	0.161	3.44	BTV	-	YES	1.21	-	-	-	-	0.05	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL	LXWC0050 Stepout #3	270159	Waste
1/7/2011	LOX-1B-3	LXWC0079	LXWC0079S001	Soil	Thorium-232	1.38	0.271	0.166	3.44	BTV	-	YES	1.38	-	-	-	-	0.05	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL	LXWC0050 Stepout #4	270159	Waste
10/13/2010	LOX-1A	LXWC0001	LXWC0001S001	Soil	Tritium	-0.191	0.568	0.987	8.59	MDC	-	-	-	-	-0.191	-	-	0.11	pCi/g	2 sigma	EPA 906.0 Modified	GEL		264660	Waste
10/13/2010	LOX-1A	LXWC0002	LXWC0002S001	Soil	Tritium	0.127	0.604	1.04	8.59	MDC	-	-	-	-	0.127	-	-	0.12	pCi/g	2 sigma	EPA 906.0 Modified	GEL		264660	Waste
10/13/2010	LOX-1A	LXWC0003	LXWC0003S001	Soil	Tritium	0.172	0.617	1.05	8.59	MDC	-	-	-	-	0.172	-	-	0.12	pCi/g	2 sigma	EPA 906.0 Modified	GEL		264660	Waste
10/13/2010	LOX-1A	LXWC0004	LXWC0004S001	Soil	Tritium	-0.178	0.59	1.02	8.59	MDC	-	-	-	-	-0.178	-	-	0.12	pCi/g	2 sigma	EPA 906.0 Modified	GEL		264660	Waste
10/13/2010	LOX-1B-1	LXWC0005	LXWC0005S001	Soil	Tritium	0.0619	0.278	0.496	8.59	MDC	-	-	-	-	0.0619	-	-	0.06	pCi/g	2 sigma	EPA 906.0 Modified	GEL		264664	Waste
10/13/2010	LOX-1B-1	LXWC0006	LXWC0006S001	Soil	Tritium	0.129	0.279	0.487	8.59	MDC	-	-	-	-	0.129	-	-	0.06	pCi/g	2 sigma	EPA 906.0 Modified	GEL		264664	Waste
10/13/2010	LOX-1B-1	LXWC0007	LXWC0007S001	Soil	Tritium	-0.0307	0.268	0.492	8.59	MDC	-	-	-	-	-0.0307	-	-	0.06	pCi/g	2 sigma	EPA 906.0 Modified	GEL		264664	Waste
10/13/2010	LOX-1B-1	LXWC0008	LXWC0008S001	Soil	Tritium	0.166	0.281	0.485	8.59	MDC	-	-	-	-	0.166	-	-	0.06	pCi/g	2 sigma	EPA 906.0 Modified	GEL		264664	Waste
10/13/2010	LOX-1B-1	LXWC0009	LXWC0009S001	Soil	Tritium	0.158	0.292	0.507	8.59	MDC	-	-	-	-	0.158	-	-	0.06	pCi/g	2 sigma	EPA 906.0 Modified	GEL		264664	Waste
10/13/2010	LOX-1B-1	LXWC0010	LXWC0010S001	Soil	Tritium	0.00774	0.274	0.497	8.59	MDC	-	-	-	-	0.00774	-	-	0.06	pCi/g	2 sigma	EPA 906.0 Modified	GEL		264664	Waste
10/13/2010	LOX-1B-1	LXWC0011	LXWC0011S001	Soil	Tritium	-0.0724	0.277	0.516	8.59	MDC	-	-	-	-	-0.0724	-	-	0.06	pCi/g	2 sigma	EPA 906.0 Modified	GEL		264664	Waste
10/12/2010	LOX-1B-2	LXWC0012	LXWC0012S001	Soil	Tritium	-0.0906	0.258	0.484	8.59	MDC	-	-	-	-	-0.0906	-	-	0.06	pCi/g	2 sigma	EPA 906.0 Modified	GEL		264562	Waste
10/12/2010	LOX-1B-2	LXWC0013	LXWC0013S001	Soil	Tritium	0.233	0.294	0.499	8.59	MDC	-	-	-	-	0.233	-	-	0.06	pCi/g	2 sigma	EPA 906.0 Modified	GEL		264562	Waste
10/12/2010	LOX-1B-2	LXWC0014	LXWC0014S001	Soil	Tritium	0.101	0.283	0.499	8.59	MDC	-	-	-	-	0.101	-	-	0.06	pCi/g	2 sigma	EPA 906.0 Modified	GEL		264562	Waste
10/12/2010	LOX-1B-2	LXWC0015	LXWC0015S001	Soil	Tritium	-0.0714	0.273	0.509	8.59	MDC	-	-	-	-	-0.0714	-	-	0.06	pCi/g	2 sigma	EPA 906.0 Modified	GEL		264562	Waste
10/12/2010	LOX-1B-2	LXWC0016	LXWC0016S001	Soil	Tritium	-0.165	0.262	0.505	8.59	MDC	-	-	-	-	-0.165	-	-	0.06	pCi/g	2 sigma	EPA 906.0 Modified	GEL		264562	Waste
10/12/2010	LOX-1B-2	LXWC0017	LXWC0017S001	Soil	Tritium	0.0766	0.277	0.491	8.59	MDC	-	-	-	-	0.0766	-	-	0.06	pCi/g	2 sigma	EPA 906.0 Modified	GEL		264562	Waste
10/11/2010	LOX-1B-2	LXWC0018	LXWC0018S001	Soil	Tritium	0.0214	0.609	1.05	8.59	MDC	-	-	-	-	0.0214	-	-	0.12	pCi/g	2 sigma	EPA 906.0 Modified	GEL		264499	Waste
10/11/2010	LOX-1B-2	LXWC0019	LXWC0019S001	Soil	Tritium	-0.103	0.587	1.02	8.59	MDC	-	-	-	-	-0.103	-	-	0.12	pCi/g	2 sigma	EPA 906.0 Modified	GEL		264499	Waste
10/13/2010	LOX-1B-3	LXWC0020	LXWC0020S001	Soil	Tritium	0.0539	0.276	0.494	8.59	MDC	-	-	-	-	0.0539	-	-	0.06	pCi/g	2 sigma	EPA 906.0 Modified	GEL		264661	Waste
10/8/2010	LOX-1B-3	LXWC0021	LXWC0021S001	Soil	Tritium	0.268	0.497	0.881	8.59	MDC	-	-	-	-	0.268	-	-	0.10	pCi/g	2 sigma	EPA 906.0 Modified	GEL		264402	Waste
10/11/2010	LOX-1B-3	LXWC0022	LXWC0022S001	Soil	Tritium	-0.0523	0.557	0.97	8.59	MDC	-	-	-	-	-0.0523	-	-	0.11	pCi/g	2 sigma	EPA 906.0 Modified	GEL		264490	Waste
10/8/2010	LOX-1B-3	LXWC0023	LXWC0023S001	Soil	Tritium	-0.459	0.47	0.845	8.59	MDC	-	-	-	-	-0.459	-	-	0.10	pCi/g	2 sigma	EPA 906.0 Modified	GEL		264402	Waste
10/8/2010	LOX-1B-3	LXWC0024	LXWC0024S001	Soil	Tritium	-0.063	0.454	0.793	8.59	MDC	-	-	-	-	-0.063	-	-	0.09	pCi/g	2 sigma	EPA 906.0 Modified	GEL		264402	Waste
10/13/2010	LOX-1B-3	LXWC0025	LXWC0025S001	Soil	Tritium	0.137	0.279	0.487	8.59	MDC	-	-	-	-	0.137	-	-	0.06	pCi/g	2 sigma	EPA 906.0 Modified	GEL			

LOX NASA ISRA Soil Data
All Chem, Radionuclides < LUT (pCi/g)

Sampling Date	Sampling Location (General)	Sampling Location (Specific)	Sample Serial Number	Media Type	Isotope	Activity	Error (+/-)	MDC	DTSC LUT	LUT Source	Activity > LUT ?	Activity > MDC ?	Detected Activity	Detected Activity > LUT ?	Non-detect Activity	Non-detect Activity > LUT ?	MDC > LUT ?	Ratio of MDC to LUT	Units	Error Type	Analysis Protocol	Analysis Organization	Comments	Document	Status
10/11/2010	LOX-1B-3	LXWC0058	LXWC0058S001	Soil	Tritium	0.0655	0.562	0.972	8.59	MDC	-	-	-	-	0.0655	-	-	0.11	pCi/g	2 sigma	EPA 906.0 Modified	GEL		264490	Waste
10/12/2010	LOX-1B-3	LXWC0059	LXWC0059S001	Soil	Tritium	-0.262	0.59	1.03	8.59	MDC	-	-	-	-	-0.262	-	-	0.12	pCi/g	2 sigma	EPA 906.0 Modified	GEL		264559	Waste
10/8/2010	LOX-1B-4	LXWC0060	LXWC0060S001	Soil	Tritium	0.225	0.498	0.851	8.59	MDC	-	-	-	-	0.225	-	-	0.10	pCi/g	2 sigma	EPA 906.0 Modified	GEL		264404	Waste
10/8/2010	LOX-1B-4	LXWC0061	LXWC0061S001	Soil	Tritium	-0.145	0.48	0.842	8.59	MDC	-	-	-	-	-0.145	-	-	0.10	pCi/g	2 sigma	EPA 906.0 Modified	GEL		264404	Waste
10/8/2010	LOX-1B-4	LXWC0062	LXWC0062S001	Soil	Tritium	-0.11	0.474	0.83	8.59	MDC	-	-	-	-	-0.11	-	-	0.10	pCi/g	2 sigma	EPA 906.0 Modified	GEL		264404	Waste
10/8/2010	LOX-1B-4	LXWC0063	LXWC0063S001	Soil	Tritium	0.108	0.472	0.812	8.59	MDC	-	-	-	-	0.108	-	-	0.09	pCi/g	2 sigma	EPA 906.0 Modified	GEL		264404	Waste
10/13/2010	LOX-1C	LXWC0064	LXWC0064S001	Soil	Tritium	0.224	0.548	0.933	8.59	MDC	-	-	-	-	0.224	-	-	0.11	pCi/g	2 sigma	EPA 906.0 Modified	GEL		264667	Waste
10/13/2010	LOX-1C	LXWC0065	LXWC0065S001	Soil	Tritium	0.16	0.525	0.898	8.59	MDC	-	-	-	-	0.16	-	-	0.10	pCi/g	2 sigma	EPA 906.0 Modified	GEL		264667	Waste
10/13/2010	LOX-1C	LXWC0066	LXWC0066S001	Soil	Tritium	0.191	0.533	0.909	8.59	MDC	-	-	-	-	0.191	-	-	0.11	pCi/g	2 sigma	EPA 906.0 Modified	GEL		264667	Waste
10/13/2010	LOX-1C	LXWC0067	LXWC0067S001	Soil	Tritium	0.124	0.531	0.909	8.59	MDC	-	-	-	-	0.124	-	-	0.11	pCi/g	2 sigma	EPA 906.0 Modified	GEL		264667	Waste
10/8/2010	LOX-1D	LXWC0068	LXWC0068S001	Soil	Tritium	-0.197	0.469	0.826	8.59	MDC	-	-	-	-	-0.197	-	-	0.10	pCi/g	2 sigma	EPA 906.0 Modified	GEL		264405	Waste
10/8/2010	LOX-1D	LXWC0069	LXWC0069S001	Soil	Tritium	0.0323	0.469	0.811	8.59	MDC	-	-	-	-	0.0323	-	-	0.09	pCi/g	2 sigma	EPA 906.0 Modified	GEL		264405	Waste
10/8/2010	LOX-1D	LXWC0070	LXWC0070S001	Soil	Tritium	-0.221	0.471	0.832	8.59	MDC	-	-	-	-	-0.221	-	-	0.10	pCi/g	2 sigma	EPA 906.0 Modified	GEL		264405	Waste
10/8/2010	LOX-1D	LXWC0071	LXWC0071S001	Soil	Tritium	-0.256	0.474	0.839	8.59	MDC	-	-	-	-	-0.256	-	-	0.10	pCi/g	2 sigma	EPA 906.0 Modified	GEL		264405	Waste
10/13/2010	LOX-1A	LXWC0001	LXWC0001S001	Soil	Uranium-235	0.159	0.144	0.263	0.152	BTV	YES	-	-	-	0.159	YES	YES	1.73	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264660	Waste
10/13/2010	LOX-1A	LXWC0002	LXWC0002S001	Soil	Uranium-235	0.0286	0.106	0.19	0.152	BTV	-	-	-	-	0.0286	-	YES	1.25	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264660	Waste
10/13/2010	LOX-1A	LXWC0003	LXWC0003S001	Soil	Uranium-235	0.104	0.108	0.197	0.152	BTV	-	-	-	-	0.104	-	YES	1.30	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264660	Waste
10/13/2010	LOX-1A	LXWC0004	LXWC0004S001	Soil	Uranium-235	0.0133	0.113	0.194	0.152	BTV	-	-	-	-	0.0133	-	YES	1.28	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264660	Waste
10/13/2010	LOX-1B-1	LXWC0005	LXWC0005S001	Soil	Uranium-235	0.126	0.12	0.204	0.152	BTV	-	-	-	-	0.126	-	YES	1.34	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264664	Waste
10/13/2010	LOX-1B-1	LXWC0006	LXWC0006S001	Soil	Uranium-235	0.12	0.122	0.213	0.152	BTV	-	-	-	-	0.12	-	YES	1.40	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264664	Waste
10/13/2010	LOX-1B-1	LXWC0007	LXWC0007S001	Soil	Uranium-235	0.0154	0.109	0.198	0.152	BTV	-	-	-	-	0.0154	-	YES	1.30	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264664	Waste
10/13/2010	LOX-1B-1	LXWC0008	LXWC0008S001	Soil	Uranium-235	0.0968	0.101	0.177	0.152	BTV	-	-	-	-	0.0968	-	YES	1.16	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264664	Waste
10/13/2010	LOX-1B-1	LXWC0009	LXWC0009S001	Soil	Uranium-235	0.0964	0.141	0.152	0.152	BTV	-	-	-	-	0.0964	-	-	1.00	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264664	Waste
10/13/2010	LOX-1B-1	LXWC0010	LXWC0010S001	Soil	Uranium-235	0.179	0.164	0.211	0.152	BTV	YES	-	-	-	0.179	YES	YES	1.39	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264664	Waste
10/13/2010	LOX-1B-1	LXWC0011	LXWC0011S001	Soil	Uranium-235	0.0997	0.103	0.188	0.152	BTV	-	-	-	-	0.0997	-	YES	1.24	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264664	Waste
10/12/2010	LOX-1B-2	LXWC0012	LXWC0012S001	Soil	Uranium-235	0.0565	0.12	0.214	0.152	BTV	-	-	-	-	0.0565	-	YES	1.41	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264562	Waste
10/12/2010	LOX-1B-2	LXWC0013	LXWC0013S001	Soil	Uranium-235	0.132	0.112	0.211	0.152	BTV	-	-	-	-	0.132	-	YES	1.39	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264562	Waste
10/12/2010	LOX-1B-2	LXWC0014	LXWC0014S001	Soil	Uranium-235	0.18	0.146	0.199	0.152	BTV	YES	-	-	-	0.18	YES	YES	1.31	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264562	Waste
10/12/2010	LOX-1B-2	LXWC0015	LXWC0015S001	Soil	Uranium-235	0.0659	0.108	0.146	0.152	BTV	-	-	-	-	0.0659	-	-	0.96	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264562	Waste
10/12/2010	LOX-1B-2	LXWC0016	LXWC0016S001	Soil	Uranium-235	0.0753	0.102	0.196	0.152	BTV	-	-	-	-	0.0753	-	YES	1.29	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264562	Waste
10/12/2010	LOX-1B-2	LXWC0017	LXWC0017S001	Soil	Uranium-235	0.0873	0.139	0.249	0.152	BTV	-	-	-	-	0.0873	-	YES	1.64	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264562	Waste
10/11/2010	LOX-1B-2	LXWC0018	LXWC0018S001	Soil	Uranium-235	0.132	0.114	0.157	0.152	BTV	-	-	-	-	0.132	-	YES	1.03	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264499	Waste
10/11/2010	LOX-1B-2	LXWC0019	LXWC0019S001	Soil	Uranium-235	0.0784	0.116	0.208	0.152	BTV	-	-	-	-	0.0784	-	YES	1.37	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264499	Waste
10/13/2010	LOX-1B-3	LXWC0020	LXWC0020S001	Soil	Uranium-235	-0.0956	0.122	0.21	0.152	BTV	-	-	-	-	-0.0956	-	YES	1.38	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264661	Waste
10/8/2010	LOX-1B-3	LXWC0021	LXWC0021S001	Soil	Uranium-235	0.079	0.113	0.207	0.152	BTV	-	-	-	-	0.079	-	YES	1.36	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264402	Waste
10/11/2010	LOX-1B-3	LXWC0022	LXWC0022S001	Soil	Uranium-235	0.0472	0.148	0.262	0.152	BTV	-	-	-	-	0.0472	-	YES	1.72	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264490	Waste
10/8/2010	LOX-1B-3	LXWC0023	LXWC0023S001	Soil	Uranium-235	0.0469	0.0914	0.166	0.152	BTV	-	-	-	-	0.0469	-	YES	1.09	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264402	Waste
10/8/2010	LOX-1B-3	LXWC0024	LXWC0024S001	Soil	Uranium-235	0.0992	0.135	0.241	0.152	BTV	-	-	-	-	0.0992	-	YES	1.59	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264402	Waste
10/13/2010	LOX-1B-3	LXWC0025	LXWC0025S001	Soil	Uranium-235	0.156	0.144	0.262	0.152	BTV	YES	-	-	-	0.156	YES	YES	1.72	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264661	Waste
10/11/2010	LOX-1B-3	LXWC0026	LXWC0026S001	Soil	Uranium-235	0.0549	0.107	0.197	0.152	BTV	-	-	-	-	0.0549	-	YES	1.30	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264490	Waste
10/11/2010	LOX-1B-3	LXWC0027	LXWC0027S001	Soil	Uranium-235	0.151	0.146	0.19	0.152	BTV	-	-	-	-	0.151	-	YES	1.25	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264490	Waste
10/12/2010	LOX-1B-3	LXWC0028	LXWC0028S001	Soil	Uranium-235	0.00596	0.147	0.258	0.152	BTV	-	-	-	-	0.00596	-	YES	1.70	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264559	Waste
10/13/2010	LOX-1B-3	LXWC0029	LXWC0029S001	Soil	Uranium-235	0.00612	0.122	0.212	0.152	BTV	-	-	-	-	0.00612	-	YES	1.39	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264661	Waste
10/12/2010	LOX-1B-3	LXWC0030	LXWC0030S001	Soil	Uranium-235	0.0331	0.109	0.195	0.152	BTV	-	-	-	-	0.0331	-	YES	1.28	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264559	Waste
1/7/2011	LOX-1B-3	LXWC0031	LXWC0031AS001	Soil	Uranium-235	0.0525	0.0845	0.15	0.152	BTV	-	-	-	-	0.0525	-	-	0.99	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL	Re-sample	270159	Waste
10/12/2010	LOX-1B-3	LXWC0031	LXWC0031S001	Soil	Uranium-235	-0.0686																			

LOX NASA ISRA Soil Data
All Chem, Radionuclides < LUT (pCi/g)

Sampling Date	Sampling Location (General)	Sampling Location (Specific)	Sample Serial Number	Media Type	Isotope	Activity	Error (+/-)	MDC	DTSC LUT	LUT Source	Activity > LUT ?	Activity > MDC ?	Detected Activity	Detected Activity > LUT ?	Non-detect Activity	Non-detect Activity > LUT ?	MDC > LUT ?	Ratio of MDC to LUT	Units	Error Type	Analysis Protocol	Analysis Organization	Comments	Document	Status
10/8/2010	LOX-1D	LXWC0069	LXWC0069S001	Soil	Uranium-235	0.236	0.146	0.175	0.152	BTV	YES	YES	0.236	YES	-	-	YES	1.15	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL	Re-sampled	264405	Waste
10/8/2010	LOX-1D	LXWC0070	LXWC0070S001	Soil	Uranium-235	0.0467	0.121	0.22	0.152	BTV	-	-	-	-	0.0467	-	YES	1.45	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264405	Waste
10/8/2010	LOX-1D	LXWC0071	LXWC0071S001	Soil	Uranium-235	0.145	0.149	0.252	0.152	BTV	-	-	-	-	0.145	-	YES	1.66	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264405	Waste
1/7/2011	LOX-1B-3	LXWC0072	LXWC0072S001	Soil	Uranium-235	0.0382	0.102	0.183	0.152	BTV	-	-	-	-	0.0382	-	YES	1.20	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL	LXWC0031 Stepout #1	270159	Waste
1/7/2011	LOX-1B-3	LXWC0073	LXWC0073S001	Soil	Uranium-235	0.0319	0.11	0.202	0.152	BTV	-	-	-	-	0.0319	-	YES	1.33	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL	LXWC0031 Stepout #2	270159	Waste
1/7/2011	LOX-1B-3	LXWC0074	LXWC0074S001	Soil	Uranium-235	-0.0535	0.0865	0.147	0.152	BTV	-	-	-	-	-0.0535	-	-	0.97	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL	LXWC0031 Stepout #3	270159	Waste
1/7/2011	LOX-1B-3	LXWC0075	LXWC0075S001	Soil	Uranium-235	0.0478	0.0954	0.17	0.152	BTV	-	-	-	-	0.0478	-	YES	1.12	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL	LXWC0031 Stepout #4	270159	Waste
1/7/2011	LOX-1B-3	LXWC0077	LXWC0077S001	Soil	Uranium-235	0.0488	0.09	0.16	0.152	BTV	-	-	-	-	0.0488	-	YES	1.05	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL	LXWC0050 Stepout #2	270159	Waste
1/7/2011	LOX-1B-3	LXWC0078	LXWC0078S001	Soil	Uranium-235	0.0418	0.0896	0.169	0.152	BTV	-	-	-	-	0.0418	-	YES	1.11	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL	LXWC0050 Stepout #3	270159	Waste
1/7/2011	LOX-1B-3	LXWC0079	LXWC0079S001	Soil	Uranium-235	-0.0166	0.115	0.201	0.152	BTV	-	-	-	-	-0.0166	-	YES	1.32	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL	LXWC0050 Stepout #4	270159	Waste
4/17/2013	LOX-1D	LXWC0069	LXWC0069AS001	Soil	Uranium-235/236	0.0275	0.0371	0.0275	0.152	BTV	-	-	-	-	0.0275	-	-	0.18	pCi/g	2 sigma	DOE EML HASL-300, U-02-RC Modified	GEL	Re-sample	324087	Waste
10/13/2010	LOX-1A	LXWC0001	LXWC0001S001	Soil	Uranium-238	0.977	1.33	2.48	1.96	BTV	-	-	-	-	0.977	-	YES	1.27	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264660	Waste
10/13/2010	LOX-1A	LXWC0002	LXWC0002S001	Soil	Uranium-238	0.596	0.866	1.05	1.96	BTV	-	-	-	-	0.596	-	-	0.54	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264660	Waste
10/13/2010	LOX-1A	LXWC0003	LXWC0003S001	Soil	Uranium-238	1.96	1.27	1.38	1.96	BTV	-	YES	1.96	-	-	-	-	0.70	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264660	Waste
10/13/2010	LOX-1A	LXWC0004	LXWC0004S001	Soil	Uranium-238	1.91	0.872	0.932	1.96	BTV	-	YES	1.91	-	-	-	-	0.48	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264660	Waste
10/13/2010	LOX-1B-1	LXWC0005	LXWC0005S001	Soil	Uranium-238	0.755	1.24	1.5	1.96	BTV	-	-	-	-	0.755	-	-	0.77	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264664	Waste
10/13/2010	LOX-1B-1	LXWC0006	LXWC0006S001	Soil	Uranium-238	1.31	1.03	1.3	1.96	BTV	-	YES	1.31	-	-	-	-	0.66	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264664	Waste
10/13/2010	LOX-1B-1	LXWC0007	LXWC0007S001	Soil	Uranium-238	0.961	0.829	1.06	1.96	BTV	-	-	-	-	0.961	-	-	0.54	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264664	Waste
10/13/2010	LOX-1B-1	LXWC0008	LXWC0008S001	Soil	Uranium-238	0.481	0.959	1.34	1.96	BTV	-	-	-	-	0.481	-	-	0.68	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264664	Waste
10/13/2010	LOX-1B-1	LXWC0009	LXWC0009S001	Soil	Uranium-238	1.38	0.552	0.467	1.96	BTV	-	YES	1.38	-	-	-	-	0.24	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264664	Waste
10/13/2010	LOX-1B-1	LXWC0010	LXWC0010S001	Soil	Uranium-238	0.532	1.67	1.63	1.96	BTV	-	-	-	-	0.532	-	-	0.83	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264664	Waste
10/13/2010	LOX-1B-1	LXWC0011	LXWC0011S001	Soil	Uranium-238	0.715	0.862	1.11	1.96	BTV	-	-	-	-	0.715	-	-	0.57	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264664	Waste
10/12/2010	LOX-1B-2	LXWC0012	LXWC0012S001	Soil	Uranium-238	1.68	0.658	0.62	1.96	BTV	-	YES	1.68	-	-	-	-	0.32	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264562	Waste
10/12/2010	LOX-1B-2	LXWC0013	LXWC0013S001	Soil	Uranium-238	1.08	1.02	1.3	1.96	BTV	-	-	-	-	1.08	-	-	0.66	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264562	Waste
10/12/2010	LOX-1B-2	LXWC0014	LXWC0014S001	Soil	Uranium-238	0.498	1.16	1.38	1.96	BTV	-	-	-	-	0.498	-	-	0.70	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264562	Waste
10/12/2010	LOX-1B-2	LXWC0015	LXWC0015S001	Soil	Uranium-238	1.02	0.461	0.414	1.96	BTV	-	YES	1.02	-	-	-	-	0.21	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264562	Waste
10/12/2010	LOX-1B-2	LXWC0016	LXWC0016S001	Soil	Uranium-238	0.861	0.709	0.907	1.96	BTV	-	-	-	-	0.861	-	-	0.46	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264562	Waste
10/12/2010	LOX-1B-2	LXWC0017	LXWC0017S001	Soil	Uranium-238	0.77	1.52	2.26	1.96	BTV	-	-	-	-	0.77	-	YES	1.15	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264562	Waste
10/11/2010	LOX-1B-2	LXWC0018	LXWC0018S001	Soil	Uranium-238	1.11	0.958	0.88	1.96	BTV	-	YES	1.11	-	-	-	-	0.45	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264499	Waste
10/11/2010	LOX-1B-2	LXWC0019	LXWC0019S001	Soil	Uranium-238	0.243	1.01	1.3	1.96	BTV	-	-	-	-	0.243	-	-	0.66	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264499	Waste
10/13/2010	LOX-1B-3	LXWC0020	LXWC0020S001	Soil	Uranium-238	1.01	1.21	1.34	1.96	BTV	-	-	-	-	1.01	-	-	0.68	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264661	Waste
10/8/2010	LOX-1B-3	LXWC0021	LXWC0021S001	Soil	Uranium-238	1.64	1.04	1.41	1.96	BTV	-	YES	1.64	-	-	-	-	0.72	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264402	Waste
10/11/2010	LOX-1B-3	LXWC0022	LXWC0022S001	Soil	Uranium-238	0.475	1.75	2.28	1.96	BTV	-	-	-	-	0.475	-	YES	1.16	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264490	Waste
10/8/2010	LOX-1B-3	LXWC0023	LXWC0023S001	Soil	Uranium-238	0.892	0.489	0.457	1.96	BTV	-	YES	0.892	-	-	-	-	0.23	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264402	Waste
10/8/2010	LOX-1B-3	LXWC0024	LXWC0024S001	Soil	Uranium-238	0.989	1.03	1.44	1.96	BTV	-	-	-	-	0.989	-	-	0.73	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264402	Waste
10/13/2010	LOX-1B-3	LXWC0025	LXWC0025S001	Soil	Uranium-238	0.538	1.39	2.57	1.96	BTV	-	-	-	-	0.538	-	YES	1.31	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264661	Waste
10/11/2010	LOX-1B-3	LXWC0026	LXWC0026S001	Soil	Uranium-238	1.95	1.11	1.34	1.96	BTV	-	YES	1.95	-	-	-	-	0.68	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264490	Waste
10/11/2010	LOX-1B-3	LXWC0027	LXWC0027S001	Soil	Uranium-238	1.36	0.981	1.08	1.96	BTV	-	YES	1.36	-	-	-	-	0.55	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264490	Waste
10/12/2010	LOX-1B-3	LXWC0028	LXWC0028S001	Soil	Uranium-238	2.27	2.29	2.28	1.96	BTV	YES	-	-	-	2.27	YES	YES	1.16	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264559	Waste
10/13/2010	LOX-1B-3	LXWC0029	LXWC0029S001	Soil	Uranium-238	1.18	1.06	1.33	1.96	BTV	-	-	-	-	1.18	-	-	0.68	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264661	Waste
10/12/2010	LOX-1B-3	LXWC0030	LXWC0030S001	Soil	Uranium-238	1.5	1.03	1.94	1.96	BTV	-	-	-	-	1.5	-	-	0.99	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264559	Waste
1/7/2011	LOX-1B-3	LXWC0031	LXWC0031AS001	Soil	Uranium-238	0.715	1.4	1.15	1.96	BTV	-	-	-	-	0.715	-	-	0.59	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL	Re-sample	270159	Waste
10/12/2010	LOX-1B-3	LXWC0031	LXWC0031S001	Soil	Uranium-238	0.428	1.43	1.52	1.96	BTV	-	-	-	-	0.428	-	-	0.78	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL	Re-sampled	264559	Waste
10/11/2010	LOX-1B-3	LXWC0032	LXWC0032S001	Soil	Uranium-238	0.477	0.863	1.08	1.96	BTV	-	-	-	-	0.477	-	-	0.55	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264490	Waste
10/11/2010	LOX-1B-3	LXWC0033	LXWC0033S001	Soil	Uranium-238	0.611	0.732	0.88	1.96	BTV	-	-	-	-	0.611	-	-	0.45	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264490	Waste
10/11/2010	LOX-1B-3	LXWC0034	LXWC0034S001	Soil	Uranium-238	0.758	0.689	0.9	1.96	BTV	-	-	-	-	0.758	-	-	0.46	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264490	Waste
10/12/2010	LOX-1B-3	LXWC0035	LXWC0035S001	Soil	Uranium-238	0.512	0.755	0.938	1.96	BTV	-	-	-	-	0.512	-	-	0.48	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264559	Waste
10/11/2010	LOX-1B-3	LXWC0036	LXWC0036S001	Soil	Uranium-238	1.3	1.02	1.38	1.96	BTV	-	-	-	-	1.3	-	-	0.70	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264490	Waste
10/8/2010	LOX-1B-3	LXWC0037	LXWC0037S001	Soil	Uranium-238	1.1	1.36	2.5	1.96	BTV	-	-	-	-	1.1	-	YES	1.28	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264402	Waste
10/8/2010	LOX-1B-3	LXWC0038	LXWC0038S001	Soil	Uranium-238	0.731	0.654	1.19	1.96	BTV	-	-	-	-	0.73										

LOX NASA ISRA Soil Data
All Chem, Radionuclides < LUT (pCi/g)

Sampling Date	Sampling Location (General)	Sampling Location (Specific)	Sample Serial Number	Media Type	Isotope	Activity	Error (+/-)	MDC	DTSC LUT	LUT Source	Activity > LUT ?	Activity > MDC ?	Detected Activity	Detected Activity > LUT ?	Non-detect Activity	Non-detect Activity > LUT ?	MDC > LUT ?	Ratio of MDC to LUT	Units	Error Type	Analysis Protocol	Analysis Organization	Comments	Document	Status
10/8/2010	LOX-1D	LXWC0071	LXWC0071S001	Soil	Uranium-238	0.539	1.35	1.55	1.96	BTV	-	-	-	-	0.539	-	-	0.79	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		264405	Waste
1/7/2011	LOX-1B-3	LXWC0072	LXWC0072S001	Soil	Uranium-238	1.2	1.11	1.05	1.96	BTV	-	YES	1.2	-	-	-	-	0.54	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL	LXWC0031 Stepout #1	270159	Waste
1/7/2011	LOX-1B-3	LXWC0073	LXWC0073S001	Soil	Uranium-238	1.22	1.39	1.36	1.96	BTV	-	-	-	-	1.22	-	-	0.69	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL	LXWC0031 Stepout #2	270159	Waste
1/7/2011	LOX-1B-3	LXWC0074	LXWC0074S001	Soil	Uranium-238	0.468	1.11	1.17	1.96	BTV	-	-	-	-	0.468	-	-	0.60	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL	LXWC0031 Stepout #3	270159	Waste
1/7/2011	LOX-1B-3	LXWC0075	LXWC0075S001	Soil	Uranium-238	1.57	1.29	0.893	1.96	BTV	-	YES	1.57	-	-	-	-	0.46	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL	LXWC0031 Stepout #4	270159	Waste
1/7/2011	LOX-1B-3	LXWC0077	LXWC0077S001	Soil	Uranium-238	0.872	1.49	1.26	1.96	BTV	-	-	-	-	0.872	-	-	0.64	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL	LXWC0050 Stepout #2	270159	Waste
1/7/2011	LOX-1B-3	LXWC0078	LXWC0078S001	Soil	Uranium-238	1.73	0.662	0.469	1.96	BTV	-	YES	1.73	-	-	-	-	0.24	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL	LXWC0050 Stepout #3	270159	Waste
1/7/2011	LOX-1B-3	LXWC0079	LXWC0079S001	Soil	Uranium-238	0.924	1.6	1.43	1.96	BTV	-	-	-	-	0.924	-	-	0.73	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL	LXWC0050 Stepout #4	270159	Waste

ISRA 009, Area II
LOX (Non-Hazardous, Radionuclides > LUT)
Soil Sampling for Radionuclides
and Waste Certification

Introduction

This data package provides the laboratory results of the two samples taken at the LOX-1B-3 site in Area II. The location of the soil samples (LXWC0076) and the demarcated area (designated by the pink shaded area) are shown in Appendix 1. Soil sample results are compared to the draft provisional DTSC look-up table (LUT) values in order to determine if soil exceeds background as required for the NASA/DTSC Administrative Order on Consent (AOC)¹.

Methodology

A total of 84 samples were taken in 79 locations at the LOX area for waste characterization. The majority of locations exhibited no elevated concentrations of radionuclides above background. One location (two samples) exhibited confirmed elevated concentrations of radionuclides above background.

Samples discussed here apply to the non-hazardous, radionuclides>LUT waste stream. Samples taken in 2010 and 2011 for waste disposal characterization were analyzed for strontium-90, tritium and/or gamma emitting radionuclides by gamma spectroscopy, using an off-site laboratory². Minimum detectable concentrations (MDC) for cesium-137 and strontium-90 averaged 0.037 pCi/g and 0.047 pCi/g respectively. The gamma spectroscopy library also included the following contaminants-of-concern: Na-22, K-40, Mn-54, Co-60, Cs-134, Eu-152, Eu-154, Th-228, Th-232, U-235, U-238 and Am-241.

NASA and DTSC have signed an AOC that requires soils on Area II and portions of Area I to be cleaned up to background³. The USEPA has characterized local radionuclide background⁴ in soil and published preliminary radiological trigger levels (RTL) based on the higher of background threshold values (BTV) or minimum detectable concentrations (MDC)⁵.

On August 23, 2012, DTSC sent NASA a letter regarding excavation of ISRA soil⁶. In the letter, DTSC stated,

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

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

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

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

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

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

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

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

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

USEPA issued revised RTLs⁷ in December 2012 which were, in general, higher than the original RTLs. USEPA also issued laboratory specific radiological reference concentrations (RRC) in December 2012⁸. Subsequently, DTSC issued draft provisional LUTs⁹ for 16 radionuclides in January 2013, which in general matched the revised RTLs for those radionuclides whose RTLs were derived from BTVs¹⁰ (for example cesium-137 and uranium-238). The draft provisional LUTs subset also matched exactly the lower of the two lab-specific RRCs. Consistent with DTSC’s intent in issuing draft provisional LUTs for interim remedial action implementation, LOX data is compared to draft provisional LUTs and sample MDCs to determine compliance with the DTSC/NASA AOC.

Results

Appendix 2 shows the soil radionuclide data for the two samples (LXWC0076S001 and re-sampled LXWC0076AS001) taken at the LOX-1B-3 area compared to the draft provisional LUTs and sample MDCs. LUT exceedances are highlighted in yellow

Both original sample LXWC0076S001 (0.264 pCi/g) and resample LXWC0076AS001 (0.347 pCi/g) exceed the cesium-137 LUT of 0.225 pCi/g.

Both original sample LXWC0076S001 (2.08 pCi/g) and resample LXWC0076AS001 (1.99 pCi/g) exceed the uranium-238 LUT of 1.96 pCi/g.

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

⁷ USEPA, “Attachment A – Original and Corrected Radiological Trigger Levels - Development and Use of Radiological Reference Concentrations”, Appendix K of “Final Radiological Characterization of Soils - Area IV and Northern Buffer Zone”, December 21, 2012.

⁸ USEPA, “Attachment B - Radiological Reference Concentrations - Development and Use of Radiological Reference Concentrations”, Appendix K of “Final Radiological Characterization of Soils - Area IV and Northern Buffer Zone”, December 21, 2012.

⁹ DTSC, “Development of the Draft Provisional Radiological Look-Up Table”, DTSC Public Meeting, Chatsworth, California, January 30, 2013.

¹⁰ A notable exception was strontium-90 with a BTV of 0.075 pCi/g, an original RTL of 0.485 pCi/g, a revised RTL of 0.645 pCi/g, lab specific RRCs of 1.07 and 0.117 pCi/g and a draft provisional LUT of 0.117 pCi/g.

Conclusions

In compliance with the NASA/DTSC AOC, excavated soil from the LOX-1B-3 (non-hazardous, radionuclides>LUT) area will be disposed of at EnergySolutions, Clive, Utah, a licensed low-level radioactive waste disposal facility.



Phil Rutherford
Manager, Health, Safety & Radiation Services

Appendix 1
LOX-1B-3 Sampling Locations

Outfall 009 Waste Characterization Sample Locations for LOX-1B-3

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

- Base Map Legend**
- ISRA Excavation Boundary

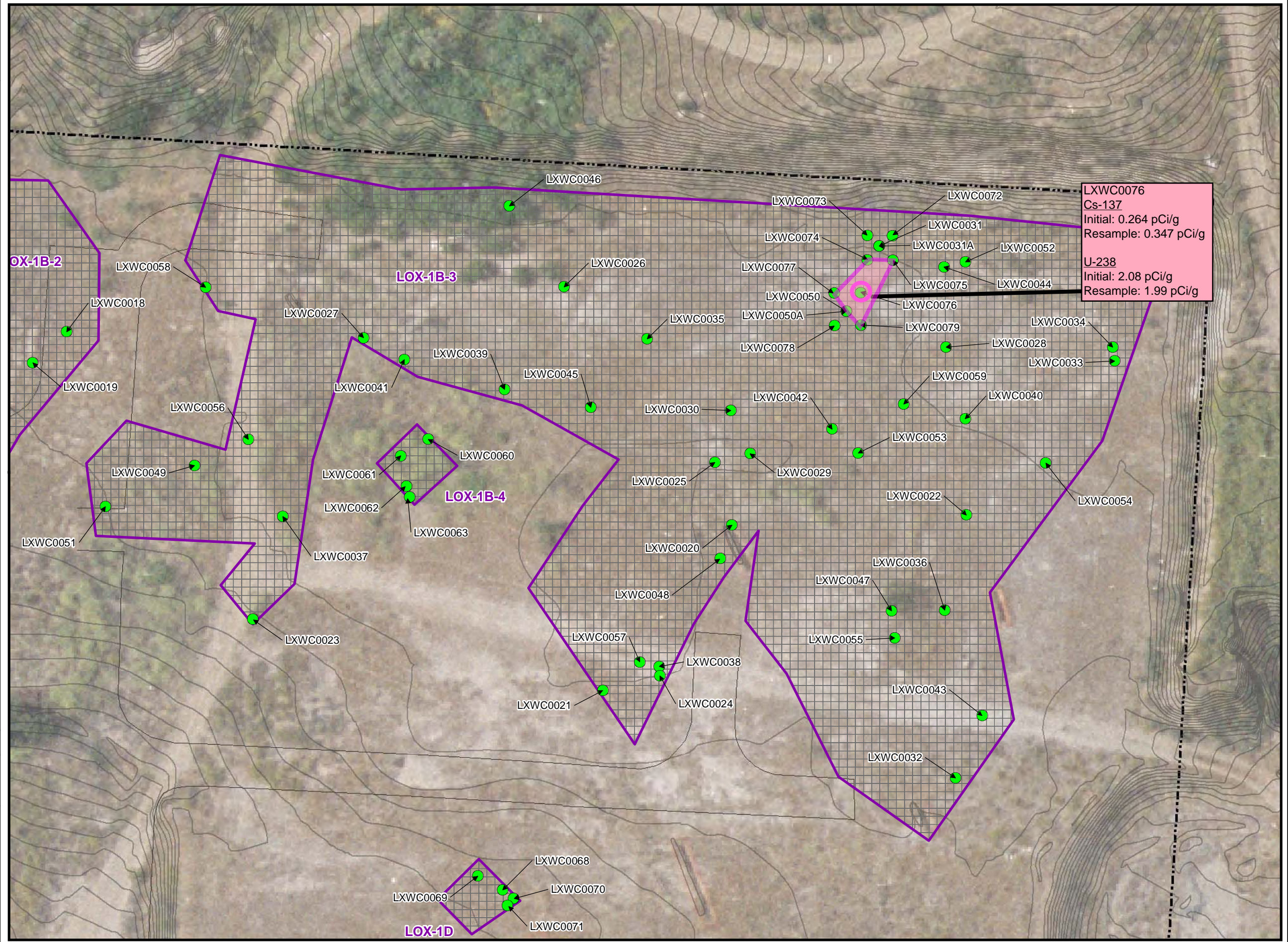
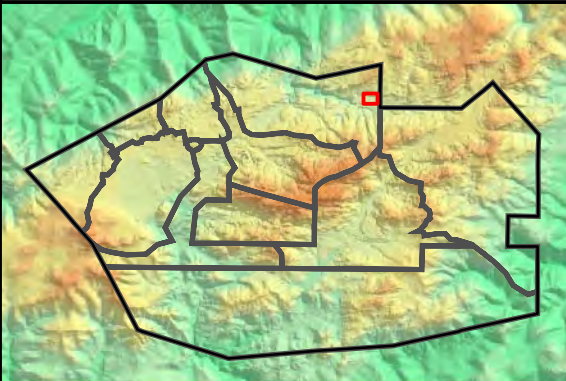
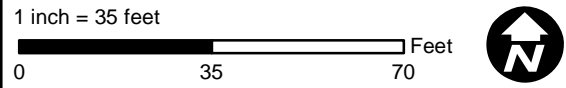
Notes:

	DTSC LUT
Cs-137:	0.225 pCi/g
U-235:	0.152 pCi/g
U-238:	1.96 pCi/g

- Resampling confirmed the initial radionuclide result that met or exceeded the trigger level.
- Boundary of non-hazardous soil with radionuclides above LUT value.

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

Document: ISRA_Plots_Working_LOX-1-B3_SampleLocations_WC.mxd Date: Feb 16, 2011



Appendix 2

**LOX-1B-3 (Non-Hazardous, Radionuclides > LUT)
Radionuclide Results**

**LOX NASA ISRA Soil Data
Non Haz, Radionuclides > LUT (pCi/g)**

Sampling Date	Sampling Location (General)	Sampling Location (Specific)	Sample Serial Number	Media Type	Isotope	Activity	Error (+/-)	MDC	DTSC LUT	LUT Source	Activity > LUT ?	Activity > MDC ?	Detected Activity	Detected Activity > LUT ?	Non-detect Activity	Non-detect Activity > LUT ?	MDC > LUT ?	Ratio of MDC to LUT	Units	Error Type	Analysis Protocol	Analysis Organization	Comments	Document	Status
2/1/2011	LOX-1B-3	LXWC0076	LXWC0076AS001	Soil	Americium-241	0.0251	0.0388	0.0633	0.0386	MDC	-	-	-	-	0.0251	-	YES	1.64	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL	LXWC0050 Stepout #1; Re-sample	271501	Waste
1/7/2011	LOX-1B-3	LXWC0076	LXWC0076S001	Soil	Americium-241	0.057	0.0977	0.173	0.0386	MDC	YES	-	-	-	0.057	YES	YES	4.48	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL	LXWC0050 Stepout #1; Re-sampled	270159	Waste
2/1/2011	LOX-1B-3	LXWC0076	LXWC0076AS001	Soil	Cesium-134	0	0.0427	0.0617	0.0431	MDC	-	-	-	-	0	-	YES	1.43	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL	LXWC0050 Stepout #1; Re-sample	271501	Waste
1/7/2011	LOX-1B-3	LXWC0076	LXWC0076S001	Soil	Cesium-134	0	0.0388	0.062	0.0431	MDC	-	-	-	-	0	-	YES	1.44	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL	LXWC0050 Stepout #1; Re-sampled	270159	Waste
2/1/2011	LOX-1B-3	LXWC0076	LXWC0076AS001	Soil	Cesium-137	0.347	0.0604	0.0432	0.225	BTV	YES	YES	0.347	YES	-	-	-	0.19	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL	LXWC0050 Stepout #1; Re-sample	271501	Waste
1/7/2011	LOX-1B-3	LXWC0076	LXWC0076S001	Soil	Cesium-137	0.264	0.0656	0.0442	0.225	BTV	YES	YES	0.264	YES	-	-	-	0.20	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL	LXWC0050 Stepout #1; Re-sampled	270159	Waste
2/1/2011	LOX-1B-3	LXWC0076	LXWC0076AS001	Soil	Cobalt-60	0.0214	0.0268	0.0485	0.0363	MDC	-	-	-	-	0.0214	-	YES	1.34	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL	LXWC0050 Stepout #1; Re-sample	271501	Waste
1/7/2011	LOX-1B-3	LXWC0076	LXWC0076S001	Soil	Cobalt-60	-0.0335	0.0258	0.0385	0.0363	MDC	-	-	-	-	-0.0335	-	YES	1.06	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL	LXWC0050 Stepout #1; Re-sampled	270159	Waste
2/1/2011	LOX-1B-3	LXWC0076	LXWC0076AS001	Soil	Europium-152	0.0541	0.0675	0.101	0.0739	MDC	-	-	-	-	0.0541	-	YES	1.37	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL	LXWC0050 Stepout #1; Re-sample	271501	Waste
1/7/2011	LOX-1B-3	LXWC0076	LXWC0076S001	Soil	Europium-152	0.0645	0.0668	0.108	0.0739	MDC	-	-	-	-	0.0645	-	YES	1.46	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL	LXWC0050 Stepout #1; Re-sampled	270159	Waste
2/1/2011	LOX-1B-3	LXWC0076	LXWC0076AS001	Soil	Europium-154	-0.0312	0.082	0.137	0.198	MDC	-	-	-	-	-0.0312	-	-	0.69	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL	LXWC0050 Stepout #1; Re-sample	271501	Waste
1/7/2011	LOX-1B-3	LXWC0076	LXWC0076S001	Soil	Europium-154	-0.0491	0.0924	0.153	0.198	MDC	-	-	-	-	-0.0491	-	-	0.77	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL	LXWC0050 Stepout #1; Re-sampled	270159	Waste
2/1/2011	LOX-1B-3	LXWC0076	LXWC0076AS001	Soil	Manganese-54	3.11E-05	0.0257	0.0437	-	-	-	-	-	-	0.0000311	-	-	-	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL	LXWC0050 Stepout #1; Re-sample	271501	Waste
1/7/2011	LOX-1B-3	LXWC0076	LXWC0076S001	Soil	Manganese-54	0.0162	0.0257	0.0464	-	-	-	-	-	-	0.0162	-	-	-	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL	LXWC0050 Stepout #1; Re-sampled	270159	Waste
2/1/2011	LOX-1B-3	LXWC0076	LXWC0076AS001	Soil	Potassium-40	21.4	2.12	0.31	35.5	BTV	-	YES	21.4	-	-	-	-	0.01	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL	LXWC0050 Stepout #1; Re-sample	271501	Waste
1/7/2011	LOX-1B-3	LXWC0076	LXWC0076S001	Soil	Potassium-40	21.5	2.29	0.418	35.5	BTV	-	YES	21.5	-	-	-	-	0.01	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL	LXWC0050 Stepout #1; Re-sampled	270159	Waste
2/1/2011	LOX-1B-3	LXWC0076	LXWC0076AS001	Soil	Sodium-22	-0.0101	0.0289	0.0484	0.0468	MDC	-	-	-	-	-0.0101	-	YES	1.03	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL	LXWC0050 Stepout #1; Re-sample	271501	Waste
1/7/2011	LOX-1B-3	LXWC0076	LXWC0076S001	Soil	Sodium-22	-0.0149	0.0323	0.0538	0.0468	MDC	-	-	-	-	-0.0149	-	YES	1.15	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL	LXWC0050 Stepout #1; Re-sampled	270159	Waste
2/1/2011	LOX-1B-3	LXWC0076	LXWC0076AS001	Soil	Thorium-228	1.77	0.225	0.0612	4.27	BTV	-	YES	1.77	-	-	-	-	0.01	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL	LXWC0050 Stepout #1; Re-sample	271501	Waste
1/7/2011	LOX-1B-3	LXWC0076	LXWC0076S001	Soil	Thorium-228	1.72	0.193	0.0577	4.27	BTV	-	YES	1.72	-	-	-	-	0.01	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL	LXWC0050 Stepout #1; Re-sampled	270159	Waste
2/1/2011	LOX-1B-3	LXWC0076	LXWC0076AS001	Soil	Thorium-232	1.68	0.314	0.142	3.44	BTV	-	YES	1.68	-	-	-	-	0.04	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL	LXWC0050 Stepout #1; Re-sample	271501	Waste
1/7/2011	LOX-1B-3	LXWC0076	LXWC0076S001	Soil	Thorium-232	1.57	0.288	0.167	3.44	BTV	-	YES	1.57	-	-	-	-	0.05	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL	LXWC0050 Stepout #1; Re-sampled	270159	Waste
2/1/2011	LOX-1B-3	LXWC0076	LXWC0076AS001	Soil	Uranium-235	0.00408	0.115	0.212	0.152	BTV	-	-	-	-	0.00408	-	YES	1.39	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL	LXWC0050 Stepout #1; Re-sample	271501	Waste
1/7/2011	LOX-1B-3	LXWC0076	LXWC0076S001	Soil	Uranium-235	0.101	0.116	0.21	0.152	BTV	-	-	-	-	0.101	-	YES	1.38	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL	LXWC0050 Stepout #1; Re-sampled	270159	Waste
2/1/2011	LOX-1B-3	LXWC0076	LXWC0076AS001	Soil	Uranium-238	1.99	0.937	0.625	1.96	BTV	YES	YES	1.99	YES	-	-	-	0.32	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL	LXWC0050 Stepout #1; Re-sample	271501	Waste
1/7/2011	LOX-1B-3	LXWC0076	LXWC0076S001	Soil	Uranium-238	2.08	1.62	1.44	1.96	BTV	YES	YES	2.08	YES	-	-	-	0.73	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL	LXWC0050 Stepout #1; Re-sampled	270159	Waste

ISRA 009, Area II
LOX Debris Pile (Radionuclides < LUT)
Soil Sampling for Radionuclides
and Waste Certification

Introduction

This data package provides the laboratory results of the six samples taken at the LOX site debris pile in Area II. Soil sample results were compared to the draft provisional DTSC look-up table (LUT) values in order to determine if soil exceeds background as required for the NASA/DTSC Administrative Order on Consent (AOC)¹.

Methodology

Samples were analyzed for the EPA Priority 1 set of radionuclides² using an off-site certified laboratory. These include Ac-228, Bi-212, Bi-214, Cs-137, Co-60, Eu-152, Pb-212, Pb-214, Tl-208, Th-234 (gamma spectroscopy); U-238, U-235, U-234, Th-230 and Pu-239/240 (alpha spectroscopy), Ni-59 and Sr-90. Minimum detectable concentrations (MDC) for cesium-137 and strontium-90 were 0.019 pCi/g and 0.045 pCi/g respectively. All radionuclide MDCs are less than their respective LUTs.

NASA and DTSC have signed an AOC that requires soils on Area II and portions of Area I to be cleaned up to background³. The USEPA has characterized local radionuclide background⁴ in soil and has published preliminary radiological trigger levels (RTL) based on the higher of background threshold values (BTV) or minimum detectable concentrations (MDC)⁵.

On August 23, 2012, DTSC sent NASA a letter regarding excavation of ISRA soil⁶. In the letter, DTSC stated,

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

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

² EPA, “Final Technical Memorandum - Look-up Table Recommendations - Santa Susana Field Laboratory - Area IV Radiological Study”, November 27, 2012. Section 4 and Table 1. “USEPA recommends focusing the list of radionuclides analyzed by the laboratory to those that have been detected at concentrations above the respective RRCs in the Area IV Radiological Study (Priority One radionuclides).”

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

⁴ USEPA, “Final Radiological Background Study Report, Santa Susana Field Laboratory, Ventura County, California”, October 2011.

⁵ USEPA, “Technical Memorandum, Radiological Trigger Levels, Santa Susana Field Laboratory Site, Area IV Radiological Study”, December 12, 2011.

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

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

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

USEPA issued revised RTLs⁷ in December 2012 which were, in general, higher than the original RTLs. USEPA also issued laboratory specific radiological reference concentrations (RRC) in December 2012⁸. Subsequently, DTSC issued draft provisional LUTs⁹ for 16 radionuclides in January 2013, which in general matched the revised RTLs for those radionuclides whose RTLs were derived from BTVs¹⁰ (for example cesium-137 and uranium-238). The draft provisional LUTs subset also matched exactly the lower of the two lab-specific RRCs. Consistent with DTSC's intent in issuing draft provisional LUTs for interim remedial action implementation, LOX data is compared to draft provisional LUTs and sample MDCs to determine compliance with the DTSC/NASA AOC.

Results

Appendix 1 shows the soil radionuclide data for the samples taken at the LOX debris pile compared to the draft provisional LUTs and sample MDCs. Appendix 2 contains the laboratory report. All concentrations are below the draft provisional LUTs and/or less than the sample MDC and therefore comply with the NASA/DTSC AOC. The LOX debris pile is therefore not contaminated above background.

Conclusions

The LOX debris pile from the LOX area is released for disposal with no radiological restrictions. .



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⁷ USEPA, "Attachment A – Original and Corrected Radiological Trigger Levels - Development and Use of Radiological Reference Concentrations", Appendix K of "Final Radiological Characterization of Soils - Area IV and Northern Buffer Zone", December 21, 2012.

⁸ USEPA, "Attachment B - Radiological Reference Concentrations - Development and Use of Radiological Reference Concentrations", Appendix K of "Final Radiological Characterization of Soils - Area IV and Northern Buffer Zone", December 21, 2012.

⁹ DTSC, "Development of the Draft Provisional Radiological Look-Up Table", DTSC Public Meeting, Chatsworth, California, January 30, 2013.

¹⁰ A notable exception was strontium-90 with a BTV of 0.075 pCi/g, an original RTL of 0.485 pCi/g, a revised RTL of 0.645 pCi/g, lab specific RRCs of 1.07 and 0.117 pCi/g and a draft provisional LUT of 0.117 pCi/g.

Appendix 1

LOX Debris Pile (Below LUT) Radionuclide Results

LOX Debris Pile Soil Data
Radionuclides < LUT (pCi/g)

Sampling Date	Sampling Location (General)	Sampling Location (Specific)	Sample Serial Number	Media Type	Isotope	Activity	Error (+/-)	MDC	DTSC LUT	LUT Source	Activity > LUT ?	Activity > MDC ?	Detected Activity	Detected Activity > LUT ?	Non-detect Activity	Non-detect Activity > LUT ?	MDC > LUT ?	Ratio of MDC to LUT	Units	Error Type	Analysis Protocol	Analysis Organization	Comments	Document	Status
8/1/2013	LOX	LOXDRS S	LOXDRS_S1	SOIL	Actinium-228	1.28	0.141	0.134	2.68	BTV	-	YES	1.28	-	-	-	-	0.05	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		330816	Waste
8/1/2013	LOX	LOXDRS S	LOXDRS_S2	SOIL	Actinium-228	0.885	0.0967	0.0892	2.68	BTV	-	YES	0.885	-	-	-	-	0.03	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		330816	Waste
8/1/2013	LOX	LOXDRS S	LOXDRS_S3	SOIL	Actinium-228	1.06	0.0807	0.078	2.68	BTV	-	YES	1.06	-	-	-	-	0.03	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		330816	Waste
8/1/2013	LOX	LOXDRS S	LOXDRS_S4	SOIL	Actinium-228	1.19	0.136	0.128	2.68	BTV	-	YES	1.19	-	-	-	-	0.05	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		330816	Waste
8/1/2013	LOX	LOXDRS S	LOXDRS_S5	SOIL	Actinium-228	1.11	0.11	0.101	2.68	BTV	-	YES	1.11	-	-	-	-	0.04	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		330816	Waste
8/1/2013	LOX	LOXDRS S	LOXDRS_S6	SOIL	Actinium-228	1	0.126	0.118	2.68	BTV	-	YES	1	-	-	-	-	0.04	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		330816	Waste
8/1/2013	LOX	LOXDRS S	LOXDRS_S1	SOIL	Bismuth-212	0.895	0.206	0.19	2.38	BTV	-	YES	0.895	-	-	-	-	0.08	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		330816	Waste
8/1/2013	LOX	LOXDRS S	LOXDRS_S2	SOIL	Bismuth-212	0.688	0.114	0.111	2.38	BTV	-	YES	0.688	-	-	-	-	0.05	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		330816	Waste
8/1/2013	LOX	LOXDRS S	LOXDRS_S3	SOIL	Bismuth-212	0.672	0.116	0.103	2.38	BTV	-	YES	0.672	-	-	-	-	0.04	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		330816	Waste
8/1/2013	LOX	LOXDRS S	LOXDRS_S4	SOIL	Bismuth-212	0.837	0.18	0.175	2.38	BTV	-	YES	0.837	-	-	-	-	0.07	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		330816	Waste
8/1/2013	LOX	LOXDRS S	LOXDRS_S5	SOIL	Bismuth-212	0.857	0.143	0.132	2.38	BTV	-	YES	0.857	-	-	-	-	0.06	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		330816	Waste
8/1/2013	LOX	LOXDRS S	LOXDRS_S6	SOIL	Bismuth-212	0.879	0.168	0.154	2.38	BTV	-	YES	0.879	-	-	-	-	0.06	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		330816	Waste
8/1/2013	LOX	LOXDRS S	LOXDRS_S1	SOIL	Bismuth-214	0.907	0.059	0.0473	1.83	BTV	-	YES	0.907	-	-	-	-	0.03	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		330816	Waste
8/1/2013	LOX	LOXDRS S	LOXDRS_S2	SOIL	Bismuth-214	0.785	0.0435	0.0274	1.83	BTV	-	YES	0.785	-	-	-	-	0.01	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		330816	Waste
8/1/2013	LOX	LOXDRS S	LOXDRS_S3	SOIL	Bismuth-214	0.713	0.0386	0.0259	1.83	BTV	-	YES	0.713	-	-	-	-	0.01	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		330816	Waste
8/1/2013	LOX	LOXDRS S	LOXDRS_S4	SOIL	Bismuth-214	0.838	0.056	0.039	1.83	BTV	-	YES	0.838	-	-	-	-	0.02	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		330816	Waste
8/1/2013	LOX	LOXDRS S	LOXDRS_S5	SOIL	Bismuth-214	0.78	0.0496	0.0319	1.83	BTV	-	YES	0.78	-	-	-	-	0.02	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		330816	Waste
8/1/2013	LOX	LOXDRS S	LOXDRS_S6	SOIL	Bismuth-214	0.698	0.0547	0.0388	1.83	BTV	-	YES	0.698	-	-	-	-	0.02	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		330816	Waste
8/1/2013	LOX	LOXDRS S	LOXDRS_S1	SOIL	Cesium-137	-0.0103	0.0145	0.0254	0.225	BTV	-	-	-	-	-0.0103	-	-	0.11	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		330816	Waste
8/1/2013	LOX	LOXDRS S	LOXDRS_S2	SOIL	Cesium-137	0.0173	0.0119	0.0144	0.225	BTV	-	YES	0.0173	-	-	-	-	0.06	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		330816	Waste
8/1/2013	LOX	LOXDRS S	LOXDRS_S3	SOIL	Cesium-137	0.0192	0.0119	0.0137	0.225	BTV	-	YES	0.0192	-	-	-	-	0.06	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		330816	Waste
8/1/2013	LOX	LOXDRS S	LOXDRS_S4	SOIL	Cesium-137	0.0116	0.0111	0.0233	0.225	BTV	-	-	-	-	-	-	-	0.10	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		330816	Waste
8/1/2013	LOX	LOXDRS S	LOXDRS_S5	SOIL	Cesium-137	0.0281	0.019	0.0151	0.225	BTV	-	YES	0.0281	-	-	-	-	0.07	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		330816	Waste
8/1/2013	LOX	LOXDRS S	LOXDRS_S6	SOIL	Cesium-137	0.0309	0.0174	0.0215	0.225	BTV	-	YES	0.0309	-	-	-	-	0.10	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		330816	Waste
8/1/2013	LOX	LOXDRS S	LOXDRS_S1	SOIL	Cobalt-60	0.00147	0.0142	0.0246	0.0363	MDC	-	-	-	-	0.00147	-	-	0.68	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		330816	Waste
8/1/2013	LOX	LOXDRS S	LOXDRS_S2	SOIL	Cobalt-60	0.0132	0.0091	0.0169	0.0363	MDC	-	-	-	-	0.0132	-	-	0.47	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		330816	Waste
8/1/2013	LOX	LOXDRS S	LOXDRS_S3	SOIL	Cobalt-60	-0.0024	0.00831	0.0141	0.0363	MDC	-	-	-	-	-0.0024	-	-	0.39	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		330816	Waste
8/1/2013	LOX	LOXDRS S	LOXDRS_S4	SOIL	Cobalt-60	0.00663	0.0137	0.0252	0.0363	MDC	-	-	-	-	0.00663	-	-	0.69	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		330816	Waste
8/1/2013	LOX	LOXDRS S	LOXDRS_S5	SOIL	Cobalt-60	-0.00275	0.0108	0.0188	0.0363	MDC	-	-	-	-	-0.00275	-	-	0.52	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		330816	Waste
8/1/2013	LOX	LOXDRS S	LOXDRS_S6	SOIL	Cobalt-60	-0.00181	0.0118	0.0208	0.0363	MDC	-	-	-	-	-0.00181	-	-	0.57	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		330816	Waste
8/1/2013	LOX	LOXDRS S	LOXDRS_S1	SOIL	Europium-152	0.0155	0.0416	0.0622	0.0739	MDC	-	-	-	-	0.0155	-	-	0.84	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		330816	Waste
8/1/2013	LOX	LOXDRS S	LOXDRS_S2	SOIL	Europium-152	-0.00217	0.0236	0.041	0.0739	MDC	-	-	-	-	-0.00217	-	-	0.55	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		330816	Waste
8/1/2013	LOX	LOXDRS S	LOXDRS_S3	SOIL	Europium-152	-0.0396	0.0267	0.0353	0.0739	MDC	-	-	-	-	-0.0396	-	-	0.48	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		330816	Waste
8/1/2013	LOX	LOXDRS S	LOXDRS_S4	SOIL	Europium-152	-0.0271	0.0264	0.0462	0.0739	MDC	-	-	-	-	-0.0271	-	-	0.63	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		330816	Waste
8/1/2013	LOX	LOXDRS S	LOXDRS_S5	SOIL	Europium-152	-0.0263	0.0234	0.0421	0.0739	MDC	-	-	-	-	-0.0263	-	-	0.57	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		330816	Waste
8/1/2013	LOX	LOXDRS S	LOXDRS_S6	SOIL	Europium-152	-0.012	0.0305	0.0513	0.0739	MDC	-	-	-	-	-0.012	-	-	0.69	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		330816	Waste
8/1/2013	LOX	LOXDRS S	LOXDRS_S1	SOIL	Lead-212	1.66	0.0484	0.0362	3.11	BTV	-	YES	1.66	-	-	-	-	0.01	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		330816	Waste
8/1/2013	LOX	LOXDRS S	LOXDRS_S2	SOIL	Lead-212	1.16	0.0372	0.0253	3.11	BTV	-	YES	1.16	-	-	-	-	0.01	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		330816	Waste
8/1/2013	LOX	LOXDRS S	LOXDRS_S3	SOIL	Lead-212	1.3	0.0317	0.0225	3.11	BTV	-	YES	1.3	-	-	-	-	0.01	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		330816	Waste
8/1/2013	LOX	LOXDRS S	LOXDRS_S4	SOIL	Lead-212	1.38	0.0372	0.0269	3.11	BTV	-	YES	1.38	-	-	-	-	0.01	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		330816	Waste
8/1/2013	LOX	LOXDRS S	LOXDRS_S5	SOIL	Lead-212	1.37	0.0381	0.0261	3.11	BTV	-	YES	1.37	-	-	-	-	0.01	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		330816	Waste
8/1/2013	LOX	LOXDRS S	LOXDRS_S6	SOIL	Lead-212	1.38	0.0456	0.0296	3.11	BTV	-	YES	1.38	-	-	-	-	0.01	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		330816	Waste
8/1/2013	LOX	LOXDRS S	LOXDRS_S1	SOIL	Lead-214	1.1	0.053	0.0448	1.96	BTV	-	YES	1.1	-	-	-	-	0.02	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		330816	Waste
8/1/2013	LOX	LOXDRS S	LOXDRS_S2	SOIL	Lead-214	0.887	0.0513	0.0291	1.96	BTV	-	YES	0.887	-	-	-	-	0.01	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		330816	Waste
8/1/2013	LOX	LOXDRS S	LOXDRS_S3	SOIL	Lead-214	0.891	0.0417	0.0266	1.96	BTV	-	YES	0.891	-	-	-	-	0.01	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		330816	Waste
8/1/2013	LOX	LOXDRS S	LOXDRS_S4	SOIL	Lead-214	0.944	0.0518	0.0346	1.96	BTV	-	YES	0.944	-	-	-	-	0.02	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		330816	Waste
8/1/2013	LOX	LOXDRS S	LOXDRS_S5	SOIL	Lead-214	0.926	0.0509	0.0324	1.96	BTV	-	YES	0.926	-	-	-	-	0.02	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		330816	Waste
8/1/2013	LOX	LOXDRS S	LOXDRS_S6	SOIL	Lead-214	0.847	0.0589	0.0371	1.96	BTV	-	YES	0.847	-	-	-	-	0.02	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		330816	Waste
8/1/2013	LOX	LOXDRS S	LOXDRS_S1	SOIL	Nickel-59	0	0.829	0.278	0.875	MDC	-	-	-	-	0	-	-	0.32	pCi/g	2 sigma	DOE RESL Ni-1	GEL		330816	Waste
8/1/2013	LOX	LOXDRS S	LOXDRS_S2	SOIL	Nickel-59	-4.19	0.442	0.589	0.875	MDC	-	-	-	-	-4.19	-	-	0.67	pCi/g	2 sigma	DOE RESL Ni-1	GEL		330816	Waste
8/1/2013	LOX	LOXDRS S	LOXDRS_S3	SOIL	Nickel-59	-0.303	0.653	0.604	0.875	MDC	-	-	-	-	-0.303	-	-	0.69	pCi/g	2 sigma	DOE RESL Ni-1	GEL		330816	Waste
8/1/2013	LOX	LOXDRS S	LOXDRS_S4	SOIL	Nickel-59	0.0162	0.346	0.59	0.875	MDC	-	-	-	-	0.0162	-	-	0.67	pCi/g	2 sigma	DOE RESL Ni-1	GEL		330816	Waste
8/1/2013	LOX	LOXDRS S	LOXDRS_S5	SOIL	Nickel-59	-0.312	0.482	0.75																	

**LOX Debris Pile Soil Data
Radionuclides < LUT (pCi/g)**

Sampling Date	Sampling Location (General)	Sampling Location (Specific)	Sample Serial Number	Media Type	Isotope	Activity	Error (+/-)	MDC	DTSC LUT	LUT Source	Activity > LUT ?	Activity > MDC ?	Detected Activity	Detected Activity > LUT ?	Non-detect Activity	Non-detect Activity > LUT ?	MDC > LUT ?	Ratio of MDC to LUT	Units	Error Type	Analysis Protocol	Analysis Organization	Comments	Document	Status
8/1/2013	LOX	LOXDRS_S	LOXDRS_S5	SOIL	Thorium-234	1.53	0.245	0.205	3.54	BTV	-	YES	1.53	-	-	-	-	0.06	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		330816	Waste
8/1/2013	LOX	LOXDRS_S	LOXDRS_S6	SOIL	Thorium-234	1.33	0.273	0.181	3.54	BTV	-	YES	1.33	-	-	-	-	0.05	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		330816	Waste
8/1/2013	LOX	LOXDRS_S	LOXDRS_S1	SOIL	Uranium-233/234	0.956	0.209	0.115	2.18	BTV	-	YES	0.956	-	-	-	-	0.05	pCi/g	2 sigma	DOE EML HASL-300, U-02-RC Modified	GEL		330816	Waste
8/1/2013	LOX	LOXDRS_S	LOXDRS_S2	SOIL	Uranium-233/234	0.875	0.151	0.0478	2.18	BTV	-	YES	0.875	-	-	-	-	0.02	pCi/g	2 sigma	DOE EML HASL-300, U-02-RC Modified	GEL		330816	Waste
8/1/2013	LOX	LOXDRS_S	LOXDRS_S3	SOIL	Uranium-233/234	0.833	0.176	0.0937	2.18	BTV	-	YES	0.833	-	-	-	-	0.04	pCi/g	2 sigma	DOE EML HASL-300, U-02-RC Modified	GEL		330816	Waste
8/1/2013	LOX	LOXDRS_S	LOXDRS_S4	SOIL	Uranium-233/234	0.763	0.21	0.114	2.18	BTV	-	YES	0.763	-	-	-	-	0.05	pCi/g	2 sigma	DOE EML HASL-300, U-02-RC Modified	GEL		330816	Waste
8/1/2013	LOX	LOXDRS_S	LOXDRS_S5	SOIL	Uranium-233/234	0.961	0.267	0.135	2.18	BTV	-	YES	0.961	-	-	-	-	0.06	pCi/g	2 sigma	DOE EML HASL-300, U-02-RC Modified	GEL		330816	Waste
8/1/2013	LOX	LOXDRS_S	LOXDRS_S6	SOIL	Uranium-233/234	0.81	0.198	0.106	2.18	BTV	-	YES	0.81	-	-	-	-	0.05	pCi/g	2 sigma	DOE EML HASL-300, U-02-RC Modified	GEL		330816	Waste
8/1/2013	LOX	LOXDRS_S	LOXDRS_S1	SOIL	Uranium-235/236	-0.0244	0.0493	0.124	0.152	BTV	-	-	-	-	-0.0244	-	-	0.82	pCi/g	2 sigma	DOE EML HASL-300, U-02-RC Modified	GEL		330816	Waste
8/1/2013	LOX	LOXDRS_S	LOXDRS_S2	SOIL	Uranium-235/236	0.0244	0.0349	0.0244	0.152	BTV	-	-	-	-	0.0244	-	-	0.16	pCi/g	2 sigma	DOE EML HASL-300, U-02-RC Modified	GEL		330816	Waste
8/1/2013	LOX	LOXDRS_S	LOXDRS_S3	SOIL	Uranium-235/236	0.111	0.075	0.0334	0.152	BTV	-	YES	0.111	-	-	-	-	0.22	pCi/g	2 sigma	DOE EML HASL-300, U-02-RC Modified	GEL		330816	Waste
8/1/2013	LOX	LOXDRS_S	LOXDRS_S4	SOIL	Uranium-235/236	0.0133	0.0497	0.0837	0.152	BTV	-	-	-	-	0.0133	-	-	0.55	pCi/g	2 sigma	DOE EML HASL-300, U-02-RC Modified	GEL		330816	Waste
8/1/2013	LOX	LOXDRS_S	LOXDRS_S5	SOIL	Uranium-235/236	0.0398	0.0782	0.108	0.152	BTV	-	-	-	-	0.0398	-	-	0.71	pCi/g	2 sigma	DOE EML HASL-300, U-02-RC Modified	GEL		330816	Waste
8/1/2013	LOX	LOXDRS_S	LOXDRS_S6	SOIL	Uranium-235/236	0.0579	0.0682	0.0434	0.152	BTV	-	YES	0.0579	-	-	-	-	0.29	pCi/g	2 sigma	DOE EML HASL-300, U-02-RC Modified	GEL		330816	Waste
8/1/2013	LOX	LOXDRS_S	LOXDRS_S1	SOIL	Uranium-238	0.953	0.205	0.0805	1.96	BTV	-	YES	0.953	-	-	-	-	0.04	pCi/g	2 sigma	DOE EML HASL-300, U-02-RC Modified	GEL		330816	Waste
8/1/2013	LOX	LOXDRS_S	LOXDRS_S2	SOIL	Uranium-238	0.943	0.159	0.0758	1.96	BTV	-	YES	0.943	-	-	-	-	0.04	pCi/g	2 sigma	DOE EML HASL-300, U-02-RC Modified	GEL		330816	Waste
8/1/2013	LOX	LOXDRS_S	LOXDRS_S3	SOIL	Uranium-238	0.805	0.172	0.0815	1.96	BTV	-	YES	0.805	-	-	-	-	0.04	pCi/g	2 sigma	DOE EML HASL-300, U-02-RC Modified	GEL		330816	Waste
8/1/2013	LOX	LOXDRS_S	LOXDRS_S4	SOIL	Uranium-238	0.833	0.214	0.0424	1.96	BTV	-	YES	0.833	-	-	-	-	0.02	pCi/g	2 sigma	DOE EML HASL-300, U-02-RC Modified	GEL		330816	Waste
8/1/2013	LOX	LOXDRS_S	LOXDRS_S5	SOIL	Uranium-238	1.04	0.273	0.0549	1.96	BTV	-	YES	1.04	-	-	-	-	0.03	pCi/g	2 sigma	DOE EML HASL-300, U-02-RC Modified	GEL		330816	Waste
8/1/2013	LOX	LOXDRS_S	LOXDRS_S6	SOIL	Uranium-238	0.88	0.206	0.106	1.96	BTV	-	YES	0.88	-	-	-	-	0.05	pCi/g	2 sigma	DOE EML HASL-300, U-02-RC Modified	GEL		330816	Waste

Appendix 2
LOX Debris Pile Laboratory Report



August 09, 2013

Ms. Sarah Von Raesfeld, MWH
MWH Americas, Inc.
2121 N California Blvd
Suite 600
Walnut Creek, California 94596

Re: ISRA Waste Characterization, Outfall 009 LOX - RAD
Work Order: 330816

Dear Ms. MWH:

GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the enclosed analytical results for the sample(s) we received on August 02, 2013. This original data report has been prepared and reviewed in accordance with GEL's standard operating procedures.

Our policy is to provide high quality, personalized analytical services to enable you to meet your analytical needs on time every time. We trust that you will find everything in order and to your satisfaction. If you have any questions, please do not hesitate to call me at (843) 556-8171, ext. 4505.

Sincerely,

Joanne Harley for
Heather Shaffer
Project Manager

Purchase Order:
Chain of Custody:
Project Number: ~PROJECT_NUMBER~
Enclosures

Case Narrative

**Case Narrative
for
Boeing - SSFL (MWH)
Work Order: 330816
SDG: 330816**

August 09, 2013

Laboratory Identification:

GEL Laboratories LLC
2040 Savage Road
Charleston, South Carolina 29407
(843) 556-8171

Summary:

Sample Receipt

The samples arrived at GEL Laboratories LLC, Charleston, South Carolina on August 02, 2013 for analysis.

The laboratory received the following samples:

<u>Laboratory Identification</u>	<u>Sample Description</u>
330816001	LOXDRS_S1
330816002	LOXDRS_S2
330816003	LOXDRS_S3
330816004	LOXDRS_S4
330816005	LOXDRS_S5
330816006	LOXDRS_S6

Data Package

Items of Note

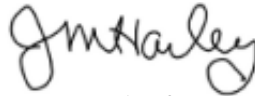
Case Narrative

Sample analyses were conducted using methodology as outlined in GEL Laboratories, LLC (GEL) Standard Operating Procedures. Any technical or administrative problems during analysis, data review, and reduction are contained in the analytical case narratives in the enclosed data package.

Data Package:

The enclosed data package contains the following sections: Case Narrative, Chain of Custody, Cooler Receipt Checklist, Data Package Qualifier Definitions and data from the following fractions: Radiochemistry.

I certify that this data package is in compliance with the terms and conditions of the subcontract and task order, both technically and for the completeness, for other than the conditions detailed in the attached case narratives.

A handwritten signature in black ink, appearing to read "Joanne Harley". The signature is written in a cursive, flowing style.

Joanne Harley for
Heather Shaffer
Project Manager

Chain of Custody and Supporting Documentation

Page: 1 of 1
 Project #: _____
 GEL Quote #: _____
 COC Number ⁽¹⁾: _____
 PO Number: Direct Bill to Boeing
GEL Chain of Custody and Analytical Request
 See www.gel.com for GEL's Sample Acceptance SOP
GEL Work Order Number: 330816 330817
 GEL Laboratories, LLC
 2040 Savage Road
 Charleston, SC 29407
 Phone: (843) 556-8171
 Fax: (843) 766-1178

Client Name: The Boeing Company - SSFL
 Project/Site Name: ISRA Waste Characterization / LOX
 Address: 5800 Woolsey Canyon Road, Canoga Park CA 91304
 Phone #: _____
 Fax #: _____

Sample Analysis Requested ⁽⁶⁾ (Fill in the number of containers for each test)

Sample ID	*Date Collected (mm-dd-yy)	*Time Collected (Military) (hhmm)	QC Code ⁽¹⁾	Field Filtered ⁽²⁾	Sample Matrix ⁽³⁾	Sample Analysis Requested ⁽⁶⁾						Comments
						EPA Priority 1 Radionuclides	SVOCs by 8270C	TPH by 8015B	Title 22 Metals by 6010B/7471A	PCBs by 8082	←-- Preservative Type (6)	
LOXDRS_S1	8/1/2013	1355			SO	X	X	X	X	X		
LOXDRS_S2	8/1/2013	1400			SO	X	X	X	X	X		
LOXDRS_S3	8/1/2013	1405			SO	X	X	X	X	X		
LOXDRS_S4	8/1/2013	1410			SO	X	X	X	X	X		
LOXDRS_S5	8/1/2013	1350			SO	X	X	X	X	X		
LOXDRS_S6	8/1/2013	1415			SO	X	X	X	X	X		

Requested: Normal: Rush: 5 day TAT Specify: _____ (Subject to Speed/Fax Results: Yes / No) Circle Deliverable: C of A / QC Summary / Level 1 / Level 2 / Level 3 / Level 4
 Remarks: See "Laboratory CRMDC" file dated 07/29/2013 for list of EPA Priority 1 Radionuclides and required MDCs (emailed 7/31/13).
 Log chem and radchem into separate SDGs
 Provide Level II pdf, bedms format EDD for chem, and SSFLRad format EDD for radchem

Chain of Custody Signatures

Relinquished By (Signed)	Date	Time	Requested by (Signed)	Date	Time
	8/1/13	1530			

GEL PM: Heather Shafter
 Method of Shipment: FedEx
 Date Shipped: 8/1/13
 Airbill #: _____
 Airbill #: _____

1.) Chain of Custody Number = Client Determined
 2.) QC Codes: N = Normal Sample, TB = Trip Blank, FD = Field Duplicate, EB = Equipment Blank, MS = Matrix Spike Sample, MSD = Matrix Spike Duplicate Sample, G = Grab, C = Composite
 3.) Field Filtered: For liquid matrices, indicate with a - Y - for yes the sample was field filtered or - N - for sample was not field filtered.
 4.) Matrix Codes: DW=Drinking Water, GW=Groundwater, SW=Surface Water, WW=Waste Water, W=Water, ML=Misc Liquid, SO=Soil, SD=Sediment, SL=Sludge, SS=Solid Waste, O=Oil, F=Filter, P=Wipe, U=Urine, F=Fecal, N=Nasal
 5.) Sample Analysis Requested: Analytical method requested (i.e. 8260B, 6010B/7470A) and number of containers provided for each (i.e. 8260B - 3, 6010B/7470A - 1).
 6.) Preservative Type: HA = Hydrochloric Acid, NI = Nitric Acid, SH = Sodium Hydroxide, SA = Sulfuric Acid, AA = Ascorbic Acid, HX = Hexane, ST = Sodium Thiosulfate. If no preservative is added - leave field blank
WHITE = LABORATORY
YELLOW = FILE
PINK = CLIENT
 For Lab Receiving Use Only
 Custody Seal Intact? YES / NO
 Cooler Temp: _____

Client: <u>SPL</u>		SDG/AR/COC/Work Order: <u>330816 330817</u>	
Received By: <u>H. Taylor</u>		Date Received: <u>080213</u>	
Suspected Hazard Information		*If Net Counts > 100cpm on samples not marked "radioactive", contact the Radiation Safety Group for further investigation.	
COC/Samples marked as radioactive?	<input type="checkbox"/>	Maximum Net Counts Observed* (Observed Counts - Area Background Counts):	
Classified Radioactive II or III by RSO?	<input type="checkbox"/>	If yes, Were swipes taken of sample containers < action levels? <u>0cpm</u>	
COC/Samples marked containing PCBs?	<input type="checkbox"/>		
Package, COC, and/or Samples marked as beryllium or asbestos containing?	<input type="checkbox"/>	If yes, samples are to be segregated as Safety Controlled Samples, and opened by the GEL Safety Group.	
Shipped as a DOT Hazardous?	<input type="checkbox"/>	Hazard Class Shipped: UN#:	
Samples identified as Foreign Soil?	<input type="checkbox"/>		

Sample Receipt Criteria		Yes	NA	No	Comments/Qualifiers (Required for Non-Conforming Items)
1	Shipping containers received intact and sealed?	<input checked="" type="checkbox"/>			Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
2	Samples requiring cold preservation within (0 ≤ 6 deg. C)?*	<input checked="" type="checkbox"/>			Preservation Method: Ice bags Blue ice Dry ice None Other (describe) <u>2</u> all temperatures are recorded in Celsius
2a	Daily check performed and passed on IR temperature gun?	<input checked="" type="checkbox"/>			Temperature Device Serial #: <u>21050004</u> Secondary Temperature Device Serial # (If Applicable):
3	Chain of custody documents included with shipment?	<input checked="" type="checkbox"/>			
4	Sample containers intact and sealed?	<input checked="" type="checkbox"/>			Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
5	Samples requiring chemical preservation at proper pH?	<input checked="" type="checkbox"/>			Sample ID's, containers affected and observed pH: If Preservation added, Lot#:
6	VOA vials free of headspace (defined as < 6mm bubble)?	<input checked="" type="checkbox"/>			Sample ID's and containers affected:
7	Are Encore containers present?	<input checked="" type="checkbox"/>			(If yes, immediately deliver to Volatiles laboratory)
8	Samples received within holding time?	<input checked="" type="checkbox"/>			ID's and tests affected:
9	Sample ID's on COC match ID's on bottles?	<input checked="" type="checkbox"/>			Sample ID's and containers affected:
10	Date & time on COC match date & time on bottles?	<input checked="" type="checkbox"/>			Sample ID's affected:
11	Number of containers received match number indicated on COC?	<input checked="" type="checkbox"/>			Sample ID's affected:
12	Are sample containers identifiable as GEL provided?	<input checked="" type="checkbox"/>			
13	COC form is properly signed in relinquished/received sections?	<input checked="" type="checkbox"/>			
14	Carrier and tracking number.				Circle Applicable: <u>FedEx Air</u> FedEx Ground UPS Field Services Courier Other <u>7963 7644 2587</u>

Comments (Use Continuation Form if needed):

GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 – (843) 556-8171 – www.gel.com

Certificate of Analysis Report for

SSFL001 Boeing – SSFL (MWH)

Client SDG: 330816 GEL Work Order: 330816

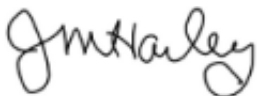
The Qualifiers in this report are defined as follows:

- * A quality control analyte recovery is outside of specified acceptance criteria
- ** Analyte is a Tracer compound
- ** Analyte is a surrogate compound
- U Analyte was analyzed for, but not detected above the MDL, MDA, or LOD.
- UI Gamma Spectroscopy—Uncertain identification

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the Certificate of Analysis.

The designation ND, if present, appears in the result column when the analyte concentration is not detected above the limit as defined in the 'U' qualifier above.

This data report has been prepared and reviewed in accordance with GEL Laboratories LLC standard operating procedures. Please direct any questions to your Project Manager, Heather Shaffer.



Reviewed by _____

DATA EXCEPTION REPORT

Mo.Day Yr. 08-AUG-13	Division: Radiochemistry	Quality Criteria: SOP	Type: Process
Instrument Type: ALPHA SPECTROMETER	Test / Method: DOE EML HASL-300, Pu-11-RC Modified	Matrix Type: Solid	Client Code: SSFL
Batch ID: 1320150	Sample Numbers: See Below		

Potentially affected work order(s)(SDG): 330816

Application Issues:

Other

**Specification and Requirements
Exception Description:**

DER Disposition:

1. Sample 1202921724 does not meet the resolution requirement of having a full width half maximum of 100 keV or less for the Pu-242 tracer.

1. The sample does meet the tracer yield requirement, the spiked recovery requirement, and its tracer peak is within the Pu-242 region of interest. Reporting results.

Originator's Name:

Melanie Aycok 08-AUG-13

Data Validator/Group Leader:

Jessica Downey 08-AUG-13

Laboratory Certifications

List of current GEL Certifications as of 09 August 2013

State	Certification
Alaska	UST-110
Arkansas	88-0651
CLIA	42D0904046
California NELAP	01151CA
Colorado	SC00012
Connecticut	PH-0169
Delaware	SC00012
DoD ELAP A2LA ISO 17025	2567.01
Florida NELAP	E87156
Foreign Soils Permit	P330-12-00283, P330-12-00284
Georgia	SC00012
Georgia SDWA	967
Hawaii	SC00012
Idaho	SC00012
Illinois NELAP	200029
Indiana	C-SC-01
Kansas NELAP	E-10332
Kentucky	90129
Louisiana NELAP	03046 (AI33904)
Louisiana SDWA	LA130005
Maryland	270
Massachusetts	M-SC012
Nevada	SC000122011-1
New Hampshire NELAP	2054
New Jersey NELAP	SC002
New Mexico	SC00012
New York NELAP	11501
North Carolina	233
North Carolina SDWA	45709
Oklahoma	9904
Pennsylvania NELAP	68-00485
Plant Material Permit	PDEP-12-00260
South Carolina Chemistry	10120001
South Carolina Radiochemi	10120002
Tennessee	TN 02934
Texas NELAP	T104704235-13-8
Utah NELAP	SC000122013-8
Vermont	VT87156
Virginia NELAP	460202
Washington	C780-12
Wisconsin	999887790

GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

Certificate of Analysis

Company : MWH Americas, Inc.
Address : 2121 N California Blvd
Suite 600
Walnut Creek, California 94596
Contact: Ms. Sarah Von Raesfeld, MWH
Project: ISRA Waste Characterization, Outfall 009

Report Date: August 9, 2013

Client Sample ID: LOXDRS_S1
Sample ID: 330816001
Matrix: Soil
Collect Date: 01-AUG-13
Receive Date: 02-AUG-13
Collector: Client
Moisture: 5.99%

Project: SSFL00112
Client ID: SSFL001

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	DF	Analyst	Date	Time	Batch	Mtd.
Rad Alpha Spec Analysis													
<i>Alphaspec Pu, Solid required MDCs "As Received"</i>													
Plutonium-239/240	U	0.00554	+/-0.0156	0.0166	+/-0.0156	0.020	pCi/g		MXS2	08/07/13	0940	1320150	1
<i>Alphaspec Th, Solid required MDCs "As Received"</i>													
Thorium-230		0.923	+/-0.675	0.885	+/-0.698	1.00	pCi/g		MXS2	08/07/13	2024	1320154	2
<i>Alphaspec U, Solid required MDCs "As Received"</i>													
Uranium-233/234		0.956	+/-0.209	0.115	+/-0.254	1.00	pCi/g		MXS2	08/07/13	2315	1320166	3
Uranium-235/236	U	-0.0244	+/-0.0493	0.124	+/-0.0493	0.100	pCi/g						
Uranium-238		0.953	+/-0.205	0.0805	+/-0.251	1.00	pCi/g						
Rad Gamma Spec Analysis													
<i>Gamma Ni59, Solid required MDCs "As Received"</i>													
Nickel-59	UI	0.00	+/-0.829	0.278	+/-0.831	0.800	pCi/g		TYJ1	08/07/13	1332	1319943	4
<i>Gammasespec, Gamma, solid required MDCs "As Received"</i>													
Actinium-228		1.28	+/-0.141	0.134	+/-0.197	1.00	pCi/g		MXR1	08/05/13	1634	1319845	5
Bismuth-212		0.895	+/-0.206	0.190	+/-0.219	1.00	pCi/g						
Bismuth-214		0.907	+/-0.059	0.0473	+/-0.0966	1.00	pCi/g						
Cesium-137	U	-0.0103	+/-0.0145	0.0254	+/-0.0152	0.050	pCi/g						
Cobalt-60	U	0.00147	+/-0.0142	0.0246	+/-0.0142	0.0363	pCi/g						
Europium-152	U	0.0155	+/-0.0416	0.0622	+/-0.0422	0.0739	pCi/g						
Lead-212		1.66	+/-0.0484	0.0362	+/-0.169	1.00	pCi/g						
Lead-214		1.10	+/-0.053	0.0448	+/-0.113	1.00	pCi/g						
Thallium-208		0.417	+/-0.0323	0.0229	+/-0.0482	0.500	pCi/g						
Thorium-234		1.49	+/-0.307	0.224	+/-0.342	1.00	pCi/g						
Rad Gas Flow Proportional Counting													
<i>GFPC, Sr90, solid required MDCs "As Received"</i>													
Strontium-90	U	0.0283	+/-0.0272	0.045	+/-0.0276	0.050	pCi/g		JXR1	08/07/13	1221	1320004	6

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	DRS1	08/02/13	1911	1319818
GEL Prep Method	Wet Soil Prep GL-RAD-A-026				1319821

The following Analytical Methods were performed

Method	Description
1	DOE EML HASL-300, Pu-11-RC Modified
2	DOE EML HASL-300, Th-01-RC Modified
3	DOE EML HASL-300, U-02-RC Modified
4	DOE RESL Ni-1

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Certificate of Analysis

Company : MWH Americas, Inc.
Address : 2121 N California Blvd
Suite 600
Walnut Creek, California 94596

Report Date: August 9, 2013

Contact: Ms. Sarah Von Raesfeld, MWH
Project: ISRA Waste Characterization, Outfall 009

Client Sample ID: LOXDRS_S1
Sample ID: 330816001

Project: SSFL00112
Client ID: SSFL001

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	DF	Analyst	Date	Time	Batch	Mtd.
5		DOE HASL 300, 4.5.2.3/Ga-01-R											
6		EPA 905.0 Modified											

Surrogate/Tracer Recovery	Test	Batch ID	Recovery%	Acceptable Limits
Plutonium-242 Tracer	Alphaspec Pu, Solid required MDCs "As Received"	1320150	64.3	(15%-125%)
Thorium-229 Tracer	Alphaspec Th, Solid required MDCs "As Received"	1320154	77.4	(15%-125%)
Uranium-232 Tracer	Alphaspec U, Solid required MDCs "As Received"	1320166	33.1	(15%-125%)
Nickel Carrier	Gamma Ni59, Solid required MDCs "As Received"	1319943	55.3	(25%-125%)
Strontium Carrier	GFPC, Sr90, solid required MDCs "As Received"	1320004	58.6	(25%-125%)

Notes:
TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

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Report Date: August 9, 2013

Contact: Ms. Sarah Von Raesfeld, MWH
Project: ISRA Waste Characterization, Outfall 009

Client Sample ID: LOXDRS_S2
Sample ID: 330816002
Matrix: Soil
Collect Date: 01-AUG-13
Receive Date: 02-AUG-13
Collector: Client
Moisture: 11.4%

Project: SSFL00112
Client ID: SSFL001

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	DF	Analyst	Date	Time	Batch	Mtd.
Rad Alpha Spec Analysis													
<i>Alphaspec Pu, Solid required MDCs "As Received"</i>													
Plutonium-239/240	U	0.00	+/-0.0114	0.017	+/-0.0115	0.020	pCi/g		MXS2	08/07/13	0940	1320150	1
<i>Alphaspec Th, Solid required MDCs "As Received"</i>													
Thorium-230	U	0.623	+/-0.684	0.934	+/-0.700	1.00	pCi/g		MXS2	08/07/13	2024	1320154	2
<i>Alphaspec U, Solid required MDCs "As Received"</i>													
Uranium-233/234		0.875	+/-0.151	0.0478	+/-0.193	1.00	pCi/g		MXS2	08/07/13	2315	1320166	3
Uranium-235/236		0.0244	+/-0.0349	0.0244	+/-0.035	0.100	pCi/g						
Uranium-238		0.943	+/-0.159	0.0758	+/-0.205	1.00	pCi/g						
Rad Gamma Spec Analysis													
<i>Gamma Ni59, Solid required MDCs "As Received"</i>													
Nickel-59	U	-4.19	+/-0.442	0.589	+/-1.98	0.800	pCi/g		TYJ1	08/07/13	1453	1319943	4
<i>Gammasespec, Gamma, solid required MDCs "As Received"</i>													
Actinium-228		0.885	+/-0.0967	0.0892	+/-0.157	1.00	pCi/g		MXR1	08/05/13	1635	1319845	5
Bismuth-212		0.688	+/-0.114	0.111	+/-0.131	1.00	pCi/g						
Bismuth-214		0.785	+/-0.0435	0.0274	+/-0.0773	1.00	pCi/g						
Cesium-137		0.0173	+/-0.0119	0.0144	+/-0.012	0.050	pCi/g						
Cobalt-60	U	0.0132	+/-0.0091	0.0169	+/-0.0109	0.0363	pCi/g						
Europium-152	U	-0.00217	+/-0.0236	0.041	+/-0.0236	0.0739	pCi/g						
Lead-212		1.16	+/-0.0372	0.0253	+/-0.112	1.00	pCi/g						
Lead-214		0.887	+/-0.0513	0.0291	+/-0.0926	1.00	pCi/g						
Thallium-208		0.328	+/-0.025	0.0145	+/-0.0366	0.500	pCi/g						
Thorium-234		1.43	+/-0.254	0.206	+/-0.285	1.00	pCi/g						
Rad Gas Flow Proportional Counting													
<i>GFPC, Sr90, solid required MDCs "As Received"</i>													
Strontium-90	U	0.0196	+/-0.0273	0.0467	+/-0.0275	0.050	pCi/g		JXR1	08/07/13	1544	1320004	6

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	DRS1	08/02/13	1911	1319818
GEL Prep Method	Wet Soil Prep GL-RAD-A-026				1319821

The following Analytical Methods were performed

Method	Description
1	DOE EML HASL-300, Pu-11-RC Modified
2	DOE EML HASL-300, Th-01-RC Modified
3	DOE EML HASL-300, U-02-RC Modified
4	DOE RESL Ni-1
5	DOE HASL 300, 4.5.2.3/Ga-01-R

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Certificate of Analysis

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Report Date: August 9, 2013

Contact: Ms. Sarah Von Raesfeld, MWH
Project: ISRA Waste Characterization, Outfall 009

Client Sample ID: LOXDRS_S2
Sample ID: 330816002

Project: SSFL00112
Client ID: SSFL001

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	DF	Analyst	Date	Time	Batch	Mtd.
6	EPA 905.0 Modified												
Surrogate/Tracer	Recovery	Test					Batch ID	Recovery%	Acceptable Limits				
Plutonium-242 Tracer		Alphaspec Pu, Solid required MDCs "As Received"					1320150	56.8	(15%-125%)				
Thorium-229 Tracer		Alphaspec Th, Solid required MDCs "As Received"					1320154	49.1	(15%-125%)				
Uranium-232 Tracer		Alphaspec U, Solid required MDCs "As Received"					1320166	51.5	(15%-125%)				
Nickel Carrier		Gamma Ni59, Solid required MDCs "As Received"					1319943	60.6	(25%-125%)				
Strontium Carrier		GFPC, Sr90, solid required MDCs "As Received"					1320004	70.7	(25%-125%)				

Notes:

TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

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Report Date: August 9, 2013

Contact: Ms. Sarah Von Raesfeld, MWH
 Project: ISRA Waste Characterization, Outfall 009

Client Sample ID: LOXDRS_S3
 Sample ID: 330816003
 Matrix: Soil
 Collect Date: 01-AUG-13
 Receive Date: 02-AUG-13
 Collector: Client
 Moisture: 6.75%

Project: SSFL00112
 Client ID: SSFL001

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	DF	Analyst	Date	Time	Batch	Mtd.
Rad Alpha Spec Analysis													
<i>Alphaspec Pu, Solid required MDCs "As Received"</i>													
Plutonium-239/240	U	0.00	+/-0.0104	0.0155	+/-0.0105	0.020	pCi/g		MXS2	08/07/13	0940	1320150	1
<i>Alphaspec Th, Solid required MDCs "As Received"</i>													
Thorium-230		1.51	+/-0.765	0.711	+/-0.812	1.00	pCi/g		MXS2	08/07/13	2024	1320154	2
<i>Alphaspec U, Solid required MDCs "As Received"</i>													
Uranium-233/234		0.833	+/-0.176	0.0937	+/-0.213	1.00	pCi/g		MXS2	08/07/13	2315	1320166	3
Uranium-235/236		0.111	+/-0.075	0.0334	+/-0.0768	0.100	pCi/g						
Uranium-238		0.805	+/-0.172	0.0815	+/-0.207	1.00	pCi/g						
Rad Gamma Spec Analysis													
<i>Gamma Ni59, Solid required MDCs "As Received"</i>													
Nickel-59	U	-0.303	+/-0.653	0.604	+/-0.668	0.800	pCi/g		TYJ1	08/07/13	1453	1319943	4
<i>Gammasespec, Gamma, solid required MDCs "As Received"</i>													
Actinium-228		1.06	+/-0.0807	0.078	+/-0.199	1.00	pCi/g		MXR1	08/05/13	1636	1319845	5
Bismuth-212		0.672	+/-0.116	0.103	+/-0.133	1.00	pCi/g						
Bismuth-214		0.713	+/-0.0386	0.0259	+/-0.0694	1.00	pCi/g						
Cesium-137		0.0192	+/-0.0119	0.0137	+/-0.012	0.050	pCi/g						
Cobalt-60	U	-0.0024	+/-0.00831	0.0141	+/-0.00838	0.0363	pCi/g						
Europium-152	U	-0.0396	+/-0.0267	0.0353	+/-0.0323	0.0739	pCi/g						
Lead-212		1.30	+/-0.0317	0.0225	+/-0.111	1.00	pCi/g						
Lead-214		0.891	+/-0.0417	0.0266	+/-0.0828	1.00	pCi/g						
Thallium-208		0.356	+/-0.0201	0.013	+/-0.0351	0.500	pCi/g						
Thorium-234		1.80	+/-0.248	0.197	+/-0.295	1.00	pCi/g						
Rad Gas Flow Proportional Counting													
<i>GFPC, Sr90, solid required MDCs "As Received"</i>													
Strontium-90	U	0.028	+/-0.0276	0.0458	+/-0.028	0.050	pCi/g		JXR1	08/07/13	1222	1320004	6

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	DRS1	08/02/13	1911	1319818
GEL Prep Method	Wet Soil Prep GL-RAD-A-026				1319821

The following Analytical Methods were performed

Method	Description
1	DOE EML HASL-300, Pu-11-RC Modified
2	DOE EML HASL-300, Th-01-RC Modified
3	DOE EML HASL-300, U-02-RC Modified
4	DOE RESL Ni-1
5	DOE HASL 300, 4.5.2.3/Ga-01-R

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Report Date: August 9, 2013

Contact: Ms. Sarah Von Raesfeld, MWH
Project: ISRA Waste Characterization, Outfall 009

Client Sample ID: LOXDRS_S3
Sample ID: 330816003

Project: SSFL00112
Client ID: SSFL001

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	DF	Analyst	Date	Time	Batch	Mtd.
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6 EPA 905.0 Modified

Surrogate/Tracer	Recovery	Test	Batch ID	Recovery%	Acceptable Limits
Plutonium-242 Tracer		Alphaspec Pu, Solid required MDCs "As Received"	1320150	66.9	(15%-125%)
Thorium-229 Tracer		Alphaspec Th, Solid required MDCs "As Received"	1320154	78.2	(15%-125%)
Uranium-232 Tracer		Alphaspec U, Solid required MDCs "As Received"	1320166	40.1	(15%-125%)
Nickel Carrier		Gamma Ni59, Solid required MDCs "As Received"	1319943	65.4	(25%-125%)
Strontium Carrier		GFPC, Sr90, solid required MDCs "As Received"	1320004	70.7	(25%-125%)

Notes:

TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

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Report Date: August 9, 2013

Contact: Ms. Sarah Von Raesfeld, MWH
 Project: ISRA Waste Characterization, Outfall 009

Client Sample ID: LOXDRS_S4
 Sample ID: 330816004
 Matrix: Soil
 Collect Date: 01-AUG-13
 Receive Date: 02-AUG-13
 Collector: Client
 Moisture: 7.02%

Project: SSFL00112
 Client ID: SSFL001

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	DF	Analyst	Date	Time	Batch	Mtd.
Rad Alpha Spec Analysis													
<i>Alphaspec Pu, Solid required MDCs "As Received"</i>													
Plutonium-239/240	U	0.00	+/-0.00877	0.013	+/-0.00879	0.020	pCi/g		MXS2	08/07/13	0940	1320150	1
<i>Alphaspec Th, Solid required MDCs "As Received"</i>													
Thorium-230		1.84	+/-0.924	0.888	+/-0.986	1.00	pCi/g		MXS2	08/07/13	2024	1320154	2
<i>Alphaspec U, Solid required MDCs "As Received"</i>													
Uranium-233/234		0.763	+/-0.210	0.114	+/-0.243	1.00	pCi/g		MXS2	08/07/13	1453	1320166	3
Uranium-235/236	U	0.0133	+/-0.0497	0.0837	+/-0.0498	0.100	pCi/g						
Uranium-238		0.833	+/-0.214	0.0424	+/-0.253	1.00	pCi/g						
Rad Gamma Spec Analysis													
<i>Gamma Ni59, Solid required MDCs "As Received"</i>													
Nickel-59	U	0.0162	+/-0.346	0.590	+/-0.347	0.800	pCi/g		TYJ1	08/07/13	1436	1319943	4
<i>Gammasespec, Gamma, solid required MDCs "As Received"</i>													
Actinium-228		1.19	+/-0.136	0.128	+/-0.204	1.00	pCi/g		MXR1	08/05/13	1637	1319845	5
Bismuth-212		0.837	+/-0.180	0.175	+/-0.195	1.00	pCi/g						
Bismuth-214		0.838	+/-0.056	0.039	+/-0.0898	1.00	pCi/g						
Cesium-137	U	0.0116	+/-0.0111	0.0233	+/-0.0112	0.050	pCi/g						
Cobalt-60	U	0.00663	+/-0.0137	0.0252	+/-0.014	0.0363	pCi/g						
Europium-152	U	-0.0271	+/-0.0264	0.0462	+/-0.0292	0.0739	pCi/g						
Lead-212		1.38	+/-0.0372	0.0269	+/-0.131	1.00	pCi/g						
Lead-214		0.944	+/-0.0518	0.0346	+/-0.096	1.00	pCi/g						
Thallium-208		0.396	+/-0.0243	0.0198	+/-0.0416	0.500	pCi/g						
Thorium-234		1.95	+/-0.191	0.155	+/-0.266	1.00	pCi/g						
Rad Gas Flow Proportional Counting													
<i>GFPC, Sr90, solid required MDCs "As Received"</i>													
Strontium-90	U	0.0172	+/-0.0263	0.0456	+/-0.0265	0.050	pCi/g		JXR1	08/07/13	1222	1320004	6

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	DRS1	08/02/13	1911	1319818
GEL Prep Method	Wet Soil Prep GL-RAD-A-026				1319821

The following Analytical Methods were performed

Method	Description
1	DOE EML HASL-300, Pu-11-RC Modified
2	DOE EML HASL-300, Th-01-RC Modified
3	DOE EML HASL-300, U-02-RC Modified
4	DOE RESL Ni-1
5	DOE HASL 300, 4.5.2.3/Ga-01-R

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Report Date: August 9, 2013

Contact: Ms. Sarah Von Raesfeld, MWH
Project: ISRA Waste Characterization, Outfall 009

Client Sample ID: LOXDRS_S4
Sample ID: 330816004

Project: SSFL00112
Client ID: SSFL001

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	DF	Analyst	Date	Time	Batch	Mtd.
6	EPA 905.0 Modified												
Surrogate/Tracer	Recovery	Test					Batch ID	Recovery%	Acceptable Limits				
Plutonium-242 Tracer		Alphaspec Pu, Solid required MDCs "As Received"					1320150	77.1	(15%-125%)				
Thorium-229 Tracer		Alphaspec Th, Solid required MDCs "As Received"					1320154	66.4	(15%-125%)				
Uranium-232 Tracer		Alphaspec U, Solid required MDCs "As Received"					1320166	94.5	(15%-125%)				
Nickel Carrier		Gamma Ni59, Solid required MDCs "As Received"					1319943	60.6	(25%-125%)				
Strontium Carrier		GFPC, Sr90, solid required MDCs "As Received"					1320004	54.1	(25%-125%)				

Notes:

TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

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Report Date: August 9, 2013

Contact: Ms. Sarah Von Raesfeld, MWH
 Project: ISRA Waste Characterization, Outfall 009

Client Sample ID: LOXDRS_S5
 Sample ID: 330816005
 Matrix: Soil
 Collect Date: 01-AUG-13
 Receive Date: 02-AUG-13
 Collector: Client
 Moisture: 7.98%

Project: SSFL00112
 Client ID: SSFL001

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	DF	Analyst	Date	Time	Batch	Mtd.
Rad Alpha Spec Analysis													
<i>Alphaspec Pu, Solid required MDCs "As Received"</i>													
Plutonium-239/240	U	0.00	+/-0.00805	0.00999	+/-0.00806	0.020	pCi/g		MXS2	08/07/13	1631	1320150	1
<i>Alphaspec Th, Solid required MDCs "As Received"</i>													
Thorium-230	U	0.268	+/-0.430	0.701	+/-0.437	1.00	pCi/g		MXS2	08/07/13	2024	1320154	2
<i>Alphaspec U, Solid required MDCs "As Received"</i>													
Uranium-233/234		0.961	+/-0.267	0.135	+/-0.315	1.00	pCi/g		MXS2	08/07/13	0942	1320166	3
Uranium-235/236	U	0.0398	+/-0.0782	0.108	+/-0.0785	0.100	pCi/g						
Uranium-238		1.04	+/-0.273	0.0549	+/-0.328	1.00	pCi/g						
Rad Gamma Spec Analysis													
<i>Gamma Ni59, Solid required MDCs "As Received"</i>													
Nickel-59	U	-0.312	+/-0.482	0.753	+/-0.503	0.800	pCi/g		TYJ1	08/07/13	1454	1319943	4
<i>Gammasespec, Gamma, solid required MDCs "As Received"</i>													
Actinium-228		1.11	+/-0.110	0.101	+/-0.208	1.00	pCi/g		MXR1	08/05/13	1637	1319845	5
Bismuth-212		0.857	+/-0.143	0.132	+/-0.166	1.00	pCi/g						
Bismuth-214		0.780	+/-0.0496	0.0319	+/-0.0823	1.00	pCi/g						
Cesium-137		0.0281	+/-0.019	0.0151	+/-0.0192	0.050	pCi/g						
Cobalt-60	U	-0.00275	+/-0.0108	0.0188	+/-0.0109	0.0363	pCi/g						
Europium-152	U	-0.0263	+/-0.0234	0.0421	+/-0.0263	0.0739	pCi/g						
Lead-212		1.37	+/-0.0381	0.0261	+/-0.145	1.00	pCi/g						
Lead-214		0.926	+/-0.0509	0.0324	+/-0.102	1.00	pCi/g						
Thallium-208		0.369	+/-0.0254	0.0161	+/-0.0401	0.500	pCi/g						
Thorium-234		1.53	+/-0.245	0.205	+/-0.290	1.00	pCi/g						
Rad Gas Flow Proportional Counting													
<i>GFPC, Sr90, solid required MDCs "As Received"</i>													
Strontium-90	U	0.0106	+/-0.0246	0.0438	+/-0.0247	0.050	pCi/g		JXR1	08/07/13	1222	1320004	6

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	DRS1	08/02/13	1911	1319818
GEL Prep Method	Wet Soil Prep GL-RAD-A-026				1319821

The following Analytical Methods were performed

Method	Description
1	DOE EML HASL-300, Pu-11-RC Modified
2	DOE EML HASL-300, Th-01-RC Modified
3	DOE EML HASL-300, U-02-RC Modified
4	DOE RESL Ni-1
5	DOE HASL 300, 4.5.2.3/Ga-01-R

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Certificate of Analysis

Company : MWH Americas, Inc.
Address : 2121 N California Blvd
Suite 600
Walnut Creek, California 94596

Report Date: August 9, 2013

Contact: Ms. Sarah Von Raesfeld, MWH
Project: ISRA Waste Characterization, Outfall 009

Client Sample ID: LOXDRS_S5
Sample ID: 330816005

Project: SSFL00112
Client ID: SSFL001

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	DF	Analyst	Date	Time	Batch	Mtd.
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6 EPA 905.0 Modified

Surrogate/Tracer	Recovery	Test	Batch ID	Recovery%	Acceptable Limits
Plutonium-242 Tracer		Alphaspec Pu, Solid required MDCs "As Received"	1320150	34.3	(15%-125%)
Thorium-229 Tracer		Alphaspec Th, Solid required MDCs "As Received"	1320154	77.3	(15%-125%)
Uranium-232 Tracer		Alphaspec U, Solid required MDCs "As Received"	1320166	57.5	(15%-125%)
Nickel Carrier		Gamma Ni59, Solid required MDCs "As Received"	1319943	63.2	(25%-125%)
Strontium Carrier		GFPC, Sr90, solid required MDCs "As Received"	1320004	60.8	(25%-125%)

Notes:

TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

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Certificate of Analysis

Company : MWH Americas, Inc.
 Address : 2121 N California Blvd
 Suite 600
 Walnut Creek, California 94596

Report Date: August 9, 2013

Contact: Ms. Sarah Von Raesfeld, MWH
 Project: ISRA Waste Characterization, Outfall 009

Client Sample ID: LOXDRS_S6
 Sample ID: 330816006
 Matrix: Soil
 Collect Date: 01-AUG-13
 Receive Date: 02-AUG-13
 Collector: Client
 Moisture: 11.3%

Project: SSFL00112
 Client ID: SSFL001

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	DF	Analyst	Date	Time	Batch	Mtd.
Rad Alpha Spec Analysis													
<i>Alphaspec Pu, Solid required MDCs "As Received"</i>													
Plutonium-239/240	U	0.00	+/-0.0118	0.0175	+/-0.0118	0.020	pCi/g		MXS2	08/07/13	0941	1320150	1
<i>Alphaspec Th, Solid required MDCs "As Received"</i>													
Thorium-230		1.39	+/-0.725	0.713	+/-0.768	1.00	pCi/g		MXS2	08/07/13	2024	1320154	2
<i>Alphaspec U, Solid required MDCs "As Received"</i>													
Uranium-233/234		0.810	+/-0.198	0.106	+/-0.234	1.00	pCi/g		MXS2	08/07/13	2315	1320166	3
Uranium-235/236		0.0579	+/-0.0682	0.0434	+/-0.0688	0.100	pCi/g						
Uranium-238		0.880	+/-0.206	0.106	+/-0.247	1.00	pCi/g						
Rad Gamma Spec Analysis													
<i>Gamma Ni59, Solid required MDCs "As Received"</i>													
Nickel-59	U	0.380	+/-0.626	0.691	+/-0.627	0.800	pCi/g		TYJ1	08/08/13	1001	1319943	4
<i>Gammasespec, Gamma, solid required MDCs "As Received"</i>													
Actinium-228		1.00	+/-0.126	0.118	+/-0.167	1.00	pCi/g		MXR1	08/05/13	1638	1319845	5
Bismuth-212		0.879	+/-0.168	0.154	+/-0.185	1.00	pCi/g						
Bismuth-214		0.698	+/-0.0547	0.0388	+/-0.0793	1.00	pCi/g						
Cesium-137		0.0309	+/-0.0174	0.0215	+/-0.0176	0.050	pCi/g						
Cobalt-60	U	-0.00181	+/-0.0118	0.0208	+/-0.0118	0.0363	pCi/g						
Europium-152	U	-0.012	+/-0.0305	0.0513	+/-0.031	0.0739	pCi/g						
Lead-212		1.38	+/-0.0456	0.0296	+/-0.131	1.00	pCi/g						
Lead-214		0.847	+/-0.0589	0.0371	+/-0.0917	1.00	pCi/g						
Thallium-208		0.362	+/-0.0296	0.0196	+/-0.0422	0.500	pCi/g						
Thorium-234		1.33	+/-0.273	0.181	+/-0.301	1.00	pCi/g						
Rad Gas Flow Proportional Counting													
<i>GFPC, Sr90, solid required MDCs "As Received"</i>													
Strontium-90	U	0.0274	+/-0.0266	0.0435	+/-0.0271	0.050	pCi/g		JXR1	08/07/13	1222	1320004	6

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	DRS1	08/02/13	1911	1319818
GEL Prep Method	Wet Soil Prep GL-RAD-A-026				1319821

The following Analytical Methods were performed

Method	Description
1	DOE EML HASL-300, Pu-11-RC Modified
2	DOE EML HASL-300, Th-01-RC Modified
3	DOE EML HASL-300, U-02-RC Modified
4	DOE RESL Ni-1
5	DOE HASL 300, 4.5.2.3/Ga-01-R

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Certificate of Analysis

Company : MWH Americas, Inc.
Address : 2121 N California Blvd
Suite 600
Walnut Creek, California 94596

Report Date: August 9, 2013

Contact: Ms. Sarah Von Raesfeld, MWH
Project: ISRA Waste Characterization, Outfall 009

Client Sample ID: LOXDRS_S6
Sample ID: 330816006

Project: SSFL00112
Client ID: SSFL001

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	DF	Analyst	Date	Time	Batch	Mtd.
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6 EPA 905.0 Modified

Surrogate/Tracer	Recovery	Test	Batch ID	Recovery%	Acceptable Limits
Plutonium-242 Tracer		Alphaspec Pu, Solid required MDCs "As Received"	1320150	56.8	(15%-125%)
Thorium-229 Tracer		Alphaspec Th, Solid required MDCs "As Received"	1320154	76.0	(15%-125%)
Uranium-232 Tracer		Alphaspec U, Solid required MDCs "As Received"	1320166	30.3	(15%-125%)
Nickel Carrier		Gamma Ni59, Solid required MDCs "As Received"	1319943	48.7	(25%-125%)
Strontium Carrier		GFPC, Sr90, solid required MDCs "As Received"	1320004	50.8	(25%-125%)

Notes:

TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

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QC Summary

Report Date: August 9, 2013
Page 1 of 5

Client : MWH Americas, Inc.
2121 N California Blvd
Suite 600
Walnut Creek, California

Contact: Ms. Sarah Von Raesfeld, MWH

Workorder: 330816

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Rad Alpha Spec											
Batch	1320150										
QC1202921723	330816001 DUP										
Plutonium-239/240	U	0.00554	U	0.00	pCi/g	0		N/A	MXS2	08/07/1309:41	
	Uncert:	+/-0.0156		+/-0.0111							
	TPU:	+/-0.0156		+/-0.0111							
QC1202921724	LCS										
Plutonium-239/240	0.870			0.961	pCi/g		110	(75%-125%)	MXS2	08/07/1309:41	
	Uncert:			+/-0.153							
	TPU:			+/-0.229							
QC1202921722	MB										
Plutonium-239/240			U	0.00	pCi/g				MXS2	08/07/1309:41	
	Uncert:			+/-0.00963							
	TPU:			+/-0.00966							
Batch	1320154										
QC1202921726	330816001 DUP										
Thorium-230		0.923		0.844	pCi/g	8.86		(0% - 100%)	MXS2	08/07/1320:24	
	Uncert:	+/-0.675		+/-0.587							
	TPU:	+/-0.698		+/-0.608							
QC1202921727	LCS										
Thorium-230	17.7			16.0	pCi/g		90.2	(75%-125%)	MXS2	08/07/1320:24	
	Uncert:			+/-2.34							
	TPU:			+/-3.59							
QC1202921725	MB										
Thorium-230			U	0.113	pCi/g				MXS2	08/07/1320:24	
	Uncert:			+/-0.389							
	TPU:			+/-0.392							
Batch	1320166										
QC1202921761	330816001 DUP										
Uranium-233/234		0.956		1.05	pCi/g	9.51		(0%-20%)	MXS2	08/07/1323:15	
	Uncert:	+/-0.209		+/-0.211							
	TPU:	+/-0.254		+/-0.263							
Uranium-235/236	U	-0.0244		0.0918	pCi/g	29.6		(0% - 100%)			
	Uncert:	+/-0.0493		+/-0.0762							
	TPU:	+/-0.0493		+/-0.0774							
Uranium-238		0.953		1.33	pCi/g	32.7*		(0%-20%)			
	Uncert:	+/-0.205		+/-0.234							
	TPU:	+/-0.251		+/-0.307							
QC1202921762	LCS										
Uranium-233/234				4.47	pCi/g				MXS2	08/07/1309:42	
	Uncert:			+/-0.449							
	TPU:			+/-0.829							
Uranium-235/236				0.434	pCi/g						
	Uncert:			+/-0.158							
	TPU:			+/-0.172							

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QC Summary

Workorder: 330816

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Parmname	NOM	Sample Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Rad Alpha Spec									
Batch	1320166								
Uranium-238	4.75		4.90	pCi/g		103	(75%-125%)		
	Uncert:		+/-0.471						
	TPU:		+/-0.898						
QC1202921760 MB									
Uranium-233/234		U	0.0294	pCi/g				MXS2	08/07/1309:42
	Uncert:		+/-0.0467						
	TPU:		+/-0.0469						
Uranium-235/236		U	0.00	pCi/g					
	Uncert:		+/-0.0291						
	TPU:		+/-0.0292						
Uranium-238		U	0.00607	pCi/g					
	Uncert:		+/-0.0337						
	TPU:		+/-0.0338						
Rad Gamma Spec									
Batch	1319845								
QC1202920961 330816001 DUP									
Actinium-228		1.28	1.14	pCi/g	11.6		(0%-20%)	MXR1	08/06/1318:36
	Uncert:	+/-0.141	+/-0.117						
	TPU:	+/-0.197	+/-0.197						
Bismuth-212		0.895	0.859	pCi/g	4.08		(0%-20%)		
	Uncert:	+/-0.206	+/-0.139						
	TPU:	+/-0.219	+/-0.161						
Bismuth-214		0.907	0.875	pCi/g	3.62		(0%-20%)		
	Uncert:	+/-0.059	+/-0.0561						
	TPU:	+/-0.0966	+/-0.0906						
Cesium-137	U	-0.0103	0.00848	pCi/g	0			N/A	
	Uncert:	+/-0.0145	+/-0.0126						
	TPU:	+/-0.0152	+/-0.0132						
Cobalt-60	U	0.00147	-0.00164	pCi/g	0			N/A	
	Uncert:	+/-0.0142	+/-0.0113						
	TPU:	+/-0.0142	+/-0.0113						
Europium-152	U	0.0155	-0.00848	pCi/g	0			N/A	
	Uncert:	+/-0.0416	+/-0.0275						
	TPU:	+/-0.0422	+/-0.0278						
Lead-212		1.66	1.52	pCi/g	8.43		(0%-20%)		
	Uncert:	+/-0.0484	+/-0.0448						
	TPU:	+/-0.169	+/-0.145						
Lead-214		1.10	1.03	pCi/g	6.4		(0%-20%)		
	Uncert:	+/-0.053	+/-0.0485						
	TPU:	+/-0.113	+/-0.102						
Thallium-208		0.417	0.388	pCi/g	7.18		(0%-20%)		
	Uncert:	+/-0.0323	+/-0.0256						
	TPU:	+/-0.0482	+/-0.0407						
Thorium-234		1.49	1.76	pCi/g	16.7		(0%-20%)		
	Uncert:	+/-0.307	+/-0.337						
	TPU:	+/-0.342	+/-0.373						
QC1202920962 LCS									
Actinium-228		U	1.73	pCi/g				MXR1	08/06/1309:19

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QC Summary

Workorder: 330816

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Parmname	NOM	Sample Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Rad Gamma Spec										
Batch	1319845									
			Uncert:							
			TPU:							
Americium-241	492		536	pCi/g		109	(75%-125%)			
			Uncert:							
			TPU:							
Bismuth-212		U	-0.636	pCi/g						
			Uncert:							
			TPU:							
Bismuth-214		U	0.702	pCi/g						
			Uncert:							
			TPU:							
Cesium-137	193		194	pCi/g		101	(75%-125%)			
			Uncert:							
			TPU:							
Cobalt-60	243		238	pCi/g		97.7	(75%-125%)			
			Uncert:							
			TPU:							
Europium-152		U	0.229	pCi/g						
			Uncert:							
			TPU:							
Lead-212		U	0.0713	pCi/g						
			Uncert:							
			TPU:							
Lead-214		U	0.0246	pCi/g						
			Uncert:							
			TPU:							
Thallium-208		U	-0.24	pCi/g						
			Uncert:							
			TPU:							
Thorium-234		U	-0.268	pCi/g						
			Uncert:							
			TPU:							
QC1202920960	MB									
Actinium-228		U	0.0368	pCi/g				MXR1	08/06/13	14:46
			Uncert:							
			TPU:							
Bismuth-212		U	-0.00838	pCi/g						
			Uncert:							
			TPU:							
Bismuth-214		U	0.00603	pCi/g						
			Uncert:							
			TPU:							
Cesium-137		U	-0.00587	pCi/g						
			Uncert:							
			TPU:							
Cobalt-60		U	-0.00271	pCi/g						
			Uncert:							
			TPU:							
Europium-152		U	0.00345	pCi/g						

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QC Summary

Workorder: 330816

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Rad Gamma Spec											
Batch	1319845										
		Uncert:		+/-0.0237							
		TPU:		+/-0.0237							
Lead-212			U	0.000177	pCi/g						
		Uncert:		+/-0.0218							
		TPU:		+/-0.0218							
Lead-214			U	-0.00666	pCi/g						
		Uncert:		+/-0.0283							
		TPU:		+/-0.0284							
Thallium-208			U	-0.017	pCi/g						
		Uncert:		+/-0.016							
		TPU:		+/-0.0178							
Thorium-234			U	0.0138	pCi/g						
		Uncert:		+/-0.259							
		TPU:		+/-0.259							
Batch	1319943										
QC1202921180	330816001 DUP										
Nickel-59		UI	0.00	U	0.311	pCi/g	0		N/A TYJ1	08/08/1311:23	
		Uncert:	+/-0.829		+/-0.370						
		TPU:	+/-0.831		+/-0.397						
QC1202921181	LCS										
Nickel-59		50.9			45.4	pCi/g	89.1	(75%-125%)	TYJ1	08/07/1318:16	
		Uncert:			+/-4.23						
		TPU:			+/-6.10						
QC1202921179	MB										
Nickel-59				U	-0.0507	pCi/g			TYJ1	08/08/1314:28	
		Uncert:			+/-0.103						
		TPU:			+/-0.105						
Rad Gas Flow											
Batch	1320004										
QC1202921314	330816005 DUP										
Strontium-90		U	0.0106	U	-0.0141	pCi/g	0		N/A JXR1	08/08/1310:19	
		Uncert:	+/-0.0246		+/-0.0271						
		TPU:	+/-0.0247		+/-0.0271						
QC1202921316	LCS										
Strontium-90		2.09			2.45	pCi/g	117	(75%-125%)	JXR1	08/07/1312:33	
		Uncert:			+/-0.154						
		TPU:			+/-0.466						
QC1202921313	MB										
Strontium-90				U	-0.0962	pCi/g			JXR1	08/07/1312:22	
		Uncert:			+/-0.016						
		TPU:			+/-0.016						
QC1202921315	330816005 MS										
Strontium-90		9.99	U	0.0106	11.3	pCi/g	113	(75%-125%)	JXR1	08/07/1312:33	
		Uncert:		+/-0.0246	+/-0.715						
		TPU:		+/-0.0247	+/-2.16						

Notes:

TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

The Qualifiers in this report are defined as follows:

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QC Summary

Workorder: 330816

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Parmname	NOM	Sample Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
**	Analyte is a Tracer compound									
<	Result is less than value reported									
>	Result is greater than value reported									
BD	Results are either below the MDC or tracer recovery is low									
FA	Failed analysis.									
H	Analytical holding time was exceeded									
J	Value is estimated									
K	Analyte present. Reported value may be biased high. Actual value is expected to be lower.									
L	Analyte present. Reported value may be biased low. Actual value is expected to be higher.									
M	M if above MDC and less than LLD									
M	REMP Result > MDC/CL and < RDL									
N/A	RPD or %Recovery limits do not apply.									
N1	See case narrative									
ND	Analyte concentration is not detected above the detection limit									
NJ	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier									
Q	One or more quality control criteria have not been met. Refer to the applicable narrative or DER.									
R	Sample results are rejected									
U	Analyte was analyzed for, but not detected above the MDL, MDA, or LOD.									
UI	Gamma Spectroscopy--Uncertain identification									
UJ	Gamma Spectroscopy--Uncertain identification									
UL	Not considered detected. The associated number is the reported concentration, which may be inaccurate due to a low bias.									
X	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier									
Y	Other specific qualifiers were required to properly define the results. Consult case narrative.									
^	RPD of sample and duplicate evaluated using +/-RL. Concentrations are <5X the RL. Qualifier Not Applicable for Radiochemistry.									
h	Preparation or preservation holding time was exceeded									

N/A indicates that spike recovery limits do not apply when sample concentration exceeds spike conc. by a factor of 4 or more.

** Indicates analyte is a surrogate/tracer compound.

^ The Relative Percent Difference (RPD) obtained from the sample duplicate (DUP) is evaluated against the acceptance criteria when the sample is greater than five times (5X) the contract required detection limit (RL). In cases where either the sample or duplicate value is less than 5X the RL, a control limit of +/- the RL is used to evaluate the DUP result.

For PS, PSD, and SDILT results, the values listed are the measured amounts, not final concentrations.

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the QC Summary.

NASA ISRA LOX Area, Area I Radiological Release Survey and Waste Certification

Introduction

This data package provides the radiation release survey results of metal and concrete debris from the NASA ISRA LOX location in Area I of SSFL. This survey complies with the "ISRA Sampling for Radionuclides Plan"¹ and with Boeing procedure RS-00012².

Methodology

Instrument measurements (1 minute static counts) were made for alpha and beta/gamma total surface activity (Ludlum 2224 plus Ludlum 43-89 plastic scintillator probe) and gamma exposure rate (Ludlum 19 microR meter). Wipes were taken for removable alpha/beta activity and counted in a low-background Tennelec laboratory alpha/beta counter.

Instrument minimum detectable activities (MDA) for total activity measurements were 325 to 473 dpm/100 cm² alpha and 797 to 1,006 dpm/100 cm² beta (Ludlum 43-89 probe). Removable activity MDAs for the Tennelec were 9 dpm/100 cm² alpha and 25 dpm/100 cm² beta. These MDAs meet the generic regulatory limits for surface activity shown in Appendix 1. The Ludlum19 MDA is ~4 µR/hr. Survey results are provided in Appendix 2.

Results

100 surface activity measurements and 25 dose rate measurements were taken of the debris.

The majority (99 of 100 or 99%) of all instrument surface activity measurements and wipe tests were non-detect (i.e. less than the MDA) and are therefore indistinguishable from background. The dose from the debris would therefore be zero mrem per year. If it were conservatively assumed that all the debris was actually contaminated at the MDA levels, then the effective dose would be much less than 1 mrem per year^{3,4}.

All surface activity measurements and wipe tests meet the most restrictive regulatory surface activity limits for release/clearance of equipment and material for unrestricted use from former radiological facilities.

¹ Boeing, "ISRA Soil Management Plan", Attachment A, "ISRA Sampling for Radionuclides", July 2009.

² Boeing, "Methods and Procedures for Radiological Monitoring." RS-00012, Revision B, August 6, 2006.

³ ANSI N13.12-1999. "Surface and Volume Radioactivity Standards for Clearance." American National Standards Institute/Health Physics Society, 1999. The most limiting beta/gamma screening value is 6,000 dpm/100 cm² corresponding to a dose of 1 mrem per year. The most limiting alpha screening value is 600 dpm/100 cm² corresponding to a dose of 1 mrem per year.

⁴ NUREG-1640. "Radiological Assessments for Clearance of Materials from Nuclear Facilities." Nuclear Regulatory Commission, June 2003. The most restrictive beta/gamma dose conversion from Table 2.1 is 0.16 µrem/y per dpm/100 cm². This corresponds to 0.8 mrem/y per 5,000 dpm/100 cm².

All surface activity measurements and wipe tests meet the general surface activity limits for release/clearance of equipment and material for unrestricted use from former radiological facilities^{5,6,7}. See Appendix 1 for regulatory limits for surface activity.

All dose rate measurements were within the range of background.

Conclusions

This debris does not originate from a former radiological facility.

The debris is certified to be radiologically acceptable for off-site disposal and/or recycling. There are no radiological controls or restrictions imposed on future disposition or use of this debris.

Waste debris meets the requirements of disposal facility permits^{8,9} and complies with the California Health & Safety Code¹⁰.

The Governor's Executive Order D-62-02 (September 2002) prohibits the "*disposal of decommissioned materials to Class 3 landfills or unclassified management units.*" The subject debris is not decommissioned material, and has not originated from a radiological facility. The survey in this certification has therefore been conducted as a best management practice, which also complies with the requirements of D-62-02. Verification surveys and/or approval by the California Department of Public Health (CDPH) Radiologic Health Branch (RHB) are not required for the off-site disposal of decommissioned material or of the subject material¹¹.

⁵ (a) U.S. Nuclear Regulatory Commission Regulatory Guide 1.86. "Termination of Operating Licenses for Nuclear Reactors." June 1974. (b) U.S. NRC "Guidelines for Decontamination of Facilities and Equipment Prior to Release to Unrestricted Use or Termination of Licenses for Byproduct, Source, or Special Nuclear Material," August 1987.

⁶ (a) U.S. Department of Energy Order 458.1, "Radiation Protection of the Public and Environment" Attachment 1, Section (f)1b, June 6, 2011. (b) U.S. Department of Energy Memorandum from Sally Robison to Roger Liddle, "Site-wide Limits for Release of Facilities without Radiological Restriction", September 17, 1996. (c) U.S. Department of Energy Draft Guide DOE G 441.1-XX. "Control and Release of Property with Residual Radioactive Material." April 4, 2002.

⁷ (a) California Department of Public Health. DECON-1. "Guidelines for Decontamination of Facilities and Equipment Prior to Release for Unrestricted Use." (b) California Department of Public Health Letter from Gerard Wong to Majelle Lee, "Authorized Site-wide Radiological Guidelines for Release for Unrestricted Use", August 9, 1996. (c) California Department of Public Health, IPM-88-2. "Clearance Inspection and Survey." December 1, 1997.

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

⁹ This waste is not prohibited from disposal by any government agency with jurisdictional authority over this waste.

¹⁰ Division 104, Part 9, Chapter 5, Article 1, Section 114715, "No person shall bury, throw away, or in any manner dispose of radioactive wastes within the state except in a manner and at locations as will result in no significant radioactive contamination of the environment."

¹¹ The California Department of Public Health (CDPH) Radiologic Health Branch (RHB) has stated in a November 9, 2007 email to Phil Rutherford (Boeing) ... "*The Governor's Executive Order D-62-02, does*



Phil Rutherford
Manager, Health, Safety & Radiation Services

not specifically require the Department of Health Services (now the Department of Public Health) to perform verification sampling of decommissioned material or to provide approval for disposal of specific decommissioned material shipped offsite (e.g., to Class I or II landfills). The California DPH has not imposed a requirement that Boeing or the Department of Energy (DOE) seek DPH verification sampling or approval of all decommissioned material destined for Class I or II landfills in compliance with the Governor's Executive Order."

Appendix 1
Surface Activity Limits

Surface Activity Limits (dpm/100 cm²)

	Alpha			Beta		
	Total		Removable ⁵	Total		Removable ⁵
	Average ⁴	Maximum ⁵		Average ⁴	Maximum ⁵	
Isotope-specific Regulatory Limits ^{1,2,3}						
Mixed beta/gamma emitters (Cs-137, Sr-90, Co-60, etc.)	-	-	-	5,000	15,000	1,000
Uranium, U-235, U-238 and decay products	5,000	15,000	1,000	5,000	15,000	1,000
Thorium, Th-232	1,000	3,000	200	-	-	-
Sr-90 (separated)				1,000	3,000	200
Transuranics, plutonium, radium-226	100	300	20	-	-	-
General Regulatory Limits	5,000	15,000	1,000	5,000	15,000	1,000
Most Restrictive Regulatory Limit	100	300	20	1,000	3,000	200
Preferred Boeing Limit	100		20	1,000		100
Typical Minimum Detectable Activities	250 - 400		<20	~1,000		<30

^[1] (a) U.S. Nuclear Regulatory Commission Regulatory Guide 1.86. "Termination of Operating Licenses for Nuclear Reactors." June 1974. (b) U.S. NRC "Guidelines for Decontamination of Facilities and Equipment Prior to Release to Unrestricted Use or Termination of Licenses for Byproduct, Source, or Special Nuclear Material," August 1987.

^[2] (a) U.S. Department of Energy Order 458.1, "Radiation Protection of the Public and Environment" Attachment 1, Section (f)1b, June 6, 2011. (b) U.S. Department of Energy Memorandum from Sally Robison to Roger Liddle, "Sitewide Limits for Release of Facilities without Radiological Restriction", September 17, 1996. (c) U.S. Department of Energy Guide DOE G 441.1-XX. "Control and Release of Property with Residual Radioactive Material." April 4, 2002.

^[3] (a) California Department of Public Health. DECON-1. "Guidelines for Decontamination of Facilities and Equipment Prior to Release for Unrestricted Use." (b) California Department of Public Health Letter from Gerard Wong to Majelle Lee, "Authorized Sitewide Radiological Guidelines for Release for Unrestricted Use", August 9, 1996. (c) California Department of Public Health, IPM-88-2. "Clearance Inspection and Survey." December 1, 1997.

^[4] Averaged over 1 m².

^[5] Maximum measured over 100 cm².

Appendix 2
Field Survey Results



RADIATION SURVEY REPORT

FACILITY: Area I

LOCATION: NASA ISRA LOX-1B-1 & LOX-1B-3 debris

LOCATION NUMBER	DATE SAMPLED	DATE MONITORED	PURPOSE: pre-disposal survey LOCATION/OBJECT DESCRIPTION	UNITS LIMITS	Alpha Removable (Net)	Beta Removable (Net)	Alpha Total (Net)	Beta Total (Net)	Gamma (Gross)
					dpm/100 cm ² < 20	dpm/100 cm ² < 100	dpm/100 cm ² < 100 (< 5,000)	dpm/100 cm ² < 1,000 (< 5,000)	μR/h < MDA
1	8/21/2013	8/21/2013	LOX-1B-3 (E/W) metal debris		< 20	< 100	0	0	11
2	8/21/2013	8/21/2013			< 20	< 100	0	0	7
3	8/21/2013	8/21/2013			< 20	< 100	0	0	7
4	8/21/2013	8/21/2013	↓		< 20	< 100	0	0	9
5	8/21/2013	8/21/2013	LOX-1B-3 (NW) metal debris		< 20	< 100	0	0	7
6	8/21/2013	8/21/2013	LOX-1B-3 (NW) metal debris		< 20	< 100	0	337	13
7	8/21/2013	8/21/2013	LOX-1B-3 (NW) metal debris		< 20	< 100	0	0	9
8	8/21/2013	8/21/2013	LOX-1B-3 (S) metal debris		< 20	< 100	0	0	11
9	8/21/2013	8/21/2013			< 20	< 100	0	0	9
10	8/21/2013	8/21/2013			< 20	< 100	0	0	10
11	8/21/2013	8/21/2013			< 20	< 100	0	0	7
12	8/21/2013	8/21/2013			< 20	< 100	0	0	7
13	8/21/2013	8/21/2013	↓		< 20	< 100	0	0	7
14	8/21/2013	8/21/2013	LOX-1B-3 (E/W) wrapped pipe		< 20	< 100	0	250	11
15	8/21/2013	8/21/2013	LOX-1B-3 (E/W) wrapped pipe		< 20	< 100	0	76	13
16	8/21/2013	8/21/2013	LOX-1B-3 (E/W) wrapped pipe		< 20	< 100	0	935	12
17	8/21/2013	8/21/2013	LOX-1B-3 (NW) footer		< 20	< 100	0	0	11
18	8/21/2013	8/21/2013	LOX-1B-3 (NW) footer		< 20	< 100	0	0	11
19	8/21/2013	8/21/2013	LOX-1B-3 non-haz metal debris		< 20	< 100	0	0	12
20	8/21/2013	8/21/2013	LOX-1B-3 non-haz metal debris		< 20	< 100	0	0	13

COMMENTS: MDA = minimum detectable activity
¹Tennelec (MDA = 9 dpm/100 cm² α and 25 dpm/100 cm² β)
²Ludlum 2224 with 43-89 dual alpha beta probe
(MDA 325 - 473 dpm/100 cm² α and 797 - 1006 dpm/100 cm² β)
³Ludlum 19 microR meter (MDA ≤ 4 μrem/h above background)
SAMPLED BY: E. Sorrels *ES* DATE: 8/21/2013
REVIEWED BY: Phil Rutherford *Phil Rutherford* DATE: 8/22/2013

INSTRUMENT	Tennelec ¹		Ludlum 2224 & 43-89 ²		Ludlum 19 ³
IDENTIFICATION	Environmental Tennelec SN 37108		ZO257835		EX030419
CALIBRATION DUE	Daily		8/7/2014		8/7/2014
BACKGROUND (cpm)	0	3.5	10 to 25	381 to 617	7 to 14 μR/h
INSTR. EFFICIENCY	34.47%	37.92%	17.7%	18.4%	NA
COUNT TIME	1 min.		1 min		Scan
Page 1 of 8					

Surface Activity Calculation using Daily Background and MDA

Facility	Area I
Location	NASA ISRA LOX-1B debris
Purpose	pre-disposal

Instrument Type	2224-1/43-89	
Instrument ID	ZO257835	
Calibration Due Date	8/7/2014	
Radiation	alpha	beta
Instrument Efficiency (cpm/emission)	0.177	0.184
Surface Efficiency (emission/dpm)	0.25	0.5
Probe Area (cm ²)	100	100

Input data in blue cells

Daily Background Measurements

Sample	Date	Description (Location, Object)	Material Type	Alpha								Beta							
				Bkgd Count Time (min)	Sample Count Time (min)	Bkgd Gross Count	Bkgd Count Rate (cpm)	Bkgd Gross Activity (dpm/100 cm ²)	L _c (counts)	L _D (counts)	MDA (dpm/100 cm ²)	Bkgd Count Time (min)	Sample Count Time (min)	Bkgd Gross Count	Bkgd Count Rate (cpm)	Bkgd Gross Activity (dpm/100 cm ²)	L _c (counts)	L _D (counts)	MDA (dpm/100 cm ²)
1	8/21/2013	B1319 Reference Location - rusty	Concrete	5	1	124	25	560	9	21	473	5	1	2980	596	6478	44	91	989
2	8/21/2013	B1319 Reference Location - rusty	Asphalt	5	1	50	10	226	6	14	325	5	1	3084	617	6704	45	93	1006
3	8/21/2013	B1319 Reference Location -metal	Construction	5	1	103	21	466	8	19	437	5	1	1905	381	4141	35	73	797
4																			
5																			
Average			Miscellaneous	5	1	92	18	417	8	18	412	5	1	2656	531	5775	41	86	931

Sample Area Measurements

Sample	Date	Description (Location, Object)	Material Type	Alpha								Beta							
				Sample Count Time (min)	Gross Sample Count	Gross Count Rate (cpm)	Bkgd Count Rate (cpm)	Net Count Rate (cpm)	Net Activity (dpm/100 cm ²)	MDA (dpm/100 cm ²)	> MDA or < MDA ?	Sample Count Time (min)	Gross Sample Count	Gross Count Rate (cpm)	Bkgd Count Rate (cpm)	Net Count Rate (cpm)	Net Activity (dpm/100 cm ²)	MDA (dpm/100 cm ²)	> MDA or < MDA ?
1		LOX-1B-3 (E/W) metal debris	Construction	1	9	9	21	-12	0	437	<MDA	1	283	283	381	-98	0	797	<MDA
2			Construction	1	2	2	21	-19	0	437	<MDA	1	300	300	381	-81	0	797	<MDA
3			Construction	1	3	3	21	-18	0	437	<MDA	1	278	278	381	-103	0	797	<MDA
4			Construction	1	4	4	21	-17	0	437	<MDA	1	302	302	381	-79	0	797	<MDA
5		LOX-1B-3 (NW) metal debris	Construction	1	1	1	21	-20	0	437	<MDA	1	353	353	381	-28	0	797	<MDA
6		LOX-1B-3 (NW) metal debris	Construction	1	4	4	21	-17	0	437	<MDA	1	412	412	381	31	337	797	<MDA
7		LOX-1B-3 (NW) metal debris	Construction	1	4	4	21	-17	0	437	<MDA	1	340	340	381	-41	0	797	<MDA
8		LOX-1B-3 (S) metal debris	Construction	1	7	7	21	-14	0	437	<MDA	1	346	346	381	-35	0	797	<MDA
9			Construction	1	4	4	21	-17	0	437	<MDA	1	358	358	381	-23	0	797	<MDA
10			Construction	1	6	6	21	-15	0	437	<MDA	1	361	361	381	-20	0	797	<MDA
11			Construction	1	4	4	21	-17	0	437	<MDA	1	299	299	381	-82	0	797	<MDA
12			Construction	1	1	1	21	-20	0	437	<MDA	1	316	316	381	-65	0	797	<MDA
13			Construction	1	6	6	21	-15	0	437	<MDA	1	303	303	381	-78	0	797	<MDA
14		LOX-1B-3 (E/W) wrapped pipe	Construction	1	13	13	21	-8	0	437	<MDA	1	404	404	381	23	250	797	<MDA
15		LOX-1B-3 (E/W) wrapped pipe	Construction	1	4	4	21	-17	0	437	<MDA	1	388	388	381	7	76	797	<MDA
16		LOX-1B-3 (E/W) wrapped pipe	Construction	1	3	3	21	-18	0	437	<MDA	1	467	467	381	86	935	797	>MDA
17		LOX-1B-3 (NW) footer	Concrete	1	3	3	25	-22	0	473	<MDA	1	474	474	596	-122	0	989	<MDA
18		LOX-1B-3 (NW) footer	Concrete	1	9	9	25	-16	0	473	<MDA	1	468	468	596	-128	0	989	<MDA
19		LOX-1B-3 non-haz metal debris	Construction	1	3	3	21	-18	0	437	<MDA	1	331	331	381	-50	0	797	<MDA
20		LOX-1B-3 non-haz metal debris	Construction	1	2	2	21	-19	0	437	<MDA	1	372	372	381	-9	0	797	<MDA
21		LOX-1B-3 non-haz metal debris	Construction	1	0	0	21	-21	0	437	<MDA	1	362	362	381	-19	0	797	<MDA
22		LOX-1B-1 wrapped pipe	Construction	1	3	3	21	-18	0	437	<MDA	1	329	329	381	-52	0	797	<MDA
23		LOX-1B-1 wrapped pipe	Construction	1	3	3	21	-18	0	437	<MDA	1	324	324	381	-57	0	797	<MDA
24		LOX-1B-1 pipe post	Construction	1	16	16	21	-5	0	437	<MDA	1	369	369	381	-12	0	797	<MDA
25		LOX-1B-1 post base	Concrete	1	11	11	25	-14	0	473	<MDA	1	503	503	596	-93	0	989	<MDA

Sample Report

Batch ID:	Smears 1 Minute Count - 201308211114	Count Date:	8/21/2013 11:14:06AM
Group:	D	Count Minutes:	1.00
Device:	Environ Tennelec SN 37108	Count Mode:	Simultaneous
Batch Key:	2486	Operating Volts:	1410
Selected	Swipe/Smear	Comments:	Area I NASA ISRA LOX-1B debris smear

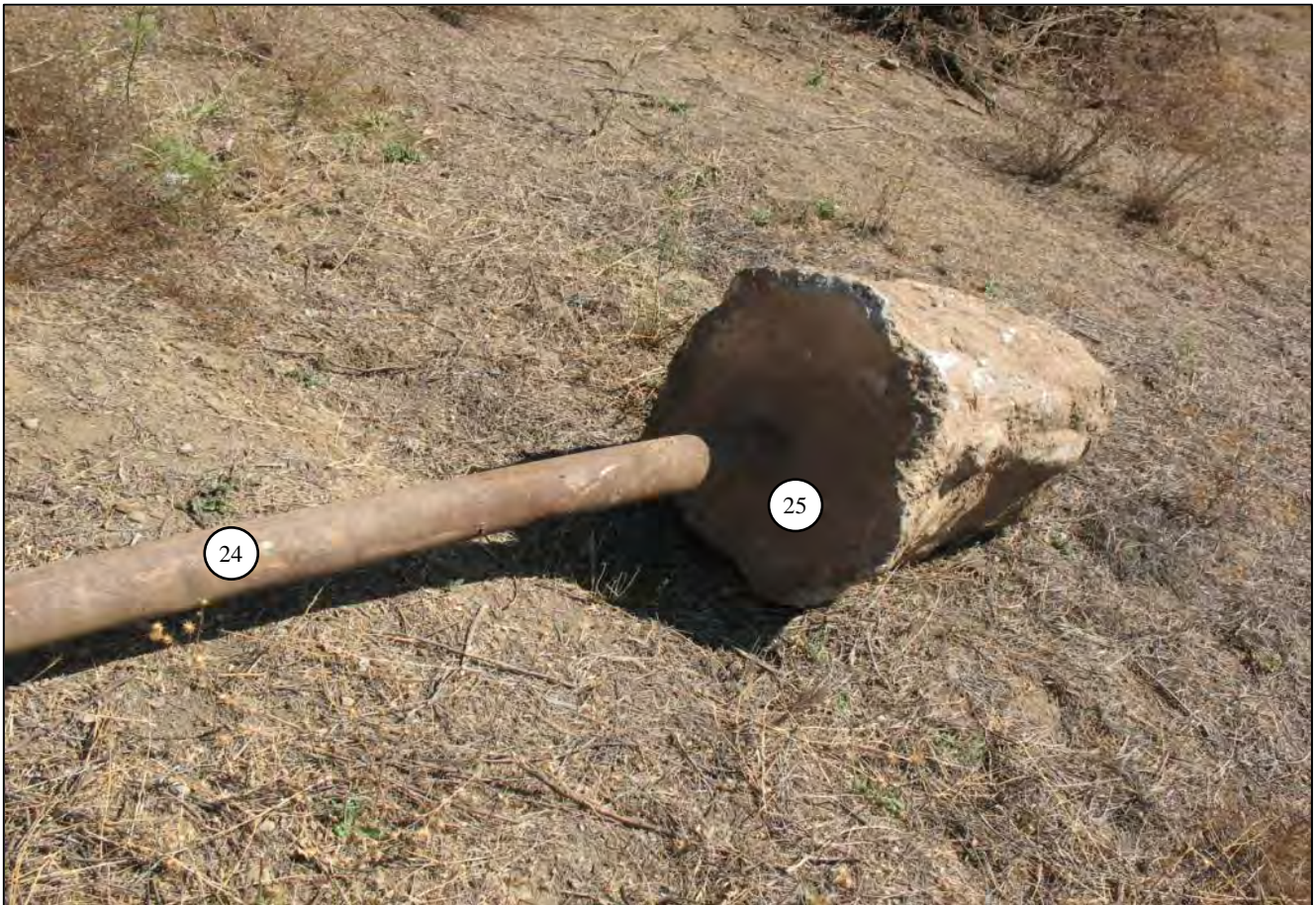
Background (cpm)	Efficiency (%)
Alpha Rate: 0.00 ± 0.00	Alpha: 34.47 ± 0.59
Beta Rate: 3.50 ± 0.59	Beta: 37.92 ± 0.73

Sample ID	Sample Type	Alpha (dpm)	Unc	Alpha MDA (dpm)	Beta (dpm)	Unc	Beta MDA (dpm)
1	Unknown	0.00	0.00	9.00	-1.32	4.83	25.00
2	Unknown	0.00	0.00	9.00	-9.23	1.57	25.00
3	Unknown	5.80	4.10	9.00	9.23	7.15	25.00
4	Unknown	2.90	2.90	9.00	17.14	8.49	25.00
5	Unknown	2.90	2.90	9.00	-6.59	3.07	25.00
6	Unknown	0.00	0.00	9.00	-1.32	4.83	25.00
7	Unknown	0.00	0.00	9.00	6.59	6.65	25.00
8	Unknown	0.00	0.00	9.00	6.59	6.65	25.00
9	Unknown	2.90	2.90	9.00	-3.96	4.04	25.00
10	Unknown	0.00	0.00	9.00	-1.32	4.83	25.00
11	Unknown	0.00	0.00	9.00	1.32	5.50	25.00
12	Unknown	0.00	0.00	9.00	3.96	6.10	25.00
13	Unknown	0.00	0.00	9.00	14.50	8.07	25.00
14	Unknown	8.70	5.03	9.00	11.87	7.62	25.00
15	Unknown	0.00	0.00	9.00	11.87	7.62	25.00
16	Unknown	0.00	0.00	9.00	1.32	5.50	25.00
17	Unknown	2.90	2.90	9.00	11.87	7.62	25.00
18	Unknown	5.80	4.10	9.00	6.59	6.65	25.00
19	Unknown	0.00	0.00	9.00	11.87	7.62	25.00
20	Unknown	2.90	2.90	9.00	9.23	7.15	25.00
21	Unknown	0.00	0.00	9.00	-6.59	3.07	25.00
22	Unknown	2.90	2.90	9.00	-1.32	4.83	25.00
23	Unknown	0.00	0.00	9.00	9.23	7.15	25.00
24	Unknown	0.00	0.00	9.00	3.96	6.10	25.00
25	Unknown	5.80	4.10	9.00	3.96	6.10	25.00









NASA ISRA LOX Area, Metal Debris - Phase 2, Area I Radiological Release Survey and Waste Certification

Introduction

This data package provides the radiation release survey results of metal debris (Phase 2) from the NASA ISRA LOX location in Area I of SSFL. This survey complies with the "ISRA Sampling for Radionuclides Plan"¹ and with Boeing procedure RS-00012².

Methodology

Instrument measurements (1 minute static counts) were made for alpha and beta/gamma total surface activity (Ludlum 2224 plus Ludlum 43-89 plastic scintillator probe) and gamma exposure rate (Ludlum 19 microR meter). Wipes were taken for removable alpha/beta activity and counted in a low-background Tennelec laboratory alpha/beta counter.

Instrument minimum detectable activities (MDA) for total activity measurements were 432 dpm/100 cm² alpha and 824 dpm/100 cm² beta (Ludlum 43-89 probe). Removable activity MDAs for the Tennelec were 13 dpm/100 cm² alpha and 26 dpm/100 cm² beta. These MDAs meet the generic regulatory limits for surface activity shown in Appendix 1. The Ludlum19 MDA is ~4 µR/hr. Survey results are provided in Appendix 2.

Results

24 surface activity measurements and 6 dose rate measurements were taken of the debris.

The majority (23 of 24 or 95.8%) of all instrument surface activity measurements and wipe tests were non-detect (i.e. less than the MDA) and are therefore indistinguishable from background. The dose from the debris would therefore be zero mrem per year. If it were conservatively assumed that all the debris was actually contaminated at the MDA levels, then the effective dose would be much less than 1 mrem per year^{3,4}.

All surface activity measurements and wipe tests meet the most restrictive regulatory surface activity limits for release/clearance of equipment and material for unrestricted use from former radiological facilities.

¹ Boeing, "ISRA Soil Management Plan", Attachment A, "ISRA Sampling for Radionuclides", July 2009.

² Boeing, "Methods and Procedures for Radiological Monitoring." RS-00012, Revision B, August 6, 2006.

³ ANSI N13.12-1999. "Surface and Volume Radioactivity Standards for Clearance." American National Standards Institute/Health Physics Society, 1999. The most limiting beta/gamma screening value is 6,000 dpm/100 cm² corresponding to a dose of 1 mrem per year. The most limiting alpha screening value is 600 dpm/100 cm² corresponding to a dose of 1 mrem per year.

⁴ NUREG-1640. "Radiological Assessments for Clearance of Materials from Nuclear Facilities." Nuclear Regulatory Commission, June 2003. The most restrictive beta/gamma dose conversion from Table 2.1 is 0.16 µrem/y per dpm/100 cm². This corresponds to 0.8 mrem/y per 5,000 dpm/100 cm².

All surface activity measurements and wipe tests meet the general surface activity limits for release/clearance of equipment and material for unrestricted use from former radiological facilities^{5,6,7}. See Appendix 1 for regulatory limits for surface activity.

All dose rate measurements were within the range of background.

Conclusions

This debris does not originate from a former radiological facility.

The debris is certified to be radiologically acceptable for off-site disposal and/or recycling. There are no radiological controls or restrictions imposed on future disposition or use of this debris.

Waste debris meets the requirements of disposal facility permits^{8,9} and complies with the California Health & Safety Code¹⁰.

The Governor's Executive Order D-62-02 (September 2002) prohibits the "*disposal of decommissioned materials to Class 3 landfills or unclassified management units.*" The subject debris is not decommissioned material, and has not originated from a radiological facility. The survey in this certification has therefore been conducted as a best management practice, which also complies with the requirements of D-62-02. Verification surveys and/or approval by the California Department of Public Health (CDPH) Radiologic Health Branch (RHB) are not required for the off-site disposal of decommissioned material or of the subject material¹¹.

⁵ (a) U.S. Nuclear Regulatory Commission Regulatory Guide 1.86. "Termination of Operating Licenses for Nuclear Reactors." June 1974. (b) U.S. NRC "Guidelines for Decontamination of Facilities and Equipment Prior to Release to Unrestricted Use or Termination of Licenses for Byproduct, Source, or Special Nuclear Material," August 1987.

⁶ (a) U.S. Department of Energy Order 458.1, "Radiation Protection of the Public and Environment" Attachment 1, Section (f)1b, June 6, 2011. (b) U.S. Department of Energy Memorandum from Sally Robison to Roger Liddle, "Site-wide Limits for Release of Facilities without Radiological Restriction", September 17, 1996. (c) U.S. Department of Energy Draft Guide DOE G 441.1-XX. "Control and Release of Property with Residual Radioactive Material." April 4, 2002.

⁷ (a) California Department of Public Health. DECON-1. "Guidelines for Decontamination of Facilities and Equipment Prior to Release for Unrestricted Use." (b) California Department of Public Health Letter from Gerard Wong to Majelle Lee, "Authorized Site-wide Radiological Guidelines for Release for Unrestricted Use", August 9, 1996. (c) California Department of Public Health, IPM-88-2. "Clearance Inspection and Survey." December 1, 1997.

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

⁹ This waste is not prohibited from disposal by any government agency with jurisdictional authority over this waste.

¹⁰ Division 104, Part 9, Chapter 5, Article 1, Section 114715, "No person shall bury, throw away, or in any manner dispose of radioactive wastes within the state except in a manner and at locations as will result in no significant radioactive contamination of the environment."

¹¹ The California Department of Public Health (CDPH) Radiologic Health Branch (RHB) has stated in a November 9, 2007 email to Phil Rutherford (Boeing) ... "*The Governor's Executive Order D-62-02, does*



Phil Rutherford
Manager, Health, Safety & Radiation Services

not specifically require the Department of Health Services (now the Department of Public Health) to perform verification sampling of decommissioned material or to provide approval for disposal of specific decommissioned material shipped offsite (e.g., to Class I or II landfills). The California DPH has not imposed a requirement that Boeing or the Department of Energy (DOE) seek DPH verification sampling or approval of all decommissioned material destined for Class I or II landfills in compliance with the Governor's Executive Order."

Appendix 1
Surface Activity Limits

Surface Activity Limits (dpm/100 cm²)

	Alpha			Beta		
	Total		Removable ⁵	Total		Removable ⁵
	Average ⁴	Maximum ⁵		Average ⁴	Maximum ⁵	
Isotope-specific Regulatory Limits ^{1,2,3}						
Mixed beta/gamma emitters (Cs-137, Sr-90, Co-60, etc.)	-	-	-	5,000	15,000	1,000
Uranium, U-235, U-238 and decay products	5,000	15,000	1,000	5,000	15,000	1,000
Thorium, Th-232	1,000	3,000	200	-	-	-
Sr-90 (separated)				1,000	3,000	200
Transuranics, plutonium, radium-226	100	300	20	-	-	-
General Regulatory Limits	5,000	15,000	1,000	5,000	15,000	1,000
Most Restrictive Regulatory Limit	100	300	20	1,000	3,000	200
Preferred Boeing Limit	100		20	1,000		100
Typical Minimum Detectable Activities	250 - 400		<20	~1,000		<30

^[1] (a) U.S. Nuclear Regulatory Commission Regulatory Guide 1.86. "Termination of Operating Licenses for Nuclear Reactors." June 1974. (b) U.S. NRC "Guidelines for Decontamination of Facilities and Equipment Prior to Release to Unrestricted Use or Termination of Licenses for Byproduct, Source, or Special Nuclear Material," August 1987.

^[2] (a) U.S. Department of Energy Order 458.1, "Radiation Protection of the Public and Environment" Attachment 1, Section (f)1b, June 6, 2011. (b) U.S. Department of Energy Memorandum from Sally Robison to Roger Liddle, "Sitewide Limits for Release of Facilities without Radiological Restriction", September 17, 1996. (c) U.S. Department of Energy Guide DOE G 441.1-XX. "Control and Release of Property with Residual Radioactive Material." April 4, 2002.

^[3] (a) California Department of Public Health. DECON-1. "Guidelines for Decontamination of Facilities and Equipment Prior to Release for Unrestricted Use." (b) California Department of Public Health Letter from Gerard Wong to Majelle Lee, "Authorized Sitewide Radiological Guidelines for Release for Unrestricted Use", August 9, 1996. (c) California Department of Public Health, IPM-88-2. "Clearance Inspection and Survey." December 1, 1997.

^[4] Averaged over 1 m².

^[5] Maximum measured over 100 cm².

Appendix 2
Field Survey Results

Surface Activity Calculation using Daily Background and MDA

Facility	Area I NASA ISRA
Location	LOX-1B-2 metal debris
Purpose	pre-disposal

Instrument Type	2224-1/43-89	
Instrument ID	ZO257835	
Calibration Due Date	8/7/2014	
Radiation	alpha	beta
Instrument Efficiency (cpm/emission)	0.177	0.184
Surface Efficiency (emission/dpm)	0.25	0.5
Probe Area (cm ²)	100	100

Input data in blue cells

Daily Background Measurements

Sample	Date	Description (Location, Object)	Material Type	Alpha								Beta							
				Bkgd Count Time (min)	Sample Count Time (min)	Bkgd Gross Count	Bkgd Count Rate (cpm)	Bkgd Gross Activity (dpm/100 cm ²)	L _c (counts)	L _D (counts)	MDA (dpm/100 cm ²)	Bkgd Count Time (min)	Sample Count Time (min)	Bkgd Gross Count	Bkgd Count Rate (cpm)	Bkgd Gross Activity (dpm/100 cm ²)	L _c (counts)	L _D (counts)	MDA (dpm/100 cm ²)
1	9/5/2013	B1319 Reference Location - rusty	Concrete	5	1	99	20	447	8	19	430	5	1	2768	554	6017	42	88	954
2	9/5/2013	B1319 Reference Location - rusty	Asphalt	5	1	58	12	262	6	15	345	5	1	3044	609	6617	44	92	999
3	9/5/2013	B1319 Reference Location -metal	Construction	5	1	100	20	452	8	19	432	5	1	2043	409	4441	36	76	824
4																			
5																			
Average			Miscellaneous	5	1	86	17	387	7	18	402	5	1	2618	524	5692	41	85	926

Sample Area Measurements

Sample	Date	Description (Location, Object)	Material Type	Alpha								Beta							
				Sample Count Time (min)	Gross Sample Count	Gross Count Rate (cpm)	Bkgd Count Rate (cpm)	Net Count Rate (cpm)	Net Activity (dpm/100 cm ²)	MDA (dpm/100 cm ²)	> MDA or < MDA ?	Sample Count Time (min)	Gross Sample Count	Gross Count Rate (cpm)	Bkgd Count Rate (cpm)	Net Count Rate (cpm)	Net Activity (dpm/100 cm ²)	MDA (dpm/100 cm ²)	> MDA or < MDA ?
1	9/5/2013	pipe	Construction	1	3	3	20	-17	0	432	<MDA	1	464	464	409	55	602	824	<MDA
2	9/5/2013	pipe	Construction	1	4	4	20	-16	0	432	<MDA	1	371	371	409	-38	0	824	<MDA
3	9/5/2013	rebar	Construction	1	1	1	20	-19	0	432	<MDA	1	467	467	409	58	635	824	<MDA
4	9/5/2013	tee-post	Construction	1	6	6	20	-14	0	432	<MDA	1	415	415	409	6	70	824	<MDA
5	9/5/2013	tee-post	Construction	1	4	4	20	-16	0	432	<MDA	1	361	361	409	-48	0	824	<MDA
6	9/5/2013	tee-post	Construction	1	3	3	20	-17	0	432	<MDA	1	318	318	409	-91	0	824	<MDA

Sample Report

Batch ID:	Smears 1 Minute Count - 201309051045	Count Date:	9/5/2013 10:45:57AM
Group:	D	Count Minutes:	1.00
Device:	Environ Tennelec SN 37108	Count Mode:	Simultaneous
Batch Key:	2515	Operating Volts:	1410
Selected	Swipe/Smear	Comments:	Area I NASA ISRA LOX-1B-2 metal debris smear

Background (cpm)	Efficiency (%)
Alpha Rate: 0.20 ± 0.14	Alpha: 34.69 ± 0.60
Beta Rate: 4.20 ± 0.65	Beta: 38.58 ± 0.74

<u>Sample ID</u>	<u>Sample Type</u>	<u>Alpha</u> <u>(dpm)</u>	<u>Unc</u>	<u>Alpha MDA</u> <u>(dpm)</u>	<u>Beta</u> <u>(dpm)</u>	<u>Unc</u>	<u>Beta MDA</u> <u>(dpm)</u>
1 pipe	Unknown	-0.58	0.41	13.00	2.07	6.03	26.00
2 pipe	Unknown	13.84	6.46	13.00	17.62	8.76	26.00
3 rebar	Unknown	2.31	2.91	13.00	4.67	6.57	26.00
4 tee-post	Unknown	5.19	4.10	13.00	7.26	7.06	26.00
5 tee-post	Unknown	-0.58	0.41	13.00	7.26	7.06	26.00
6 tee-post	Unknown	5.19	4.10	13.00	2.07	6.03	26.00



Area I NASA ISRA LOX-1B-3 Pipe – Container 126888 Radiological Release Survey and Waste Certification

Introduction

This data package provides the radiation survey results for metal pipe debris from the Area I NASA ISRA LOX-1B-3 excavation in container 126888. This survey complies with the “ISRA Sampling for Radionuclides Plan”¹ and with Boeing procedure RS-00012².

Methodology

Instrument measurements (1 minute static counts) were made for alpha and beta/gamma total surface activity (Ludlum 2224 plus Ludlum 43-89 plastic scintillator probe) and gamma exposure rate (Bicron microRem meter). Wipes were taken for removable alpha/beta activity and counted in a low-background Tennelec laboratory alpha/beta counter.

Instrument minimum detectable activities (MDA) for total activity measurements were 443 dpm/100 cm² alpha and 811 dpm/100 cm² beta (Ludlum 43-89 probe). Removable activity MDAs for the Tennelec were 12 dpm/100 cm² alpha and 25 dpm/100 cm² beta. These MDAs meet the general regulatory limits for surface activity shown in Appendix 1. The Bicron minimum detectable dose rate (MDDR) is ~4 µR/hr.

Results

Survey results are provided in Appendix 2. Eight surface activity measurements and two exposure measurements were taken of the pipe debris.

No instrument surface activity measurements and wipe tests were detected above the MDA. If it were conservatively assumed that all the debris was actually contaminated at the MDA levels, then the dose would be much less than 1 mrem per year. This is because both measurements and MDAs are less than the clearance standards of ANSI/HPS N13.12 which are based on 1 mrem per year^{3,4}.

All surface activity measurements meet the general surface activity limits for release/clearance of equipment and material for unrestricted use from former radiological facilities^{5,6,7}. See Appendix 1 for regulatory limits for surface activity.

¹ Boeing, “ISRA Soil Management Plan”, Attachment A, “ISRA Sampling for Radionuclides”, July 2009.

² Boeing, “Methods and Procedures for Radiological Monitoring.” RS-00012, Revision B, August 6, 2006.

³ ANSI N13.12-1999. “Surface and Volume Radioactivity Standards for Clearance.” American National Standards Institute/Health Physics Society, 1999. The most limiting beta/gamma screening value is 6,000 dpm/100 cm² corresponding to a dose of 1 mrem per year. The most limiting alpha screening value is 600 dpm/100 cm² corresponding to a dose of 1 mrem per year.

⁴ NUREG-1640. “Radiological Assessments for Clearance of Materials from Nuclear Facilities.” Nuclear Regulatory Commission, June 2003. The most restrictive beta/gamma dose conversion from Table 2.1 is 0.16 µrem/y per dpm/100 cm². This corresponds to 0.8 mrem/y per 5,000 dpm/100 cm².

⁵ (a) U.S. Nuclear Regulatory Commission Regulatory Guide 1.86. “Termination of Operating Licenses for Nuclear Reactors.” June 1974. (b) U.S. NRC “Guidelines for Decontamination of Facilities and

All dose rate measurements were indistinguishable from background.

Conclusions

Based on measurements taken, the plastic debris is radiologically acceptable for off-site disposal and/or recycling. There are no radiological controls or restrictions imposed on future disposition or use of this debris.

This waste is not subject to licensing by the California Department of Public Health (CDPH), is not regulated radioactive material, and complies with the California Health & Safety Code⁸.

The Governor's Executive Order D-62-02 (September 2002) prohibits the "disposal of decommissioned materials to Class 3 landfills or unclassified management units." The subject waste is not decommissioned material. The survey in this certification has therefore been conducted as a best management practice, which also complies with the requirements of D-62-02. Verification surveys and/or approval by the CDPH Radiologic Health Branch (RHB) are not required for the off-site disposal of decommissioned material or of the subject material⁹.



Phil Rutherford
Manager, Health, Safety & Radiation Services
Environment, Health & Safety

Equipment Prior to Release to Unrestricted Use or Termination of Licenses for Byproduct, Source, or Special Nuclear Material," August 1987.

⁶ (a) U.S. Department of Energy Order 458.1, "Radiation Protection of the Public and Environment" Attachment 1, Section (f)1b, June 6, 2011. (b) U.S. Department of Energy Memorandum from Sally Robison to Roger Liddle, "Site-wide Limits for Release of Facilities without Radiological Restriction", September 17, 1996. (c) U.S. Department of Energy Draft Guide DOE G 441.1-XX. "Control and Release of Property with Residual Radioactive Material." April 4, 2002.

⁷ California Department of Public Health. CDPH Letter from Gerard Wong to Majelle Lee, "Authorized Site-wide Radiological Guidelines for Release for Unrestricted Use", August 9, 1996.

⁸ Division 104, Part 9, Chapter 5, Article 1, Section 114715, "No person shall bury, throw away, or in any manner dispose of radioactive wastes within the state except in a manner and at locations as will result in no significant radioactive contamination of the environment."

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

Appendix 1
Surface Activity Limits

Surface Activity Limits (dpm/100 cm²)

	Alpha			Beta		
	Total		Removable ⁵	Total		Removable ⁵
	Average ⁴	Maximum ⁵		Average ⁴	Maximum ⁵	
Isotope-specific Regulatory Limits^{1,2,3}						
Mixed beta/gamma emitters (Cs-137, Sr-90, Co-60, etc.)	-	-	-	5,000	15,000	1,000
Uranium, U-235, U-238 and decay products	5,000	15,000	1,000	5,000	15,000	1,000
Thorium, Th-232	1,000	3,000	200	-	-	-
Sr-90 (separated)				1,000	3,000	200
Transuranics, plutonium, radium-226	100	300	20	-	-	-
General Regulatory Limits	5,000	15,000	1,000	5,000	15,000	1,000
Most Restrictive Regulatory Limit⁶	100	300	20	1,000	3,000	200
Typical Minimum Detectable Activities	300 - 450		<20	~1,000		<30

[1] (a) U.S. Nuclear Regulatory Commission Regulatory Guide 1.86. "Termination of Operating Licenses for Nuclear Reactors." June 1974. (b) U.S. NRC "Guidelines for Decontamination of Facilities and Equipment Prior to Release to Unrestricted Use or Termination of Licenses for Byproduct, Source, or Special Nuclear Material," August 1987.

[2] (a) U.S. Department of Energy Order 458.1, "Radiation Protection of the Public and Environment" Attachment 1, Section (f)1b, June 6, 2011. (b) U.S. Department of Energy Memorandum from Sally Robison to Roger Liddle, "Sitewide Limits for Release of Facilities without Radiological Restriction", September 17, 1996. (c) U.S. Department of Energy Draft Guide DOE G 441.1-XX. "Control and Release of Property with Residual Radioactive Material." April 4, 2002.

[3] California Department of Public Health. CDPH Letter from Gerard Wong to Majelle Lee, "Authorized Sitewide Radiological Guidelines for Release for Unrestricted Use", August 9, 1996.

[4] Averaged over 1 m².

[5] Maximum measured over 100 cm².

[6] The lowest, most restrictive regulatory limits are applicable only when the principal alpha contaminants being measured are transuranics or radium and when the principal beta contaminant being measured is separated strontium-90. Absent these conditions, the general regulatory limits will be used at SSFL.

Appendix 2
Field Survey Results

Surface Activity Calculation using Daily Background and MDA

Facility	Area I NASA ISRA LOX 1B-3
Location	F-listed pipe waste cont#126888
Purpose	pre-disposal

Instrument Type	2224-1/43-89	
Instrument ID	ZO257835	
Calibration Due Date	8/7/2014	
Radiation	alpha	beta
Instrument Efficiency (cpm/emission)	0.177	0.184
Surface Efficiency (emission/dpm)	0.25	0.5
Probe Area (cm ²)	100	100

Input data in blue cells

Daily Background Measurements

Sample	Date	Description (Location, Object)	Material Type	Alpha								Beta							
				Bkgd Count Time	Sample Count Time	Bkgd Gross Count	Bkgd Count Rate	Bkgd Gross Activity	L _c	L _D	MDA	Bkgd Count Time	Sample Count Time	Bkgd Gross Count	Bkgd Count Rate	Bkgd Gross Activity	L _c	L _D	MDA
1	11/14/2013	B1319 Reference Location (rusty)	Concrete	5	1	103	21	466	8	19	437	5	1	2879	576	6259	43	89	973
2	11/14/2013	B1319 Reference Location (rusty)	Asphalt	5	1	52	10	235	6	15	330	5	1	3099	620	6737	45	93	1008
3	11/14/2013	B1319 Reference Location(metal)	Construction	5	1	106	21	479	8	20	443	5	1	1974	395	4291	36	75	811
4																			
5																			
Average			Miscellaneous	5	1	87	17	393	7	18	404	5	1	2651	530	5762	41	86	930

Sample Area Measurements

Sample	Date	Description (Location, Object)	Material Type	Alpha								Beta							
				Sample Count Time	Gross Sample Count	Gross Count Rate	Bkgd Count Rate	Net Count Rate	Net Activity	MDA	> MDA or < MDA ?	Sample Count Time	Gross Sample Count	Gross Count Rate	Bkgd Count Rate	Net Count Rate	Net Activity	MDA	> MDA or < MDA ?
1	11/14/2013	F-listed pipe waste cont #126888	Construction	1	0	0	21	-21	0	443	<MDA	1	305	305	395	-90	0	811	<MDA
2	11/14/2013	F-listed pipe waste cont #126889	Construction	1	1	1	21	-20	0	443	<MDA	1	329	329	395	-66	0	811	<MDA

Sample Report

Batch ID:	Smears 1 Minute Count - 201311140946	Count Date:	11/14/2013 9:46:20AM
Group:	D	Count Minutes:	1.00
Device:	Environ Tennelec SN 37108	Count Mode:	Simultaneous
Batch Key:	2737	Operating Volts:	1410
Selected	Swipe/Smear	Comments:	NASA ISRA LOX 1B-3 debris cont #126888 smear

Background (cpm)		Efficiency (%)	
Alpha Rate:	0.10 ± 0.10	Alpha:	34.44 ± 0.59
Beta Rate:	3.20 ± 0.57	Beta:	37.61 ± 0.72

<u>Sample ID</u>	<u>Sample Type</u>	<u>Alpha</u> <u>(dpm)</u>	<u>Unc</u>	<u>Alpha MDA</u> <u>(dpm)</u>	<u>Beta</u> <u>(dpm)</u>	<u>Unc</u>	<u>Beta MDA</u> <u>(dpm)</u>
#1	Unknown	2.61	2.92	12.00	10.10	7.20	25.00
#2	Unknown	-0.29	0.29	12.00	-0.53	4.84	25.00



Highest contact dose rate on container #126888 is 7 $\mu\text{rem/h}$