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**ISRA 009, Area II**  
**ELV-1D (F-listed, Radionuclides < LUT)**  
**Soil Sampling for Radionuclides**  
**and Waste Certification**

### Introduction

This data package provides the laboratory results of the samples taken at the ELV-1D (F-listed) site in Area II. Soil sample locations and the demarcated area (outside the pink area) are shown in Appendix 1. 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)<sup>1</sup>.

### Methodology

Samples were taken in 2009 at the ELV-1D area, and apply to the F-listed waste with radionuclides less than the LUTs. Several locations were re-sampled in 2009 and several more step-outs were taken in 2013. Original samples were analyzed for strontium-90, tritium and gamma emitting radionuclides by gamma spectroscopy, using an off-site laboratory<sup>2</sup>. The 2009 gamma spectroscopy library included the following analytes: 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.

Two additional samples taken at depth in 2013 were analyzed for the 17 Priority 1 radionuclides established by USEPA in December 2012, namely, Ac-228, Bi-212, Bi-214, Cs-137, Co-60, Eu-152, Pb-212, Pb-214, Ni-59, Pu-239/240, Sr-90, Tl-208, Th-230, Th-234, U-224, U-235 and U-238.

Average minimum detectable concentrations (MDC) for cesium-137 and strontium-90 for all samples were 0.037 pCi/g and 0.032 pCi/g respectively.

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

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

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

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

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

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

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

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

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

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

USEPA issued revised RTLs<sup>7</sup> in December 2012 which were, in general, higher than the original RTLs. USEPA also issued laboratory specific radiological reference concentrations (RRC) in December 2012<sup>8</sup>. Subsequently, DTSC issued draft provisional LUTs<sup>9</sup> for 16 radionuclides in January 2013, which in general matched the revised RTLs for those radionuclides whose RTLs were derived from BTVs<sup>10</sup> (for example cesium-137 and uranium-238). The draft provisional LUTs subset also matched exactly the lower of the two lab-specific RRCs. Consistent with DTSC’s intent in issuing draft provisional LUTs for interim remedial action implementation, ELV-1D 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 ELV-1D F-listed area compared to the draft provisional LUTs and sample MDCs.

Several samples had americium-241 that exceeded the LUT but were less than the MDC and were therefore classified as non-detect.

Three locations, ISWC0065, ISWC0066 and ISWC0129, initially exceeded the cesium-137 LUT, but subsequent re-sampling at the same locations did not confirm these exceedances.

Two locations, ISWC0065 and ISWC0066, initially exceeded the uranium-235 LUT but were less than the MDC and were therefore classified as non-detect. Also, subsequent re-sampling at the same locations did not confirm these non-detect exceedances.

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

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

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

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

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

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One location, ISWC0064, initially exceeded the uranium-238 LUT, but subsequent re-sampling at the same location did not confirm this exceedance.

One location, ISWC0139, initially exceeded the plutonium-239/240 LUT. However, the laboratory QC split of the sample did not exceed the LUT. Subsequent realiquot, reanalysis and split QC analysis of the same sample did not confirm the initial exceedance

All confirmed concentrations are therefore below the draft provisional LUTs and/or are less than the sample MDCs. The ELV-1D F-listed waste therefore complies with the NASA/DTSC AOC and is classified as not contaminated above background.

### **Conclusions**

Excavated soil from the ELV-1D F-listed area is released for disposal with no radiological restrictions.



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**Appendix 1**  
**ELV-1D Sampling Locations**



# Outfall 009 Potential BMP and Performance Monitoring Locations ISRA Area ELV-1D

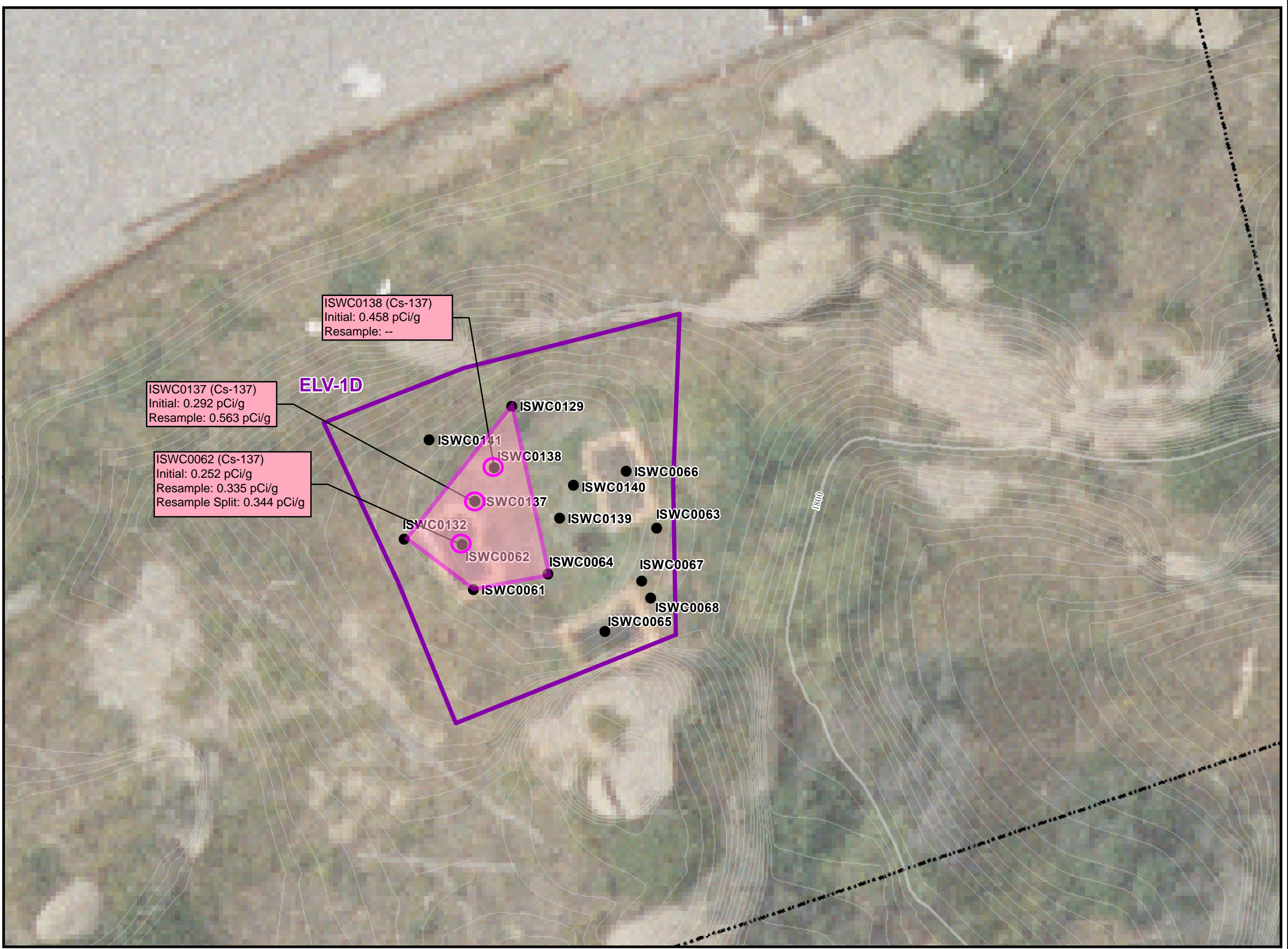
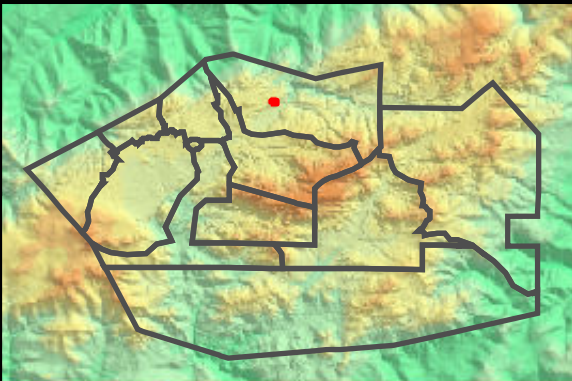
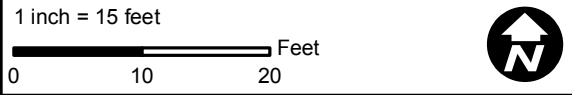
- Base Map Legend**
- Administrative Area Boundary
  - RFI Site Boundary
  - NPDES Outfall
  - A/C Paving
  - Drainage
  - Non Jurisdictional Surface Water Pathway
  - Surface Water Divide

- Figure Legend**
- Planned ISRA Excavation Boundary
  - Sample Location
- January 2013 LUT Value**  
Cs-137 = 0.225 pCi/g
- Sample with confirmed result above LUT value.
  - Boundary of F-Listed soil with radionuclides above LUT value.

**Note:**

- Aerial imagery from 2010 Sage Consulting.
- Topographic contours from 2010 Sage Consulting.

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SANTA SUSANA FIELD LABORATORY

FIGURE 1



**Appendix 2**

**ELV-1D (F-listed, Radionuclides < LUT)**

**Radionuclide Results**

ELV-1D NASA ISRA F-Listed, Radionuclides < LUT (pCi/g)

Sampling Date	Sampling Location (General)	Sampling Location (Specific)	Sample Serial Number	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
6/27/2013	ELV-1D	ISWC0139	ISWC0139S001	Actinium-228	1.77	0.156	0.134	2.68	BTV	-	YES	1.77	-	-	-	-	0.05	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		328454	Waste
6/27/2013	ELV-1D	ISWC0140	ISWC0140S001	Actinium-228	1.09	0.164	0.169	2.68	BTV	-	YES	1.09	-	-	-	-	0.06	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		328454	Waste
7/28/2009	ELV-1D	ISWC0061	ISWC0061RadS001	Americium-241	0.0905	0.0909	0.154	0.0386	MDC	YES	-	-	-	0.0905	YES	YES	3.99	pCi/g	2 sigma	EML HASL 300, 4.5.2.3	GEL		234235	Waste
7/28/2009	ELV-1D	ISWC0063	ISWC0063RadS001	Americium-241	0.0577	0.0635	0.109	0.0386	MDC	YES	-	-	-	0.0577	YES	YES	2.82	pCi/g	2 sigma	EML HASL 300, 4.5.2.3	GEL		234235	Waste
7/28/2009	ELV-1D	ISWC0064	ISWC0064RadS001	Americium-241	0.0108	0.108	0.188	0.0386	MDC	-	-	-	-	0.0108	-	YES	4.87	pCi/g	2 sigma	EML HASL 300, 4.5.2.3	GEL		234235	Waste
8/28/2009	ELV-1D	ISWC0065	ISWC0065ARadS001	Americium-241	0.0186	0.0383	0.0633	0.0386	MDC	-	-	-	-	0.0186	-	YES	1.64	pCi/g	2 sigma	EML HASL 300, 4.5.2.3	GEL	Re-sample	236227	Waste
7/28/2009	ELV-1D	ISWC0065	ISWC0065RadS001	Americium-241	0.0634	0.0441	0.0726	0.0386	MDC	YES	-	-	-	0.0634	YES	YES	1.88	pCi/g	2 sigma	EML HASL 300, 4.5.2.3	GEL	Re-sampled	234235	Waste
8/28/2009	ELV-1D	ISWC0066	ISWC0066ARadS001	Americium-241	0.0665	0.0985	0.17	0.0386	MDC	YES	-	-	-	0.0665	YES	YES	4.40	pCi/g	2 sigma	EML HASL 300, 4.5.2.3	GEL	Re-sample	236227	Waste
7/28/2009	ELV-1D	ISWC0066	ISWC0066RadS001	Americium-241	0.00872	0.128	0.24	0.0386	MDC	-	-	-	-	0.00872	-	YES	6.22	pCi/g	2 sigma	EML HASL 300, 4.5.2.3	GEL	Re-sampled	234235	Waste
7/28/2009	ELV-1D	ISWC0067	ISWC0067RadS001	Americium-241	0.0578	0.0957	0.163	0.0386	MDC	YES	-	-	-	0.0578	YES	YES	4.22	pCi/g	2 sigma	EML HASL 300, 4.5.2.3	GEL		234235	Waste
7/28/2009	ELV-1D	ISWC0068	ISWC0068RadS001	Americium-241	0.0422	0.0393	0.067	0.0386	MDC	YES	-	-	-	0.0422	YES	YES	1.74	pCi/g	2 sigma	EML HASL 300, 4.5.2.3	GEL		234235	Waste
6/27/2013	ELV-1D	ISWC0139	ISWC0139S001	Bismuth-212	1.08	0.232	0.18	2.38	BTV	-	YES	1.08	-	-	-	-	0.08	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		328454	Waste
6/27/2013	ELV-1D	ISWC0140	ISWC0140S001	Bismuth-212	0.73	0.205	0.206	2.38	BTV	-	YES	0.73	-	-	-	-	0.09	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		328454	Waste
6/27/2013	ELV-1D	ISWC0139	ISWC0139S001	Bismuth-214	1.35	0.0751	0.0464	1.83	BTV	-	YES	1.35	-	-	-	-	0.03	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		328454	Waste
6/27/2013	ELV-1D	ISWC0140	ISWC0140S001	Bismuth-214	1.15	0.0753	0.0516	1.83	BTV	-	YES	1.15	-	-	-	-	0.03	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		328454	Waste
7/28/2009	ELV-1D	ISWC0061	ISWC0061RadS001	Cesium-134	0	0.0395	0.0506	0.0431	MDC	-	-	-	-	0	-	YES	1.17	pCi/g	2 sigma	EML HASL 300, 4.5.2.3	GEL		234235	Waste
7/28/2009	ELV-1D	ISWC0063	ISWC0063RadS001	Cesium-134	0	0.0329	0.0469	0.0431	MDC	-	-	-	-	0	-	YES	1.09	pCi/g	2 sigma	EML HASL 300, 4.5.2.3	GEL		234235	Waste
7/28/2009	ELV-1D	ISWC0064	ISWC0064RadS001	Cesium-134	0	0.0394	0.0577	0.0431	MDC	-	-	-	-	0	-	YES	1.34	pCi/g	2 sigma	EML HASL 300, 4.5.2.3	GEL		234235	Waste
8/28/2009	ELV-1D	ISWC0065	ISWC0065ARadS001	Cesium-134	0	0.0489	0.0659	0.0431	MDC	-	-	-	-	0	-	YES	1.53	pCi/g	2 sigma	EML HASL 300, 4.5.2.3	GEL	Re-sample	236227	Waste
7/28/2009	ELV-1D	ISWC0065	ISWC0065RadS001	Cesium-134	0	0.0648	0.0766	0.0431	MDC	-	-	-	-	0	-	YES	1.78	pCi/g	2 sigma	EML HASL 300, 4.5.2.3	GEL	Re-sampled	234235	Waste
8/28/2009	ELV-1D	ISWC0066	ISWC0066ARadS001	Cesium-134	0	0.0258	0.0425	0.0431	MDC	-	-	-	-	0	-	YES	0.99	pCi/g	2 sigma	EML HASL 300, 4.5.2.3	GEL	Re-sample	236227	Waste
7/28/2009	ELV-1D	ISWC0066	ISWC0066RadS001	Cesium-134	0	0.033	0.0545	0.0431	MDC	-	-	-	-	0	-	YES	1.26	pCi/g	2 sigma	EML HASL 300, 4.5.2.3	GEL	Re-sampled	234235	Waste
7/28/2009	ELV-1D	ISWC0067	ISWC0067RadS001	Cesium-134	0	0.0357	0.0495	0.0431	MDC	-	-	-	-	0	-	YES	1.15	pCi/g	2 sigma	EML HASL 300, 4.5.2.3	GEL		234235	Waste
7/28/2009	ELV-1D	ISWC0068	ISWC0068RadS001	Cesium-134	0	0.0514	0.0658	0.0431	MDC	-	-	-	-	0	-	YES	1.53	pCi/g	2 sigma	EML HASL 300, 4.5.2.3	GEL		234235	Waste
7/28/2009	ELV-1D	ISWC0061	ISWC0061RadS001	Cesium-137	0.172	0.037	0.034	0.225	BTV	-	YES	0.172	-	-	-	-	0.15	pCi/g	2 sigma	EML HASL 300, 4.5.2.3	GEL		234235	Waste
7/28/2009	ELV-1D	ISWC0063	ISWC0063RadS001	Cesium-137	-0.00425	0.018	0.0317	0.225	BTV	-	-	-	-	-0.00425	-	-	0.14	pCi/g	2 sigma	EML HASL 300, 4.5.2.3	GEL		234235	Waste
7/28/2009	ELV-1D	ISWC0064	ISWC0064RadS001	Cesium-137	0.101	0.0349	0.0416	0.225	BTV	-	YES	0.101	-	-	-	-	0.18	pCi/g	2 sigma	EML HASL 300, 4.5.2.3	GEL		234235	Waste
8/28/2009	ELV-1D	ISWC0065	ISWC0065ARadS001	Cesium-137	-0.0128	0.0269	0.0414	0.225	BTV	-	-	-	-	-0.0128	-	-	0.18	pCi/g	2 sigma	EML HASL 300, 4.5.2.3	GEL	Re-sample	236227	Waste
7/28/2009	ELV-1D	ISWC0065	ISWC0065RadS001	Cesium-137	0.455	0.0861	0.0551	0.225	BTV	YES	YES	0.455	YES	-	-	-	0.24	pCi/g	2 sigma	EML HASL 300, 4.5.2.3	GEL	Re-sampled	234235	Waste
8/28/2009	ELV-1D	ISWC0066	ISWC0066ARadS001	Cesium-137	0.172	0.0319	0.0301	0.225	BTV	-	YES	0.172	-	-	-	-	0.13	pCi/g	2 sigma	EML HASL 300, 4.5.2.3	GEL	Re-sample	236227	Waste
7/28/2009	ELV-1D	ISWC0066	ISWC0066RadS001	Cesium-137	0.653	0.0692	0.0375	0.225	BTV	YES	YES	0.653	YES	-	-	-	0.17	pCi/g	2 sigma	EML HASL 300, 4.5.2.3	GEL	Re-sampled	234235	Waste
7/28/2009	ELV-1D	ISWC0067	ISWC0067RadS001	Cesium-137	0.124	0.0355	0.0347	0.225	BTV	-	YES	0.124	-	-	-	-	0.15	pCi/g	2 sigma	EML HASL 300, 4.5.2.3	GEL		234235	Waste
7/28/2009	ELV-1D	ISWC0068	ISWC0068RadS001	Cesium-137	0.026	0.0272	0.0484	0.225	BTV	-	-	-	-	0.026	-	-	0.22	pCi/g	2 sigma	EML HASL 300, 4.5.2.3	GEL		234235	Waste
6/27/2013	ELV-1D	ISWC0129	ISWC0129AS001	Cesium-137	0.223	0.0358	0.03	0.225	BTV	-	YES	0.223	-	-	-	-	0.13	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL	Re-sample	328438	Waste
3/6/2013	ELV-1D	ISWC0129	ISWC0129S001	Cesium-137	0.251	0.037	0.0335	0.225	BTV	YES	YES	0.251	YES	-	-	-	0.15	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL	Re-sampled	327846	Waste
3/5/2013	ELV-1D	ISWC0132	ISWC0132S001	Cesium-137	0.222	0.0432	0.0445	0.225	BTV	-	YES	0.222	-	-	-	-	0.20	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL	ISWC0062 stepout	321335	Waste
6/27/2013	ELV-1D	ISWC0139	ISWC0139S001	Cesium-137	0.162	0.0266	0.0252	0.225	BTV	-	YES	0.162	-	-	-	-	0.11	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		328454	Waste
6/27/2013	ELV-1D	ISWC0140	ISWC0140S001	Cesium-137	0.155	0.0256	0.0276	0.225	BTV	-	YES	0.155	-	-	-	-	0.12	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		328454	Waste
6/27/2013	ELV-1D	ISWC0141	ISWC0141S001	Cesium-137	0.0501	0.0378	0.0424	0.225	BTV	-	YES	0.0501	-	-	-	-	0.19	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		328438	Waste
7/28/2009	ELV-1D	ISWC0061	ISWC0061RadS001	Cobalt-60	-0.000487	0.0203	0.0348	0.0363	MDC	-	-	-	-	-0.000487	-	-	0.96	pCi/g	2 sigma	EML HASL 300, 4.5.2.3	GEL		234235	Waste
7/28/2009	ELV-1D	ISWC0063	ISWC0063RadS001	Cobalt-60	0.0111	0.0183	0.0321	0.0363	MDC	-	-	-	-	0.0111	-	-	0.88	pCi/g	2 sigma	EML HASL 300, 4.5.2.3	GEL		234235	Waste
7/28/2009	ELV-1D	ISWC0064	ISWC0064RadS001	Cobalt-60	-0.0065	0.0243	0.0402	0.0363	MDC	-	-	-	-	-0.0065	-	YES	1.11	pCi/g	2 sigma	EML HASL 300, 4.5.2.3	GEL		234235	Waste
8/28/2009	ELV-1D	ISWC0065	ISWC0065ARadS001	Cobalt-60	0.0286	0.0275	0.0449	0.0363	MDC	-	-	-	-	0.0286	-	YES	1.24	pCi/g	2 sigma	EML HASL 300, 4.5.2.3	GEL	Re-sample	236227	Waste
7/28/2009	ELV-1D	ISWC0065	ISWC0065RadS001	Cobalt-60	-0.0286	0.0327	0.0515	0.0363	MDC	-	-	-	-	-0.0286	-	YES	1.42	pCi/g	2 sigma	EML HASL 300, 4.5.2.3	GEL	Re-sampled	234235	Waste
8/28/2009	ELV-1D	ISWC0066	ISWC0066ARadS001	Cobalt-60	-0.0072	0.0167	0.0274	0.0363	MDC	-	-	-	-	-0.0072	-	-	0.75	pCi/g	2 sigma	EML HASL 300, 4.5.2.3	GEL	Re-sample	236227	Waste
7/28/2009	ELV-1D	ISWC0066	ISWC0066RadS001	Cobalt-60	-0.00693	0.0224	0.0373	0.0363	MDC	-	-	-	-	-0.00693	-	YES	1.03	pCi/g	2 sigma	EML HASL 300, 4.5.2.3	GEL	Re-sampled	234235	Waste
7/28/2009	ELV-1D	ISWC0067	ISWC0067RadS001	Cobalt-60	-0.0232	0.0191	0.0281	0.0363	MDC	-	-	-	-	-0.0232	-	-	0.77	pCi/g	2 sigma	EML HASL 300, 4.5.2.3	GEL		234235	Waste
7/28/2009	ELV-1D	ISWC0068	ISWC0068RadS001	Cobalt-60	-0.042	0.027	0.0382	0.0363	MDC	-	-	-	-	-0.042	-	YES	1.05	pCi/g	2 sigma	EML HASL 300, 4.5.2.3	GEL		234235	Waste
6/27/2013	ELV-1D	ISWC0139	ISWC0139S001	Cobalt-60	-0.00197	0.0144	0.0253	0.0363	MDC	-	-	-	-	-0.00197	-	-	0.70	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		328454	Waste
6/27/2013	ELV-1D	ISWC0140	ISWC0140S001	Cobalt-60	0.016	0.0165	0.0313	0.0363	MDC	-	-	-	-	0.016	-	-	0.86	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		328454	Waste
7/28/2009	ELV-1D	ISWC0061	ISWC0061RadS001	Europium-152	0.0199	0.0847	0.0919	0.0739	MDC	-	-	-	-	0.0199	-	YES	1.24	pCi/g	2 sigma	EML HASL 300, 4.5.2.3	GEL		234235	Waste
7/28/2009	ELV-1D	ISWC0063	ISWC0063RadS001	Europium-152	0.0102	0.0488	0.0847	0.0739	MDC	-	-	-	-	0.0102	-	YES	1.15	pCi/g	2 sigma	EML HASL 300, 4.5.2.3	GEL		234235	Waste
7/28/2009	ELV-1D	ISWC0064	ISWC0064RadS001	Europium-152	0.																			



ELV-1D NASA ISRA F-Listed, Radionuclides < LUT (pCi/g)

Sampling Date	Sampling Location (General)	Sampling Location (Specific)	Sample Serial Number	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
6/27/2013	ELV-1D	ISWC0140	ISWC0140S001	Plutonium-239/240	0.0143	0.0133	0.00717	0.023	MDC	-	YES	0.0143	-	-	-	-	0.31	pCi/g	2 sigma	DOE EML HASL-300, Pu-11-RC Modified	GEL		328454	Waste
7/28/2009	ELV-1D	ISWC0061	ISWC0061RadS001	Potassium-40	23.1	1.94	0.27	35.5	BTV	-	YES	23.1	-	-	-	-	0.01	pCi/g	2 sigma	EML HASL 300, 4.5.2.3	GEL		234235	Waste
7/28/2009	ELV-1D	ISWC0063	ISWC0063RadS001	Potassium-40	21.6	1.63	0.244	35.5	BTV	-	YES	21.6	-	-	-	-	0.01	pCi/g	2 sigma	EML HASL 300, 4.5.2.3	GEL		234235	Waste
7/28/2009	ELV-1D	ISWC0064	ISWC0064RadS001	Potassium-40	21.4	1.88	0.305	35.5	BTV	-	YES	21.4	-	-	-	-	0.01	pCi/g	2 sigma	EML HASL 300, 4.5.2.3	GEL		234235	Waste
8/28/2009	ELV-1D	ISWC0065	ISWC0065ARadS001	Potassium-40	21.2	1.7	0.331	35.5	BTV	-	YES	21.2	-	-	-	-	0.01	pCi/g	2 sigma	EML HASL 300, 4.5.2.3	GEL	Re-sample	236227	Waste
7/28/2009	ELV-1D	ISWC0065	ISWC0065RadS001	Potassium-40	21.8	2.22	0.493	35.5	BTV	-	YES	21.8	-	-	-	-	0.01	pCi/g	2 sigma	EML HASL 300, 4.5.2.3	GEL	Re-sampled	234235	Waste
8/28/2009	ELV-1D	ISWC0066	ISWC0066ARadS001	Potassium-40	21.4	1.76	0.218	35.5	BTV	-	YES	21.4	-	-	-	-	0.01	pCi/g	2 sigma	EML HASL 300, 4.5.2.3	GEL	Re-sample	236227	Waste
7/28/2009	ELV-1D	ISWC0066	ISWC0066RadS001	Potassium-40	22.2	1.88	0.317	35.5	BTV	-	YES	22.2	-	-	-	-	0.01	pCi/g	2 sigma	EML HASL 300, 4.5.2.3	GEL	Re-sampled	234235	Waste
7/28/2009	ELV-1D	ISWC0067	ISWC0067RadS001	Potassium-40	22.2	2.06	0.294	35.5	BTV	-	YES	22.2	-	-	-	-	0.01	pCi/g	2 sigma	EML HASL 300, 4.5.2.3	GEL		234235	Waste
7/28/2009	ELV-1D	ISWC0068	ISWC0068RadS001	Potassium-40	23.1	1.77	0.339	35.5	BTV	-	YES	23.1	-	-	-	-	0.01	pCi/g	2 sigma	EML HASL 300, 4.5.2.3	GEL		234235	Waste
7/28/2009	ELV-1D	ISWC0061	ISWC0061RadS001	Sodium-22	0.00488	0.0237	0.0414	0.0468	MDC	-	-	-	-	0.00488	-	-	0.88	pCi/g	2 sigma	EML HASL 300, 4.5.2.3	GEL		234235	Waste
7/28/2009	ELV-1D	ISWC0063	ISWC0063RadS001	Sodium-22	0.0114	0.0213	0.037	0.0468	MDC	-	-	-	-	0.0114	-	-	0.79	pCi/g	2 sigma	EML HASL 300, 4.5.2.3	GEL		234235	Waste
7/28/2009	ELV-1D	ISWC0064	ISWC0064RadS001	Sodium-22	-0.0193	0.025	0.0399	0.0468	MDC	-	-	-	-	-0.0193	-	-	0.85	pCi/g	2 sigma	EML HASL 300, 4.5.2.3	GEL		234235	Waste
8/28/2009	ELV-1D	ISWC0065	ISWC0065ARadS001	Sodium-22	0.0101	0.0291	0.0504	0.0468	MDC	-	-	-	-	0.0101	-	YES	1.08	pCi/g	2 sigma	EML HASL 300, 4.5.2.3	GEL	Re-sample	236227	Waste
7/28/2009	ELV-1D	ISWC0065	ISWC0065RadS001	Sodium-22	-0.0264	0.0396	0.0655	0.0468	MDC	-	-	-	-	-0.0264	-	YES	1.40	pCi/g	2 sigma	EML HASL 300, 4.5.2.3	GEL	Re-sampled	234235	Waste
8/28/2009	ELV-1D	ISWC0066	ISWC0066ARadS001	Sodium-22	0.00335	0.0196	0.0337	0.0468	MDC	-	-	-	-	0.00335	-	-	0.72	pCi/g	2 sigma	EML HASL 300, 4.5.2.3	GEL	Re-sample	236227	Waste
7/28/2009	ELV-1D	ISWC0066	ISWC0066RadS001	Sodium-22	-0.0182	0.0239	0.0386	0.0468	MDC	-	-	-	-	-0.0182	-	-	0.82	pCi/g	2 sigma	EML HASL 300, 4.5.2.3	GEL	Re-sampled	234235	Waste
7/28/2009	ELV-1D	ISWC0067	ISWC0067RadS001	Sodium-22	-0.0153	0.0247	0.0398	0.0468	MDC	-	-	-	-	-0.0153	-	-	0.85	pCi/g	2 sigma	EML HASL 300, 4.5.2.3	GEL		234235	Waste
7/28/2009	ELV-1D	ISWC0068	ISWC0068RadS001	Sodium-22	0.00193	0.0303	0.0508	0.0468	MDC	-	-	-	-	0.00193	-	YES	1.09	pCi/g	2 sigma	EML HASL 300, 4.5.2.3	GEL		234235	Waste
7/28/2009	ELV-1D	ISWC0061	ISWC0061RadS001	Strontium-90	0.0162	0.0203	0.0344	0.117	MDC	-	-	-	-	0.0162	-	-	0.29	pCi/g	2 sigma	EPA 905.0 Modified	GEL		234235	Waste
7/28/2009	ELV-1D	ISWC0063	ISWC0063RadS001	Strontium-90	0.0144	0.015	0.0248	0.117	MDC	-	-	-	-	0.0144	-	-	0.21	pCi/g	2 sigma	EPA 905.0 Modified	GEL		234235	Waste
7/28/2009	ELV-1D	ISWC0064	ISWC0064RadS001	Strontium-90	0.00269	0.015	0.029	0.117	MDC	-	-	-	-	0.00269	-	-	0.25	pCi/g	2 sigma	EPA 905.0 Modified	GEL		234235	Waste
7/28/2009	ELV-1D	ISWC0065	ISWC0065RadS001	Strontium-90	0.0363	0.0189	0.0277	0.117	MDC	-	YES	0.0363	-	-	-	-	0.24	pCi/g	2 sigma	EPA 905.0 Modified	GEL		234235	Waste
7/28/2009	ELV-1D	ISWC0066	ISWC0066RadS001	Strontium-90	0.0229	0.0146	0.0219	0.117	MDC	-	YES	0.0229	-	-	-	-	0.19	pCi/g	2 sigma	EPA 905.0 Modified	GEL		234235	Waste
7/28/2009	ELV-1D	ISWC0067	ISWC0067RadS001	Strontium-90	0.0243	0.0291	0.0491	0.117	MDC	-	-	-	-	0.0243	-	-	0.42	pCi/g	2 sigma	EPA 905.0 Modified	GEL		234235	Waste
7/28/2009	ELV-1D	ISWC0068	ISWC0068RadS001	Strontium-90	0.0166	0.0194	0.0326	0.117	MDC	-	-	-	-	0.0166	-	-	0.28	pCi/g	2 sigma	EPA 905.0 Modified	GEL		234235	Waste
6/27/2013	ELV-1D	ISWC0139	ISWC0139S001	Strontium-90	-0.00435	0.0148	0.031	0.117	MDC	-	-	-	-	-0.00435	-	-	0.26	pCi/g	2 sigma	EPA 905.0 Modified	GEL		328454	Waste
6/27/2013	ELV-1D	ISWC0140	ISWC0140S001	Strontium-90	0.0295	0.0221	0.0349	0.117	MDC	-	-	-	-	0.0295	-	-	0.30	pCi/g	2 sigma	EPA 905.0 Modified	GEL		328454	Waste
6/27/2013	ELV-1D	ISWC0139	ISWC0139S001	Thallium-208	0.488	0.0346	0.0244	1.07	BTV	-	YES	0.488	-	-	-	-	0.02	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		328454	Waste
6/27/2013	ELV-1D	ISWC0140	ISWC0140S001	Thallium-208	0.406	0.0364	0.0254	1.07	BTV	-	YES	0.406	-	-	-	-	0.02	pCi/g	2 sigma	DOE HASL 300, 4.5.2.3/Ga-01-R	GEL		328454	Waste
7/28/2009	ELV-1D	ISWC0061	ISWC0061RadS001	Thorium-228	1.13	0.1	0.0539	4.27	BTV	-	YES	1.13	-	-	-	-	0.01	pCi/g	2 sigma	EML HASL 300, 4.5.2.3	GEL		234235	Waste
7/28/2009	ELV-1D	ISWC0063	ISWC0063RadS001	Thorium-228	1.24	0.139	0.0452	4.27	BTV	-	YES	1.24	-	-	-	-	0.01	pCi/g	2 sigma	EML HASL 300, 4.5.2.3	GEL		234235	Waste
7/28/2009	ELV-1D	ISWC0064	ISWC0064RadS001	Thorium-228	1.38	0.145	0.0583	4.27	BTV	-	YES	1.38	-	-	-	-	0.01	pCi/g	2 sigma	EML HASL 300, 4.5.2.3	GEL		234235	Waste
8/28/2009	ELV-1D	ISWC0065	ISWC0065ARadS001	Thorium-228	1.3	0.13	0.0514	4.27	BTV	-	YES	1.3	-	-	-	-	0.01	pCi/g	2 sigma	EML HASL 300, 4.5.2.3	GEL	Re-sample	236227	Waste
7/28/2009	ELV-1D	ISWC0065	ISWC0065RadS001	Thorium-228	1.43	0.159	0.0672	4.27	BTV	-	YES	1.43	-	-	-	-	0.02	pCi/g	2 sigma	EML HASL 300, 4.5.2.3	GEL	Re-sampled	234235	Waste
8/28/2009	ELV-1D	ISWC0066	ISWC0066ARadS001	Thorium-228	1.19	0.098	0.0445	4.27	BTV	-	YES	1.19	-	-	-	-	0.01	pCi/g	2 sigma	EML HASL 300, 4.5.2.3	GEL	Re-sample	236227	Waste
7/28/2009	ELV-1D	ISWC0066	ISWC0066RadS001	Thorium-228	1.2	0.116	0.0561	4.27	BTV	-	YES	1.2	-	-	-	-	0.01	pCi/g	2 sigma	EML HASL 300, 4.5.2.3	GEL	Re-sampled	234235	Waste
7/28/2009	ELV-1D	ISWC0067	ISWC0067RadS001	Thorium-228	1.16	0.0976	0.0524	4.27	BTV	-	YES	1.16	-	-	-	-	0.01	pCi/g	2 sigma	EML HASL 300, 4.5.2.3	GEL		234235	Waste
7/28/2009	ELV-1D	ISWC0068	ISWC0068RadS001	Thorium-228	1.33	0.157	0.061	4.27	BTV	-	YES	1.33	-	-	-	-	0.01	pCi/g	2 sigma	EML HASL 300, 4.5.2.3	GEL		234235	Waste
6/27/2013	ELV-1D	ISWC0139	ISWC0139S001	Thorium-230	1.51	0.271	0.142	2.38	BTV	-	YES	1.51	-	-	-	-	0.06	pCi/g	2 sigma	DOE EML HASL-300, Th-01-RC Modified	GEL		328454	Waste
6/27/2013	ELV-1D	ISWC0140	ISWC0140S001	Thorium-230	1.01	0.262	0.179	2.38	BTV	-	YES	1.01	-	-	-	-	0.08	pCi/g	2 sigma	DOE EML HASL-300, Th-01-RC Modified	GEL		328454	Waste
7/28/2009	ELV-1D	ISWC0061	ISWC0061RadS001	Thorium-232	1.26	0.196	0.113	3.44	BTV	-	YES	1.26	-	-	-	-	0.03	pCi/g	2 sigma	EML HASL 300, 4.5.2.3	GEL		234235	Waste
7/28/2009	ELV-1D	ISWC0063	ISWC0063RadS001	Thorium-232	1.28	0.212	0.101	3.44	BTV	-	YES	1.28	-	-	-	-	0.03	pCi/g	2 sigma	EML HASL 300, 4.5.2.3	GEL		234235	Waste
7/28/2009	ELV-1D	ISWC0064	ISWC0064RadS001	Thorium-232	1.41	0.246	0.13	3.44	BTV	-	YES	1.41	-	-	-	-	0.04	pCi/g	2 sigma	EML HASL 300, 4.5.2.3	GEL		234235	Waste
8/28/2009	ELV-1D	ISWC0065	ISWC0065ARadS001	Thorium-232	1.35	0.264	0.14	3.44	BTV	-	YES	1.35	-	-	-	-	0.04	pCi/g	2 sigma	EML HASL 300, 4.5.2.3	GEL	Re-sample	236227	Waste
7/28/2009	ELV-1D	ISWC0065	ISWC0065RadS001	Thorium-232	1.3	0.256	0.179	3.44	BTV	-	YES	1.3	-	-	-	-	0.05	pCi/g	2 sigma	EML HASL 300, 4.5.2.3	GEL	Re-sampled	234235	Waste
8/28/2009	ELV-1D	ISWC0066	ISWC0066ARadS001	Thorium-232	1.23	0.211	0.0975	3.44	BTV	-	YES	1.23	-	-	-	-	0.03	pCi/g	2 sigma	EML HASL 300, 4.5.2.3	GEL	Re-sample	236227	Waste
7/28/2009	ELV-1D	ISWC0066	ISWC0066RadS001	Thorium-232	1.33	0.221	0.125	3.44	BTV	-	YES	1.33	-	-	-	-	0.							