ISRA 009, Area II
ELV-1C (California Hazardous, Radionuclides > LUT)
Soil Sampling for Radionuclides
and Waste Certification

Introduction

This data package provides the laboratory results of the eleven samples taken at the ELV-1C (California Hazardous, Radionuclides>LUT) site in Area II. Soil sample locations 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

Numerous samples have been taken in the ELV-1C area for waste characterization. The majority of samples exhibited no elevated concentrations of radionuclides above background. The minority of samples discussed here all exhibited elevated concentrations of radionuclides above background.

Samples discussed here apply to the California hazardous, radionuclides>LUT waste stream. Three locations sampled in 2009 for waste disposal characterization exhibited elevated cesium-137. These locations were subsequently re-sampled later in 2009. In 2012 step-out samples were taken to demarcate the lateral extent of elevated cesium. Five step-out samples again exhibited elevated cesium. The initial three 2009 locations were analyzed for strontium-90, tritium and gamma emitting radionuclides by gamma spectroscopy, using an off-site laboratory[2]. Re-sampled locations and step-out locations were analyzed for only gamma emitting radionuclides. Minimum detectable concentrations (MDC) for cesium-137 and strontium-90 were 0.043 pCi/g and 0.039 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 background[3]. The USEPA has characterized local radionuclide background[4] 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].

[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.

On August 23, 2012, DTSC sent NASA a letter regarding excavation of ISRA soil[6]. 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[7] in December 2012 which were, in general, higher than the original RTLs. USEPA also issued laboratory specific radiological reference concentrations (RRC) in December 2012[8]. Subsequently, DTSC issued draft provisional LUTs[9] for 16 radionuclides in January 2013, which in general matched the revised RTLs for those radionuclides whose RTLs were derived from BTVs[10] (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-1C 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 cesium elevated samples taken at the ELV-1C California hazardous area compared to the draft provisional LUTs and sample MDCs. LUT exceedances are highlighted in yellow

All samples (0.34 to 0.659 pCi/g) exceed the cesium-137 LUT of 0.225 pCi/g.

Three samples (0.0418 to 0.0644 pCi/g) also exceed the americium-241 LUT of 0.0386 pCi/g, but do not exceed the sample MDCs of 0.0753 to 0.301 pCi/g and are therefore considered non-detects.

One sample (2.13 pCi/g) also exceeds the uranium-238 LUT of 1.96 pCi/g, but does not exceed the sample MDC of 2.32 pCi/g and is therefore considered a non-detect.

[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

[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.

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

Conclusions

In compliance with the NASA/DTSC AOC, excavated soil from the ELV-1C (California hazardous, radionuclides>LUT) area will be disposed of at EnergySolutions, Clive, Utah, a licensed low-level radioactive waste site.

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Appendix 1

ELV-1C Sampling Locations

Outfall 009 ELV-1C
Waste Characterization
Sample Location

Base Map Legend

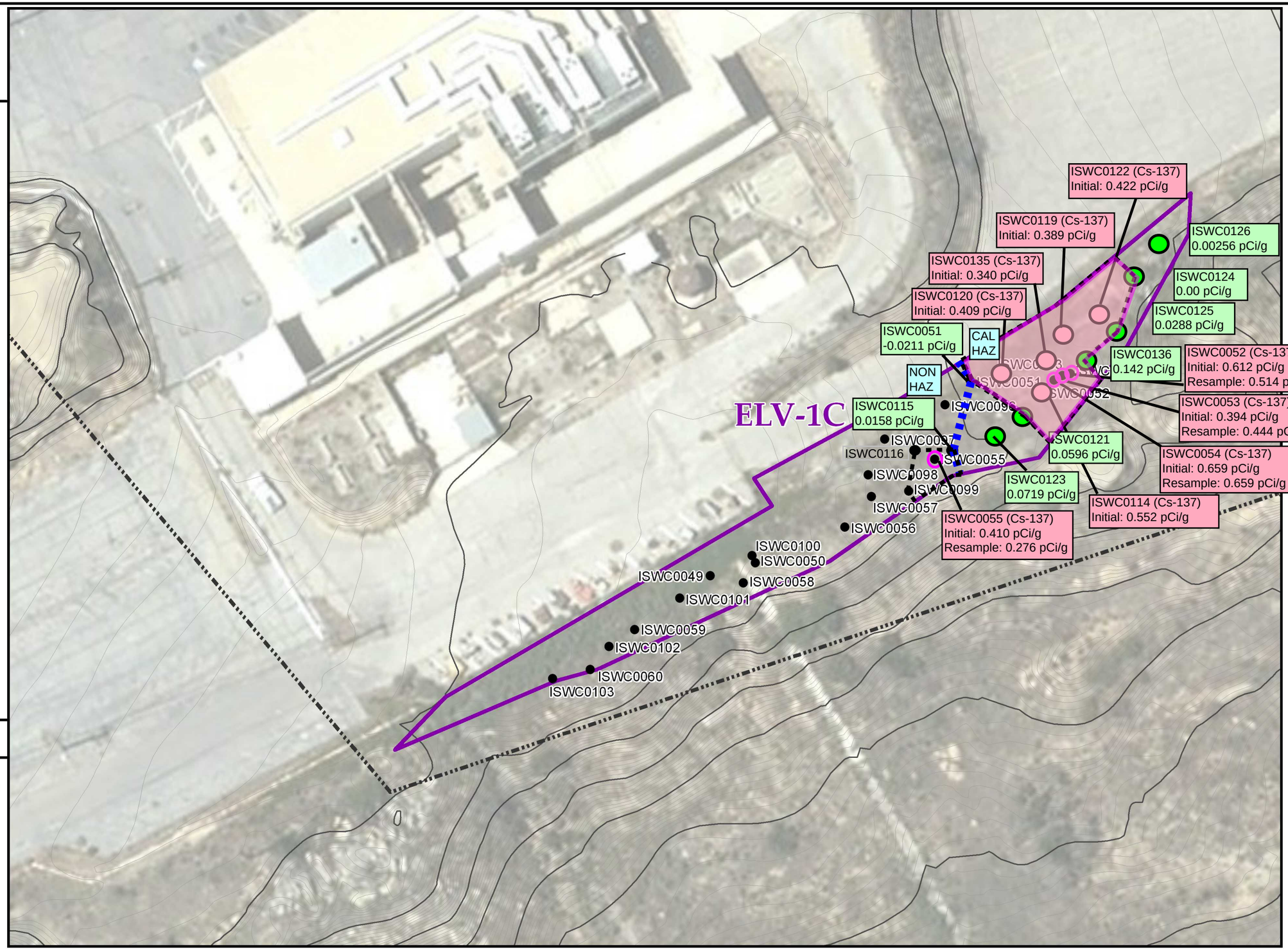
- Administrative Area Boundary
- RFI Site Boundary
- Excavation Area
- Surface Water Drainage
- Surface Water Divide
- Outfall Water Divide
- NPDES Outfall
- Elevation Contour
- Waste Characterization Sample Location

January 2013 LUT Value
Cs-137 = 0.225 pCi/g

- Sample with confirmed result above LUT value.
- Stepout sample; cs-137 result above LUT value; resampling not performed.
- Stepout sample; cs-137 result below LUT value.
- Non-Haz / Cal Haz (Pb) Boundary
- Boundary of soils with results above LUT value
- Boundary of California hazardous soil with radionuclides above LUT value.

DRAFT

0 20 40 80 Feet



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

MWH FIGURE 1

Printing Date: August 31, 2009 File: \\uswck1netapp1\nrii\Industrial Projects\GIS\BoeingSantaSusana\MXD\Surface Water Driver Maps\ISRA-Aug2009\082809\009 ISRA_ELV1C.mxd

Appendix 2

ELV-1C (California Hazardous, Radionuclides>LUT)
Radionuclide Results

ELV-1C NASA ISRA - CALIFORNIA HAZARDOUS - RADIOLOGICAL > LUT

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	Comments	Document
7/28/2009	ELV-1C	ISWC0052	ISWC0052RadS001	Soil	Americium-241	0.0346	0.0614	0.104	0.0386	MDC	-	-	-	-	0.0346	-	YES	2.69	pCi/g	Cal Haz Area; Re-sampled	234235
7/28/2009	ELV-1C	ISWC0052	ISWC0052RadS001	Soil	Cesium-134	0.0415	0.0327	0.0506	0.0801	MDC	-	-	-	-	0.0415	-	-	0.63	pCi/g	Cal Haz Area; Re-sampled	234235
7/28/2009	ELV-1C	ISWC0052	ISWC0052RadS001	Soil	Cesium-137	0.612	0.0752	0.0358	0.225	BTV	YES	YES	0.612	YES	-	-	-	0.16	pCi/g	Cal Haz Area; Re-sampled	234235
7/28/2009	ELV-1C	ISWC0052	ISWC0052RadS001	Soil	Cobalt-60	-0.0117	0.0206	0.0331	0.0363	MDC	-	-	-	-	-0.0117	-	-	0.91	pCi/g	Cal Haz Area; Re-sampled	234235
7/28/2009	ELV-1C	ISWC0052	ISWC0052RadS001	Soil	Europium-152	-0.0132	0.0547	0.0917	0.0739	MDC	-	-	-	-	-0.0132	-	YES	1.24	pCi/g	Cal Haz Area; Re-sampled	234235
7/28/2009	ELV-1C	ISWC0052	ISWC0052RadS001	Soil	Europium-154	0.0137	0.0675	0.117	0.198	MDC	-	-	-	-	0.0137	-	-	0.59	pCi/g	Cal Haz Area; Re-sampled	234235
7/28/2009	ELV-1C	ISWC0052	ISWC0052RadS001	Soil	Manganese-54	-0.00485	0.0215	0.0363	-	-	-	-	-	-	-0.00485	-	-	-	pCi/g	Cal Haz Area; Re-sampled	234235
7/28/2009	ELV-1C	ISWC0052	ISWC0052RadS001	Soil	Potassium-40	22.6	2.14	0.318	35.5	BTV	-	YES	22.6	-	-	-	-	0.01	pCi/g	Cal Haz Area; Re-sampled	234235
7/28/2009	ELV-1C	ISWC0052	ISWC0052RadS001	Soil	Sodium-22	0.00649	0.0239	0.0417	0.0468	MDC	-	-	-	-	0.00649	-	-	0.89	pCi/g	Cal Haz Area; Re-sampled	234235
7/28/2009	ELV-1C	ISWC0052	ISWC0052RadS001	Soil	Strontium-90	0.0237	0.0216	0.0341	0.117	MDC	-	-	-	-	0.0237	-	-	0.29	pCi/g	Cal Haz Area	234235
7/28/2009	ELV-1C	ISWC0052	ISWC0052RadS001	Soil	Thorium-228	1.21	0.129	0.0518	4.27	BTV	-	YES	1.21	-	-	-	-	0.01	pCi/g	Cal Haz Area; Re-sampled	234235
7/28/2009	ELV-1C	ISWC0052	ISWC0052RadS001	Soil	Thorium-232	1.27	0.214	0.107	3.44	BTV	-	YES	1.27	-	-	-	-	0.03	pCi/g	Cal Haz Area; Re-sampled	234235
7/28/2009	ELV-1C	ISWC0052	ISWC0052RadS001	Soil	Tritium	0.0539	0.397	0.712	8.59	MDC	-	-	-	-	0.0539	-	-	0.08	pCi/g	Cal Haz Area	234235
7/28/2009	ELV-1C	ISWC0052	ISWC0052RadS001	Soil	Uranium-235	-0.0484	0.121	0.203	0.152	BTV	-	-	-	-	-0.0484	-	YES	1.34	pCi/g	Cal Haz Area; Re-sampled	234235
7/28/2009	ELV-1C	ISWC0052	ISWC0052RadS001	Soil	Uranium-238	0.724	0.742	0.904	1.96	BTV	-	-	-	-	0.724	-	-	0.46	pCi/g	Cal Haz Area; Re-sampled	234235
7/28/2009	ELV-1C	ISWC0053	ISWC0053RadS001	Soil	Americium-241	0.0418	0.0443	0.0753	0.0386	MDC	YES	-	-	-	0.0418	YES	YES	1.95	pCi/g	Cal Haz Area; Re-sampled	234235
7/28/2009	ELV-1C	ISWC0053	ISWC0053RadS001	Soil	Cesium-134	0	0.0496	0.0691	0.0801	MDC	-	-	-	-	0	-	-	0.86	pCi/g	Cal Haz Area; Re-sampled	234235
7/28/2009	ELV-1C	ISWC0053	ISWC0053RadS001	Soil	Cesium-137	0.394	0.0711	0.0534	0.225	BTV	YES	YES	0.394	YES	-	-	-	0.24	pCi/g	Cal Haz Area; Re-sampled	234235
7/28/2009	ELV-1C	ISWC0053	ISWC0053RadS001	Soil	Cobalt-60	0.00124	0.0281	0.0473	0.0363	MDC	-	-	-	-	0.00124	-	YES	1.30	pCi/g	Cal Haz Area; Re-sampled	234235
7/28/2009	ELV-1C	ISWC0053	ISWC0053RadS001	Soil	Europium-152	-0.0326	0.0754	0.114	0.0739	MDC	-	-	-	-	-0.0326	-	YES	1.54	pCi/g	Cal Haz Area; Re-sampled	234235
7/28/2009	ELV-1C	ISWC0053	ISWC0053RadS001	Soil	Europium-154	-0.00963	0.0943	0.158	0.198	MDC	-	-	-	-	-0.00963	-	-	0.80	pCi/g	Cal Haz Area; Re-sampled	234235
7/28/2009	ELV-1C	ISWC0053	ISWC0053RadS001	Soil	Manganese-54	0.0103	0.0282	0.0504	-	-	-	-	-	-	0.0103	-	-	-	pCi/g	Cal Haz Area; Re-sampled	234235
7/28/2009	ELV-1C	ISWC0053	ISWC0053RadS001	Soil	Potassium-40	22.1	1.75	0.392	35.5	BTV	-	YES	22.1	-	-	-	-	0.01	pCi/g	Cal Haz Area; Re-sampled	234235
7/28/2009	ELV-1C	ISWC0053	ISWC0053RadS001	Soil	Sodium-22	-0.00392	0.0335	0.056	0.0468	MDC	-	-	-	-	-0.00392	-	YES	1.20	pCi/g	Cal Haz Area; Re-sampled	234235
7/28/2009	ELV-1C	ISWC0053	ISWC0053RadS001	Soil	Strontium-90	0.0351	0.0228	0.0365	0.117	MDC	-	-	-	-	0.0351	-	-	0.31	pCi/g	Cal Haz Area	234235
7/28/2009	ELV-1C	ISWC0053	ISWC0053RadS001	Soil	Thorium-228	1.21	0.125	0.0628	4.27	BTV	-	YES	1.21	-	-	-	-	0.01	pCi/g	Cal Haz Area; Re-sampled	234235
7/28/2009	ELV-1C	ISWC0053	ISWC0053RadS001	Soil	Thorium-232	1.08	0.254	0.16	3.44	BTV	-	YES	1.08	-	-	-	-	0.05	pCi/g	Cal Haz Area; Re-sampled	234235
7/28/2009	ELV-1C	ISWC0053	ISWC0053RadS001	Soil	Tritium	0.126	0.374	0.663	8.59	MDC	-	-	-	-	0.126	-	-	0.08	pCi/g	Cal Haz Area	234235
7/28/2009	ELV-1C	ISWC0053	ISWC0053RadS001	Soil	Uranium-235	-0.0156	0.141	0.247	0.152	BTV	-	-	-	-	-0.0156	-	YES	1.63	pCi/g	Cal Haz Area; Re-sampled	234235
7/28/2009	ELV-1C	ISWC0053	ISWC0053RadS001	Soil	Uranium-238	1.2	0.704	0.724	1.96	BTV	-	YES	1.2	-	-	-	-	0.37	pCi/g	Cal Haz Area; Re-sampled	234235
7/28/2009	ELV-1C	ISWC0054	ISWC0054RadS001	Soil	Americium-241	0.0455	0.185	0.301	0.0386	MDC	YES	-	-	-	0.0455	YES	YES	7.80	pCi/g	Cal Haz Area; Re-sampled	234235
7/28/2009	ELV-1C	ISWC0054	ISWC0054RadS001	Soil	Cesium-134	0	0.0482	0.0625	0.0801	MDC	-	-	-	-	0	-	-	0.78	pCi/g	Cal Haz Area; Re-sampled	234235
7/28/2009	ELV-1C	ISWC0054	ISWC0054RadS001	Soil	Cesium-137	0.659	0.0639	0.0449	0.225	BTV	YES	YES	0.659	YES	-	-	-	0.20	pCi/g	Cal Haz Area; Re-sampled	234235
7/28/2009	ELV-1C	ISWC0054	ISWC0054RadS001	Soil	Cobalt-60	0.0297	0.0272	0.0493	0.0363	MDC	-	-	-	-	0.0297	-	YES	1.36	pCi/g	Cal Haz Area; Re-sampled	234235
7/28/2009	ELV-1C	ISWC0054	ISWC0054RadS001	Soil	Europium-152	0.0551	0.092	0.129	0.0739	MDC	-	-	-	-	0.0551	-	YES	1.75	pCi/g	Cal Haz Area; Re-sampled	234235
7/28/2009	ELV-1C	ISWC0054	ISWC0054RadS001	Soil	Europium-154	0.0112	0.0839	0.135	0.198	MDC	-	-	-	-	0.0112	-	-	0.68	pCi/g	Cal Haz Area; Re-sampled	234235
7/28/2009	ELV-1C	ISWC0054	ISWC0054RadS001	Soil	Manganese-54	-0.00428	0.0247	0.0423	-	-	-	-	-	-	-0.00428	-	-	-	pCi/g	Cal Haz Area; Re-sampled	234235
7/28/2009	ELV-1C	ISWC0054	ISWC0054RadS001	Soil	Potassium-40	23.6	2.12	0.361	35.5	BTV	-	YES	23.6	-	-	-	-	0.01	pCi/g	Cal Haz Area; Re-sampled	234235
7/28/2009	ELV-1C	ISWC0054	ISWC0054RadS001	Soil	Sodium-22	0.00479	0.0299	0.0481	0.0468	MDC	-	-	-	-	0.00479	-	YES	1.03	pCi/g	Cal Haz Area; Re-sampled	234235
7/28/2009	ELV-1C	ISWC0054	ISWC0054RadS001	Soil	Strontium-90	0.0413	0.03	0.0474	0.117	MDC	-	-	-	-	0.0413	-	-	0.41	pCi/g	Cal Haz Area	234235
7/28/2009	ELV-1C	ISWC0054	ISWC0054RadS001	Soil	Thorium-228	1.23	0.127	0.0722	4.27	BTV	-	YES	1.23	-	-	-	-	0.02	pCi/g	Cal Haz Area; Re-sampled	234235
7/28/2009	ELV-1C	ISWC0054	ISWC0054RadS001	Soil	Thorium-232	1.24	0.228	0.154	3.44	BTV	-	YES	1.24	-	-	-	-	0.04	pCi/g	Cal Haz Area; Re-sampled	234235
7/28/2009	ELV-1C	ISWC0054	ISWC0054RadS001	Soil	Tritium	0.357	0.404	0.679	8.59	MDC	-	-	-	-	0.357	-	-	0.08	pCi/g	Cal Haz Area	234235
7/28/2009	ELV-1C	ISWC0054	ISWC0054RadS001	Soil	Uranium-235	0.0202	0.166	0.282	0.152	BTV	-	-	-	-	0.0202	-	YES	1.86	pCi/g	Cal Haz Area; Re-sampled	234235
7/28/2009	ELV-1C	ISWC0054	ISWC0054RadS001	Soil	Uranium-238	2.13	1.83	2.32	1.96	BTV	YES	-	-	-	2.13	YES	YES	1.18	pCi/g	Cal Haz Area; Re-sampled	234235
8/28/2009	ELV-1C	ISWC0052	ISWC0052ARadS001	Soil	Americium-241	0.0219	0.0995	0.176	0.0386	MDC	-	-	-	-	0.0219	-	YES	4.56	pCi/g	Cal Haz Area; Re-sample	236227
8/28/2009	ELV-1C	ISWC0052	ISWC0052ARadS001	Soil	Cesium-134	0	0.0337	0.0539	0.0801	MDC	-	-	-	-	0	-	-	0.67	pCi/g	Cal Haz Area; Re-sample	236227
8/28/2009	ELV-1C	ISWC0052	ISWC0052ARadS001	Soil	Cesium-137	0.514	0.059	0.0369	0.225	BTV	YES	YES	0.514	YES	-	-	-	0.16	pCi/g	Cal Haz Area; Re-sample	236227
8/28/2009	ELV-1C	ISWC0052	ISWC0052ARadS001	Soil	Cobalt-60	0.000239	0.023	0.0392	0.0363	MDC	-	-	-	-	0.000239	-	YES	1.08	pCi/g	Cal Haz Area; Re-sample	236227
8/28/2009	ELV-1C	ISWC0052	ISWC0052ARadS001	Soil	Europium-152	-0.0524	0.0586	0.0928	0.0739	MDC	-	-	-	-	-0.0524	-	YES	1.26	pCi/g	Cal Haz Area; Re-sample	236227
8/28/2009	ELV-1C	ISWC0052	ISWC0052ARadS001	Soil	Europium-154	0.0494	0.0704	0.126	0.198	MDC	-	-	-	-	0.0494	-	-	0.64	pCi/g	Cal Haz Area; Re-sample	236227
8/28/2009	ELV-1C	ISWC0052	ISWC0052ARadS001	Soil	Manganese-54	0.000987	0.0218	0.0377	-	-	-	-	-	-	0.000987	-	-	-	pCi/g	Cal Haz Area; Re-sample	236227
8/28/2009	ELV-1C	ISWC0052	ISWC0052ARadS001	Soil	Potassium-40	21.8	1.85	0.307	35.5	BTV	-	YES	21.8	-	-	-	-	0.01	pCi/g	Cal Haz Area; Re-sample	236227
8/28/2009	ELV-1C	ISWC0052	ISWC0052ARadS001	Soil	Sodium-22	0.0171	0.025	0.0448	0.0468	MDC	-	-	-	-	0.0171	-	-	0.96	pCi/g	Cal Haz Area; Re-sample	236227
8/28/2009	ELV-1C	ISWC0052	ISWC0052ARadS001	Soil	Thorium-228	1.09	0.116	0.0537	4.27	BTV	-	YES	1.09	-	-	-	-	0.01	pCi/g	Cal Haz Area; Re-sample	236227
8/28/2009	ELV-1C	ISWC0052	ISWC0052ARadS001	Soil	Thorium-232	1.02	0.221	0.127	3.44	BTV	-	YES	1.02	-	-	-	-	0.04	pCi/g	Cal Haz Area; Re-sample	236227
8/28/2009	ELV-1C	ISWC0052	ISWC0052ARadS001	Soil	Uranium-235	0.0994	0.144	0.2	0.152	BTV	-	-	-	-	0.0994	-	YES	1.32	pCi/g	Cal Haz Area; Re-sample	236227
8/28/2009	ELV-1C	ISWC0052	ISWC0052ARadS001	Soil	Uranium-238	1.57	1.25	1.36	1.96	BTV	-	YES	1.57	-	-	-	-	0.69	pCi/g	Cal Haz Area; Re-sample	236227
8/28/2009	ELV-1C	ISWC0053	ISWC0053ARadS001	Soil	Americium-241	0.0644	0.0592	0.104	0.0386	MDC	YES	-	-	-	0.0644	YES	YES	2.69	pCi/g	Cal Haz Area; Re-sample	236227
8/28/2009	ELV-1C	ISWC0053	ISWC0053ARadS001	Soil	Cesium-134	0.0473	0.0314	0.0505	0.0801	MDC	-	-	-	-	0.0473	-	-	0.63	pCi/g	Cal Haz Area; Re-sample	236227
8/28/2009	ELV-1C	ISWC0053	ISWC0053ARadS001	Soil	Cesium-137	0.444	0.0565	0.0403	0.225	BTV	YES	YES	0.444	YES	-	-	-	0.18	pCi/g	Cal Haz Area; Re-sample	236227
8/28/2009	ELV-1C	ISWC0053	ISWC0053ARadS001	Soil	Cobalt-60	0.000416	0.02	0.0343	0.0363	MDC	-	-	-	-	0.000416	-	-	0.94	pCi/g	Cal Haz Area; Re-sample	236227
8/28/2009	ELV-1C	ISWC0053	ISWC0053ARadS001	Soil	Europium-152	0.00124	0.0586	0.0912	0.0739	MDC	-	-	-	-	0.00124	-	YES	1.23	pCi/g	Cal Haz Area; Re-sample	236227

ELV-1C NASA ISRA - CALIFORNIA HAZARDOUS - RADIOLOGICAL > LUT

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	Comments	Document
8/28/2009	ELV-1C	ISWC0053	ISWC0053ARadS001	Soil	Europium-154	0.0438	0.0699	0.125	0.198	MDC	-	-	-	-	0.0438	-	-	0.63	pCi/g	Cal Haz Area; Re-sample	236227
8/28/2009	ELV-1C	ISWC0053	ISWC0053ARadS001	Soil	Manganese-54	-0.00495	0.0192	0.0325	-	-	-	-	-	-	-0.00495	-	-	-	pCi/g	Cal Haz Area; Re-sample	236227
8/28/2009	ELV-1C	ISWC0053	ISWC0053ARadS001	Soil	Potassium-40	22.3	2.11	0.294	35.5	BTV	-	YES	22.3	-	-	-	-	0.01	pCi/g	Cal Haz Area; Re-sample	236227
8/28/2009	ELV-1C	ISWC0053	ISWC0053ARadS001	Soil	Sodium-22	0.0135	0.0249	0.0443	0.0468	MDC	-	-	-	-	0.0135	-	-	0.95	pCi/g	Cal Haz Area; Re-sample	236227
8/28/2009	ELV-1C	ISWC0053	ISWC0053ARadS001	Soil	Thorium-228	1.17	0.125	0.0511	4.27	BTV	-	YES	1.17	-	-	-	-	0.01	pCi/g	Cal Haz Area; Re-sample	236227
8/28/2009	ELV-1C	ISWC0053	ISWC0053ARadS001	Soil	Thorium-232	1.16	0.211	0.122	3.44	BTV	-	YES	1.16	-	-	-	-	0.04	pCi/g	Cal Haz Area; Re-sample	236227
8/28/2009	ELV-1C	ISWC0053	ISWC0053ARadS001	Soil	Uranium-235	-0.00934	0.115	0.195	0.152	BTV	-	-	-	-	-0.00934	-	YES	1.28	pCi/g	Cal Haz Area; Re-sample	236227
8/28/2009	ELV-1C	ISWC0053	ISWC0053ARadS001	Soil	Uranium-238	0.808	0.79	0.878	1.96	BTV	-	-	-	-	0.808	-	-	0.45	pCi/g	Cal Haz Area; Re-sample	236227
8/28/2009	ELV-1C	ISWC0054	ISWC0054ARadS001	Soil	Americium-241	-0.163	0.164	0.302	0.0386	MDC	-	-	-	-	-0.163	-	YES	7.82	pCi/g	Cal Haz Area; Re-sample	236227
8/28/2009	ELV-1C	ISWC0054	ISWC0054ARadS001	Soil	Cesium-134	0	0.0291	0.0563	0.0801	MDC	-	-	-	-	0	-	-	0.70	pCi/g	Cal Haz Area; Re-sample	236227
8/28/2009	ELV-1C	ISWC0054	ISWC0054ARadS001	Soil	Cesium-137	0.659	0.0707	0.0388	0.225	BTV	YES	YES	0.659	YES	-	-	-	0.17	pCi/g	Cal Haz Area; Re-sample	236227
8/28/2009	ELV-1C	ISWC0054	ISWC0054ARadS001	Soil	Cobalt-60	0.0142	0.0251	0.044	0.0363	MDC	-	-	-	-	0.0142	-	YES	1.21	pCi/g	Cal Haz Area; Re-sample	236227
8/28/2009	ELV-1C	ISWC0054	ISWC0054ARadS001	Soil	Europium-152	-0.00786	0.0939	0.115	0.0739	MDC	-	-	-	-	-0.00786	-	YES	1.56	pCi/g	Cal Haz Area; Re-sample	236227
8/28/2009	ELV-1C	ISWC0054	ISWC0054ARadS001	Soil	Europium-154	-0.0354	0.0789	0.128	0.198	MDC	-	-	-	-	-0.0354	-	-	0.65	pCi/g	Cal Haz Area; Re-sample	236227
8/28/2009	ELV-1C	ISWC0054	ISWC0054ARadS001	Soil	Manganese-54	0.00912	0.0223	0.0399	-	-	-	-	-	-	0.00912	-	-	-	pCi/g	Cal Haz Area; Re-sample	236227
8/28/2009	ELV-1C	ISWC0054	ISWC0054ARadS001	Soil	Potassium-40	22.5	1.99	0.337	35.5	BTV	-	YES	22.5	-	-	-	-	0.01	pCi/g	Cal Haz Area; Re-sample	236227
8/28/2009	ELV-1C	ISWC0054	ISWC0054ARadS001	Soil	Sodium-22	-0.0122	0.0281	0.0458	0.0468	MDC	-	-	-	-	-0.0122	-	-	0.98	pCi/g	Cal Haz Area; Re-sample	236227
8/28/2009	ELV-1C	ISWC0054	ISWC0054ARadS001	Soil	Thorium-228	1.12	0.115	0.0682	4.27	BTV	-	YES	1.12	-	-	-	-	0.02	pCi/g	Cal Haz Area; Re-sample	236227
8/28/2009	ELV-1C	ISWC0054	ISWC0054ARadS001	Soil	Thorium-232	1.17	0.215	0.12	3.44	BTV	-	YES	1.17	-	-	-	-	0.03	pCi/g	Cal Haz Area; Re-sample	236227
8/28/2009	ELV-1C	ISWC0054	ISWC0054ARadS001	Soil	Uranium-235	0.068	0.151	0.266	0.152	BTV	-	-	-	-	0.068	-	YES	1.75	pCi/g	Cal Haz Area; Re-sample	236227
8/28/2009	ELV-1C	ISWC0054	ISWC0054ARadS001	Soil	Uranium-238	0.171	1.26	2.31	1.96	BTV	-	-	-	-	0.171	-	YES	1.18	pCi/g	Cal Haz Area; Re-sample	236227
9/28/2012	ELV-1C	ISWC0135	ISWC0135S001	Soil	Cesium-137	0.34	0.0536	0.0395	0.225	BTV	YES	YES	0.34	YES	-	-	-	0.18	pCi/g	Cal Haz Area; ISWC0052,53,54 Stepout #1	312152
9/28/2012	ELV-1C	ISWC0114	ISWC0114S001	Soil	Cesium-137	0.552	0.0701	0.0375	0.225	BTV	YES	YES	0.552	YES	-	-	-	0.17	pCi/g	Cal Haz Area; ISWC0052,53,54 Stepout #3	312152
11/2/2012	ELV-1C	ISWC0119	ISWC0119S001	Soil	Cesium-137	0.389	0.0757	0.0524	0.225	BTV	YES	YES	0.389	YES	-	-	-	0.23	pCi/g	Cal Haz Area; ISWC0052,53,54 Stepout #4	314581
11/2/2012	ELV-1C	ISWC0120	ISWC0120S001	Soil	Cesium-137	0.409	0.0641	0.0413	0.225	BTV	YES	YES	0.409	YES	-	-	-	0.18	pCi/g	Cal Haz Area; ISWC0052,53,54 Stepout #5	314581
11/2/2012	ELV-1C	ISWC0122	ISWC0122S001	Soil	Cesium-137	0.422	0.0698	0.0504	0.225	BTV	YES	YES	0.422	YES	-	-	-	0.22	pCi/g	Cal Haz Area; ISWC0052,53,54 Stepout #7	315762