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Radionuclide Concentrations in Soils and Vegetation at Low-Level Radioactive Waste Disposal Area G during 2005

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RADIONUCLIDE CONCENTRATIONS IN SOILS AND VEGETATION AT LOW-LEVEL RADIOACTIVE WASTE DISPOSAL AREA G DURING 2005

P.R. Fresquez, M.W. McNaughton, and M.J. Winch

ABSTRACT

Soil samples were collected at 15 locations and unwashed overstory and understory vegetation samples were collected from up to nine locations within and around the perimeter of Area G, the primary disposal facility for low-level radioactive solid waste at Los Alamos National Laboratory (LANL). Soil and plant samples were also collected from the proposed expansion area west of Area G for the purpose of gaining preoperational baseline data. Soil and plant samples were analyzed for radionuclides that have shown a history of detection in past years; these included ^{3}H, ^{238}Pu, ^{239,240}Pu, ^{241}Am, ^{234}U, ^{235}U, and ^{238}U for soils and ^{3}H, ^{238}Pu, and ^{239,240}Pu for plants. As in previous years, the highest levels of ^{3}H in soils and vegetation were detected at the south portion of Area G near the ^{3}H shafts; whereas, the highest concentrations of the Pu isotopes were detected in the northern and northeastern portions near the pads for transuranic waste. All concentrations of radionuclides in soils and vegetation, however, were still very low (pCi range) and far below LANL screening levels and regulatory standards.

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1. INTRODUCTION

Solid radioactive wastes have been disposed of by burial at Los Alamos National Laboratory (LANL) since the early 1940s (Purtymun et al., 1980). Area G is a 25.5-hectare (63-acre) low-level radioactive waste processing area located on the east end of Mesa del Buey at Technical Area (TA) 54 (Figure 1). Area G was established in 1957 and is the Laboratory's primary radioactive solid waste burial and storage site (Soholt, 1990). Wastes include contaminated equipment, paper, clothing, building materials, soils, and process wastes and are placed in pits, trenches, or shafts and then covered with fill material (Hansen et al., 1980). Tritium (^{3}H), plutonium (^{238}Pu and ^{239,240}Pu), americium (^{241}Am), uranium (^{234}U, ^{235}U, ^{238}U), and a variety of fission and activation products

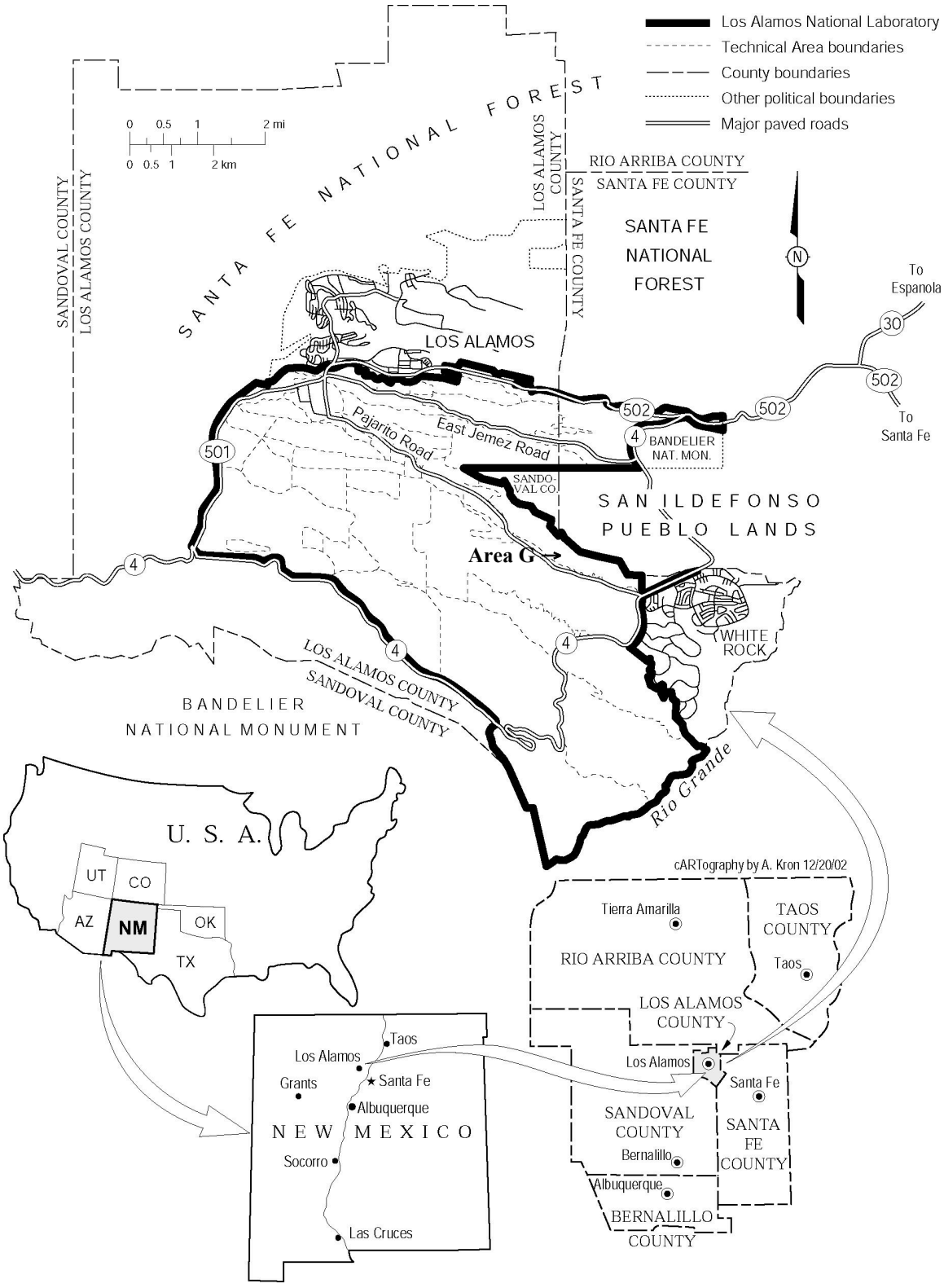

Figure 1. The location of Area G at Los Alamos National Laboratory.

are the main radionuclides in waste materials deposited at Area G (U.S. DOE, 1979).

As part of the Environmental Surveillance Program at LANL, samples of soils and vegetation have been collected within and around the perimeter of Area G to monitor and assess the site's impact on the surrounding environment (Lopez, 2002). A soil sampling program is the most direct means of estimating the types, concentrations, and distribution of radionuclides in the environment within and around nuclear facilities (Fresquez et al., 1996). Subsequently, the knowledge gained from the radiological surveillance of soil is critical to provide information about potential exposure by way of several pathways that include soil ingestion, consumption of food crops, resuspension of radionuclides into the air, and contamination of groundwater (Hakonson et al., 1981). The uptake of radionuclides by vegetation may also give some insight into surface (Hansen et al., 1980) and subsurface (Wenzel et al., 1987) pathways of contaminants to receptors from waste disposal areas. Trees, in particular, have been shown to be excellent indicators of subterranean ^{3}H migration from low-level radioactive waste disposal sites (Rickard and Kirby, 1987; Fresquez et al., 2003).

The objective of this program is to compare radionuclides of concern in soils and vegetation collected from within and around Area G with similar media collected from regional background areas in an effort to determine impacts to human health and the environment, if any. Radionuclides that were analyzed this year included those that have shown a history of detection at Area G; they were ^{3}H, ^{241}Am, ^{238}Pu, $^{239,240}Pu$, and the uranium isotopes for soils and ^{3}H, ^{238}Pu, and $^{239,234}Pu$ for vegetation. Based on past years, other radionuclides such as cesium and strontium do not appear to be of significant concern and were not analyzed this year.

2. METHODS

In 2005, the Soils, Foodstuffs, and Biota Environmental Surveillance Team of LANL's Meteorology and Air Quality Group collected 15 soil surface samples and up to nine overstory and understory vegetation samples at locations within and around Area G at TA-54 (Figure 2). Table 1 describes each site in more detail. Other soil and

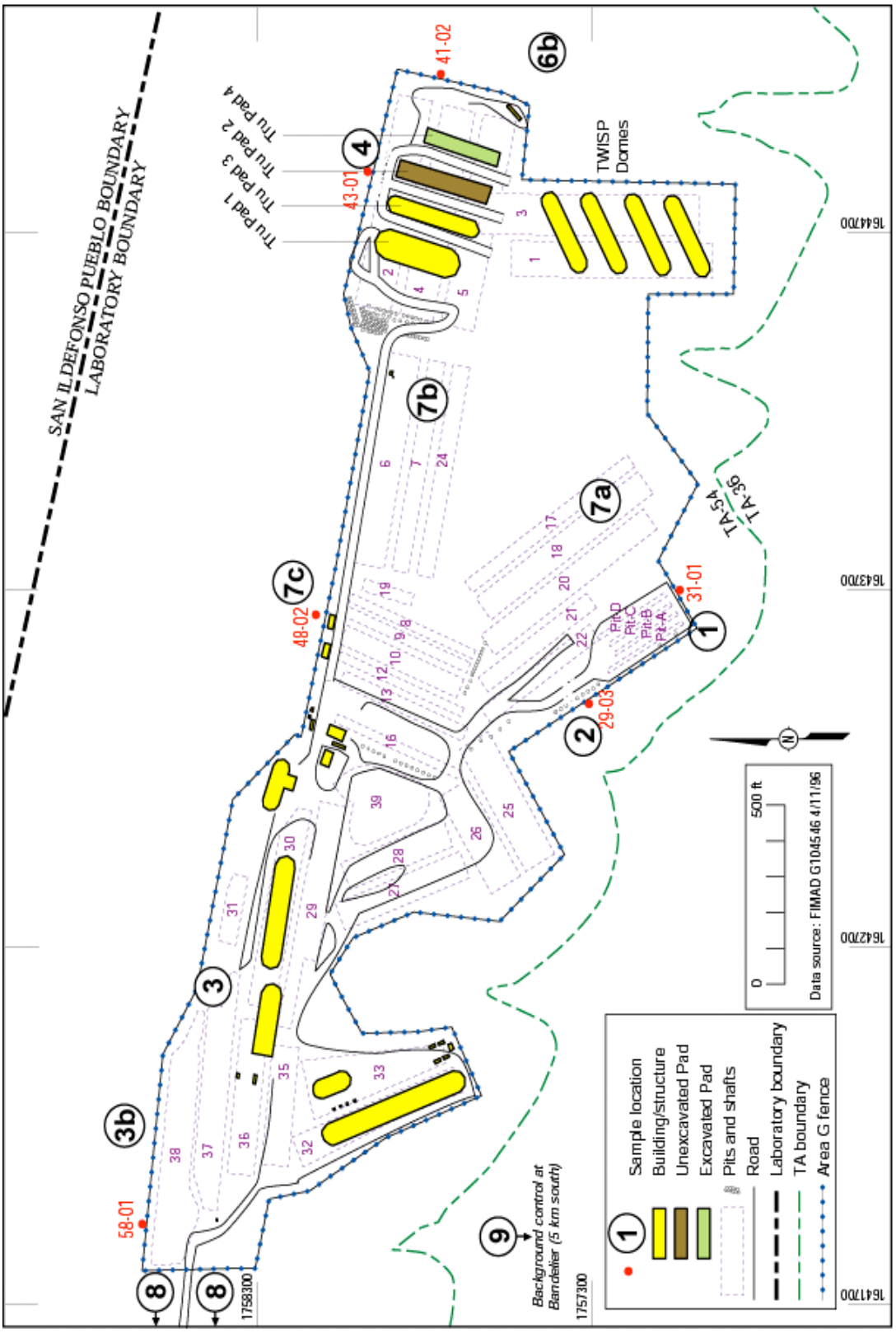

Figure 2. Site/sample locations of soils and vegetation at Area G. (Site #8 is located farther west and Site #9 is located farther south than what is shown here.)

vegetation materials were collected west of Area G in the proposed expansion area (site identified as 8 in Figure 2 and Table 1); this site has been sampled for some time now for the purpose of gaining preoperational baseline data.

a. Soil Sampling

Over the years, two soil sampling strategies have been used at Area G to determine the pathway contributions of surface water runoff and fugitive dust. The first soil sampling strategy (1980 to present) involves collecting grab samples along the perimeter fence line and is focused on the possibility of contaminated sediment movement through surface-water runoff out of Area G (Conrad et al., 1995). The locations chosen represent the most sensitive to possible contaminant migration. The second soil sampling strategy (1996 to present) involved collecting composite samples

Table 1. Sampling Locations Used in 2005 and Shown on Figure 2.

Location Number	Description
Area G sampling sites	
1	South of ^{3}H shafts immediately outside the Area G fence
2	West of the high-level ^{3}H shafts immediately outside the Area G fence
3	East of Pit 38 (inside the Area G fence)
3b	North of Pit 38 outside the Area G fence
4	Outside the Area G fence north of the transuranic (TRU) Waste Pads 2 and 4
6b	Southeast of TRU Waste Pad 4 outside Area G fence
7a	Southeastern portions of Pits 17 and 18 (inside the Area G fence)
7b	East end of Pit 7 (inside the Area G fence)
7c	North of Pit 8 outside the Area G fence
G-29-03	Southwest of Pit 22 (outside the Area G fence)
G-31-01	Southeast of Disposal Trench C (outside the Area G fence)
G-41-02	East of the eastern end of Pit 2 and TRU Waste Pad 4 (outside the Area G fence)
G-43-01	North of TRU Waste Pad 2 (outside the Area G fence)
G-48-02	North of Pit 10 (outside the Area G fence)
G-58-01	North of western end of Pit 38 near gate (outside the Area G fence)
Expansion Area	
8	Proposed expansion area is one-half mile west of the entrance gate to Area G

over a larger area within and outside the perimeter of Area G to determine the amount of contaminants as a result of fugitive dust (Fresquez et al., 1997). The methods of collection of the two soil sampling strategies are the following:

1. Samples prefixed with the letter G were collected as a grab sample from the top 15 cm (6 in.) of the soil surface with either a stainless steel or a disposable polystyrene scoop. These samples were placed into 500-mL (17-oz.) poly bottles.
2. Samples prefixed with a number were collected from the surface with a stainless steel soil ring 10 cm (4 in.) in diameter driven 5 cm (2 in.) into the soil (ASTM, 1990). Samples were collected from the center and corners of a square plot of 10 m (33 ft) per side. The five subsamples were combined and mixed thoroughly in a 11.4-L (three-gallon) Ziploc® bag, and a subsample from the composite was placed in a 500-mL (17-oz.) poly bottle.

All soil samples were submitted under full chain-of-custody to Paragon Analytics, Inc., for analysis of ^{3}H, ^{238}Pu, $^{239,240}Pu$, ^{234}U, ^{235}U, ^{238}U, and ^{241}Am. All quality assurance/quality control requirements were met by Paragon Analytics, Inc. All methods of radiochemical analyses have been described previously (Fresquez et al., 1997; Childs and Conrad, 1997) and the methods for estimating Total Propagated Analytical Uncertainty (TPU) for all radiometric analyses were described in detail previously (Nyhan et al., 2002). Radionuclide results were reported in pCi/mL of soil moisture for ^{3}H and pCi/g dry soil for all the others.

b. Plant Sampling

Samples of overstory vegetation, mostly juniper trees, and understory vegetation, mostly grasses and forbs, were collected. Overstory and understory samples were collected at all sampling locations from the same 10- by 10-m plots as the soil composite samples. (Note: In past years both piñon pine and juniper trees were sampled, but in 2004 most piñon pine trees died because of a severe insect infestation coupled with drought. Therefore, only juniper trees are sampled in this study.) Samples of the overstory consisted of the tips of tree shoots approximately 2.5 to 5.1 cm (1 to 2 in.) in length,

which were collected at a height of 1.3 to 1.6 m (4 to 5 ft); whereas, samples of the understory plants consisted of clippings of the top growth cut at the soil level.

Personnel collecting samples wore plastic gloves and used clean shears to clip vegetation; gloves and shears were decontaminated (washed with soap and water) between sampling locations. Vegetation clippings ranged from 0.9 to 1.4 kg (2 to 3 lb) of composited material, which was placed in labeled double-bagged Ziploc® plastic bags and transported to the laboratory in a locked ice chest. Each sample was divided into two subsets to provide enough material for ^{3}H analysis and for the other radionuclides. Samples were not washed and thus represent the total concentration of radionuclides deposited on the plant surfaces by rain splash and/or airborne deposition as well as radionuclides taken up by plant roots. The total radionuclide concentration is a realistic measure of the amount available to receptors that consume the plants at Area G.

Part of the vegetation sample was subsampled for ^{3}H analysis. The subsamples were placed in glass beakers to collect distillate water (Salazar, 1984). The remaining portion of each subsample was placed in a 1-L (34-oz.) glass beaker and slowly ashed at 500°C (932°F) for 40 h. The ashed sample was pulverized and homogenized, then transferred to labeled 500-mL (17-oz.) poly bottles, and submitted with the distillate samples under full chain-of-custody to Paragon Analytics, Inc., for the analysis of ^{3}H, ^{238}Pu, and $^{239,240}Pu$; all quality assurance/quality control requirements were met. All methods of radiochemical analyses have been described previously (Fresquez et al., 1996). Radionuclide results were reported in pCi/mL of tissue moisture for ^{3}H and pCi/g ash for the plutonium isotopes. Results reported in grams of ash are usually two to four orders of magnitude greater than live (wet) weight. To convert units on a per gram ash weight basis to a wet weight basis for dose assessments, see Fresquez et al. (2004) for moisture conversion ratios for the various plant groups.

c. Determining the Composition of Uranium

To determine the source of U in soils at the 99% confidence level, the U isotopic distribution of ^{234}U and ^{238}U, which for naturally occurring U is one, was assessed using the following steps: (1) the difference between ^{234}U and ^{238}U was calculated, (2) the squares of their uncertainties were summed and then the square root of this number was

taken, (3) the ^{234}U and ^{238}U difference was divided by the pooled square root, (4) if the result was greater than 3, then it was observed whether the ^{234}U value or the ^{238}U value was larger, (5) if the ^{234}U value was larger, then excess enriched U was indicated. Conversely, if the ^{238}U value was larger, then excess depleted U was indicated.

d. Soil and Plant Standards

To evaluate Area G impacts from detectable (the result is greater than three times the TPU) radionuclides, the analytical results of soil and plant samples collected from the facility are first compared to Regional Statistical Reference Levels (RSRLs). RSRLs are the upper-level background concentration (mean plus three standard deviations = 99% confidence level) for radionuclides calculated from soil and vegetation data collected from regional background locations away from the influence of the Laboratory over the past five years and represent natural and fallout sources (Fresquez and Gonzales, 2004).

Where the levels exceed RSRLs, the concentrations are then compared to the screening levels (SLs). For soils, the SLs were developed by the Environmental Restoration Project at LANL to identify contaminants of concern (i.e., an investigative action level) on the basis of a conservative (e.g., residential) 15-mrem protective dose limit (ER, 2002). For vegetation, the SLs were developed by the Meteorology and Air Quality Group dose assessment team at the Laboratory to identify the contaminants of concern at 10% of the standard.

Finally, if a contaminant exceeds the SL then it is compared to the standard. For soils, the measured concentrations are used to calculate a per-person dose with the help of the RESRAD computer model (Yu et al., 1995). The calculated dose is based on a residential scenario and assumes soil ingestion, inhalation of suspended dust, and ingestion of homegrown fruits and vegetables as the primary exposure pathways for one or more radionuclides. The unit conversions, input parameters, model and parameter assumptions, and the uncertainty analysis that are used can be found in Fresquez et al. (1996). This calculated per-person dose is compared to the 100-mrem/yr U.S. Department of Energy (DOE) standard (U.S. DOE, 1993). For vegetation, the measured concentrations are used to calculate a dose according to U.S. DOE (2002) and compare it

with the 1 rad/d DOE dose standard for terrestrial plants. Table 2 summarizes the levels and/or standard used to evaluate the soil and vegetation monitoring program at Area G.

Table 2. Application of Soil and Vegetation Standards and Other Reference Levels to Area G Radionuclide Monitoring Data.

Media	Standard	Screening Level	Background
Soil	100 mrem/y	15 mrem/y	RSRL
Vegetation	1 rad/d	0.1 rad/d	RSRL

3. RESULTS

a. Radionuclide Concentrations in Soils

Results of radionuclide concentrations in soils are given in Table 3. The chain-of-custody records and Paragon Analytics, Inc., analytical reports are included in Appendix A for reference.

Concentrations of ^{3}H in soils were detected above the RSRL in four of the 15 soil samples collected. These results are similar to those detected in past years, particularly in the southern portion of Area G were the ^{3}H shafts are located (Nyhan et al., 2004; Fresquez et al., 2004). All results, however, are far below the SL of 6,400 pCi/mL.

Many of the soil samples collected at Area G, particularly around the perimeter of the north and northeastern sections, contained ^{241}Am (eight out of 15), ^{238}Pu (seven out of 15), and $^{239,240}Pu$ (nine out of 15) above RSRLs. The highest concentrations of ^{241}Am (0.41 pCi/g dry), ^{238}Pu (3.1 pCi/g dry), and $^{239,240}Pu$ (1.1 pCi/g dry) were detected in a soil grab sample located on the perimeter of the northeastern corner of Area G. All concentrations were below SLs, however.

Only one uranium isotope, ^{234}U, out of 45 values was higher than the RSRL (1.4 vs 1.3 pCi/g dry) and the ratio of ^{234}U to ^{238}U in all of the soil samples collected indicated natural sources. These data are very similar to last year's results.

b. Radionuclide Concentrations in Plants

Tables 4 and 5 show ^{3}H, ^{238}Pu, and $^{239,240}Pu$ concentrations in unwashed overstory and understory vegetation, respectively, collected from within and around Area G during

the 2005 growing season. The Paragon Analytics, Inc., analytical reports are included in Appendix B for reference.

In general, all concentrations of radionuclides in overstory and understory vegetation collected from within and around Area G are very low and most were not greater than both the TPU and RSRL values. As in previous years, the highest concentrations of ^{3}H in vegetation were observed on the southern perimeter of Area G adjacent to the ^{3}H shafts (Sites 1 and 2) (Nyhan et al., 2004; Fresquez et al., 2004; Fresquez and Lopez, 2004). Similarly, the highest concentrations of ^{238}Pu and $^{239,240}Pu$ in vegetation were detected in samples collected from the north (Site 7c) and northeastern (Site 4) regions of Area G. All radionuclides, however, were below SLs.

4. CONCLUSIONS

All concentrations of radionuclides in soils and plants collected at Area G were low and below SLs and regulatory standards. Therefore, exposure to radionuclides in Area G soils and vegetation poses little risk to humans and the environment.

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Table 3. Radionuclide Concentrations (TPU, 99% confidence level) in Soils Collected from Area G in 2005. (Bold values are greater than the TPU and RSRL.)

Location	^{3}H (pCi/mL)	^{241}Am (pCi/g dry)	^{238}Pu (pCi/g dry)	$^{239,240}Pu$ (pCi/g dry)	^{234}U (pCi/g dry)	^{235}U (pCi/g dry)	^{238}U (pCi/g dry)
1	**7.4**	0.012	**0.017**	**0.041**	0.99	0.044	1.0
	(1.8)	(0.014)	**(0.015)**	**(0.024)**	(0.26)	(0.021)	(0.27)
2	**297**	0.0098	0.0008	0.021	0.98	0.047	0.97
	(68)	(0.013)	(0.0090)	(0.018)	(0.26)	(0.023)	(0.26)
3	0.39	**0.021**	0.0029	0.015	0.89	0.041	0.90
	(0.42)	**(0.021)**	(0.0075)	(0.014)	(0.23)	(0.020)	(0.24)
3b	0.10	0.0066	0.0010	0.0025	0.83	0.041	0.88
	(0.41)	(0.013)	(0.0080)	(0.0080)	(0.21)	(0.020)	(0.23)
4	0.10	**0.29**	**0.37**	**0.39**	0.98	0.062	1.0
	(0.41)	**(0.10)**	**(0.11)**	**(0.12)**	(0.26)	(0.026)	(0.26)
6b	-0.01	**0.024**	0.0040	**0.071**	0.76	0.048	0.81
	(0.41)	**(0.024)**	(0.0081)	**(0.036)**	(0.21)	(0.023)	(0.21)
7a	0.82	0.0053	**0.019**	**0.053**	0.88	0.054	0.87
	(0.47)	(0.0098)	**(0.017)**	**(0.030)**	(0.23)	(0.024)	(0.23)
7b	0.45	0.012	0.0010	**0.066**	0.89	0.038	0.90
	(0.56)	(0.014)	(0.0081)	**(0.035)**	(0.24)	(0.020)	(0.24)
7c	0.55	**0.087**	**0.13**	**0.38**	0.81	0.029	0.75
	(0.44)	**(0.051)**	**(0.053)**	**(0.12)**	(0.21)	(0.017)	(0.20)
G-29-03	**274**	0.0035	-0.0014	0.011	1.0	0.045	1.1
	(63)	(0.0099)	(0.0084)	(0.012)	(0.27)	(0.021)	(0.27)
G-31-01	**9.9**	0.0010	0.0	0.0	0.88	0.039	0.94
	(2.4)	(0.0084)	(0.0065)	(0.0065)	(0.24)	(0.024)	(0.26)
G-41-02	0.17	**0.41**	**3.1**	**1.1**	0.92	0.043	0.99
	(0.41)	**(0.13)**	**(0.78)**	**(0.29)**	(0.26)	(0.026)	(0.27)
G-43-01	0.22	**0.13**	**0.48**	**0.42**	**1.4**	0.066	1.4
	(0.42)	**(0.051)**	**(0.14)**	**(0.13)**	**(0.35)**	(0.027)	(0.36)
G-48-02	0.46	**0.059**	**0.088**	**0.27**	0.93	0.056	0.94
	(0.44)	**(0.035)**	**(0.041)**	**(0.089)**	(0.24)	(0.026)	(0.024)

Table 3 (cont.)

Location	^{3}H (pCi/mL)	^{241}Am (pCi/g dry)	^{238}Pu (pCi/g dry)	^{239,240}Pu (pCi/g dry)	^{234}U (pCi/g dry)	^{235}U (pCi/g dry)	^{238}U (pCi/g dry)
G-58-01	0.09	**0.024**	0.0034	0.026	0.98	0.048	1.0
	(0.41)	**(0.023)**	(0.0077)	(0.020)	(0.26)	(0.027)	(0.27)
Exp. (8)[a]	0.08	0.0026	-0.0005	0.0057	0.79	0.059	0.90
	(0.41)	(0.012)	(0.0083)	(0.011)	(0.21)	(0.027)	(0.24)
RSRL[b]	0.94	0.018	0.0070	0.032	1.3	0.12	1.4
SL[c]	6,400[e]	39	49	44	63	17	93

[a]Expansion Area located just west of Area G. The data are being gathered for baseline use.
[b]Regional Statistical Reference Level; this is the upper-limit background concentration (mean plus three standard deviations) based on data from 1999 through 2003 (Fresquez, 2004).
[c]Los Alamos National Laboratory Screening (investigative) Level based on RESRAD version 6.21 (ER, 2001).

Table 4. Radionuclide Concentrations (TPU, 99% confidence level) in Unwashed Overstory Vegetation Collected from Area G in 2005. (Bold values are equal to or greater than both the TPU and RSRL values.)

Sample Location	^{3}H (pCi/mL)	^{238}Pu (pCi/g ash)	$^{239,240}Pu$ (pCi/g ash)
1	**73 (17)**	-0.0004 (0.0069)	0.0073 (0.0096)
2	**598 (137)**	0.0081 (0.011)	0.017 (0.015)
3	**1.1 (0.56)**	0.0052 (0.0095)	0.020 (0.017)
3b	0.26 (0.44)	0.0029 (0.0078)	0.0049 (0.0089)
4	0.34 (0.42)	**0.013 (0.015)**	**0.16 (0.062)**
6b	-0.03 (0.45)	0.0013 (0.0072)	0.020 (0.017)
7c	**2.2 (0.69)**	**0.034 (0.023)**	0.043 (0.027)
Expansion area (8)	0.37 (0.48)	-0.0007 (0.0068)	0.0012 (0.0068)
RSRL[a]	0.72	0.013	0.070

[a]Regional Statistical Reference Level; this is the upper-limit background concentration (mean plus three standard deviations) based on data from 1998 through 2003 (Fresquez and Gonzales, 2004).

Table 5. Radionuclide Concentrations (TPU, 99% confidence level) in Unwashed Understory Vegetation Collected from Area G in 2005. (Bold values are equal to or greater than both the TPU and RSRL values.)

Sample Location	^{3}H (pCi/mL)	^{238}Pu (pCi/g ash)	$^{239,240}Pu$ (pCi/g ash)
1	**97 (23)**	-0.0008 (0.0075)	0.0041 (0.0075)
2	**1700 (390)**	-0.0004 (0.0069)	0.0085 (0.010)
3	0.83 (0.60)	**0.0066 (0.0090)**	0.0097 (0.012)
3b	0.33 (0.50)	0.0014 (0.0074)	0.0015 (0.0074)
4	0.47 (0.56)	0.034 (0.023)	**0.063 (0.032)**
6b	0.03 (0.39)	-0.0018 (0.0092)	0.0062 (0.010)
7a	2.6 (0.83)	**0.0067 (0.0095)**	0.0037(0.0068)
7b	1.8 (0.83)	0.019 (0.017)	0.0068 (0.0093)
7c	1.9 (0.63)	0.043 (0.026)	**0.12 (0.048)**
Expansion area (8)	0.30 (0.47)	-0.0003 (0.0072)	0.0009 (0.0072)
RSRL	3.6	0.0049	0.015

[a]Regional Statistical Reference Level; this is the upper-limit background concentration (mean plus three standard deviations) based on data from 1998 through 2003 (Fresquez and Gonzales, 2004).

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APPENDIX A

ANALYTICAL DATA REPORTS OF RADIONUCLIDE CONCENTRATIONS IN SOILS COLLECTED AT AREA G DURING 2005

LOS ALAMOS NATIONAL LABORATORY - ENVIRONMENTAL STEWARDSHIP - METEOROLOGY AIR QUALITY

Environmental Surveillance Team Chain of Custody Record

Chain of Custody Number: 88 **Creation Date:** 5/2/2005

Project Contact: Phil Fresquez
Contact Phone: (505) 667-0815

Project Name: Facility Sampling (soils, ~~sediments &~~ 2) TA-54 Area G (soil)

Cost Center: 7C2000
Program Code: ~~C357~~ C348
Cost Account: ~~0540/4E03~~ 3400/9700

(USI)	USI	Date Collected	Time Collected	Location Name	Number of Samples	Analysis Requested	Remarks	Field ID
484	~~4855~~	5/3/2005	11:00	3b	1	^3H, Am-241	East of pit 38 inside Area G fence	.01
485	~~4865~~	5/3/2005	1:25	7c	1	ISO Pu	North of pit 8 outside Area G fence	.02
486	~~4875~~	5/4/2005	11:20	4	1	ISO U	outside Area G fence north of TRU pad 2 & 4	.03
487	~~4885~~	5/4/2005	12:10	6b	1		South east of TRU pad 4 outside fence	.04
488	~~4895~~	5/5/2005	1:09	3	1	Detection level MDC	East of pit 38 inside Area G fence	.05
489	~~4905~~	5/5/2005	1:59	7a	1	Am = 0.02	South eastern portion of pit 17 & 18 inside fence	.06
490	491	5/6/2005	~~3:57~~ 1:57	7b	1	ISO Pu = 0.02	~~East~~ 2 East end of pit 17 inside Area G	.07
491	~~492~~	5/5/2005	3:00	2	1	ISO U = ~~0.01~~ 0.1 pCi/g.	West of ^3H outside of Area G fence	.08
492	493	5/5/2005	4:00	8 & 1	1	^3H = 700 pCi/mL	South of ^3H immediately outside fence	.09
493	494	5/5/2005	4:45	8	1		Proposed expansion area.	.10

Relinquished by (print and sign)	Date	Relinquished by (print and sign)	Date	Relinquished by (print and sign)	Date
Louis Naranjo Jr.	6/20/2005				
	Time 10:00		Time		Time
Received by (print and sign)		**Received by (print and sign)**		**Received by (print and sign)**	

Samplers (print names and initial) Louis Naranjo Jr. LN Glenda S. Fred G Raymond Martinez RM
Victoria Martinez VM, Roger Gonzales RG, Gilbert Quintana GQ,
Kevin Tafoya KT

Comments

Monday, May 02, 2005

LOS ALAMOS NATIONAL LABORATORY - ENVIRONMENTAL STEWARDSHIP - METEOROLOGY AIR QUALITY

Environmental Surveillance Team Chain of Custody Record

Chain of Custody Number: 89 **Creation Date:** 5/2/2005

Project Contact: Phil Fresquez	**Project Name:** Facility Sampling (soils, ~~sediments &~~ TA-54 Area G Grab sample (soil)	**Cost Center:** 7C2000
Contact Phone: (505) 667-0815		**Program Code:** ~~C357~~ C34B
		Cost Account: ~~0540/4E03~~ 3400/9700

USI	Date Collected	Time Collected	Location Name	Number of Samples	Analysis Requested	Remarks	Field ID
494	5/3/2005	11:15	G-58-01	1	^{3}H, Am-241	NW end of pit 38 (outside fence)	.01
495	5/3/2005	1:20	G-48-02	1	ISO Pu	North of pit 10 outside fence	.02
496	5/4/2005	11:00	G-43-01	1	ISO U	North of TRU pad 2 outside fence	.03
497	5/4/2005	11:35	G-41-02	1		East of pit TRU pad 2 Outside fence	.04
498	5/5/2005	3:00	G-29-03	1	Detection Level MDC	Southwest of pit 22 outside fence	.05
499	5/5/2005	3:45	G-31-01	1	Am = 0.02	Southeast of Disposal Trench Cut S. side fence	.06
					ISO Pu = 0.02		.07
					ISO U = 0.01		.08
					^{3}H = 700 pCi/mL		.09
							.10

Relinquished by (print and sign)	Date	Relinquished by (print and sign)	Date	Relinquished by (print and sign)	Date
Louis Naranjo Jr.	6/20/05				
Louis Naranjo Jr.	Time 10:00		Time		Time
Received by (print and sign)		Received by (print and sign)		Received by (print and sign)	

Samplers (print names and initial) Louis Naranjo Jr. LJ, Victoria Martinez VM, Glenda Fred GF, Ryan Gonzales, Raymond Martinez RM, Gilbert Gutierrez GG, Louis Tafoya LT

Comments

Tritium Analysis By Liquid Scintillation Sample Results Summary

Client Name: ESH20_LANL
Client Project Name: TA-55, Area G Grab sample (soil)
Client Project Number: 7C2000 C34B 3A00 9700

Laboratory Name: Paragon Analytics
PAI Work Order: 0506167

Reported on: Wednesday, July 20, 2005 12:48:17 PM

Lab Sample ID	Client Sample ID	Sample Type	Nuclide	Result +/- 2 s TPU	MDC	Units	Matrix	Prep Batch	Date Analyzed	Flags
0506167-1	88.484 3b	Sample	H-3	0.10 +/- 0.27	0.45	pCi/ml	SOIL	3H050628-2	7/13/2005	U
0506167-2	88.485 3c	Sample	H-3	0.55 +/- 0.29	0.45	pCi/ml	SOIL	3H050628-2	7/13/2005	LT
0506167-3	88.486 4	Sample	H-3	0.10 +/- 0.27	0.45	pCi/ml	SOIL	3H050628-2	7/13/2005	U
0506167-4	88.487 6b	Sample	H-3	-0.01 +/- 0.27	0.45	pCi/ml	SOIL	3H050628-2	7/14/2005	U
0506167-5	88.488 3	Sample	H-3	0.39 +/- 0.28	0.45	pCi/ml	SOIL	3H050628-2	7/14/2005	U
0506167-6	88.489 3a	Sample	H-3	0.82 +/- 0.31	0.45	pCi/ml	SOIL	3H050628-2	7/14/2005	
0506167-7	488.90 3b	Sample	H-3	0.45 +/- 0.37	0.59	pCi/ml	SOIL	3H050628-2	7/14/2005	U
0506167-8	88.491 2	Sample	H-3	297 +/- 45	0	pCi/ml	SOIL	3H050628-2	7/14/2005	
0506167-9	88.492 1	Sample	H-3	7.4 +/- 1.2	0.4	pCi/ml	SOIL	3H050628-2	7/14/2005	

Comments:

Data Package ID: *H30506167-1*

Qualifiers/Flags:

U - Result is less than the sample specific MDC.
LT - Result is less than Requested MDC, greater than sample specific MDC.
Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.
Y2 - Chemical Yield outside default limits.
M - The requested MDC was not met.
M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

Abbreviations:

TPU - Total Propagated Uncertainty (see PAI SOP 743)
MDC - Minimum Detectable Concentration (see PAI SOP 709)

BDL - Below Detection Limit

Tritium Analysis By Liquid Scintillation Sample Results Summary

Client Name: ESH20_LANL
Client Project Name: TA-55, Area G Grab sample (soil)
Client Project Number: 7C2000 C34B 3A00 9700

Laboratory Name: Paragon Analytics
PAI Work Order: 0506167

Reported on: Wednesday, July 20, 2005 12:48:18 PM

Lab Sample ID	Client Sample ID	Sample Type	Nuclide	Result +/- 2 s TPU	MDC	Units	Matrix	Prep Batch	Date Analyzed	Flags
0506167-10	88.493 8	Sample	H-3	0.08 +/- 0.27	0.45	pCi/ml	SOIL	3H050628-2	7/14/2005	U

22

Comments:

Data Package ID: *H30506167-1*

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

LT - Result is less than Requested MDC, greater than sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

M - The requested MDC was not met.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

Abbreviations:

TPU - Total Propagated Uncertainty (see PAI SOP 743)

MDC - Minimum Detectable Concentration (see PAI SOP 709)

BDL - Below Detection Limit

Tritium Analysis By Liquid Scintillation Sample Results Summary

Client Name: ESH20_LANL
Client Project Name: TA-55, Area G Grab sample (soil)
Client Project Number: 7C2000 C34B 3A00 9700

Laboratory Name: Paragon Analytics
PAI Work Order: 0506168

Page: 1 of 1
Reported on: Wednesday, July 20, 2005 12:52:02 PM

Lab Sample ID	Client Sample ID	Sample Type	Nuclide	Result +/- 2 s TPU	MDC	Units	Matrix	Prep Batch	Date Analyzed	Flags
0506168-1	89.494 G-58-01	Sample	H-3	0.09 +/- 0.27	0.45	pCi/ml	SOIL	3H050628-2	7/14/2005	U
0506168-2	89.495 G-48-02	Sample	H-3	0.46 +/- 0.29	0.45	pCi/ml	SOIL	3H050628-2	7/14/2005	LT
0506168-3	89.496 G-43-01	Sample	H-3	0.22 +/- 0.28	0.45	pCi/ml	SOIL	3H050628-2	7/14/2005	U
0506168-4	89.497 G-41-02	Sample	H-3	0.17 +/- 0.27	0.45	pCi/ml	SOIL	3H050628-2	7/14/2005	U
0506168-5	89.498 G-29-03	Sample	H-3	274 +/- 42	0	pCi/ml	SOIL	3H050628-2	7/14/2005	
0506168-6	89.499 G-31-01	Sample	H-3	9.9 +/- 1.6	0.4	pCi/ml	SOIL	3H050628-2	7/14/2005	

Comments:

Data Package ID: *H30506168-1*

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

LT - Result is less than Requested MDC, greater than sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

M - The requested MDC was not met.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

Abbreviations:

TPU - Total Propagated Uncertainty (see PAI SOP 743)

MDC - Minimum Detectable Concentration (see PAI SOP 709)

BDL - Below Detection Limit

Isotopic Americium By Alpha Spectroscopy Sample Results Summary

Client Name: ESH20_LANL
Client Project Name: TA-55, Area G Grab sample (soil)
Client Project Number: 7C2000 C34B 3A00 9700

Laboratory Name: Paragon Analytics
PAI Work Order: 0506167

Reported on: Tuesday, July 19, 2005 1:27:20 PM

Lab Sample ID	Client Sample ID	Sample Type	Nuclide	Result +/- 2 s TPU	MDC	Units	Matrix	Prep Batch	Date Analyzed	Flags
0506167-1	88.484 3b	Sample	Am-241	0.0066 +/- 0.0089	0.0159	pCi/g	SOIL	AS050705-1	7/14/2005	U
0506167-2	88.485 7c	Sample	Am-241	0.087 +/- 0.034	0.022	pCi/g	SOIL	AS050705-1	7/14/2005	M3
0506167-3	88.486 4	Sample	Am-241	0.287 +/- 0.068	0.010	pCi/g	SOIL	AS050705-1	7/14/2005	
0506167-4	88.487 6b	Sample	Am-241	0.024 +/- 0.016	0.015	pCi/g	SOIL	AS050705-1	7/14/2005	
0506167-5	88.488 3	Sample	Am-241	0.021 +/- 0.014	0.006	pCi/g	SOIL	AS050705-1	7/15/2005	
0506167-6	88.489 7a	Sample	Am-241	0.0053 +/- 0.0065	0.0048	pCi/g	SOIL	AS050705-1	7/14/2005	LT
0506167-7	488.90 7b	Sample	Am-241	0.0124 +/- 0.0096	0.0048	pCi/g	SOIL	AS050705-1	7/14/2005	LT
0506167-8	88.491 2	Sample	Am-241	0.0098 +/- 0.0088	0.0095	pCi/g	SOIL	AS050705-1	7/14/2005	LT
0506167-9	88.492 1	Sample	Am-241	0.0117 +/- 0.0091	0.0045	pCi/g	SOIL	AS050705-1	7/14/2005	LT

Comments:

Data Package ID: *am0506167-1*

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

LT - Result is less than Requested MDC, greater than sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

M - The requested MDC was not met.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

Abbreviations:

TPU - Total Propagated Uncertainty (see PAI SOP 743)

MDC - Minimum Detectable Concentration (see PAI SOP 709)

BDL - Below Detection Limit

Isotopic Americium By Alpha Spectroscopy Sample Results Summary

Client Name: ESH20_LANL
Client Project Name: TA-55, Area G Grab sample (soil)
Client Project Number: 7C2000 C34B 3A00 9700

Laboratory Name: Paragon Analytics
PAI Work Order: 0506167

Reported on: Tuesday, July 19, 2005
1:27:20 PM

Lab Sample ID	Client Sample ID	Sample Type	Nuclide	Result +/- 2 s TPU	MDC	Units	Matrix	Prep Batch	Date Analyzed	Flags
0506167-10	88.493 8	Sample	Am-241	0.0026 +/- 0.0079	0.0182	pCi/g	SOIL	AS050705-1	7/14/2005	U

25

Comments:

Data Package ID: *am0506167-1*

Qualifiers/Flags:

U - Result is less than the sample specific MDC.
LT - Result is less than Requested MDC, greater than sample specific MDC.
Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.
Y2 - Chemical Yield outside default limits.
M - The requested MDC was not met.
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Abbreviations:

TPU - Total Propagated Uncertainty (see PAI SOP 743)
MDC - Minimum Detectable Concentration (see PAI SOP 709)
BDL - Below Detection Limit

Isotopic Americium By Alpha Spectroscopy Sample Results Summary

Client Name: ESH20_LANL
Client Project Name: TA-55, Area G Grab sample (soil)
Client Project Number: 7C2000 C34B 3A00 9700

Laboratory Name: Paragon Analytics
PAI Work Order: 0506168

Page: 1 of 1
Reported on: Tuesday, July 19, 2005 1:34:38 PM

Lab Sample ID	Client Sample ID	Sample Type	Nuclide	Result +/- 2 s TPU	MDC	Units	Matrix	Prep Batch	Date Analyzed	Flags
0506168-1	89.494 G-58-01	Sample	Am-241	0.024 +/- 0.015	0.006	pCi/g	SOIL	AS050705-1	7/14/2005	
0506168-2	89.495 G-48-02	Sample	Am-241	0.059 +/- 0.023	0.005	pCi/g	SOIL	AS050705-1	7/14/2005	
0506168-3	89.496 G-43-01	Sample	Am-241	0.128 +/- 0.034	0.008	pCi/g	SOIL	AS050705-1	7/14/2005	
0506168-4	89.497 G-41-02	Sample	Am-241	0.409 +/- 0.087	0.009	pCi/g	SOIL	AS050705-1	7/14/2005	
0506168-5	89.498 G-29-02	Sample	Am-241	0.0035 +/- 0.0066	0.0135	pCi/g	SOIL	AS050705-1	7/14/2005	U
0506168-6	89.499 G-31-01	Sample	Am-241	0.0010 +/- 0.0056	0.0083	pCi/g	SOIL	AS050705-1	7/14/2005	U

Comments:

Data Package ID: *am0506168-1*

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

LT - Result is less than Requested MDC, greater than sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

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Abbreviations:

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MDC - Minimum Detectable Concentration (see PAI SOP 709)

BDL - Below Detection Limit

Isotopic Plutonium By Alpha Spectroscopy Sample Results Summary

Client Name: ESH20_LANL
Client Project Name: TA-55, Area G Grab sample (soil)
Client Project Number: 7C2000 C34B 3A00 9700

Laboratory Name: Paragon Analytics
PAI Work Order: 0506167

Reported on: Tuesday, July 19, 2005 1:29:50 PM

Lab Sample ID	Client Sample ID	Sample Type	Nuclide	Result +/- 2 s TPU	MDC	Units	Matrix	Prep Batch	Date Analyzed	Flags
0506167-1	88.484 3b	Sample	Pu-238	0.0010 +/- 0.0053	0.0077	pCi/g	SOIL	AS050705-1	7/13/2005	U
0506167-1	88.484 3b	Sample	Pu-239/240	0.0025 +/- 0.0053	0.0076	pCi/g	SOIL	AS050705-1	7/13/2005	U
0506167-2	88.485 7c	Sample	Pu-238	0.132 +/- 0.035	0.009	pCi/g	SOIL	AS050705-1	7/13/2005	
0506167-2	88.485 7c	Sample	Pu-239/240	0.375 +/- 0.078	0.009	pCi/g	SOIL	AS050705-1	7/13/2005	
0506167-3	88.486 4	Sample	Pu-238	0.365 +/- 0.076	0.013	pCi/g	SOIL	AS050705-1	7/13/2005	
0506167-3	88.486 4	Sample	Pu-239/240	0.390 +/- 0.080	0.011	pCi/g	SOIL	AS050705-1	7/13/2005	
0506167-4	88.487 6b	Sample	Pu-238	0.0040 +/- 0.0054	0.0077	pCi/g	SOIL	AS050705-1	7/13/2005	U
0506167-4	88.487 6b	Sample	Pu-239/240	0.071 +/- 0.024	0.008	pCi/g	SOIL	AS050705-1	7/13/2005	
0506167-5	88.488 3	Sample	Pu-238	0.0029 +/- 0.0050	0.0098	pCi/g	SOIL	AS050705-1	7/13/2005	U

Comments:

Data Package ID: *pu0506167-1*

Qualifiers/Flags:

U - Result is less than the sample specific MDC.
LT - Result is less than Requested MDC, greater than sample specific MDC.
Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.
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Abbreviations:

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MDC - Minimum Detectable Concentration (see PAI SOP 709)

BDL - Below Detection Limit

Isotopic Plutonium By Alpha Spectroscopy Sample Results Summary

Client Name: ESH20_LANL
Client Project Name: TA-55, Area G Grab sample (soil)
Client Project Number: 7C2000 C34B 3A00 9700

Laboratory Name: Paragon Analytics
PAI Work Order: 0506167

Reported on: Tuesday, July 19, 2005 1:29:50 PM

Lab Sample ID	Client Sample ID	Sample Type	Nuclide	Result +/- 2 s TPU	MDC	Units	Matrix	Prep Batch	Date Analyzed	Flags
0506167-5	88.488 3	Sample	Pu-239/240	0.0152 +/- 0.0095	0.0037	pCi/g	SOIL	AS050705-1	7/13/2005	LT
0506167-6	88.489 7a	Sample	Pu-238	0.019 +/- 0.011	0.008	pCi/g	SOIL	AS050705-1	7/15/2005	LT
0506167-6	88.489 7a	Sample	Pu-239/240	0.053 +/- 0.020	0.004	pCi/g	SOIL	AS050705-1	7/15/2005	
0506167-7	488.90 7b	Sample	Pu-238	0.0010 +/- 0.0054	0.0078	pCi/g	SOIL	AS050705-1	7/15/2005	U
0506167-7	488.90 7b	Sample	Pu-239/240	0.066 +/- 0.023	0.008	pCi/g	SOIL	AS050705-1	7/15/2005	
0506167-8	88.491 2	Sample	Pu-238	0.0008 +/- 0.0060	0.0139	pCi/g	SOIL	AS050705-1	7/15/2005	U
0506167-8	88.491 2	Sample	Pu-239/240	0.021 +/- 0.012	0.009	pCi/g	SOIL	AS050705-1	7/15/2005	
0506167-9	88.492 1	Sample	Pu-238	0.017 +/- 0.010	0.007	pCi/g	SOIL	AS050705-1	7/15/2005	LT
0506167-9	88.492 1	Sample	Pu-239/240	0.041 +/- 0.016	0.008	pCi/g	SOIL	AS050705-1	7/15/2005	

Comments:

Data Package ID: *pu0506167-1*

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

LT - Result is less than Requested MDC, greater than sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

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M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

Abbreviations:

TPU - Total Propagated Uncertainty (see PAI SOP 743)

MDC - Minimum Detectable Concentration (see PAI SOP 709)

BDL - Below Detection Limit

Isotopic Plutonium By Alpha Spectroscopy Sample Results Summary

Client Name: ESH20_LANL
Client Project Name: TA-55, Area G Grab sample (soil)
Client Project Number: 7C2000 C34B 3A00 9700

Laboratory Name: Paragon Analytics
PAI Work Order: 0506167

Reported on: Tuesday, July 19, 2005 1:29:50 PM

Lab Sample ID	Client Sample ID	Sample Type	Nuclide	Result +/- 2 s TPU	MDC	Units	Matrix	Prep Batch	Date Analyzed	Flags
0506167-10	88.493 8	Sample	Pu-238	-0.0005 +/- 0.0055	0.0080	pCi/g	SOIL	AS050705-1	7/15/2005	U
0506167-10	88.493 8	Sample	Pu-239/240	0.0057 +/- 0.0071	0.0118	pCi/g	SOIL	AS050705-1	7/15/2005	U

Comments:

Data Package ID: *pu0506167-1*

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

LT - Result is less than Requested MDC, greater than sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

M - The requested MDC was not met.

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Abbreviations:

TPU - Total Propagated Uncertainty (see PAI SOP 743)

MDC - Minimum Detectable Concentration (see PAI SOP 709)

BDL - Below Detection Limit

Isotopic Plutonium By Alpha Spectroscopy Sample Results Summary

Client Name: ESH20_LANL
Client Project Name: TA-55, Area G Grab sample (soil)
Client Project Number: 7C2000 C34B 3A00 9700

Laboratory Name: Paragon Analytics
PAI Work Order: 0506168

Reported on: Tuesday, July 19, 2005 1:32:08 PM

Lab Sample ID	Client Sample ID	Sample Type	Nuclide	Result +/- 2 s TPU	MDC	Units	Matrix	Prep Batch	Date Analyzed	Flags
0506168-1	89.494 G-58-01	Sample	Pu-238	0.0034 +/- 0.0051	0.0089	pCi/g	SOIL	AS050705-1	7/15/2005	U
0506168-1	89.494 G-58-01	Sample	Pu-239/240	0.026 +/- 0.013	0.007	pCi/g	SOIL	AS050705-1	7/15/2005	
0506168-2	89.495 G-48-02	Sample	Pu-238	0.088 +/- 0.027	0.012	pCi/g	SOIL	AS050705-1	7/15/2005	
0506168-2	89.495 G-48-02	Sample	Pu-239/240	0.265 +/- 0.059	0.011	pCi/g	SOIL	AS050705-1	7/15/2005	
0506168-3	89.496 G-43-01	Sample	Pu-238	0.481 +/- 0.096	0.009	pCi/g	SOIL	AS050705-1	7/15/2005	
0506168-3	89.496 G-43-01	Sample	Pu-239/240	0.420 +/- 0.085	0.009	pCi/g	SOIL	AS050705-1	7/15/2005	
0506168-4	89.497 G-41-02	Sample	Pu-238	3.06 +/- 0.52	0.01	pCi/g	SOIL	AS050705-1	7/15/2005	
0506168-4	89.497 G-41-02	Sample	Pu-239/240	1.06 +/- 0.19	0.01	pCi/g	SOIL	AS050705-1	7/15/2005	
0506168-5	89.498 G-29-03	Sample	Pu-238	-0.0014 +/- 0.0056	0.0110	pCi/g	SOIL	AS050705-1	7/15/2005	U

Comments:

Data Package ID: *pu0506168-1*

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

LT - Result is less than Requested MDC, greater than sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

M - The requested MDC was not met.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

Abbreviations:

TPU - Total Propagated Uncertainty (see PAI SOP 743)

MDC - Minimum Detectable Concentration (see PAI SOP 709)

BDL - Below Detection Limit

Isotopic Plutonium By Alpha Spectroscopy Sample Results Summary

Client Name: ESH20_LANL
Client Project Name: TA-55, Area G Grab sample (soil)
Client Project Number: 7C2000 C34B 3A00 9700

Laboratory Name: Paragon Analytics
PAI Work Order: 0506168

Reported on: Tuesday, July 19, 2005 1:32:08 PM

Lab Sample ID	Client Sample ID	Sample Type	Nuclide	Result +/- 2 s TPU	MDC	Units	Matrix	Prep Batch	Date Analyzed	Flags
0506168-5	89.498 6-29-03	Sample	Pu-239/240	0.0108 +/- 0.0083	0.0042	pCi/g	SOIL	AS050705-1	7/15/2005	LT
0506168-6	89.499 6-31-01	Sample	Pu-238	0 +/- 0.0043	0.0032	pCi/g	SOIL	AS050705-1	7/15/2005	U
0506168-6	89.499 6-31-01	Sample	Pu-239/240	0 +/- 0.0043	0.0032	pCi/g	SOIL	AS050705-1	7/15/2005	U

Comments:

Data Package ID: *pu0506168-1*

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

LT - Result is less than Requested MDC, greater than sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

M - The requested MDC was not met.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

Abbreviations:

TPU - Total Propagated Uncertainty (see PAI SOP 743)

MDC - Minimum Detectable Concentration (see PAI SOP 709)

BDL - Below Detection Limit

Isotopic Uranium By Alpha Spectroscopy Sample Results Summary

Client Name: ESH20_LANL
Client Project Name: TA-55, Area G Grab sample (soil)
Client Project Number: 7C2000 C34B 3A00 9700

Laboratory Name: Paragon Analytics
PAI Work Order: 0506167

Reported on: Tuesday, July 19, 2005 2:00:43 PM

Lab Sample ID	Client Sample ID	Sample Type	Nuclide	Result +/- 2 s TPU	MDC	Units	Matrix	Prep Batch	Date Analyzed	Flags
0506167-1	88.484 3b	Sample	U-234	0.83 +/- 0.14	0.01	pCi/g	SOIL	AS050705-1	7/13/2005	
0506167-1	88.484 3b	Sample	U-235	0.041 +/- 0.013	0.005	pCi/g	SOIL	AS050705-1	7/13/2005	
0506167-1	88.484 3b	Sample	U-238	0.88 +/- 0.15	0.01	pCi/g	SOIL	AS050705-1	7/13/2005	
0506167-2	88.485 7c	Sample	U-234	0.81 +/- 0.14	0	pCi/g	SOIL	AS050705-1	7/15/2005	
0506167-2	88.485 7c	Sample	U-235	0.029 +/- 0.011	0.002	pCi/g	SOIL	AS050705-1	7/15/2005	
0506167-2	88.485 7c	Sample	U-238	0.75 +/- 0.13	0	pCi/g	SOIL	AS050705-1	7/15/2005	
0506167-3	88.486 4	Sample	U-234	0.98 +/- 0.17	0.01	pCi/g	SOIL	AS050705-1	7/15/2005	
0506167-3	88.486 4	Sample	U-235	0.062 +/- 0.017	0.005	pCi/g	SOIL	AS050705-1	7/15/2005	
0506167-3	88.486 4	Sample	U-238	1.00 +/- 0.17	0.01	pCi/g	SOIL	AS050705-1	7/15/2005	

Comments:

Data Package ID: *ur0506167-1*

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

LT - Result is less than Requested MDC, greater than sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

M - The requested MDC was not met.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

Abbreviations:

TPU - Total Propagated Uncertainty (see PAI SOP 743)

MDC - Minimum Detectable Concentration (see PAI SOP 709)

BDL - Below Detection Limit

Isotopic Uranium By Alpha Spectroscopy Sample Results Summary

Client Name: ESH20_LANL
Client Project Name: TA-55, Area G Grab sample (soil)
Client Project Number: 7C2000 C34B 3A00 9700

Laboratory Name: Paragon Analytics
PAI Work Order: 0506167

Reported on: Tuesday, July 19, 2005 2:00:43 PM

Lab Sample ID	Client Sample ID	Sample Type	Nuclide	Result +/- 2 s TPU	MDC	Units	Matrix	Prep Batch	Date Analyzed	Flags
0506167-4	88.487 6b	Sample	U-234	0.76 +/- 0.14	0	pCi/g	SOIL	AS050705-1	7/15/2005	
0506167-4	88.487 6b	Sample	U-235	0.048 +/- 0.015	0.002	pCi/g	SOIL	AS050705-1	7/15/2005	
0506167-4	88.487 6b	Sample	U-238	0.81 +/- 0.14	0	pCi/g	SOIL	AS050705-1	7/15/2005	
0506167-5	88.488 3	Sample	U-234	0.89 +/- 0.15	0.01	pCi/g	SOIL	AS050705-1	7/15/2005	
0506167-5	88.488 3	Sample	U-235	0.041 +/- 0.013	0.002	pCi/g	SOIL	AS050705-1	7/15/2005	
0506167-5	88.488 3	Sample	U-238	0.90 +/- 0.16	0	pCi/g	SOIL	AS050705-1	7/15/2005	
0506167-6	88.489 7a	Sample	U-234	0.88 +/- 0.15	0.01	pCi/g	SOIL	AS050705-1	7/15/2005	
0506167-6	88.489 7a	Sample	U-235	0.054 +/- 0.016	0.005	pCi/g	SOIL	AS050705-1	7/15/2005	
0506167-6	88.489 7a	Sample	U-238	0.87 +/- 0.15	0.01	pCi/g	SOIL	AS050705-1	7/15/2005	

Comments:

Data Package ID: *ur0506167-1*

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

LT - Result is less than Requested MDC, greater than sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

M - The requested MDC was not met.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

Abbreviations:

TPU - Total Propagated Uncertainty (see PAI SOP 743)

MDC - Minimum Detectable Concentration (see PAI SOP 709)

BDL - Below Detection Limit

Isotopic Uranium By Alpha Spectroscopy Sample Results Summary

Client Name: ESH20_LANL
Client Project Name: TA-55, Area G Grab sample (soil)
Client Project Number: 7C2000 C34B 3A00 9700

Laboratory Name: Paragon Analytics
PAI Work Order: 0506167

Reported on: Tuesday, July 19, 2005 2:00:43 PM

Lab Sample ID	Client Sample ID	Sample Type	Nuclide	Result +/- 2 s TPU	MDC	Units	Matrix	Prep Batch	Date Analyzed	Flags
0506167-7	488.90 7b	Sample	U-234	0.89 +/- 0.16	0.01	pCi/g	SOIL	AS050705-1	7/15/2005	
0506167-7	488.90 7b	Sample	U-235	0.038 +/- 0.013	0.007	pCi/g	SOIL	AS050705-1	7/15/2005	
0506167-7	488.90 7b	Sample	U-238	0.90 +/- 0.16	0	pCi/g	SOIL	AS050705-1	7/15/2005	
0506167-8	88.491 2	Sample	U-234	0.98 +/- 0.17	0.01	pCi/g	SOIL	AS050705-1	7/15/2005	
0506167-8	88.491 2	Sample	U-235	0.047 +/- 0.015	0.005	pCi/g	SOIL	AS050705-1	7/15/2005	
0506167-8	88.491 2	Sample	U-238	0.97 +/- 0.17	0	pCi/g	SOIL	AS050705-1	7/15/2005	
0506167-9	88.492 1	Sample	U-234	0.99 +/- 0.17	0	pCi/g	SOIL	AS050705-1	7/15/2005	
0506167-9	88.492 1	Sample	U-235	0.044 +/- 0.014	0.005	pCi/g	SOIL	AS050705-1	7/15/2005	
0506167-9	88.492 1	Sample	U-238	1.02 +/- 0.18	0	pCi/g	SOIL	AS050705-1	7/15/2005	

Comments:

Data Package ID: *ur0506167-1*

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

LT - Result is less than Requested MDC, greater than sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

M - The requested MDC was not met.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

Abbreviations:

TPU - Total Propagated Uncertainty (see PAI SOP 743)

MDC - Minimum Detectable Concentration (see PAI SOP 709)

BDL - Below Detection Limit

Isotopic Uranium By Alpha Spectroscopy Sample Results Summary

Client Name: ESH20_LANL
Client Project Name: TA-55, Area G Grab sample (soil)
Client Project Number: 7C2000 C34B 3A00 9700

Laboratory Name: Paragon Analytics
PAI Work Order: 0506167

Reported on: Tuesday, July 19, 2005 2:00:43 PM

Lab Sample ID	Client Sample ID	Sample Type	Nuclide	Result +/- 2 s TPU	MDC	Units	Matrix	Prep Batch	Date Analyzed	Flags
0506167-10	88.493	Sample	U-234	0.79 +/- 0.14	0	pCi/g	SOIL	AS050705-1	7/15/2005	
0506167-10	88.493	Sample	U-235	0.059 +/- 0.018	0.006	pCi/g	SOIL	AS050705-1	7/15/2005	
0506167-10	88.493	Sample	U-238	0.90 +/- 0.16	0	pCi/g	SOIL	AS050705-1	7/15/2005	

Comments:

Data Package ID: *ur0506167-1*

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

LT - Result is less than Requested MDC, greater than sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

M - The requested MDC was not met.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

Abbreviations:

TPU - Total Propagated Uncertainty (see PAI SOP 743)

MDC - Minimum Detectable Concentration (see PAI SOP 709)

BDL - Below Detection Limit

Isotopic Uranium By Alpha Spectroscopy Sample Results Summary

Client Name: ESH20_LANL
Client Project Name: TA-55, Area G Grab sample (soil)
Client Project Number: 7C2000 C34B 3A00 9700

Laboratory Name: Paragon Analytics
PAI Work Order: 0506168

Reported on: Tuesday, July 26, 2005 3:45:30 PM

Lab Sample ID	Client Sample ID	Sample Type	Nuclide	Result +/- 2 s TPU	MDC	Units	Matrix	Prep Batch	Date Analyzed	Flags
0506168-1	89.494 G-52-01	Sample	U-234	0.98 +/- 0.17	0.01	pCi/g	SOIL	AS050718-12	7/20/2005	
0506168-1	89.494 G-52-01	Sample	U-235	0.048 +/- 0.018	0.003	pCi/g	SOIL	AS050718-12	7/20/2005	
0506168-1	89.494 G-52-01	Sample	U-238	1.02 +/- 0.18	0.01	pCi/g	SOIL	AS050718-12	7/20/2005	
0506168-2	89.495 G-48-02	Sample	U-234	0.93 +/- 0.16	0.01	pCi/g	SOIL	AS050705-1	7/15/2005	
0506168-2	89.495 G-48-02	Sample	U-235	0.056 +/- 0.017	0.009	pCi/g	SOIL	AS050705-1	7/15/2005	
0506168-2	89.495 G-48-02	Sample	U-238	0.94 +/- 0.16	0	pCi/g	SOIL	AS050705-1	7/15/2005	
0506168-3	89.496 G-43-01	Sample	U-234	1.36 +/- 0.23	0.01	pCi/g	SOIL	AS050705-1	7/16/2005	
0506168-3	89.496 G-43-01	Sample	U-235	0.066 +/- 0.018	0.005	pCi/g	SOIL	AS050705-1	7/16/2005	
0506168-3	89.496 G-43-01	Sample	U-238	1.43 +/- 0.24	0.01	pCi/g	SOIL	AS050705-1	7/16/2005	

Comments:

Data Package ID: *ur0506168-1*

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

LT - Result is less than Requested MDC, greater than sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

M - The requested MDC was not met.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

Abbreviations:

TPU - Total Propagated Uncertainty (see PAI SOP 743)

MDC - Minimum Detectable Concentration (see PAI SOP 709)

BDL - Below Detection Limit

Isotopic Uranium By Alpha Spectroscopy Sample Results Summary

Client Name: ESH20_LANL
Client Project Name: TA-55, Area G Grab sample (soil)
Client Project Number: 7C2000 C34B 3A00 9700

Laboratory Name: Paragon Analytics
PAI Work Order: 0506168

Reported on: Tuesday, July 26, 2005 3:45:31 PM

Lab Sample ID	Client Sample ID	Sample Type	Nuclide	Result +/- 2 s TPU	MDC	Units	Matrix	Prep Batch	Date Analyzed	Flags
0506168-4	89.497 G-41-02	Sample	U-234	0.92 +/- 0.17	0.01	pCi/g	SOIL	AS050718-12	7/20/2005	
0506168-4	89.497 G-41-02	Sample	U-235	0.043 +/- 0.017	0.012	pCi/g	SOIL	AS050718-12	7/20/2005	M3
0506168-4	89.497 G-41-02	Sample	U-238	0.99 +/- 0.18	0	pCi/g	SOIL	AS050718-12	7/20/2005	
0506168-5	89.498 G-29-03	Sample	U-234	1.01 +/- 0.18	0	pCi/g	SOIL	AS050705-1	7/16/2005	
0506168-5	89.498 G-29-03	Sample	U-235	0.045 +/- 0.014	0.005	pCi/g	SOIL	AS050705-1	7/16/2005	
0506168-5	89.498 G-29-03	Sample	U-238	1.06 +/- 0.18	0	pCi/g	SOIL	AS050705-1	7/16/2005	
0506168-6	89.499 G-31-01	Sample	U-234	0.88 +/- 0.16	0.01	pCi/g	SOIL	AS050718-12	7/20/2005	M3
0506168-6	89.499 G-31-01	Sample	U-235	0.039 +/- 0.016	0.010	pCi/g	SOIL	AS050718-12	7/20/2005	
0506168-6	89.499 G-31-01	Sample	U-238	0.94 +/- 0.17	0.01	pCi/g	SOIL	AS050718-12	7/20/2005	

Comments:

Data Package ID: *ur0506168-1*

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

LT - Result is less than Requested MDC, greater than sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

M - The requested MDC was not met.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

Abbreviations:

TPU - Total Propagated Uncertainty (see PAI SOP 743)

MDC - Minimum Detectable Concentration (see PAI SOP 709)

BDL - Below Detection Limit

APPENDIX B

ANALYTICAL DATA REPORTS OF RADIONUCLIDE CONCENTRATIONS IN OVERSTORY AND UNDERSTORY VEGETATION COLLECTED AT AREA G DURING 2005

LOS ALAMOS NATIONAL LABORATORY - ENVIRONMENTAL STEWARDSHIP - METEOROLOGY AIR QUALITY

Environmental Surveillance Team Chain of Custody Record

Chain of Custody Number: 91 **Creation Date:** 05/03/2005

Project Contact: Phil Fresquez
Contact Phone: (505) 667-0815

Project Name: Facility Sampling (soils, sediments & TA-54 Vegetation overst[redacted]

Cost Center: 7C2000
Program Code: C357
Cost Account: 0540/4E03

USI	Date Collected	Time Collected	Location Name	Number of Samples	Analysis Requested	Remarks	Field ID
510	5/3/2005	10:35 AM	3b	1	~~North of pit 38 outside fence~~	North of pit 38 outside fence	.01
511	5/3/2005	1:19	7c	1		North of pit 8 outside fence	.02
512	5/4/2005	10:00	4	1	150 Pu	North of TRU pad 4 outside fence	.03
513	5/4/2005	12:10	~~8~~ 6b	1	D.L. 150 Pu = 0.02	South of TRU pad 4 outside fence	.04
514	5/5/2005	1:09	3	1		East of pit 38 inside Area G fence	.05
515	5/5/2005	3:10	2	1		West of ^3H outside fence	.06
516	5/5/2005	3:55	1	1	^3H	South of ^3H shafts immediately outside fence	.07
517	5/5/2005	4:50	8	1	700 pCi/mL	proposed expansion Area 1/5 mile west of Area G main gate	.08 .09
							.10

Relinquished by (print and sign)	Date	Relinquished by (print and sign)	Date	Relinquished by (print and sign)	Date
Louis Naranjo Jr. Louis Naranjo Jr.	6/20/2005 Time 10:00		Time		Time
Received by (print and sign)		Received by (print and sign)		Received by (print and sign)	

Samplers (print names and initial) Louis Naranjo Jr. Victoria Martinez VM, Glenda Fred GJ, Ryan K Gonzales RG Raymond Martinez RM. Gilbert Gutierrez, GG Kevin Tafoya KT

Comments

ASH VEGETATION OVERTSTORY TA-54 AREA-G / waters.

Tritium Analysis By Liquid Scintillation Sample Results Summary

Client Name: ESH20_LANL
Client Project Name: TA-54 Vegetation Overstory (OS)
Client Project Number: 7C2000 C357 0540 4E03

Laboratory Name: Paragon Analytics
PAI Work Order: 0506164

Page: 1 of 1
Reported on: Wednesday, July 20, 2005 12:52:02 PM

Lab Sample ID	Client Sample ID	Sample Type	Nuclide	Result +/- 2 s TPU (3TPU)	MDC	Units	Matrix	Prep Batch	Date Analyzed	Flags
0506164-9	91.510 3b	Sample	H-3	0.26 +/- 0.29 (0.44)	0.47	pCi/ml	WATER	3H050706-1	7/14/2005	U
0506164-10	91.511 7C	Sample	H-3	2.21 +/- 0.46 (0.69)	0.44	pCi/ml	WATER	3H050706-1	7/14/2005	
0506164-11	91.512 4	Sample	H-3	0.34 +/- 0.28 (0.42)	0.44	pCi/ml	WATER	3H050706-1	7/14/2005	U
0506164-12	91.513 2a	Sample	H-3	-0.03 +/- 0.30 (0.45)	0.51	pCi/ml	WATER	3H050706-1	7/15/2005	U
0506164-13	91.514 5	Sample	H-3	1.07 +/- 0.37 (0.56)	0.52	pCi/ml	WATER	3H050706-1	7/19/2005	
0506164-14	91.515 6	Sample	H-3	598 +/- 91 (137)	1	pCi/ml	WATER	3H050706-1	7/15/2005	M3
0506164-15	91.516 1	Sample	H-3	73 +/- 11 (17)	0	pCi/ml	WATER	3H050706-1	7/15/2005	
0506164-16	91.517 3	Sample	H-3	0.37 +/- 0.32 (0.48)	0.51	pCi/ml	WATER	3H050706-1	7/19/2005	U

Comments:

Data Package ID: *H30506164-1*

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

LT - Result is less than Requested MDC, greater than sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

M - The requested MDC was not met.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

Abbreviations:

TPU - Total Propagated Uncertainty (see PAI SOP 743)

MDC - Minimum Detectable Concentration (see PAI SOP 709)

BDL - Below Detection Limit

Isotopic Plutonium By Alpha Spectroscopy Sample Results Summary

Client Name: ESH20_LANL
Client Project Name: TA-54 Vegetation Overstory (OS)
Client Project Number: 7C2000 C357 0540 4E03

Laboratory Name: Paragon Analytics
PAI Work Order: 0506164

Entered by [illegible] 8/3/05

Reported on: Tuesday, July 19, 2005 12:12:18 PM

Lab Sample ID	Client Sample ID	Sample Type	Nuclide	Result +/- 2 s TPU (3 TPU)	MDC	Units	Matrix	Prep Batch	Date Analyzed	Flags
0506164-1	91.510 3b	Sample	Pu-238	0.0029 +/- 0.0052 (0.0079)	0.0039	pCi/g	ASH	AS050627-1	7/6/2005	U
0506164-1	91.510 ~~7~~ 3b	Sample	Pu-239/240	0.0049 +/- 0.0059 (0.0089)	0.0091	pCi/g	ASH	AS050627-1	7/6/2005	U
0506164-2	91.511 ~~4~~ 7C	Sample	Pu-238	0.034 +/- 0.015 (0.023)	0.009	pCi/g	ASH	AS050627-1	7/6/2005	
0506164-2	91.511 ~~6b~~ 7C	Sample	Pu-239/240	0.043 +/- 0.018 (0.027)	0.008	pCi/g	ASH	AS050627-1	7/6/2005	
0506164-3	91.512 ~~3~~ 4	Sample	Pu-238	0.013 +/- 0.010 (0.015)	0.014	pCi/g	ASH	AS050627-1	7/6/2005	U
0506164-3	91.512 ~~7~~ 4	Sample	Pu-239/240	0.163 +/- 0.041 (0.067)	0.009	pCi/g	ASH	AS050627-1	7/6/2005	
0506164-4	91.513 6b	Sample	Pu-238	0.0013 +/- 0.0048 (0.0072)	0.0036	pCi/g	ASH	AS050627-1	7/6/2005	U
0506164-4	91.513 6b	Sample	Pu-239/240	0.020 +/- 0.011 (0.017)	0.008	pCi/g	ASH	AS050627-1	7/6/2005	
0506164-5	91.514 3	Sample	Pu-238	0.0052 +/- 0.0063 (0.0095)	0.0096	pCi/g	ASH	AS050627-1	7/6/2005	U

Comments:

Data Package ID: *pu0506164-1*

Qualifiers/Flags:

U - Result is less than the sample specific MDC.
LT - Result is less than Requested MDC, greater than sample specific MDC.
Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.
Y2 - Chemical Yield outside default limits.
M - The requested MDC was not met.
M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

Abbreviations:

TPU - Total Propagated Uncertainty (see PAI SOP 743)
MDC - Minimum Detectable Concentration (see PAI SOP 709)

BDL - Below Detection Limit

Isotopic Plutonium By Alpha Spectroscopy Sample Results Summary

Client Name: ESH20_LANL
Client Project Name: TA-54 Vegetation Overstory (OS)
Client Project Number: 7C2000 C357 0540 4E03

Laboratory Name: Paragon Analytics
PAI Work Order: 0506164

Reported on: Tuesday, July 19, 2005 12:12:18 PM

Lab Sample ID	Client Sample ID	Sample Type	Nuclide	Result +/- 2 s TPU (3 TPU)	MDC	Units	Matrix	Prep Batch	Date Analyzed	Flags
0506164-5	91.514 3	Sample	Pu-239/240	0.020 +/- 0.011 (0.017)	0.004	pCi/g	ASH	AS050627-1	7/6/2005	LT
0506164-6	91.515 2	Sample	Pu-238	0.0081 +/- 0.0073 (0.011)	0.0095	pCi/g	ASH	AS050627-1	7/6/2005	U
0506164-6	91.515 2	Sample	Pu-239/240	0.017 +/- 0.010 (0.015)	0.004	pCi/g	ASH	AS050627-1	7/6/2005	LT
0506164-7	91.516 1	Sample	Pu-238	-0.0004 +/- 0.0046 (0.0069)	0.0067	pCi/g	ASH	AS050627-1	7/6/2005	U
0506164-7	91.516 1	Sample	Pu-239/240	0.0073 +/- 0.0064 (0.0096)	0.0067	pCi/g	ASH	AS050627-1	7/6/2005	LT
0506164-8	91.517 8	Sample	Pu-238	-0.0007 +/- 0.0045 (0.0068)	0.0078	pCi/g	ASH	AS050627-1	7/6/2005	U
0506164-8	91.517 8	Sample	Pu-239/240	0.0012 +/- 0.0045 (0.0068)	0.0034	pCi/g	ASH	AS050627-1	7/6/2005	U

Comments:

Data Package ID: *pu0506164-1*

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

LT - Result is less than Requested MDC, greater than sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

M - The requested MDC was not met.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

Abbreviations:

TPU - Total Propagated Uncertainty (see PAI SOP 743)

MDC - Minimum Detectable Concentration (see PAI SOP 709)

BDL - Below Detection Limit

LOS ALAMOS NATIONAL LABORATORY - ENVIRONMENTAL STEWARDSHIP - METEOROLOGY AIR QUALITY

Environmental Surveillance Team Chain of Custody Record

Chain of Custody Number: 90 **Creation Date:** 5/2/2005

Project Contact: Phil Fresquez
Contact Phone: (505) 667-0815

Project Name: Facility Sampling (soils, sediments & TA-54 Area G (Vegetation) [redacted]
Cost Center: 7C2000
Program Code: C357
Cost Account: 0540/4E03

USI	Date Collected	Time Collected	Location Name	Number of Samples	Analysis Requested	Remarks	Field ID
500	5/3/2005	10:35 AM	3b	1		North of pit 38 outside fence	.01
501	5/3/2005	1:19	7c	1		North of pit 8 outside fence	.02
502	5/4/2005	9:59	4	1	ISO Pu	North of trupad 2 outside fence	.03
503	5/4/2005	12:10	6b	1	D.L. iso Pu = 0.02	Southeast of Trupad 4 outside fence	.04
504	5/5/2005	1:15	3	1		East of pit 38 inside Area G fence	.05
505	5/5/2005	1:56	7a	1		Southeastern of pit 17 & 18 inside fence	.06
506	5/5/2005	1:57	7b	1	^3H	East end of pit 7 inside fence	.07
507	5/5/2005	3:25	2	1		West of ^3H shaft outside fence	.08
508	5/5/2005	3:45	1	1	D.L. ^3H = 700 pCi/mL	South of ^3H shaft outside fence	.09
509	5/5/2005	4:45	8	1		Proposed expansion Area	.10

Relinquished by (print and sign)	Date	Relinquished by (print and sign)	Date	Relinquished by (print and sign)	Date
Louis Naranjo Jr	6/10/2005				
	Time 10:00		Time		Time
Received by (print and sign)		**Received by (print and sign)**		**Received by (print and sign)**	

Samplers (print names and initial) Louis Naranjo LN & Glenda Fred GF, Raymond Martinez RM
Victoria Martinez VM, Ryan Gonzales RG, Gilbert Gutierrez GG
Kevin Tofoya KT

Comments
ASH VEGETATION - UNDERSTORY TA-54 AREA-G / waters

Tritium Analysis By Liquid Scintillation Sample Results Summary

Client Name: ESH20_LANL
Client Project Name: TA-54 Area G (Vegetation Understory)
Client Project Number: 7C2000 C357 0540 4E03

Laboratory Name: Paragon Analytics
PAI Work Order: 0506166

Reported on: Wednesday, July 20, 2005 12:53:02 PM

Lab Sample ID	Client Sample ID	Sample Type	Nuclide	Result +/- 2 s TPU 3TPU	MDC	Units	Matrix	Prep Batch	Date Analyzed	Flags
0506166-11	90.500 3b	Sample	H-3	0.33 +/- 0.33 (0.50)	0.53	pCi/ml	WATER	3H050706-1	7/15/2005	U
0506166-12	90.501 7c	Sample	H-3	1.90 +/- 0.42 (0.63)	0.44	pCi/ml	WATER	3H050706-1	7/15/2005	
0506166-13	90.502 4	Sample	H-3	0.47 +/- 0.37 (0.56)	0.58	pCi/ml	WATER	3H050706-1	7/15/2005	U
0506166-14	90.503 6b	Sample	H-3	0.03 +/- 0.26 (0.39)	0.44	pCi/ml	WATER	3H050706-1	7/15/2005	U
0506166-15	90.504 3	Sample	H-3	0.83 +/- 0.40 (0.60)	0.60	pCi/ml	WATER	3H050706-1	7/15/2005	M3
0506166-16	90.505 7a	Sample	H-3	2.58 +/- 0.55 (0.82)	0.54	pCi/ml	WATER	3H050706-1	7/15/2005	
0506166-17	90.506 7b	Sample	H-3	1.76 +/- 0.55 0.83	0.73	pCi/ml	WATER	3H050706-1	7/15/2005	M3
0506166-18	90.507 2	Sample	H-3	1700 +/- 260 (390)	0	pCi/ml	WATER	3H050706-1	7/15/2005	M3
0506166-19	90.508 1	Sample	H-3	97 +/- 15 (23)	1	pCi/ml	WATER	3H050706-1	7/15/2005	

Comments:

Data Package ID: *H30506166-1*

Qualifiers/Flags:

U - Result is less than the sample specific MDC.
LT - Result is less than Requested MDC, greater than sample specific MDC.
Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.
Y2 - Chemical Yield outside default limits.
M - The requested MDC was not met.
M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

Abbreviations:

TPU - Total Propagated Uncertainty (see PAI SOP 743)
MDC - Minimum Detectable Concentration (see PAI SOP 709)

BDL - Below Detection Limit

Tritium Analysis By Liquid Scintillation Sample Results Summary

Client Name: ESH20_LANL
Client Project Name: TA-54 Area G (Vegetation Understory)
Client Project Number: 7C2000 C357 0540 4E03

Laboratory Name: Paragon Analytics
PAI Work Order: 0506166

Reported on: Wednesday, July 20, 2005 12:53:02 PM

Lab Sample ID	Client Sample ID	Sample Type	Nuclide	Result +/- 2 s TPU (3 TPU)	MDC	Units	Matrix	Prep Batch	Date Analyzed	Flags
0506166-20	90.509 8	Sample	H-3	0.30 +/- 0.31 (0.47)	0.51	pCi/ml	WATER	3H050706-1	7/19/2005	U

Comments:

Data Package ID: *H30506166-1*

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

LT - Result is less than Requested MDC, greater than sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

M - The requested MDC was not met.

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Abbreviations:

TPU - Total Propagated Uncertainty (see PAI SOP 743)

MDC - Minimum Detectable Concentration (see PAI SOP 709)

BDL - Below Detection Limit

Isotopic Plutonium By Alpha Spectroscopy Sample Results Summary

Client Name: ESH20_LANL
Client Project Name: TA-54 Area G (Vegetation Understory)
Client Project Number: 7C2000 C357 0540 4E03

Laboratory Name: Paragon Analytics
PAI Work Order: 0506166

Reported on: Tuesday, July 19, 2005 12:15:50 PM

Lab Sample ID	Client Sample ID	Sample Type	Nuclide	Result +/- 2 s TPU (3 TPU)	MDC	Units	Matrix	Prep Batch	Date Analyzed	Flags
0506166-1	90.500 3b	Sample	Pu-238	0.0014 +/- 0.0049 (0.0074)	0.0037	pCi/g	ASH	AS050627-1	7/6/2005	U
0506166-1	90.500 3b	Sample	Pu-239/240	0.0015 +/- 0.0049 (0.0074)	0.0096	pCi/g	ASH	AS050627-1	7/6/2005	U
0506166-2	90.501 7c	Sample	Pu-238	0.043 +/- 0.017 (0.026)	0.010	pCi/g	ASH	AS050627-1	7/6/2005	
0506166-2	90.501 7c	Sample	Pu-239/240	0.121 +/- 0.032 (0.048)	0.007	pCi/g	ASH	AS050627-1	7/6/2005	
0506166-3	90.502 4	Sample	Pu-238	0.034 +/- 0.015 (0.023)	0.004	pCi/g	ASH	AS050627-1	7/6/2005	
0506166-3	90.502 4	Sample	Pu-239/240	0.063 +/- 0.021 (0.032)	0.008	pCi/g	ASH	AS050627-1	7/6/2005	
0506166-4	90.503 6b	Sample	Pu-238	-0.0018 +/- 0.0061 (0.0092)	0.0159	pCi/g	ASH	AS050627-1	7/6/2005	U
0506166-4	90.503 6b	Sample	Pu-239/240	0.0062 +/- 0.0069 (0.0104)	0.0088	pCi/g	ASH	AS050627-1	7/6/2005	U
0506166-5	90.504 3	Sample	Pu-238	0.0066 +/- 0.0060 (0.009)	0.0036	pCi/g	ASH	AS050627-1	7/6/2005	LT

Comments:

Data Package ID: *pu0506166-1*

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

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Isotopic Plutonium By Alpha Spectroscopy Sample Results Summary

Client Name: ESH20_LANL
Client Project Name: TA-54 Area G (Vegetation Understory)
Client Project Number: 7C2000 C357 0540 4E03

Laboratory Name: Paragon Analytics
PAI Work Order: 0506166

Reported on: Tuesday, July 19, 2005 12:15:50 PM

Lab Sample ID	Client Sample ID	Sample Type	Nuclide	Result +/- 2 s TPU (3 TPU)	MDC	Units	Matrix	Prep Batch	Date Analyzed	Flags
0506166-5	90.504 3	Sample	Pu-239/240	0.0097 +/- 0.0077 (0.0116)	0.0083	pCi/g	ASH	AS050627-1	7/6/2005	LT
0506166-6	90.505 7a	Sample	Pu-238	0.0067 +/- 0.0063 (0.0095)	0.0079	pCi/g	ASH	AS050627-1	7/6/2005	U
0506166-6	90.505 7a	Sample	Pu-239/240	0.0037 +/- 0.0045 (0.0068)	0.0034	pCi/g	ASH	AS050627-1	7/6/2005	LT
0506166-7	90.506 7b	Sample	Pu-238	0.019 +/- 0.011 (0.017)	0.010	pCi/g	ASH	AS050627-1	7/6/2005	LT
0506166-7	90.506 7b	Sample	Pu-239/240	0.0068 +/- 0.0062 (0.0093)	0.0037	pCi/g	ASH	AS050627-1	7/6/2005	LT
0506166-8	90.507 2	Sample	Pu-238	-0.0004 +/- 0.0046 (0.0069)	0.0067	pCi/g	ASH	AS050627-1	7/6/2005	U
0506166-8	90.507 2	Sample	Pu-239/240	0.0085 +/- 0.0069 (0.0104)	0.0066	pCi/g	ASH	AS050627-1	7/6/2005	LT
0506166-9	90.508 1	Sample	Pu-238	-0.0008 +/- 0.0050 (0.0075)	0.0087	pCi/g	ASH	AS050627-1	7/6/2005	U
0506166-9	90.508 1	Sample	Pu-239/240	0.0041 +/- 0.0050 (0.0075)	0.0037	pCi/g	ASH	AS050627-1	7/6/2005	LT

Comments:

Data Package ID: *pu0506166-1*

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Isotopic Plutonium By Alpha Spectroscopy Sample Results Summary

Client Name: ESH20_LANL
Client Project Name: TA-54 Area G (Vegetation Understory)
Client Project Number: 7C2000 C357 0540 4E03

Laboratory Name: Paragon Analytics
PAI Work Order: 0506166

Reported on: Tuesday, July 19, 2005 12:15:50 PM

Lab Sample ID	Client Sample ID	Sample Type	Nuclide	Result +/- 2 s TPU (3 TPU)	MDC	Units	Matrix	Prep Batch	Date Analyzed	Flags
0506166-10	90.509 8	Sample	Pu-238	-0.0003 +/- 0.0048 (0.0072)	0.0103	pCi/g	ASH	AS050627-1	7/6/2005	U
0506166-10	90.509 8	Sample	Pu-239/240	0.0009 +/- 0.0048 (0.0072)	0.0069	pCi/g	ASH	AS050627-1	7/6/2005	U

Comments:

Data Package ID: *pu0506166-1*

Qualifiers/Flags:

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