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Radionuclide Concentrations in Soils and Vegetation at Low-Level Radioactive Waste Disposal Area G during 2004

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Cover photo: Meteorology and Air Quality group personnel collect soil and plant samples over the southeastern portions of Pits 17 and 18 at Area G.

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RADIONUCLIDE CONCENTRATIONS IN SOILS AND VEGETATION AT LOW-LEVEL RADIOACTIVE WASTE DISPOSAL AREA G DURING 2004

P.R. Fresquez and E.A. Lopez

ABSTRACT

Soil samples were collected at 15 locations and unwashed overstory and understory vegetation samples were collected at 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). These samples were analyzed for ^3H , ^{238}Pu , $^{239,240}\text{Pu}$, ^{90}Sr , ^{241}Am , ^{137}Cs , ^{234}U , ^{235}U , and ^{238}U . Soil samples collected at Area G contained detectable concentrations of ^3H (27%), $^{239,240}\text{Pu}$ (60%), ^{238}Pu (40%), and ^{241}Am (47%) above regional statistical reference levels (RSRLs). In contrast, the levels of ^{137}Cs , ^{90}Sr , and U in all of the soil samples at Area G were either nondetectable or within RSRLs. The highest levels of ^3H in soils were detected in the southwestern portion of Area G near the ^3H shafts, whereas the highest concentrations of the Pu isotopes were detected in the northern and northeastern portions. All concentrations of ^3H and Pu in soils, however, were far below LANL screening action levels. As for vegetation, most radionuclides in/on plants were either nondetectable or within RSRLs. The exceptions were ^3H in overstory and some understory vegetation, particularly in the southwestern portion of Area G, which correlated very well with the soils data in that area. Also, there was some foliar contamination from ^{241}Am and Pu isotopes in/on a few plant samples—the highest concentrations occurring in the northern section of Area G.

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 and disposal 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 for disposal include contaminated equipment, paper, plastics, 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). ^3H , U, ^{238}Pu , $^{239,240}\text{Pu}$, and a variety of fission and activation products are the main isotopes in waste materials deposited at Area G (U.S. DOE, 1979).

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

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). Soil provides an integrating medium, or reservoir, that can account for contaminants released to the atmosphere, either directly from gaseous effluents, such as air stack emissions, or indirectly from the resuspension of on-site contamination (fugitive dust) (Healy, 1977). 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 ^3H migration from low-level radioactive waste disposal sites (Rickard and Kirby 1987, Fresquez et al., 2003a).

The objective of this program is to compare radionuclides 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.

2. METHODS

In 2004, the Soils, Foodstuffs, and Biota Environmental Surveillance Team of LANL's Meteorology and Air Quality Group collected 15 soil surface samples and nine overstory and understory vegetation samples at locations within and around Area G at TA-54 (Figure 2 and Table 1 describes each site in more detail). Other soil and 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.

Table 1. Sampling Locations Used in 2004 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 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 Pad 4 (outside the Area G fence)
G-43-01	North of TRU 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

a. Soil Sampling

Over the years, two soil-sampling strategies have been utilized at Area G in an effort 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 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 ³H, ²³⁸Pu, ^{239,240}Pu, ¹³⁷Cs, ²³⁴U, ²³⁵U, ²³⁸U, ⁹⁰Sr, and ²⁴¹Am. 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 ³H and pCi/g dry soil for all the other isotopes.

b. Plant Sampling

Samples of overstory vegetation, mostly piñon and 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. Overstory samples were mainly from piñon pine because piñon pine is the prevalent tree in the vicinity of Area G (Tierney and Foxx, 1982). 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 ^3H analysis and for the other radionuclides. Samples were not washed and thus represent the total concentration of radionuclides deposited on the plant surfaces by rainsplash 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 ^3H 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 120 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 ^3H , ^{238}Pu , $^{239,240}\text{Pu}$, ^{137}Cs , ^{234}U , ^{235}U , ^{238}U , ^{241}Am , and ^{90}Sr ; 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 ^3H and pCi/g ash for all the other isotopes. Results reported in grams of ash are usually two to four orders of magnitude greater than live (wet) weight.

c. Determining the Composition of Uranium

To determine the source of U in soils and vegetation 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.

3. RESULTS

a. Radionuclide Concentrations in Soils

Results of radionuclide concentrations in soils are given in Table 2. The chain-of-custody records and actual Paragon Analytics, Inc., analytical reports are included in Appendix A for reference.

Concentrations of ^3H were detected (results greater than three times the TPU; the 99% confidence level) above the regional statistical reference level (RSRL) in only four of the 15 soil samples (27%); these results are down from 87% detected last year and the amounts are far lower than past years (Nyhan et al., 2004; Fresquez et al., 2004), particularly in the south and southwestern portions of Area G where the ^3H shafts are located. The RSRL is the mean plus three standard deviations (99% confidence level) of regional background sample concentrations collected from 1999 through 2003 (Fresquez, 2004). The concentrations of $^{239,240}\text{Pu}$ in most soil samples were at higher levels than the RSRL (60%) and correlate very well with past results. Other radionuclides that were detected above RSRLs in soil samples were ^{241}Am at 47% (down from 53% last year), and ^{238}Pu at 40% (down from 60% last year) of the samples collected. None of the assays for soil ^{90}Sr , ^{137}Cs , or U isotopes were higher than the corresponding RSRLs, and the source of uranium at all sampling sites was natural. All radionuclides that were higher than the RSRL were still far below the screening action levels (SALs) for soils. SALs, established by the Environmental Restoration Project at Los Alamos (ER, 2001), are levels of radionuclides that limit the potential radiation dose to humans to less than 15 mrem/yr.

b. Radionuclide Concentrations in Plants

Table 3 shows radionuclide concentrations in unwashed overstory vegetation collected from within and around Area G during the 2004 growing season. The Paragon Analytics, Inc., analytical reports are included in Appendix B for reference.

Table 2. Radionuclide Concentrations (TPU, 99% confidence level) in Soils collected from Area G in 2004. (Bold values are greater than the TPU and RSRL).

Location	³ H (pCi/mL)	²⁴¹ Am (pCi/g dry)	¹³⁷ Cs (pCi/g dry)	²³⁸ Pu (pCi/g dry)	^{239,240} Pu (pCi/g dry)	⁹⁰ Sr (pCi/g dry)	²³⁴ U (pCi/g dry)	²³⁵ U (pCi/g dry)	²³⁸ U (pCi/g dry)
1	4.5 (1.2)	0.014 (0.011)	0.30 (0.18)	0.0081 (0.0092)	0.021 (0.014)	0.15 (0.15)	0.87 (0.26)	0.037 (0.038)	0.81 (0.24)
2	58 (13)	0.0069 (0.0065)	0.38 (0.23)	0.0063 (0.0065)	0.023 (0.014)	0.0020 (0.14)	1.1 (0.32)	0.035 (0.035)	1.2 (0.33)
3	0.45 (0.47)	0.0076 (0.0065)	0.21 (0.18)	0.0069 (0.0084)	0.034 (0.018)	0.047 (0.14)	0.92 (0.27)	0.050 (0.044)	0.93 (0.27)
3b	0.20 (0.45)	0.0080 (0.0071)	0.45 (0.23)	0.0058 (0.0075)	0.020 (0.014)	-0.11 (0.15)	1.0 (0.30)	0.061 (0.050)	0.96 (0.29)
4	0.14 (0.47)	0.17 (0.051)	0.54 (0.26)	0.14 (0.045)	0.32 (0.086)	0.20 (0.18)	1.1 (0.33)	0.052 (0.044)	1.2 (0.35)
6b	0.050 (0.44)	0.029 (0.014)	0.28 (0.18)	0.0069 (0.0078)	0.12 (0.039)	-0.030 (0.15)	0.79 (0.24)	0.028 (0.033)	0.90 (0.27)
7a	0.58 (0.48)	0.0061 (0.0063)	0.010 (0.15)	0.020 (0.012)	0.19 (0.012)	-0.10 (0.15)	0.92 (0.27)	0.050 (0.044)	1.1 (0.33)
7b	0.64 (0.48)	0.016 (0.011)	-0.010 (0.15)	0.0064 (0.0072)	0.089 (0.032)	-0.045 (0.15)	0.88 (0.26)	0.041 (0.038)	0.89 (0.27)
7c	0.49 (0.47)	0.11 (0.035)	0.67 (0.26)	0.059 (0.024)	0.31 (0.084)	-0.040 (0.17)	1.1 (0.32)	0.049 (0.042)	1.0 (0.29)
G-29-03	159 (36)	0.0030 (0.0045)	0.16 (0.17)	0.0015 (0.0056)	0.0068 (0.0084)	0.050 (0.18)	0.86 (0.26)	0.035 (0.035)	0.91 (0.27)
G-31-01	17 (3.9)	0.0064 (0.0069)	0.099 (0.14)	0.0015 (0.0065)	0.0068 (0.0089)	0.070 (0.17)	0.80 (0.24)	0.031 (0.030)	0.87 (0.26)
G-41-02	0.52 (0.47)	0.051 (0.023)	0.20 (0.15)	0.33 (0.090)	0.14 (0.045)	0.10 (0.14)	0.87 (0.26)	0.049 (0.039)	0.89 (0.26)
G-43-01	0.27 (0.45)	0.060 (0.024)	0.35 (0.21)	0.056 (0.024)	0.19 (0.057)	0.40 (0.18)	1.0 (0.30)	0.050 (0.042)	1.1 (0.32)
G-48-02	0.58 (0.48)	0.13 (0.042)	0.40 (0.20)	0.094 (0.033)	0.64 (0.17)	0.092 (0.11)	1.0 (0.29)	0.042 (0.038)	1.0 (0.29)

Table 2 (cont.)

Location	³H (pCi/mL)	²⁴¹Am (pCi/g dry)	¹³⁷Cs (pCi/g dry)	²³⁸Pu (pCi/g dry)	^{239,240}Pu (pCi/g dry)	⁹⁰Sr (pCi/g dry)	²³⁴U (pCi/g dry)	²³⁵U (pCi/g dry)	²³⁸U (pCi/g dry)
G-58-01	0.23 (0.45)	0.0030 (0.0056)	0.034 (0.15)	-0.00080 (0.0059)	0.0032 (0.0060)	0.13 (0.12)	0.91 (0.27)	0.042 (0.038)	0.88 (0.26)
Exp. (8)^a	0.34 (0.45)	0.0069 (0.0065)	0.37 (0.20)	0.0033 (0.0060)	0.011 (0.010)	0.086 (0.13)	0.80 (0.24)	0.044 (0.038)	0.92 (0.27)
RSRL^b	0.94	0.018	0.69	0.007	0.032	0.41	1.3	0.12	1.4
SAL^c	6,400 ^e	39	5.3	49	44	5.7	63	17	93

^aExpansion Area located just west of Area G and the data are being gathered for baseline use.

^bRegional Statistical Reference Level; this is the upper-limit background concentration (mean plus three standard deviations) based on data from 1999 through 2003 (Fresquez 2004).

^cLos Alamos National Laboratory Screening Action Level based on RESRAD version 6.21 (ER 2001).

Unlike the radionuclide data shown in Table 2 for the soils, most radionuclide concentrations, with the exception of ^3H , in unwashed overstory vegetation were usually not greater than both the TPU and RSRL values. The RSRL mean values plus three standard deviations were calculated from data collected from 1998 to 2003 (Fresquez and Gonzales 2004). Of the eight overstory samples collected in and around the perimeter of Area G, 67% of the samples contained detectable concentrations of ^3H greater than the RSRLs. The ^3H concentrations in overstory samples ranged from 2.3 to 83,000 pCi/mL for the eight samples assayed. As in previous years, ^3H concentrations in overstory vegetation collected outside of Area G and adjacent to the ^3H shafts (locations 1 and 2) exhibited the largest concentrations of any of the samples collected (Nyhan et al., 2004, Fresquez et al., 2004). The highest concentration (4.7E05 pCi/g dry), however, was still below the toxicity reference value of 2E06 pCi/g dry (Fresquez et al., 2003b) and concentrations of ^3H in the southern region of Area G have been shown to decrease with distance to within the RSRL at about 90 m (295 ft) (Fresquez et al., 2003a).

Radionuclide concentrations in unwashed understory vegetation can be found in Table 4. Most radionuclide concentrations, with the exception of ^3H , in understory vegetation were either nondetectable or within RSRLs. As observed with the overstory vegetation results for ^3H , the highest amounts in understory vegetation were associated with plants growing in the southwestern perimeter area of Area G near the ^3H shafts (sample locations 1 and 2). Most of the other radionuclides in understory vegetation collected at Area G were not significantly elevated as compared to RSRLs. Some areas, particularly in the northern section (sample location 4) of Area G, contained ^{241}Am and Pu isotopes in overstory and understory vegetation above RSRLs.

4. CONCLUSIONS

The majority of radionuclide contamination problems in soils and plants were due to ^3H , ^{241}Am , and Pu isotopes. All radionuclide values in soils and plants above RSRLs were still very low (pCi range), say for a few ^3H values, and were far below the SALs for soils and toxicity reference values for vegetation. Therefore, exposure to radionuclides in Area G soils and vegetation poses little risk to humans and the environment.

Table 3. Radionuclide Concentrations (TPU, 99% confidence level) in Unwashed Overstory Vegetation Collected from Area G in 2004. (Bold Values are Equal to or Greater than Both the TPU and RSRL values.)

Sample Location	³ H (pCi/mL)	²⁴¹ Am (pCi/g ash)	¹³⁷ Cs (pCi/g ash)	²³⁸ Pu (pCi/g ash)	^{239,240} Pu (pCi/g ash)	⁹⁰ Sr (pCi/g ash)	²³⁴ U (pCi/g ash)	²³⁵ U (pCi/g ash)	²³⁸ U (pCi/g ash)
1	522 (119)	0.0019 (0.0069)	-0.02 (0.72)	0.0003 (0.0053)	0.0064 (0.0077)	7.2 (2.6)	0.060 (0.021)	0.0019 (0.0036)	0.12 (0.036)
2	83,000 (19,5600)	0.0078 (0.0096)	0.10 (0.77)	0.0019 (0.0057)	0.0017 (0.0057)	6.8 (2.4)	0.11 (0.032)	0.0054 (0.0050)	0.18 (0.050)
3	2.3 (0.81)	0.020 (0.017)	-0.09 (0.69)	0.0045 (0.0065)	0.019 (0.013)	4.5 (1.7)	0.16 (0.045)	0.011 (0.0078)	0.19 (0.053)
3b	2.4 (0.84)	0.0032 (0.0071)	0.11 (0.35)	-0.0006 (0.0045)	0.0052 (0.0060)	7.1 (2.6)	0.12 (0.036)	0.0069 (0.0065)	0.14 (0.041)
4	4.1 (1.2)	0.38 (0.12)	0.10 (0.83)	0.023 (0.015)	0.30 (0.087)	17 (5.9)	0.12 (0.035)	0.0069 (0.0057)	0.14 (0.039)
6b	2.0 (0.77)	0.051 (0.027)	0.03 (0.57)	0.0001 (0.0045)	0.054 (0.023)	9.4 (3.3)	0.082 (0.027)	0.0025 (0.0057)	0.14 (0.041)
7a	7.6 (2.0)	0.0043 (0.0038)	0.24 (0.89)	a	a	0.17 (0.071)	0.12 (0.032)	0.0079 (0.0050)	0.11 (0.030)
7c	6.1 (1.7)	0.046 (0.026)	-0.14 (0.80)	0.013 (0.011)	0.054 (0.024)	6.4 (2.3)	0.15 (0.044)	0.011 (0.0078)	0.17 (0.048)
Expansion area (8)	2.0 (0.78)	0.0033 (0.0063)	-0.14 (0.81)	0.0002 (0.0050)	0.0039 (0.0063)	3.5 (1.3)	0.097 (0.030)	0.0044 (0.0050)	0.12 (0.036)
RSRL^b	2.3	0.052	0.62	0.070	0.052	13	0.50	0.021	0.44

^aLost in analysis.

^bRegional 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 4. Radionuclide Concentrations (TPU, 99% confidence level) in Unwashed Understory Vegetation Collected from Area G in 2004. (Bold Values are Equal to or Greater than Both the TPU and RSRL values.)

Sample Location	³ H (pCi/mL)	²⁴¹ Am (pCi/g ash)	¹³⁷ Cs (pCi/g ash)	²³⁸ Pu (pCi/g ash)	^{239,240} Pu (pCi/g ash)	⁹⁰ Sr (pCi/g ash)	²³⁴ U (pCi/g ash)	²³⁵ U (pCi/g ash)	²³⁸ U (pCi/g ash)
1	465 (107)	0.0 (0.0071)	0.16 (0.86)	0.0007 (0.0069)	0.0032 (0.0069)	1.1 (0.41)	0.028 (0.012)	0.0033 (0.0039)	0.025 (0.011)
2	390 (89)	0.0037 (0.0070)	-0.32 (0.81)	0.0 (0.0063)	0.0022 (0.0063)	1.1 (0.38)	0.026 (0.012)	0.0010 (0.0039)	0.028 (0.013)
3	2.9 (0.81)	0.0026 (0.0074)	-0.07 (0.80)	0.0 (0.0074)	0.0052 (0.0080)	1.5 (0.54)	0.070 (0.024)	0.0016 (0.0039)	0.083 (0.027)
3b	2.0 (0.74)	0.0017 (0.0062)	-0.11 (0.80)	-0.0014 (0.0063)	0.0 (0.0063)	1.7 (0.59)	0.041 (0.017)	0.0041 (0.0044)	0.041 (0.017)
4	2.5 (0.75)	0.034 (0.021)	0.25 (0.79)	0.017 (0.014)	0.013 (0.012)	1.6 (0.59)	0.046 (0.020)	0.0005 (0.0051)	0.038 (0.015)
6b	1.4 (0.57)	0.0012 (0.0066)	-0.24 (0.77)	-0.0003 (0.0063)	0.0022 (0.0063)	1.5 (0.53)	0.023 (0.011)	0.0010 (0.0039)	0.021 (0.011)
7a	13 (3.0)	0.0044 (0.0068)	4.1 (1.2)	0.0034 (0.0065)	0.0020 (0.0065)	5.3 (1.8)	0.090 (0.029)	0.0019 (0.0036)	0.074 (0.024)
7b	13 (3.0)	0.0007 (0.0068)	0.01 (0.81)	0.0023 (0.0060)	-0.0018 (0.0060)	0.48 (0.18)	0.052 (0.018)	0.0028 (0.0045)	0.052 (0.018)
7c	2.7 (0.90)	0.0060 (0.0083)	0.49 (0.78)	0.0042 (0.0072)	0.014 (0.013)	1.6 (0.57)	0.061 (0.021)	0.0015 (0.0038)	0.065 (0.023)
Expansion area (8)	1.9 (0.77)	0.0062 (0.0084)	-0.19 (0.78)	0.0006 (0.0062)	-0.0005 (0.0062)	0.69 (0.26)	0.027 (0.012)	0.0038 (0.0050)	0.030 (0.013)
RSRL^a	3.6	0.0093	0.63	0.0049	0.015	5.0	1.3	0.052	1.1

^aRegional 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)

ACKNOWLEDGMENTS

Thanks to the 2004 field crew (Louis Naranjo, Jr., Brian Spall, and Gaylene Fred) for sample collection and processing. Also, special thanks to Hector Hinojosa for editing and to Teresa Hiteman for composition work.

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APPENDIX A

ANALYTICAL DATA REPORTS OF RADIONUCLIDE CONCENTRATIONS IN SOILS COLLECTED AT AREA G DURING 2004

CHAIN-OF-CUSTODY RECORD

04104139

Los Alamos

Los Alamos National Laboratory
Los Alamos, New Mexico 87545

Soils and Foodstuffs (7H02/C34A/3A00/0009)

P.I. # (505) 667-0815

RRES-MAQ MS J978

Project Name		Request the following analysis:				Number of Containers	Sample Location/Remarks
AREA-G (Soils)		Am ²⁴¹	ISO Pu	Total U calculated H (as pCi/mL)	(G) Grab Sample (R) Ring Sampler		
Date	Time	Am ²⁴¹	ISO Pu	Total U calculated H (as pCi/mL)	Sample Name/Number		
4/13/04	1:30	1	1	1	1	1	(R) South of H shafts immediately outside of Area-G fence
4/13/04	2:30	2	2	2	2	1	(R) West of the high-level H shafts immediately outside Area-G fence
4/13/04	10:45	3	3	3	3	1	(R) East of Pit 38 (inside of Area-G fence)
4/12/04	10:45 AM	4	4	4	3b	1	(R) North of Pit 38 outside of Area- fence
4/12/04	1:35 PM	5	5	5	4	1	(R) Outside of Area-G fence north of the TRU Waste Pads 2 and 4
4/12/04	2:36 PM	6	6	6	6b	1	(R) Southeast of the TRU WASTE PAD 4 outside Area-G fence
4/12/04	11:30	7	7	7	7a	1	(R) Southwestern portions of Pits 17 and 18 (inside of Area-G fence)
4/13/04	11:10	8	8	8	7b	1	(R) East end of Pit 7 (inside of Area-G fence)
4/12/04	1:00 PM	9	9	9	7c	1	(R) North of Pit 8 (outside Area-G fence)
4/13/04	1:30	10	10	10	G-29-03	1	(G) Southwest of Pit 22 (outside the Area-G fence)
4/13/04	2:30	11	11	11	G-31-01	1	(G) Southeast of Disposal Trench C (outside the Area-G fence)
4/12/04	2:00 PM	12	12	12	G-41-02	1	(G) East of the eastern end of Pit 2 and TRU pad 4 (outside the Area-G fence)
4/12/04	1:35 PM	13	13	13	G-43-01	1	(G) North of TRU Pad 2 (outside the Area-G fence)
4/12/04	1:00 PM	14	14	14	G-48-02	1	(G) North of Pit 10 (outside the Area-G fence)
Relinquished by: (signature)	Date/Time	Received by: (signature)			Relinquished by: (signature)	Date/Time	Received by: (signature)
Relinquished by: (signature)	Date/Time	Received by: (signature)			Relinquished by: (signature)	Date/Time	Received by: (signature)
Relinquished by: (signature)	Date/Time	Received for Lab. by: (signature)			Relinquished by: (signature)	Date/Time	Remarks:

Soils and Foodstuffs (7H05/C34A/3A00/0009)
P.I. # (505) 667-0815
RRES-MAQ MS 1978

[illegible]

Tritium Analysis By Liquid Scintillation Sample Results Summary

Client Name: ESH20_LANL
 Client Project Name: Area G Soil Surveillance Program
 Client Project Number: 7H02 C34A 3A00 0009

Laboratory Name: Paragon Analytics
 PAI Work Order: 0404139

Page: 1 of 2
 Reported on: Wednesday, May 12, 2004
 9:48:26 AM

Lab Sample ID	Client Sample ID	Sample Type	Nuclide	Result +/- 2 s TPU	MDC	Units	Matrix	Prep Batch	Date Analyzed	Flags
0404139-1	1	Sample	H-3	4.46 +/- 0.79 /	0.48	pCi/ml	SOIL	3H040427-1	5/5/04	
0404139-2	2	Sample	H-3	57.9 +/- 8.9 /	0.6	pCi/ml	SOIL	3H040427-1	5/5/04	
0404139-3	3	Sample	H-3	0.45 +/- 0.31 /	0.48	pCi/ml	SOIL	3H040427-1	5/5/04	U
0404139-4	3b	Sample	H-3	0.20 +/- 0.30 /	0.48	pCi/ml	SOIL	3H040427-1	5/5/04	U
0404139-5	4	Sample	H-3	0.14 +/- 0.31 /	0.48	pCi/ml	SOIL	3H040427-1	5/5/04	U
0404139-6	6b	Sample	H-3	0.05 +/- 0.29 /	0.48	pCi/ml	SOIL	3H040427-1	5/5/04	U
0404139-7	7a	Sample	H-3	0.58 +/- 0.32 /	0.48	pCi/ml	SOIL	3H040427-1	5/5/04	LT
0404139-8	7b	Sample	H-3	0.64 +/- 0.32 /	0.48	pCi/ml	SOIL	3H040427-1	5/5/04	
0404139-9	7c	Sample	H-3	0.49 +/- 0.31 /	0.48	pCi/ml	SOIL	3H040427-1	5/5/04	LT

Comments:

Data Package ID: h3s0404139-1

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 - This 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

Date Printed: Wednesday, May 12, 2004

Paragon Analytics
 LIMS Version: 5.013A

Page 1 of 2

Itrium Analysis by Liquid Scintillation Sample Results Summary

Client Name: ESH20_LANL Laboratory Name: Paragon Analytics Page: 2 of 2
 Client Project Name: Area G Soil Surveillance Program PAI Work Order: 0404139 Reported on: Wednesday, May 12, 2004
 Client Project Number: 7H02 C34A 3A00 0009 *OK 8/1/04* 9:48:26 AM

Lab Sample ID	Client Sample ID	Sample Type	Nuclide	Result +/- 2 s TPU	MDC	Units	Matrix	Prep Batch	Date Analyzed	Flags
0404139-10	G-29-03	Sample	H-3	159 +/- 24 ✓	1	pCi/ml	SOIL	3H040427-1	5/5/04	M3
0404139-11	G-31-01	Sample	H-3	16.7 +/- 2.6 ✓	0.5	pCi/ml	SOIL	3H040427-1	5/5/04	
0404139-12	G-41-02	Sample	H-3	0.52 +/- 0.31 ✓	0.48	pCi/ml	SOIL	3H040427-1	5/5/04	LT
0404139-13	G-43-01	Sample	H-3	0.27 +/- 0.30 ✓	0.48	pCi/ml	SOIL	3H040427-1	5/5/04	U
0404139-14	G-48-02	Sample	H-3	0.58 +/- 0.32 ✓	0.48	pCi/ml	SOIL	3H040427-1	5/5/04	LT
0404139-15	G-58-01	Sample	H-3	0.23 +/- 0.30 ✓	0.48	pCi/ml	SOIL	3H040427-1	5/5/04	U
0404139-16	8	Sample	H-3	0.34 +/- 0.30 ✓	0.48	pCi/ml	SOIL	3H040427-1	5/5/04	U

Comments:

Data Package ID: h3s0404139-1

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)
- BOL - Below Detection Limit

Isotopic Americium By Alpha Spectroscopy Sample Results Summary

Client Name: ESH20_LANL
 Client Project Name: Area G Soil Surveillance Program
 Client Project Number: 7H02 C34A 3A00 0009

Laboratory Name: Paragon Analytics
 PAI Work Order: 0404139

Page: 1 of 2
 Reported on: Thursday, June 03, 2004
 2:25:47 PM

Lab Sample ID	Client Sample ID	Sample Type	Nuclide	Result +/- 2 s TPU	MDC	Units	Matrix	Prep Batch	Date Analyzed	Flags
0404139-1	1	Sample	Am-241	0.0135 +/- 0.0070 ✓	0.0055	pCi/g	SOIL	AS040522-1	5/29/04	LT
0404139-2	2	Sample	Am-241	0.0059 +/- 0.0043 ✓	0.0017	pCi/g	SOIL	AS040522-1	5/29/04	LT
0404139-3	3	Sample	Am-241	0.0076 +/- 0.0043 ✓	0.0016	pCi/g	SOIL	AS040522-1	5/29/04	LT
0404139-4	3b	Sample	Am-241	0.0080 +/- 0.0047 ✓	0.0042	pCi/g	SOIL	AS040522-1	5/29/04	LT
0404139-5	4	Sample	Am-241	0.174 +/- 0.034 ✓	0.002	pCi/g	SOIL	AS040522-1	5/29/04	
0404139-6	6b	Sample	Am-241	0.0286 +/- 0.0095 ✓	0.0017	pCi/g	SOIL	AS040522-1	5/29/04	
0404139-7	7a	Sample	Am-241	0.0051 +/- 0.0042 ✓	0.0018	pCi/g	SOIL	AS040522-1	5/29/04	LT
0404139-8	7b	Sample	Am-241	0.0156 +/- 0.0072 ✓	0.0050	pCi/g	SOIL	AS040522-1	5/29/04	LT
0404139-9	7c	Sample	Am-241	0.108 +/- 0.023 ✓	0.002	pCi/g	SOIL	AS040522-1	5/29/04	

Comments:

Data Package ID: a0404139-1

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

000003
 000004

ISOTOPIC AMERICIUM BY ALPHA SPECTROSCOPY SAMPLE RESULTS SUMMARY

Client Name: ESH20_LANL
 Client Project Name: Area G Soil Surveillance Program
 Client Project Number: 7H02 C34A 3A00 0009

Laboratory Name: Paragon Analytics
 PAI Work Order: 0404139
 Reported on: Thursday, June 03, 2004
 2:25:47 PM

Page: 2 of 2

Lab Sample ID	Client Sample ID	Sample Type	Nuclide	Result +/- 2 s TPU	MDC	Units	Matrix	Prep Batch	Date Analyzed	Flags
0404139-10	G-29-03	Sample	Am-241	0.0030 +/- 0.0030 ✓	0.0016	pCi/g	SOIL	AS040522-1	5/29/04	LT
0404139-11	G-31-01	Sample	Am-241	0.0064 +/- 0.0046 /	0.0054	pCi/g	SOIL	AS040522-1	5/29/04	LT
0404139-12	G-41-02	Sample	Am-241	0.051 +/- 0.015 /	0.005	pCi/g	SOIL	AS040522-1	5/29/04	
0404139-13	G-43-01	Sample	Am-241	0.060 +/- 0.016 ✓	0.008	pCi/g	SOIL	AS040522-1	5/29/04	
0404139-14	G-48-02	Sample	Am-241	0.133 +/- 0.028 /	0.006	pCi/g	SOIL	AS040522-1	5/29/04	
0404139-15	G-58-01	Sample	Am-241	0.0030 +/- 0.0037 /	0.0020	pCi/g	SOIL	AS040522-1	5/29/04	LT
0404139-16	8	Sample	Am-241	0.0069 +/- 0.0043 /	0.0017	pCi/g	SOIL	AS040522-1	5/29/04	LT

Comments:

Data Package ID: a0404139-1

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

Gamma Spectroscopy Results

PAI 713 Rev 8
Sample Results

Lab Name: Paragon Analytics
Work Order Number: 0404139
Client Name: ESH20_LANL
ClientProject ID: Area G Soil Surveillance Program 7H02 C34A 3A00 0009

*OK'd
8/4/04*

Field ID: 1	Sample Matrix: SOIL	Prep Batch: GS040524-1	Final Aliquot: 319 g
Lab ID: 0404139-1	Prep SOP: PAI 739 Rev 8	QC Batch ID: GS040524-1-1	Prep Basis: Dry Weight
	Date Collected: 13-Apr-04	Run ID: GS040524-1A	Moisture(%): NA
	Date Prepared: 24-May-04	Count Time: 30 minutes	Result Units: pCi/g
Library: USGS	Date Analyzed: 03-Jun-04	Report Basis: Dry Weight	File Name: 040847D08A

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Lab Qualifier
10045-97-3	Cs-137	0.30 +/- 0.12	0.14	M3,G

Comments:

Qualifiers/Flags:

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

Abbreviations:

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

SQ - Spectral quality prevents accurate quantitation.
SI - Nuclide identification and/or quantitation is tentative.
TI - Nuclide identification is tentative.
R - Nuclide has exceeded 8 half-lives.
G - Sample density differs by more than 15% of LCS density.

Data Package ID: GSS0404139-1

Date Printed: Thursday, June 10, 2004

Paragon Analytics
LIMS Version: 5.029A

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000011

Gamma Spectroscopy Results

PAI 713 Rev 8

Sample Results

CPA-801
8/4/04

Lab Name: Paragon Analytics

Work Order Number: 0404139

Client Name: ESH20_LANL

Client/Project ID: Area G Soil Surveillance Program 7H02 C34A 3A00 0009

Field ID: 2	Sample Matrix: SOIL	Prep Batch: GS040524-1	Final Aliquot: 261 g
Lab ID: 0404139-2	Prep SOP: PAI 739 Rev 8	QCBatchID: GS040524-1-1	Prep Basis: Dry Weight
	Date Collected: 13-Apr-04	Run ID: GS040524-1A	Moisture(%): NA
	Date Prepared: 24-May-04	Count Time: 30 minutes	Result Units: pCi/g
Library: USGS	Date Analyzed: 03-Jun-04	Report Basis: Dry Weight	File Name: 040848D08A

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Lab Qualifier
10045-97-3	Cs-137	0.38 +/- 0.15 ✓	0.19	M3,G

Comments:

Qualifiers/Flags:

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

Abbreviations:

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

SQ - Spectral quality prevents accurate quantitation.

SI - Nuclide identification and/or quantitation is tentative.

TI - Nuclide identification is tentative.

R - Nuclide has exceeded 8 half-lives.

G - Sample density differs by more than 15% of LCS density.

Data Package ID: GSS0404139-1

Date Printed: Thursday, June 10, 2004

Paragon Analytics
LIMS Version: 5.029A

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000013

Gamma Spectroscopy Results

PAI 713 Rev 8

Sample Results

OK
8/4/04

Lab Name: Paragon Analytics
Work Order Number: 0404139
Client Name: ESH20_LANL
ClientProject ID: Area G Soil Surveillance Program 7H02 C34A 3A00 0009

Field ID: 3 Lab ID: 0404139-3	Sample Matrix: SOIL Prep SOP: PAI 739 Rev 8 Date Collected: 13-Apr-04 Date Prepared: 24-May-04 Date Analyzed: 03-Jun-04	Prep Batch: GS040524-1 QCBatchID: GS040524-1-1 Run ID: GS040524-1A Count Time: 30 minutes Report Basis: Dry Weight	Final Aliquot: 250 g Prep Basis: Dry Weight Moisture(%): NA Result Units: pCi/g File Name: 040849D08A
----------------------------------	---	--	---

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Lab Qualifier
10045-97-3	Cs-137	0.21 +/- 0.12 ✓	0.16	T1,M3,G

Comments:

Qualifiers/Flags:

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

Abbreviations:

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

Data Package ID: GSS0404139-1

SQ - Spectral quality prevents accurate quantitation.
SI - Nuclide identification and/or quantitation is tentative.
TI - Nuclide identification is tentative.
R - Nuclide has exceeded 8 half-lives.
G - Sample density differs by more than 15% of LCS density.

Date Printed: Thursday, June 10, 2004

Paragon Analytics
LIMS Version: 5.029A

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000014

Gamma Spectroscopy Results

PAI 713 Rev 8
Sample Results

Lab Name: Paragon Analytics
Work Order Number: 0404139
Client Name: ESH20_LANL
ClientProject ID: Area G Soil Surveillance Program 7H02 C34A 3A00 0009

QA 8/4/04

Field ID: 3b Lab ID: 0404139-4	Sample Matrix: SOIL Prep SOP: PAI 739 Rev 8 Date Collected: 12-Apr-04 Date Prepared: 24-May-04 Date Analyzed: 04-Jun-04	Prep Batch: GS040524-1 QCBatchID: GS040524-1-1 Run ID: GS040524-1A Count Time: 30 minutes Report Basis: Dry Weight	Final Aliquot: 295 g Prep Basis: Dry Weight Moisture(%): NA Result Units: pCi/g File Name: 040854D08A
-----------------------------------	---	--	---

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Lab Qualifier
10045-97-3	Cs-137	0.45 +/- 0.15	0.16	M3,G

Comments:

Qualifiers/Flags:

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

Abbreviations:

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

SQ - Spectral quality prevents accurate quantitation.
SI - Nuclide identification and/or quantitation is tentative.
TI - Nuclide identification is tentative.
R - Nuclide has exceeded 8 half-lives.
G - Sample density differs by more than 15% of LCS density.

Data Package ID: GSS0404139-1

Date Printed: Thursday, June 10, 2004

Paragon Analytics
LIMS Version: 5.029A

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000015

Gamma Spectroscopy Results

PAI 713 Rev 8

Sample Results

QALW
8/4/04

Lab Name: Paragon Analytics
Work Order Number: 0404139
Client Name: ESH20_LANL
ClientProject ID: Area G Soil Surveillance Program 7H02 C34A 3A00 0009

Field ID: 4
Lab ID: 0404139-5

Sample Matrix: SOIL
Prep SOP: PAI 739 Rev 8
Date Collected: 12-Apr-04
Date Prepared: 24-May-04
Date Analyzed: 04-Jun-04

Prep Batch: GS040524-1
QCBatchID: GS040524-1-1
Run ID: GS040524-1A
Count Time: 30 minutes
Report Basis: Dry Weight

Final Aliquot: 253 g
Prep Basis: Dry Weight
Moisture(%): NA
Result Units: pCi/g
File Name: 040855D08A

Library: USGS

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Lab Qualifier
10045-97-3	Cs-137	0.54 +/- 0.17	0.16	M3,G

Comments:

Qualifiers/Flags:

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

Abbreviations:

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

Data Package ID: GSS0404139-1

SQ - Spectral quality prevents accurate quantitation.
SI - Nuclide identification and/or quantitation is tentative.
TI - Nuclide identification is tentative.
R - Nuclide has exceeded 8 half-lives.
G - Sample density differs by more than 15% of LCS density.

Date Printed: Thursday, June 10, 2004

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Gamma Spectroscopy Results

PAI 713 Rev 8

Sample Results

QAR
8/4/04

Lab Name: Paragon Analytics
Work Order Number: 0404139
Client Name: ESH20_LANL
ClientProject ID: Area G Soil Surveillance Program 7H02 C34A 3A00 0009

Field ID: 6b
Lab ID: 0404139-6

Sample Matrix: SOIL
Prep SOP: PAI 739 Rev 8
Date Collected: 12-Apr-04
Date Prepared: 24-May-04
Date Analyzed: 04-Jun-04

Prep Batch: GS040524-1
QCBatchID: GS040524-1-1
Run ID: GS040524-1A
Count Time: 30 minutes
Report Basis: Dry Weight

Final Aliquot: 346 g
Prep Basis: Dry Weight
Moisture(%): NA
Result Units: pCi/g
File Name: 040856D08A

Library: USGS

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Lab Qualifier
10045-97-3	Cs-137	0.28 +/- 0.12 /	0.16	M3,G

Comments:

Qualifiers/Flags:

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

Abbreviations:

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

SQ - Spectral quality prevents accurate quantitation.
SI - Nuclide identification and/or quantitation is tentative.
TI - Nuclide identification is tentative.
R - Nuclide has exceeded 8 half-lives.
G - Sample density differs by more than 15% of LCS density.

Data Package ID: GSS0404139-1

Date Printed: Thursday, June 10, 2004

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LIMS Version: 5.029A

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Gamma Spectroscopy Results

PAI 713 Rev 8

Sample Results

OK
8/4/04

Lab Name: Paragon Analytics
Work Order Number: 0404139
Client Name: ESH20_LANL
ClientProject ID: Area G Soil Surveillance Program 7H02 C34A 3A00 0009

Field ID: 7a
Lab ID: 0404139-7

Sample Matrix: SOIL
Prep SOP: PAI 739 Rev 8
Date Collected: 12-Apr-04
Date Prepared: 24-May-04
Date Analyzed: 04-Jun-04

Prep Batch: GS040524-1
QCBatchID: GS040524-1-1
Run ID: GS040524-1A
Count Time: 30 minutes
Report Basis: Dry Weight

Final Aliquot: 235 g
Prep Basis: Dry Weight
Moisture(%): NA
Result Units: pCi/g
File Name: 040857D08A

Library: USGS

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Lab Qualifier
10045-97-3	Cs-137	0.01 +/- 0.10	0.19	U,M,G

Comments:

Qualifiers/Flags:

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

Abbreviations:

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

Data Package ID: GSS0404139-1

SQ - Spectral quality prevents accurate quantitation.
SI - Nuclide Identification and/or quantitation is tentative.
TI - Nuclide identification is tentative.
R - Nuclide has exceeded 8 half-lives.
G - Sample density differs by more than 15% of LCS density.

Date Printed: Thursday, June 10, 2004

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LIMS Version: 5.029A

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Gamma Spectroscopy Results

PAI 713 Rev 8

Sample Results

Lab Name: Paragon Analytics
Work Order Number: 0404139
Client Name: ESH20_LANL
ClientProject ID: Area G Soil Surveillance Program 7H02 C34A 3A00 0009

Field ID: 7b
Lab ID: 0404139-8

Sample Matrix: SOIL
Prep SOP: PAI 739 Rev 8
Date Collected: 13-Apr-04
Date Prepared: 24-May-04
Date Analyzed: 04-Jun-04

Prep Batch: GS040524-1
QCBatchID: GS040524-1-1
Run ID: GS040524-1A
Count Time: 30 minutes
Report Basis: Dry Weight

Final Aliquot: 291 g
Prep Basis: Dry Weight
Moisture(%): NA
Result Units: pCi/g
File Name: 040858D08A

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Lab Qualifier
10045-97-3	Cs-137	-0.01 +/- 0.10	0.19	U,M,G

Comments:

Qualifiers/Flags:

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

SQ - Spectral quality prevents accurate quantitation.
SI - Nuclide identification and/or quantitation is tentative.
TI - Nuclide identification is tentative.
R - Nuclide has exceeded 8 half-lives.
G - Sample density differs by more than 15% of LCS density.

Abbreviations:

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

Data Package ID: GSS0404139-1

Date Printed: Thursday, June 10, 2004

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Gamma Spectroscopy Results

PAI 713 Rev 8

Sample Results

Lab Name: Paragon Analytics

Work Order Number: 0404139

Client Name: ESH20_LANL

ClientProject ID: Area G Soil Surveillance Program 7H02 C34A 3A00 0009

Field ID: 7c
Lab ID: 0404139-9

Sample Matrix: SOIL

Prep SOP: PAI 739 Rev 8

Date Collected: 12-Apr-04

Date Prepared: 24-May-04

Date Analyzed: 04-Jun-04

Prep Batch: GS040524-1

QCBatchID: GS040524-1-1

Run ID: GS040524-1A

Count Time: 30 minutes

Report Basis: Dry Weight

Final Aliquot: 307 g

Prep Basis: Dry Weight

Moisture(%): NA

Result Units: pCi/g

File Name: 040859D08A

Library: USGS

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Lab Qualifier
10045-97-3	Cs-137	0.67 +/- 0.17	0.13	M3,G

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC or less than the associated TPU

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

Y2 - Chemical Yield outside default limits.

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

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

M - The requested MDC was not met.

Abbreviations:

TPU - Total Propagated Uncertainty (see PAI SOP 743)

MDC - Minimum Detectable Concentration (see PAI SOP 709)

BDL - Below Detection Limit

SQ - Spectral quality prevents accurate quantitation.

SI - Nuclide Identification and/or quantitation is tentative.

TI - Nuclide Identification is tentative.

R - Nuclide has exceeded 8 half-lives.

G - Sample density differs by more than 15% of LCS density.

Data Package ID: GSS0404139-1

Date Printed: Thursday, June 10, 2004

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LIMS Version: 5.029A

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Gamma Spectroscopy Results

PAI 713 Rev 8

Sample Results

Lab Name: Paragon Analytics

Work Order Number: 0404139

Client Name: ESH20_LANL

Client/Project ID: Area G Soil Surveillance Program 7H02 C34A 3A00 0009

Field ID: G-29-03
Lab ID: 0404139-10

Sample Matrix: SOIL
Prep SOP: PAI 739 Rev 8
Date Collected: 13-Apr-04
Date Prepared: 24-May-04
Date Analyzed: 04-Jun-04

Prep Batch: GS040524-1
QCBatchID: GS040524-1-1
Run ID: GS040524-1A
Count Time: 30 minutes
Report Basis: Dry Weight

Final Aliquot: 315 g
Prep Basis: Dry Weight
Moisture(%): NA
Result Units: pCi/g
File Name: 040860D08A

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Lab Qualifier
10045-97-3	Cs-137	0.16 +/- 0.11 ✓	0.16	U,M,G

Comments:

Qualifiers/Flags:

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

Abbreviations:

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

Data Package ID: GSS0404139-1

SQ - Spectral quality prevents accurate quantitation.
SI - Nuclide identification and/or quantitation is tentative.
TI - Nuclide identification is tentative.
R - Nuclide has exceeded 8 half-lives.
G - Sample density differs by more than 15% of LCS density.

Date Printed: Thursday, June 10, 2004

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LIMS Version: 5.029A

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Gamma Spectroscopy Results

PAI 713 Rev 8

Sample Results

Lab Name: Paragon Analytics

Work Order Number: 0404139

Client Name: ESH20_LANL

ClientProject ID: Area G Soil Surveillance Program 7H02 C34A 3A00 0009

Field ID: G-31-01
Lab ID: 0404139-11

Sample Matrix: SOIL
Prep SOP: PAI 739 Rev 8
Date Collected: 13-Apr-04
Date Prepared: 24-May-04
Date Analyzed: 04-Jun-04

Prep Batch: GS040524-1
QCBatchID: GS040524-1-1
Run ID: GS040524-1A
Count Time: 30 minutes
Report Basis: Dry Weight

Final Aliquot: 380 g
Prep Basis: Dry Weight
Moisture(%): NA
Result Units: pCi/g
File Name: 040861D08A

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Lab Qualifier
10045-97-3	Cs-137	0.099 +/- 0.091 J	0.143	U,M,G

Comments:

Qualifiers/Flags:

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

Abbreviations:

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

Data Package ID: GSS0404139-1

SQ - Spectral quality prevents accurate quantitation.
SI - Nuclide identification and/or quantitation is tentative.
TI - Nuclide identification is tentative.
R - Nuclide has exceeded 8 half-lives.
G - Sample density differs by more than 15% of LCS density.

Date Printed: Thursday, June 10, 2004

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LIMS Version: 5.029A

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Gamma Spectroscopy Results

PAI 713 Rev 8

Sample Results

Lab Name: Paragon Analytics
Work Order Number: 0404139
Client Name: ESH20_LANL
ClientProject ID: Area G Soil Surveillance Program 7H02 C34A 3A00 0009

OK
6/4/04

Field ID: G-41-02	Sample Matrix: SOIL	Prep Batch: GS040524-1	Final Aliquot: 380 g
Lab ID: 0404139-12	Prep SOP: PAI 739 Rev 8	QCBatchID: GS040524-1-1	Prep Basis: Dry Weight
	Date Collected: 12-Apr-04	Run ID: GS040524-1A	Moisture(%): NA
	Date Prepared: 24-May-04	Count Time: 30 minutes	Result Units: pCi/g
Library: USGS	Date Analyzed: 04-Jun-04	Report Basis: Dry Weight	File Name: 040800D07A

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Lab Qualifier
10045-97-3	Cs-137	0.20 +/- 0.10	0.13	M3,G

Comments:

Qualifiers/Flags:

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

SQ - Spectral quality prevents accurate quantitation.

SI - Nuclide identification and/or quantitation is tentative.

TI - Nuclide identification is tentative.

R - Nuclide has exceeded 8 half-lives.

G - Sample density differs by more than 15% of LCS density.

Abbreviations:

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

Data Package ID: GSS0404139-1

Date Printed: Thursday, June 10, 2004

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LIMS Version: 5.029A

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Gamma Spectroscopy Results

PAI 713 Rev 8

Sample Results

6/4/04

Lab Name: Paragon Analytics

Work Order Number: 0404139

Client Name: ESH20_LANL

ClientProject ID: Area G Soil Surveillance Program 7H02 C34A 3A00 0009

Field ID: G-43-01	Sample Matrix: SOIL	Prep Batch: GS040524-1	Final Aliquot: 255 g
Lab ID: 0404139-13	Prep SOP: PAI 739 Rev 8	QCBatchID: GS040524-1-1	Prep Basis: Dry Weight
	Date Collected: 12-Apr-04	Run ID: GS040524-1A	Moisture(%): NA
	Date Prepared: 24-May-04	Count Time: 30 minutes	Result Units: pCi/g
	Date Analyzed: 04-Jun-04	Report Basis: Dry Weight	File Name: 040862D08A

Library: USGS

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Lab Qualifier
10045-97-3	Cs-137	0.35 +/- 0.14	0.17	M3,G

Comments:

Qualifiers/Flags:

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

Abbreviations:

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

Data Package ID: GSS0404139-1

SQ - Spectral quality prevents accurate quantitation.

SI - Nuclide Identification and/or quantitation is tentative.

TI - Nuclide Identification is tentative.

R - Nuclide has exceeded 8 halflives.

G - Sample density differs by more than 15% of LCS density.

Date Printed: Thursday, June 10, 2004

Paragon Analytics
LIMS Version: 5.029A

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Gamma Spectroscopy Results

PAI 713 Rev 8

Sample Results

Lab Name: Paragon Analytics
Work Order Number: 0404139
Client Name: ESH20_LANL
ClientProject ID: Area G Soil Surveillance Program 7H02 C34A 3A00 0009

Field ID: G-48-02
Lab ID: 0404139-14
Library: USGS
Sample Matrix: SOIL
Prep SOP: PAI 739 Rev 8
Date Collected: 12-Apr-04
Date Prepared: 24-May-04
Date Analyzed: 04-Jun-04
Prep Batch: GS040524-1
QCBatchID: GS040524-1-1
Run ID: GS040524-1A
Count Time: 30 minutes
Report Basis: Dry Weight
Final Aliquot: 324 g
Prep Basis: Dry Weight
Moisture(%): NA
Result Units: pCi/g
File Name: 040863D08A

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Lab Qualifier
10045-97-3	Cs-137	0.40 +/- 0.13	0.14	M3,G

Comments:

Qualifiers/Flags:

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

Abbreviations:

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

SQ - Spectral quality prevents accurate quantitation.
SI - Nuclide identification and/or quantitation is tentative.
TI - Nuclide identification is tentative.
R - Nuclide has exceeded 6 half-lives.
G - Sample density differs by more than 15% of LCS density.

Data Package ID: GSS0404139-1

Date Printed: Thursday, June 10, 2004

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LIMS Version: 5.029A

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Gamma Spectroscopy Results

PAI 713 Rev 8

Sample Results

Qick 8/14/04

Lab Name: Paragon Analytics
Work Order Number: 0404139
Client Name: ESH20_LANL
ClientProject ID: Area G Soil Surveillance Program 7H02 C34A 3A00 0009

Field ID: G-58-01	Sample Matrix: SOIL	Prep Batch: GS040524-1	Final Aliquot: 329 g
Lab ID: 0404139-15	Prep SOP: PAI 739 Rev 8	QCBatchID: GS040524-1-1	Prep Basis: Dry Weight
	Date Collected: 12-Apr-04	Run ID: GS040524-1A	Moisture(%): NA
	Date Prepared: 24-May-04	Count Time: 30 minutes	Result Units: pCi/g
	Date Analyzed: 04-Jun-04	Report Basis: Dry Weight	File Name: 040864D08A

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Lab Qualifier
10045-97-3	Cs-137	0.034 +/- 0.099	0.172	U,M,G

Comments:

Qualifiers/Flags:

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

Abbreviations:

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

SQ - Spectral quality prevents accurate quantitation.
SI - Nuclide identification and/or quantitation is tentative.
TI - Nuclide identification is tentative.
R - Nuclide has exceeded 8 half-lives.
G - Sample density differs by more than 15% of LCS density.

Data Package ID: GSS0404139-1

Date Printed: Thursday, June 10, 2004

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LIMS Version: 5.029A

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Gamma Spectroscopy Results

PAI 713 Rev 8

Sample Results

Qx 2
2/4/04

Lab Name: Paragon Analytics
Work Order Number: 0404139
Client Name: ESH20_LANL
ClientProject ID: Area G Soil Surveillance Program 7H02 C34A 3A00 0009

Field ID: 8
Lab ID: 0404139-16

Sample Matrix: SOIL
Prep SOP: PAI 739 Rev 8
Date Collected: 12-Apr-04
Date Prepared: 24-May-04
Date Analyzed: 04-Jun-04

Prep Batch: GS040524-1
QCBatchID: GS040524-1-1
Run ID: GS040524-1A
Count Time: 30 minutes
Report Basis: Dry Weight

Final Aliquot: 364 g
Prep Basis: Dry Weight
Moisture(%): NA
Result Units: pCi/g
File Name: 040865D08A

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Lab Qualifier
10045-97-3	Cs-137	0.37 +/- 0.13 /	0.15	M3,G

Comments:

Qualifiers/Flags:

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

Abbreviations:

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

Data Package ID: GSS0404139-1

SQ - Spectral quality prevents accurate quantitation.
SI - Nuclide identification and/or quantitation is tentative.
TI - Nuclide identification is tentative.
R - Nuclide has exceeded 8 half-lives.
G - Sample density differs by more than 15% of LCS density.

Date Printed: Thursday, June 10, 2004

Paragon Analytics
LIMS Version: 5.029A

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Isotopic Plutonium By Alpha Spectroscopy Sample Results Summary

Client Name: ESH20_LANL
 Client Project Name: Area G Soil Surveillance Program
 Client Project Number: 7H02 C34A 3A00 0009
 Laboratory Name: Paragon Analytics
 PAI Work Order: 0404139
 Page: 1 of 4
 Reported on: Thursday, June 03, 2004
 1:32:34 PM

Lab Sample ID	Client Sample ID	Sample Type	Nuclide	Result +/- 2 s TPU	MDC	Units	Matrix	Prep Batch	Date Analyzed	Flags
0404139-1	1	Sample	Pu-238	0.0081 +/- 0.0061	0.0067	pCi/g	SOIL	AS040522-1	6/2/04	LT
0404139-1	1	Sample	Pu-239	0.0208 +/- 0.0092	0.0024	pCi/g	SOIL	AS040522-1	6/2/04	
0404139-2	2	Sample	Pu-238	0.0063 +/- 0.0043	0.0019	pCi/g	SOIL	AS040522-1	6/2/04	LT
0404139-2	2	Sample	Pu-239	0.0231 +/- 0.0090	0.0051	pCi/g	SOIL	AS040522-1	6/2/04	
0404139-3	3	Sample	Pu-238	0.0069 +/- 0.0056	0.0071	pCi/g	SOIL	AS040522-1	6/2/04	U
0404139-3	3	Sample	Pu-239	0.034 +/- 0.012	0.002	pCi/g	SOIL	AS040522-1	6/2/04	
0404139-4	3b	Sample	Pu-238	0.0058 +/- 0.0050	0.0061	pCi/g	SOIL	AS040522-1	6/2/04	U
0404139-4	3b	Sample	Pu-239	0.0198 +/- 0.0090	0.0061	pCi/g	SOIL	AS040522-1	6/2/04	LT
0404139-5	4	Sample	Pu-238	0.141 +/- 0.030	0.005	pCi/g	SOIL	AS040522-1	6/2/04	

Comments:

Data Package ID: p0404139-1

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.

Date Reported: Thursday, June 03, 2004
 Paragon Analytics
 LIMS Version: 5.025A
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Isotopic Plutonium By Alpha Spectroscopy Sample Results Summary

Client Name: ESH20_LANL
 Client Project Name: Area G Soil Surveillance Program
 Client Project Number: 7H02 C34A 3A00 0009

Laboratory Name: Paragon Analytics
 PAI Work Order: 0404139

Page: 2 of 4
 Reported on: Thursday, June 03, 2004
 1:32:35 PM

Lab Sample ID	Client Sample ID	Sample Type	Nuclide	Result +/- 2 s TPU	MDC	Units	Matrix	Prep Batch	Date Analyzed	Flags
0404139-5	4	Sample	Pu-239	0.317 +/- 0.057 /	0.007	pCi/g	SOIL	AS040522-1	6/2/04	
0404139-6	6b	Sample	Pu-238	0.0069 +/- 0.0052 /	0.0057	pCi/g	SOIL	AS040522-1	6/2/04	LT
0404139-6	6b	Sample	Pu-239	0.115 +/- 0.026 /	0.002	pCi/g	SOIL	AS040522-1	6/2/04	
0404139-7	7a	Sample	Pu-238	0.0199 +/- 0.0081 /	0.0019	pCi/g	SOIL	AS040522-1	5/31/04	LT
0404139-7	7a	Sample	Pu-239	0.0192 +/- 0.0082 /	0.0052	pCi/g	SOIL	AS040522-1	5/31/04	LT
0404139-8	7b	Sample	Pu-238	0.0064 +/- 0.0043 /	0.0052	pCi/g	SOIL	AS040522-1	5/31/04	LT
0404139-8	7b	Sample	Pu-239	0.089 +/- 0.021 /	0.005	pCi/g	SOIL	AS040522-1	5/31/04	
0404139-9	7c	Sample	Pu-238	0.059 +/- 0.016 /	0.002	pCi/g	SOIL	AS040522-1	5/31/04	
0404139-9	7c	Sample	Pu-239	0.308 +/- 0.056 /	0.002	pCi/g	SOIL	AS040522-1	5/31/04	

Comments:

Data Package ID: p0404139-1

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

Date Printed: Thursday, June 03, 2004

Paragon Analytics
 LIMS Version: 5.025A

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Isotopic Plutonium By Alpha Spectroscopy Sample Results Summary

Client Name: ESH20_LANL
 Client Project Name: Area G Soil Surveillance Program
 Client Project Number: 7H02 C34A 3A00 0009

Laboratory Name: Paragon Analytics
 PAI Work Order: 0404139 *ed*
 Reported on: Thursday, June 03, 2004
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Lab Sample ID	Client Sample ID	Sample Type	Nuclide	Result +/- 2 s TPU	MDC	Units	Matrix	Prep Batch	Date Analyzed	Flags
0404139-10	G-29-03	Sample	Pu-238	0.0015 +/- 0.0037 ✓	0.0021	pCi/g	SOIL	AS040522-1	5/31/04	U
0404139-10	G-29-03	Sample	Pu-239	0.0068 +/- 0.0066 ✓	0.0071	pCi/g	SOIL	AS040522-1	5/31/04	U
0404139-11	G-31-01	Sample	Pu-238	0.0015 +/- 0.0043 ✓	0.0081	pCi/g	SOIL	AS040522-1	5/31/04	U
0404139-11	G-31-01	Sample	Pu-239	0.0068 +/- 0.0059 ✓	0.0081	pCi/g	SOIL	AS040522-1	5/31/04	U
0404139-12	G-41-02	Sample	Pu-238	0.332 +/- 0.060 ✓	0.006	pCi/g	SOIL	AS040522-1	5/31/04	
0404139-12	G-41-02	Sample	Pu-239	0.141 +/- 0.030 ✓	0.002	pCi/g	SOIL	AS040522-1	5/31/04	
0404139-13	G-43-01	Sample	Pu-238	0.056 +/- 0.016 ✓	0.007	pCi/g	SOIL	AS040522-1	5/31/04	
0404139-13	G-43-01	Sample	Pu-239	0.194 +/- 0.038 ✓	0.007	pCi/g	SOIL	AS040522-1	5/31/04	
0404139-14	G-48-02	Sample	Pu-238	0.094 +/- 0.022 ✓	0.006	pCi/g	SOIL	AS040522-1	5/31/04	

Comments:

Data Package ID: p0404139-1

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)
 BOL - Below Detection Limit

Date Printed: Thursday, June 03, 2004

Paragon Analytics
 LIMS Version: 5.025A

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Isotopic Plutonium By Alpha Spectroscopy Sample Results Summary

Client Name: ESH20_LANL
 Client Project Name: Area G Soil Surveillance Program
 Client Project Number: 7H02 C34A.3A00 0009

Laboratory Name: Paragon Analytics
 PAI Work Order: 0404139
 Reported on: Thursday, June 03, 2004
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Lab Sample ID	Client Sample ID	Sample Type	Nuclide	Result +/- 2 s TPU	MDC	Units	Matrix	Prep Batch	Date Analyzed	Flags
0404139-14	G-48-02	Sample	Pu-239	0.64 +/- 0.11 ✓	0	pCi/g	SOIL	AS040522-1	5/31/04	
0404139-15	G-58-01	Sample	Pu-238	-0.0008 +/- 0.0039 ✓	0.0059	pCi/g	SOIL	AS040522-1	5/31/04	U
0404139-15	G-58-01	Sample	Pu-239	0.0032 +/- 0.0040 ✓	0.0059	pCi/g	SOIL	AS040522-1	5/31/04	U
0404139-16	8	Sample	Pu-238	0.0033 +/- 0.0040 ✓	0.0022	pCi/g	SOIL	AS040522-1	5/31/04	LT
0404139-16	8	Sample	Pu-239	0.0114 +/- 0.0068 ✓	0.0060	pCi/g	SOIL	AS040522-1	5/31/04	LT

Comments:

Data Package ID: p0404139-1

Qualifiers/Flags:

- Result is less than the sample specific MDC.
- Result is less than Requested MDC, greater than sample specific MDC.
- 1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.
- 2 - Chemical Yield outside default limits.
- 1 - The requested MDC was not met.
- 13 - 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

Date Printed: Thursday, June 03, 2004

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Strontium-90 Analysis by GT-PC Sample Results Summary

Client Name: ESH20_LANL
 Client Project Name: Area G Soil Surveillance Program
 Client Project Number: 7H02 C34A 3A00 0009

Laboratory Name: Paragon Analytics
 PAI Work Order: 0404139
 Reported on: Wednesday, June 09, 2004
 3:00:01 PM

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Lab Sample ID	Client Sample ID	Sample Type	Nuclide	Result +/- 2 s TPU	MDC	Units	Matrix	Prep Batch	Date Analyzed	Flags
0404139-1	1	Sample	Sr-90	0.145 +/- 0.097	0.154	pCi/g	SOIL	SR040601-1	6/3/2004	Y1,U
0404139-2	2	Sample	Sr-90	0.002 +/- 0.095	0.167	pCi/g	SOIL	SR040601-1	6/3/2004	U
0404139-3	3	Sample	Sr-90	0.047 +/- 0.090	0.155	pCi/g	SOIL	SR040601-1	6/3/2004	U
0404139-4	3b	Sample	Sr-90	-0.105 +/- 0.097	0.169	pCi/g	SOIL	SR040601-1	6/3/2004	Y1,U
0404139-5	4	Sample	Sr-90	0.20 +/- 0.12	0.18	pCi/g	SOIL	SR040601-1	6/3/2004	LT
0404139-6	6b	Sample	Sr-90	-0.03 +/- 0.10	0.18	pCi/g	SOIL	SR040601-1	6/3/2004	U
0404139-7	7a	Sample	Sr-90	-0.10 +/- 0.10	0.18	pCi/g	SOIL	SR040601-1	6/3/2004	U
0404139-8	7b	Sample	Sr-90	-0.045 +/- 0.098	0.173	pCi/g	SOIL	SR040601-1	6/3/2004	U
0404139-9	7c	Sample	Sr-90	-0.04 +/- 0.11	0.19	pCi/g	SOIL	SR040601-1	6/3/2004	U

Comments:

Data Package ID: SRS0404139-1

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

Strontium-90 Analysis by GFPC Sample Results Summary

Client Name: ESH20_LANL
 Client Project Name: Area G Soil Surveillance Program
 Client Project Number: 7H02 C34A 3A00 0009

Laboratory Name: Paragon Analytics
 PAI Work Order: 0404139 *QK 8/10/04*

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 Reported on: Wednesday, June 09, 2004
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Lab Sample ID	Client Sample ID	Sample Type	Nuclide	Result +/- 2 s TPU	MDC	Units	Matrix	Prep Batch	Date Analyzed	Flags
0404139-10	G-28-03	Sample	Sr-90	0.05 +/- 0.12	0.22	pCi/g	SOIL	SR040601-1	6/3/2004	U
0404139-11	G-31-01	Sample	Sr-90	0.07 +/- 0.11	0.19	pCi/g	SOIL	SR040601-1	6/5/2004	U
0404139-12	G-41-02	Sample	Sr-90	0.104 +/- 0.093	0.155	pCi/g	SOIL	SR040601-1	6/5/2004	Y1,U
0404139-13	G-43-01	Sample	Sr-90	0.40 +/- 0.12	0.12	pCi/g	SOIL	SR040601-1	6/7/2004	LT
0404139-14	G-48-02	Sample	Sr-90	0.092 +/- 0.074	0.122	pCi/g	SOIL	SR040601-1	6/7/2004	U
0404139-15	G-59-01	Sample	Sr-90	0.134 +/- 0.077	0.119	pCi/g	SOIL	SR040601-1	6/7/2004	LT
0404139-16	8	Sample	Sr-90	0.086 +/- 0.089	0.150	pCi/g	SOIL	SR040601-1	6/5/2004	U

Comments:

Data Package ID: SRS0404139-1

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: Area G Soil Surveillance Program
 Client Project Number: 7H02 C34A 3A00 0009

Laboratory Name: Paragon Analytics
 PAI Work Order: 0404139
 Reported on: Thursday, June 03, 2004
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Lab Sample ID	Client Sample ID	Sample Type	Nuclide	Result +/- 2 s TPU	MDC	Units	Matrix	Prep Batch	Date Analyzed	Flags
0404139-1	1	Sample	U-234	0.87 +/- 0.17 ✓	0.04	pCi/g	SOIL	AS040522-1	5/31/2004	
0404139-1	1	Sample	U-235	0.037 +/- 0.025 ✓	0.027	pCi/g	SOIL	AS040522-1	5/31/2004	LT
0404139-1	1	Sample	U-238	0.81 +/- 0.16 ✓	0.02	pCi/g	SOIL	AS040522-1	5/31/2004	
0404139-2	2	Sample	U-234	1.09 +/- 0.21 ✓	0.02	pCi/g	SOIL	AS040522-1	5/31/2004	
0404139-2	2	Sample	U-235	0.035 +/- 0.023 ✓	0.009	pCi/g	SOIL	AS040522-1	5/31/2004	LT
0404139-2	2	Sample	U-238	1.17 +/- 0.22 ✓	0.02	pCi/g	SOIL	AS040522-1	5/31/2004	
0404139-3	3	Sample	U-234	0.92 +/- 0.18 ✓	0.02	pCi/g	SOIL	AS040522-1	5/31/2004	
0404139-3	3	Sample	U-235	0.050 +/- 0.029 ✓	0.018	pCi/g	SOIL	AS040522-1	5/31/2004	LT
0404139-3	3	Sample	U-238	0.93 +/- 0.18 ✓	0.01	pCi/g	SOIL	AS040522-1	5/31/2004	

Comments:

Data Package ID: u0404139-1

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: Area G Soil Surveillance Program
 Client Project Number: 7H02 C34A 3A00 0009

Laboratory Name: Paragon Analytics
 PAI Work Order: 0404139

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Lab Sample ID	Client Sample ID	Sample Type	Nuclide	Result +/- 2 s TPU	MDC	Units	Matrix	Prep Batch	Date Analyzed	Flags
0404139-4	3b	Sample	U-234	1.01 +/- 0.20 ✓	0.03	pCi/g	SOIL	AS040522-1	5/31/2004	
0404139-4	3b	Sample	U-235	0.061 +/- 0.033 ✓	0.025	pCi/g	SOIL	AS040522-1	5/31/2004	LT
0404139-4	3b	Sample	U-238	0.96 +/- 0.19 ✓	0.03	pCi/g	SOIL	AS040522-1	5/31/2004	
0404139-5	4	Sample	U-234	1.12 +/- 0.22 ✓	0.02	pCi/g	SOIL	AS040522-1	5/31/2004	
0404139-5	4	Sample	U-235	0.052 +/- 0.029 ✓	0.019	pCi/g	SOIL	AS040522-1	5/31/2004	LT
0404139-5	4	Sample	U-238	1.21 +/- 0.23 ✓	0.02	pCi/g	SOIL	AS040522-1	5/31/2004	
0404139-6	6b	Sample	U-234	0.79 +/- 0.16 ✓	0.02	pCi/g	SOIL	AS040522-1	5/31/2004	
0404139-6	6b	Sample	U-235	0.028 +/- 0.022 ✓	0.022	pCi/g	SOIL	AS040522-1	5/31/2004	LT
0404139-6	6b	Sample	U-238	0.90 +/- 0.18 ✓	0.02	pCi/g	SOIL	AS040522-1	5/31/2004	

Comments:

Data Package ID: 0404139-1

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

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Isotopic Uranium by Alpha Spectroscopy Sample Results Summary

Client Name: ESH20_LANL
 Client Project Name: Area G Soil Surveillance Program
 Client Project Number: 7H02 C34A 3A00 0009

Laboratory Name: Paragon Analytics
 PAI Work Order: 0404139
 Reported on: Thursday, June 03, 2004
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Lab Sample ID	Client Sample ID	Sample Type	Nuclide	Result +/- 2 s TPU	MDC	Units	Matrix	Prep Batch	Date Analyzed	Flags
0404139-7	7a	Sample	U-234	0.92 +/- 0.18 ✓	0.03	pCi/g	SOIL	AS040522-1	5/31/2004	
0404139-7	7a	Sample	U-235	0.050 +/- 0.029 ✓	0.010	pCi/g	SOIL	AS040522-1	5/31/2004	LT
0404139-7	7a	Sample	U-238	1.10 +/- 0.22 ✓	0.02	pCi/g	SOIL	AS040522-1	5/31/2004	
0404139-8	7b	Sample	U-234	0.88 +/- 0.17 ✓	0.02	pCi/g	SOIL	AS040522-1	5/31/2004	
0404139-8	7b	Sample	U-235	0.041 +/- 0.025 ✓	0.017	pCi/g	SOIL	AS040522-1	5/31/2004	LT
0404139-8	7b	Sample	U-238	0.89 +/- 0.18 ✓	0.02	pCi/g	SOIL	AS040522-1	5/31/2004	
0404139-9	7c	Sample	U-234	1.12 +/- 0.21 ✓	0.03	pCi/g	SOIL	AS040522-1	5/31/2004	
0404139-9	7c	Sample	U-235	0.049 +/- 0.028 ✓	0.023	pCi/g	SOIL	AS040522-1	5/31/2004	LT
0404139-9	7c	Sample	U-238	1.00 +/- 0.19 ✓	0.02	pCi/g	SOIL	AS040522-1	5/31/2004	

Comments:

Data Package ID: u0404139-1

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: Area G Soil Surveillance Program
 Client Project Number: 7H02 C34A 3A00 0009

Laboratory Name: Paragon Analytics
 PAI Work Order: 0404139

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Lab Sample ID	Client Sample ID	Sample Type	Nuclide	Result +/- 2 s TPU	MDC	Units	Matrix	Prep Batch	Date Analyzed	Flags
0404139-10	G-29-03	Sample	U-234	0.86 +/- 0.17 ✓	0.02	pCi/g	SOIL	AS040522-1	5/31/2004	
0404139-10	G-29-03	Sample	U-235	0.035 +/- 0.023 ✓	0.010	pCi/g	SOIL	AS040522-1	5/31/2004	LT
0404139-10	G-29-03	Sample	U-238	0.91 +/- 0.18 ✓	0.01	pCi/g	SOIL	AS040522-1	5/31/2004	
0404139-11	G-31-01	Sample	U-234	0.80 +/- 0.16 ✓	0.02	pCi/g	SOIL	AS040522-1	5/31/2004	
0404139-11	G-31-01	Sample	U-235	0.031 +/- 0.020 ✓	0.016	pCi/g	SOIL	AS040522-1	5/31/2004	LT
0404139-11	G-31-01	Sample	U-238	0.87 +/- 0.17 ✓	0.02	pCi/g	SOIL	AS040522-1	5/31/2004	
0404139-12	G-41-02	Sample	U-234	0.87 +/- 0.17 ✓	0.01	pCi/g	SOIL	AS040522-1	5/31/2004	
0404139-12	G-41-02	Sample	U-235	0.049 +/- 0.026 ✓	0.009	pCi/g	SOIL	AS040522-1	5/31/2004	LT
0404139-12	G-41-02	Sample	U-238	0.89 +/- 0.17 ✓	0.02	pCi/g	SOIL	AS040522-1	5/31/2004	

Comments:

Data Package ID: u0404139-1

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: Area G Soil Surveillance Program
 Client Project Number: 7H02 C34A 3A00 0009

Laboratory Name: Paragon Analytics
 PAI Work Order: 0404139

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 Reported on: Thursday, June 03, 2004
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Lab Sample ID	Client Sample ID	Sample Type	Nuclide	Result +/- 2 s TPU	MDC	Units	Matrix	Prep Batch	Date Analyzed	Flags
0404139-13	G-43-01	Sample	U-234	1.03 +/- 0.20 ✓	0.02	pCi/g	SOIL	AS040522-1	5/31/2004	
0404139-13	G-43-01	Sample	U-235	0.050 +/- 0.028 ✓	0.023	pCi/g	SOIL	AS040522-1	5/31/2004	LT
0404139-13	G-43-01	Sample	U-238	1.07 +/- 0.21 ✓	0.02	pCi/g	SOIL	AS040522-1	5/31/2004	
0404139-14	G-48-02	Sample	U-234	1.00 +/- 0.19 ✓	0.03	pCi/g	SOIL	AS040522-1	5/31/2004	
0404139-14	G-48-02	Sample	U-235	0.042 +/- 0.025 ✓	0.024	pCi/g	SOIL	AS040522-1	5/31/2004	LT
0404139-14	G-48-02	Sample	U-238	1.02 +/- 0.19 ✓	0.01	pCi/g	SOIL	AS040522-1	5/31/2004	
0404139-15	G-58-01	Sample	U-234	0.91 +/- 0.18 ✓	0.02	pCi/g	SOIL	AS040522-1	5/31/2004	
0404139-15	G-58-01	Sample	U-235	0.042 +/- 0.025 ✓	0.009	pCi/g	SOIL	AS040522-1	5/31/2004	LT
0404139-15	G-58-01	Sample	U-238	0.88 +/- 0.17 ✓	0.01	pCi/g	SOIL	AS040522-1	5/31/2004	

Comments:

Data Package ID: u0404139-1

Qualifiers/Flags:

- Result is less than the sample specific MDC.
- Result is less than Requested MDC, greater than sample specific MDC.
- Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.
- Chemical Yield outside default limits.
- The requested MDC was not met.
- 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)

BOL - Below Detection Limit

Date Printed: Thursday, June 03, 2004

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 LIMS Version: 5.025A

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Isotopic Uranium By Alpha Spectroscopy Sample Results Summary

Client Name: ESH20_LANL
 Client Project Name: Area G Soil Surveillance Program
 Client Project Number: 7H02 C34A 3A00 0009
 Laboratory Name: Paragon Analytics
 PAI Work Order: 0404139
 Reported on: Thursday, June 03, 2004
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Lab Sample ID	Client Sample ID	Sample Type	Nuclide	Result +/- 2 s TPU	MDC	Units	Matrix	Prep Batch	Date Analyzed	Flags
0404139-16	8	Sample	U-234	0.80 +/- 0.16 ✓	0.03	pCi/g	SOIL	AS040522-1	5/31/2004	
0404139-16	8	Sample	U-235	0.044 +/- 0.025 ✓	0.019	pCi/g	SOIL	AS040522-1	5/31/2004	LT
0404139-16	8	Sample	U-238	0.92 +/- 0.18 ✓	0.02	pCi/g	SOIL	AS040522-1	5/31/2004	

Comments:

Data Package ID: u0404139-1

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.

Date Printed: Thursday, June 03, 2004

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APPENDIX B

ANALYTICAL DATA REPORTS OF RADIONUCLIDE CONCENTRATIONS IN OVERSTORY AND UNDERSTORY VEGETATION COLLECTED AT AREA G DURING 2004

0407058

Meteorology and Air Quality
Los Alamos National Laboratory

RRES-MAQ-711, R5
Attachment 3, Page 1 of 1

Environmental Surveillance Team Chain-of-Custody Record									
MAQ, Meteorology and Air Quality									
This form is from MAQ-711									
Project Contact <u>Phillip Frisquez</u>		Project Name <u>Facility Sampling</u> Soils, sediments, and vegetation		Account Code <u>3A00</u>					
Contact Phone No. <u>667-0815</u> MS <u>J978</u>		Area - <u>G (TA-54) Vegetation</u>		Cost Center <u>0009</u>					
		Over story (OS)		Program Code <u>C34A</u>					
Date Collected	Time Collected	Station Name/Number	Number of Samples	Analysts Requested	Remarks				
6/22/04	2:00	3-OS	①	13H	Waters (condensed)				
6/22/04	2:10	7A-OS	②		Tree shoots				
6/23/04	9:30	3b-OS	③						
6/23/04	11:00	4C-OS	④						
6/23/04	11:30	4-OS	⑤		D.L.				
6/23/04	11:55	6b-OS	⑥		700 psi/acre				
6/23/04	3:42	1-OS	⑦						
6/23/04	3:19	2-OS	⑧						
Relinquished by (print and sign)		Date		Relinquished by (print and sign)		Date			
Louis Naranjo Jr.		9/2/04							
Received by (print and sign)		Time		Received by (print and sign)		Date			
Amy Wolf		1:30							
Date		Time		Date		Time			
7/8/04		0945							
Samplers (print names and Initial) <u>Louis Naranjo Jr.</u>									
Comments									

Environmental Surveillance Team Chain-of-Custody Record

This form is from MAQ-711

[illegible]

Samplers (print names and initial) Colin Naranyi, Jr. 84

Comments	Sample collected	Notes
2-WT-6S	Sample collected WT, 4" tree standing dead mid section. Sample. 2-TL-OS standing dead tree.	A-54 outside perimeter fence by the Tatum shaft.
2-TL-OS		
	3" section from limb of tree.	

Tritium Analysis By Liquid Scintillation Sample Results Summary

Client Name: ESH20_LANL
 Client Project Name: AREA G OS Vegetation
 Client Project Number: 7H02 C34A 3A00 0009

Laboratory Name: Paragon Analytics
 PAI Work Order: 0407058

Page: 1 of 2
 Reported on: Saturday, August 07, 2004
 11:58:15 AM

Lab Sample ID	Client Sample ID	Sample Type	Nuclide	Result +/- 2 s TPU	MDC	Units	Matrix	Prep Batch	Date Analyzed	Flags
0407058-1	3-OS	Sample	H-3	2.26 +/- 0.54	0.58	pCi/ml	LIQUID	3H040723-1	8/6/2004	
0407058-2	7A-OS	Sample	H-3	7.6 +/- 1.3	0.6	pCi/ml	LIQUID	3H040723-1	8/6/2004	
0407058-3	3B-OS	Sample	H-3	2.40 +/- 0.56	0.58	pCi/ml	LIQUID	3H040723-1	8/6/2004	
0407058-4	7C-OS	Sample	H-3	6.1 +/- 1.1	0.6	pCi/ml	LIQUID	3H040723-1	8/6/2004	
0407058-5	4-OS	Sample	H-3	4.07 +/- 0.78	0.58	pCi/ml	LIQUID	3H040723-1	8/6/2004	
0407058-6	6B-OS	Sample	H-3	1.95 +/- 0.51	0.60	pCi/ml	LIQUID	3H040723-1	8/6/2004	
0407058-7	1-OS	Sample	H-3	522 +/- 79	1	pCi/ml	LIQUID	3H040723-1	8/6/2004	
0407058-8	2-OS	Sample	H-3	83000 +/- 13000	0	pCi/ml	LIQUID	3H040723-1	8/6/2004	
0407058-9	8-OS	Sample	H-3	2.04 +/- 0.52	0.58	pCi/ml	LIQUID	3H040723-1	8/6/2004	

Comments:

Data Package ID: h3w0407058-1

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

Date Printed: Saturday, August 07, 2004

Paragon Analytics
 LIMS Version: 5.052A

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Tritium Analysis By Liquid Scintillation Sample Results Summary

Client Name: ESH20_LANL
 Client Project Name: AREA G OS Vegetation
 Client Project Number: 7H02 C34A 3A00 0009

Laboratory Name: Paragon Analytics
 PAI Work Order: 0407058

Page: 2 of 2
 Reported on: Saturday, August 07, 2004
 11:58:15 AM

Lab Sample ID	Client Sample ID	Sample Type	Nuclide	Result +/- 2 s TPU	MDC	Units	Matrix	Prep Batch	Date Analyzed	Flags
0407058-10	2-WT-OS	Sample	H-3	173 +/- 26	1	pCi/ml	LIQUID	3H040723-1	8/6/2004	
0407058-11	2-TL-OS	Sample	H-3	370 +/- 56	1	pCi/ml	LIQUID	3H040723-1	8/6/2004	

Comments:

Data Package ID: h3w0407058-1

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

Date Printed: Saturday, August 07, 2004

Paragon Analytics
 LIMS Version: 5.052A

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0407060

RRES-MAQ-711, R5
Attachment 3, Page 1 of 1Meteorology and Air Quality
Los Alamos National Laboratory

MAQ, Meteorology and Air Quality				Environmental Surveillance Team Chain-of-Custody Record				This form is from MAQ-711			
Project Contact <u>Phillip Frasquez</u>		Project Name <u>AREA-G (IA-S4) Vegetation</u>		Facility Sampling <u>Soils, sediments, and vegetation</u>		Account Code <u>3A00</u>					
Contact Phone No. <u>667-0815</u> MS <u>J978</u>		Number of Samples <u>1</u>		Analysis Requested <u>Am-241, Cs-137, I-131, Sr-90</u>		Cost <u>0009</u>					
		Station Name/Number <u>3-05</u>				Center <u>C34A</u>					
Date Collected		Time Collected		Number of Samples		Analysis Requested		Remarks			
6/22/04	2:00	①		1		Am-241, Cs-137, I-131, Sr-90		ash tree shoots			
6/22/04	2:10	②		1		ISO-U, Sr-90		AREA-G			
6/23/04	9:30	③		1				DL			
6/23/04	11:00	④		1				Am = 0.02			
6/23/04	11:30	⑤		1				ISO Pu = 0.02			
6/23/04	11:55	⑥		1				ISO U = 0.01			
6/23/04	3:42	⑦		1				Sr = 0.06			
6/23/04	3:19	⑧		1				Cs = 1			
Relinquished by (print and sign)		Date		Relinquished by (print and sign)		Date		Relinquished by (print and sign)		Date	
Louis Naranjo Jr.		7/02/04									
Received by (print and sign)		Time		Received by (print and sign)		Time		Received by (print and sign)		Time	
Phillip Frasquez		3:07									
Date		Time		Date		Time		Date		Time	
Samplers (print names and initial) <u>Louis Naranjo Jr.</u>											
Comments											

0407060

MAQ, Meteorology and Air Quality			
Environmental Surveillance Team Chain-of-Custody Record			
This form is from MAQ-711			
Project Contact <u>Phillip Frequez</u>		Project Name <u>Facility Sampling</u>	
Contact Phone No. <u>667-0815 MS J978</u>		Soils, sediments, and vegetation <u>AREA-G (JA-54) Vegetation</u>	
		<u>OVER STORY (OS)</u>	
Station Name/Number		Analysis Requested	
Date Collected	Time Collected	Number of Samples	Remarks
6/23/04	4:17	1	ASH tree shoots.
			AREA-G
			D.L.
			Am = 0.02
			ISO Pu = 0.02
			ISO LL = 0.01
			SR = 0.06
			CS = 1
Relinquished by (print and sign)		Relinquished by (print and sign)	
Date		Date	
Time		Time	
Received by (print and sign)		Received by (print and sign)	
Date		Date	
Time		Time	
Samplers (print names and Initial) <u>Louis Narany, Jr</u>			
Comments			

Isotopic Americium By Alpha Spectroscopy Sample Results Summary

Client Name: ESH20_LANL
 Client Project Name: AREA G OS Vegetation
 Client Project Number: 7H02 C34A 3A00 0009

Laboratory Name: Paragon Analytics
 PAI Work Order: 0407060

Page: 1 of 1
 Reported on: Monday, August 23, 2004
 3:23:47 PM

Lab Sample ID	Client Sample ID	Sample Type	Nuclide	Result +/- 2 s TPU	MDC	Units	Matrix	Prep Batch	Date Analyzed	Flags
0407060-1	3-OS	Sample	Am-241	0.020 +/- 0.011	0.008	pCi/g	ASH	AS040802-4	8/10/2004	LT
0407060-2	7A-OS	Sample	Am-241	0.0043 +/- 0.0025	0.0021	pCi/g	ASH	AS040728-3	8/10/2004	LT
0407060-3	3B-OS	Sample	Am-241	0.0032 +/- 0.0047	0.0072	pCi/g	ASH	AS040802-4	8/11/2004	U
0407060-4	7C-OS	Sample	Am-241	0.046 +/- 0.017	0.007	pCi/g	ASH	AS040802-4	8/11/2004	
0407060-5	4-OS	Sample	Am-241	0.379 +/- 0.080	0.007	pCi/g	ASH	AS040802-4	8/11/2004	
0407060-6	6B-OS	Sample	Am-241	0.051 +/- 0.018	0.003	pCi/g	ASH	AS040802-4	8/11/2004	
0407060-7	1-OS	Sample	Am-241	0.0019 +/- 0.0046	0.0071	pCi/g	ASH	AS040802-4	8/11/2004	U
0407060-8	2-OS	Sample	Am-241	0.0078 +/- 0.0064	0.0076	pCi/g	ASH	AS040802-4	8/11/2004	LT
0407060-9	8-OS	Sample	Am-241	0.0033 +/- 0.0042	0.0030	pCi/g	ASH	AS040802-4	8/11/2004	LT

Comments:

Data Package ID: am0407060-1

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

Date Printed: Monday, August 23, 2004

Paragon Analytics
 LIMS Version: 5.053A

Gamma Spectroscopy Results

PAI 713 Rev 8

Sample Results

Lab Name: Paragon Analytics

Work Order Number: 0407060

Client Name: ESH20_LANL

ClientProject ID: AREA G OS Vegetation 7H02 C34A 3A00 0009

Field ID: 3-OS
Lab ID: 0407060-1

Sample Matrix: ASH

Prep SOP: PAI 739 Rev 8

Date Collected: 22-Jun-04

Date Prepared: 13-Jul-04

Date Analyzed: 25-Jul-04

Prep Batch: GS040713-4

QCBatchID: GS040713-4-1

Run ID: GS040713-4

Count Time: 400 minutes

Report Basis: As Received

Final Aliquot: 10.0 g

Prep Basis: As Received

Moisture(%): NA

Result Units: pCi/g

File Name: 041251D07A

Library: USGS

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Lab Qualifier
10045-97-3	Cs-137	-0.09 +/- 0.46	0.80	U

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC or less than the associated TPU

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

Y2 - Chemical Yield outside default limits.

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

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

M - The requested MDC was not met.

SQ - Spectral quality prevents accurate quantitation.

SI - Nuclide identification and/or quantitation is tentative.

TI - Nuclide identification is tentative.

R - Nuclide has exceeded 8 half-lives.

G - Sample density differs by more than 15% of LCS density.

Abbreviations:

TPU - Total Propagated Uncertainty (see PAI SOP 743)

MDC - Minimum Detectable Concentration (see PAI SOP 709)

BDL - Below Detection Limit

Data Package ID: GSA0407060-1

Date Printed: Tuesday, August 24, 2004

Paragon Analytics

LIMS Version: 5.054A

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Gamma Spectroscopy Results

PAI 713 Rev 8

Sample Results

Lab Name: Paragon Analytics
Work Order Number: 0407060
Client Name: ESH20_LANL
Client/Project ID: AREA G OS Vegetation 7H02 C34A 3A00 0009

Field ID: 7A-OS
Lab ID: 0407060-2

Sample Matrix: ASH
Prep SOP: PAI 739 Rev 8
Date Collected: 22-Jun-04
Date Prepared: 13-Jul-04
Date Analyzed: 24-Jul-04

Prep Batch: GS040713-3
QCBatchID: GS040713-3-1
Run ID: GS040713-3A
Count Time: 400 minutes
Report Basis: As Received

Final Aliquot: 7.10 g
Prep Basis: As Received
Moisture(%): NA
Result Units: pCi/g
File Name: 041336D03A

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Lab Qualifier
10045-97-3	Cs-137	0.24 +/- 0.59	0.99	U

Comments:

Qualifiers/Flags:

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

Abbreviations:

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

SQ - Spectral quality prevents accurate quantitation.
SI - Nuclide identification and/or quantitation is tentative.
TI - Nuclide identification is tentative.
R - Nuclide has exceeded 8 half-lives.
G - Sample density differs by more than 15% of LCS density.

Data Package ID: GSA0407060-1

Date Printed: Tuesday, August 24, 2004

Paragon Analytics
LIMS Version: 5.054A

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Gamma Spectroscopy Results

PAI 713 Rev 8

Sample Results

Lab Name: Paragon Analytics
Work Order Number: 0407060
Client Name: ESH20_LANL
ClientProject ID: AREA G OS Vegetation 7H02 C34A 3A00 0009

Field ID: 3B-OS	Sample Matrix: ASH	Prep Batch: GS040713-4	Final Aliquot: 10.3 g
Lab ID: 0407060-3	Prep SOP: PAI 739 Rev 8	QCBatchID: GS040713-4-1	Prep Basis: As Received
	Date Collected: 23-Jun-04	Run ID: GS040713-4	Moisture(%): NA
	Date Prepared: 13-Jul-04	Count Time: 400 minutes	Result Units: pCi/g
Library: USGS	Date Analyzed: 25-Jul-04	Report Basis: As Received	File Name: 041267D1

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Lab Qualifier
10045-97-3	Cs-137	0.11 +/- 0.23	0.38	U

Comments:

Qualifiers/Flags:

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

Abbreviations:

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

SQ - Spectral quality prevents accurate quantitation.
SI - Nuclide identification and/or quantitation is tentative.
TI - Nuclide identification is tentative.
R - Nuclide has exceeded 8 half-lives.
G - Sample density differs by more than 15% of LCS density.

Data Package ID: GSA0407060-1

Gamma Spectroscopy Results

PAI 713 Rev 8

Sample Results

Lab Name: Paragon Analytics
Work Order Number: 0407060
Client Name: ESH20_LANL
ClientProject ID: AREA G OS Vegetation 7H02 C34A 3A00 0009

Field ID: 7C-OS	Sample Matrix: ASH	Prep Batch: GS040713-4	Final Aliquot: 10.2 g
Lab ID: 0407060-4	Prep SOP: PAI 739 Rev 8	QCBatchID: GS040713-4-1	Prep Basis: As Received
	Date Collected: 23-Jun-04	Run ID: GS040713-4	Moisture(%): NA
	Date Prepared: 13-Jul-04	Count Time: 180 minutes	Result Units: pCi/g
Library: USGS	Date Analyzed: 26-Jul-04	Report Basis: As Received	File Name: 041296DC

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Lab Qualifier
10045-97-3	Cs-137	-0.14 +/- 0.53	0.96	U

Comments:

Qualifiers/Flags:

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

Abbreviations:

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

SQ - Spectral quality prevents accurate quantitation.
SI - Nuclide identification and/or quantitation is tentative.
TI - Nuclide identification is tentative.
R - Nuclide has exceeded 8 half-lives.
G - Sample density differs by more than 15% of LCS density.

Data Package ID: GSA0407060-1

Gamma Spectroscopy Results

PAI 713 Rev 8

Sample Results

Lab Name: Paragon Analytics
Work Order Number: 0407060
Client Name: ESH20_LANL
ClientProject ID: AREA G OS Vegetation 7H02 C34A 3A00 0009

Field ID: 4-OS	Sample Matrix: ASH	Prep Batch: GS040713-4	Final Aliquot: 10.0 g
Lab ID: 0407060-5	Prep SOP: PAI 739 Rev 8	QCBatchID: GS040713-4-1	Prep Basis: As Received
	Date Collected: 23-Jun-04	Run ID: GS040713-4	Moisture(%): NA
	Date Prepared: 13-Jul-04	Count Time: 180 minutes	Result Units: pCi/g
	Date Analyzed: 26-Jul-04	Report Basis: As Received	File Name: 041286D08A

Library: USGS

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Lab Qualifier
10045-97-3	Cs-137	0.10 +/- 0.55	0.95	U

Comments:

Qualifiers/Flags:

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

Abbreviations:

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

SQ - Spectral quality prevents accurate quantitation.
SI - Nuclide identification and/or quantitation is tentative.
TI - Nuclide identification is tentative.
R - Nuclide has exceeded 8 half-lives.
G - Sample density differs by more than 15% of LCS density.

Data Package ID: GSA0407060-1

Date Printed: Tuesday, August 24, 2004

Paragon Analytics
LIMS Version: 5.054A

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Gamma Spectroscopy Results

PAI 713 Rev 8

Sample Results

Lab Name: Paragon Analytics
Work Order Number: 0407060
Client Name: ESH20_LANL
ClientProject ID: AREA G OS Vegetation 7H02 C34A 3A00 0009

Field ID: 6B-OS	Sample Matrix: ASH	Prep Batch: GS040713-4	Final Aliquot: 10.2 g
Lab ID: 0407060-6	Prep SOP: PAI 739 Rev 8	QCBatchID: GS040713-4-1	Prep Basis: As Received
	Date Collected: 23-Jun-04	Run ID: GS040713-4	Moisture(%): NA
	Date Prepared: 13-Jul-04	Count Time: 180 minutes	Result Units: pCi/g
Library: USGS	Date Analyzed: 26-Jul-04	Report Basis: As Received	File Name: 041269D1

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Lab Qualifier
10045-97-3	Cs-137	0.03 +/- 0.38	0.64	U

Comments:

Qualifiers/Flags:

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

Abbreviations:

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

SQ - Spectral quality prevents accurate quantitation.
SI - Nuclide identification and/or quantitation is tentative.
TI - Nuclide identification is tentative.
R - Nuclide has exceeded 8 half-lives.
G - Sample density differs by more than 15% of LCS density.

Data Package ID: GSA0407060-1

Date Printed: Tuesday, August 24, 2004

Paragon Analytics
LIMS Version: 5.054A

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Gamma Spectroscopy Results

PAI 713 Rev 8

Sample Results

Lab Name: Paragon Analytics
Work Order Number: 0407060
Client Name: ESH20_LANL
Client/Project ID: AREA G OS Vegetation 7H02 C34A 3A00 0009

Field ID: 1-OS
Lab ID: 0407060-7

Sample Matrix: ASH
Prep SOP: PAI 739 Rev 8
Date Collected: 23-Jun-04
Date Prepared: 13-Jul-04
Date Analyzed: 27-Jul-04

Prep Batch: GS040713-4
QCBatchID: GS040713-4-1
Run ID: GS040713-4
Count Time: 105 minutes
Report Basis: As Received

Final Aliquot: 10.1 g
Prep Basis: As Received
Moisture(%): NA
Result Units: pCi/g
File Name: 041273D10A

Library: USGS

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Lab Qualifier
10045-97-3	Cs-137	-0.02 +/- 0.48	0.83	U

Comments:

Qualifiers/Flags:

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

Abbreviations:

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

SQ - Spectral quality prevents accurate quantitation.
SI - Nuclide identification and/or quantitation is tentative.
TI - Nuclide identification is tentative.
R - Nuclide has exceeded 8 half-lives.
G - Sample density differs by more than 15% of LCS density.

Data Package ID: GSA0407060-1

Date Printed: Tuesday, August 24, 2004

Paragon Analytics
LIMS Version: 5.054A

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Gamma Spectroscopy Results

PAI 713 Rev 8

Sample Results

Lab Name: Paragon Analytics
Work Order Number: 0407060
Client Name: ESH20_LANL
ClientProject ID: AREA G OS Vegetation 7H02 C34A 3A00 0009

Field ID: 2-OS	Sample Matrix: ASH	Prep Batch: GS040713-4	Final Aliquot: 10.0 g
Lab ID: 0407060-8	Prep SOP: PAI 739 Rev 8	QCBatchID: GS040713-4-1	Prep Basis: As Received
	Date Collected: 23-Jun-04	Run ID: GS040713-4	Moisture(%): NA
	Date Prepared: 13-Jul-04	Count Time: 180 minutes	Result Units: pCi/g
	Date Analyzed: 27-Jul-04	Report Basis: As Received	File Name: 041289D08D

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Lab Qualifier
10045-97-3	Cs-137	0.10 +/- 0.51	0.89	U

Comments:

Qualifiers/Flags:

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

Abbreviations:

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

SQ - Spectral quality prevents accurate quantitation.
SI - Nuclide identification and/or quantitation is tentative.
TI - Nuclide identification is tentative.
R - Nuclide has exceeded 8 half-lives.
G - Sample density differs by more than 15% of LCS density.

Data Package ID: GSA0407060-1

Date Printed: Tuesday, August 24, 2004

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Gamma Spectroscopy Results

PAI 713 Rev 8

Sample Results

Lab Name: Paragon Analytics
Work Order Number: 0407060
Client Name: ESH20_LANL
ClientProject ID: AREA G OS Vegetation 7H02 C34A 3A00 0009

Field ID: 8-OS	Sample Matrix: ASH	Prep Batch: GS040713-4	Final Aliquot: 10.0 g
Lab ID: 0407060-9	Prep SOP: PAI 739 Rev 8	QCBatchID: GS040713-4-1	Prep Basis: As Received
	Date Collected: 23-Jun-04	Run ID: GS040713-4	Moisture(%): NA
	Date Prepared: 13-Jul-04	Count Time: 210 minutes	Result Units: pCi/g
Library: USGS	Date Analyzed: 27-Jul-04	Report Basis: As Received	File Name: 041300DC

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Lab Qualifier
10045-97-3	Cs-137	-0.14 +/- 0.54	0.98	U

Comments:

Qualifiers/Flags:

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

Abbreviations:

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

SQ - Spectral quality prevents accurate quantitation.
SI - Nuclide identification and/or quantitation is tentative.
TI - Nuclide identification is tentative.
R - Nuclide has exceeded 8 half-lives.
G - Sample density differs by more than 15% of LCS density.

Data Package ID: GSA0407060-1

Isotopic Plutonium By Alpha Spectroscopy Sample Results Summary

Client Name: ESH20_LANL
 Client Project Name: AREA G OS Vegetation
 Client Project Number: 7H02 C34A 3A00 0009

Laboratory Name: Paragon Analytics
 PAI Work Order: 0407060

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 Reported on: Monday, August 23, 2004
 1:39:33 PM

Lab Sample ID	Client Sample ID	Sample Type	Nuclide	Result +/- 2 s TPU	MDC	Units	Matrix	Prep Batch	Date Analyzed	Flags
0407060-1	3-OS	Sample	Pu-238	0.0045 +/- 0.0043	0.0053	pCi/g	ASH	AS040802-4	8/8/2004	U
0407060-1	3-OS	Sample	Pu-239	0.0188 +/- 0.0087	0.0053	pCi/g	ASH	AS040802-4	8/8/2004	LT
0407060-3	3B-OS	Sample	Pu-238	-0.0006 +/- 0.0030	0.0067	pCi/g	ASH	AS040802-4	8/8/2004	U
0407060-3	3B-OS	Sample	Pu-239	0.0052 +/- 0.0040	0.0020	pCi/g	ASH	AS040802-4	8/8/2004	LT
0407060-4	7C-OS	Sample	Pu-238	0.0132 +/- 0.0074	0.0073	pCi/g	ASH	AS040802-4	8/8/2004	LT
0407060-4	7C-OS	Sample	Pu-239	0.054 +/- 0.016	0.006	pCi/g	ASH	AS040802-4	8/8/2004	
0407060-5	4-OS	Sample	Pu-238	0.0230 +/- 0.0100	0.0090	pCi/g	ASH	AS040802-4	8/8/2004	
0407060-5	4-OS	Sample	Pu-239	0.298 +/- 0.058	0.002	pCi/g	ASH	AS040802-4	8/8/2004	
0407060-6	6B-OS	Sample	Pu-238	0.0001 +/- 0.0030	0.0067	pCi/g	ASH	AS040802-4	8/8/2004	U

Comments:

Data Package ID: pu0407060-1

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

Date Printed: Monday, August 23, 2004

Paragon Analytics
 LIMS Version: 5.053A

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ISOTOPIC PLUTONIUM BY ALPHA SPECTROSCOPY SAMPLE RESULTS SUMMARY

Name: ESH20_LANL
 Name: AREA G OS Vegetation
 Number: 7H02 C34A 3A00 0009

Laboratory Name: Paragon Analytics
 PAI Work Order: 0407060

Page: 2 of 2
 Reported on: Monday, August 23, 2004
 1:39:34 PM

Client Sample ID	Sample Type	Nuclide	Result +/- 2 s TPU	MDC	Units	Matrix	Prep Batch	Date Analyzed	Flags
6B-OS	Sample	Pu-239	0.054 +/- 0.015	0.002	pCi/g	ASH	AS040802-4	8/8/2004	
1-OS	Sample	Pu-238	0.0003 +/- 0.0035	0.0054	pCi/g	ASH	AS040802-4	8/10/2004	U
1-OS	Sample	Pu-239	0.0064 +/- 0.0051	0.0054	pCi/g	ASH	AS040802-4	8/10/2004	LT
2-OS	Sample	Pu-238	0.0019 +/- 0.0038	0.0025	pCi/g	ASH	AS040802-4	8/10/2004	U
2-OS	Sample	Pu-239	0.0017 +/- 0.0038	0.0072	pCi/g	ASH	AS040802-4	8/10/2004	U
8-OS	Sample	Pu-238	0.0002 +/- 0.0033	0.0072	pCi/g	ASH	AS040802-4	8/10/2004	U
8-OS	Sample	Pu-239	0.0039 +/- 0.0042	0.0063	pCi/g	ASH	AS040802-4	8/10/2004	U

ID: pu0407060-1

the sample specific MDC.
 Requested MDC, greater than sample specific MDC.
 1 control at 100-110%. Quantitative Yield is assumed.
 side default limits.
 : was not met.
 C 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

Strontium-90 Analysis by GFPC Sample Results Summary

Client Name: ESH20_LANL
 Client Project Name: AREA G OS Vegetation
 Client Project Number: 7H02 C34A 3A00 0009

Laboratory Name: Paragon Analytics
 PAI Work Order: 0407060

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 Reported on: Friday, August 20, 2004
 3:13:29 PM

Lab Sample ID	Client Sample ID	Sample Type	Nuclide	Result +/- 2 s TPU	MDC	Units	Matrix	Prep Batch	Date Analyzed	Flags
0407060-1	3-OS	Sample	Sr-90	4.5 +/- 1.1	0.1	pCi/g	ASH	SR040802-1	8/18/2004	M3
0407060-2	7A-OS	Sample	Sr-90	0.189 +/- 0.047	0.037	pCi/g	ASH	SR040728-1	8/17/2004	
0407060-3	3B-OS	Sample	Sr-90	7.1 +/- 1.7	0.1	pCi/g	ASH	SR040802-1	8/18/2004	
0407060-4	7C-OS	Sample	Sr-90	6.4 +/- 1.5	0.1	pCi/g	ASH	SR040802-1	8/18/2004	
0407060-5	4-OS	Sample	Sr-90	16.8 +/- 3.9	0.1	pCi/g	ASH	SR040802-1	8/19/2004	M3
0407060-6	6B-OS	Sample	Sr-90	9.4 +/- 2.2	0.1	pCi/g	ASH	SR040802-1	8/18/2004	M3
0407060-7	1-OS	Sample	Sr-90	7.2 +/- 1.7	0.1	pCi/g	ASH	SR040802-1	8/18/2004	M3
0407060-8	2-OS	Sample	Sr-90	6.8 +/- 1.6	0.1	pCi/g	ASH	SR040802-1	8/18/2004	M3
0407060-9	8-OS	Sample	Sr-90	3.54 +/- 0.84	0.08	pCi/g	ASH	SR040802-1	8/18/2004	Y2.M3

Comments:

ita Package ID: SR0407060-1

Differs/Flags:

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

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

Printed: Friday, August 20, 2004

Paragon Analytics
 LIMS Version: 5.053A

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Isotopic Uranium By Alpha Spectroscopy Sample Results Summary

Client Name: ESH20_LANL
 Client Project Name: AREA G OS Vegetation
 Client Project Number: 7H02 C34A 3A00 0009

Laboratory Name: Paragon Analytics
 PAI Work Order: 0407060

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 Reported on: Monday, August 23, 2004
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Lab Sample ID	Client Sample ID	Sample Type	Nuclide	Result +/- 2 s TPU	MDC	Units	Matrix	Prep Batch	Date Analyzed	Flags
0407060-1	3-OS	Sample	U-234	0.157 +/- 0.030	0.006	pCi/g	ASH	AS040802-4	8/5/2004	
0407060-1	3-OS	Sample	U-235	0.0106 +/- 0.0052	0.0015	pCi/g	ASH	AS040802-4	8/5/2004	
0407060-1	3-OS	Sample	U-238	0.187 +/- 0.035	0.003	pCi/g	ASH	AS040802-4	8/5/2004	
0407060-2	7A-OS	Sample	U-234	0.116 +/- 0.021	0.002	pCi/g	ASH	AS040728-3	8/6/2004	
0407060-2	7A-OS	Sample	U-235	0.0079 +/- 0.0033	0.0008	pCi/g	ASH	AS040728-3	8/6/2004	LT
0407060-2	7A-OS	Sample	U-238	0.111 +/- 0.020	0.003	pCi/g	ASH	AS040728-3	8/6/2004	
0407060-3	3B-OS	Sample	U-234	0.121 +/- 0.024	0.005	pCi/g	ASH	AS040802-4	8/5/2004	
0407060-3	3B-OS	Sample	U-235	0.0069 +/- 0.0043	0.0039	pCi/g	ASH	AS040802-4	8/5/2004	LT
0407060-3	3B-OS	Sample	U-238	0.140 +/- 0.027	0.004	pCi/g	ASH	AS040802-4	8/5/2004	

Comments:

Data Package ID: ur0407060-1

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

Date Printed: Monday, August 23, 2004

Paragon Analytics
 LIMS Version: 5.053A

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Isotopic Uranium by Alpha Spectroscopy Sample Results Summary

Sample: ESH20_LANL
 Name: AREA G OS Vegetation
 Number: 7H02 C34A 3A00 0009

Laboratory Name: Paragon Analytics
 PAI Work Order: 0407060

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Reported on: Monday, August 23, 2004
 3:14:19 PM

Client Sample ID	Sample Type	Nuclide	Result +/- 2 s TPU	MDC	Units	Matrix	Prep Batch	Date Analyzed	Flags
7C-OS	Sample	U-234	0.149 +/- 0.029	0.004	pCi/g	ASH	AS040802-4	8/5/2004	
7C-OS	Sample	U-235	0.0113 +/- 0.0052	0.0015	pCi/g	ASH	AS040802-4	8/5/2004	
7C-OS	Sample	U-238	0.172 +/- 0.032	0.003	pCi/g	ASH	AS040802-4	8/5/2004	
4-OS	Sample	U-234	0.115 +/- 0.023	0.004	pCi/g	ASH	AS040802-4	8/5/2004	
4-OS	Sample	U-235	0.0069 +/- 0.0038	0.0013	pCi/g	ASH	AS040802-4	8/5/2004	LT
4-OS	Sample	U-238	0.135 +/- 0.026	0.004	pCi/g	ASH	AS040802-4	8/5/2004	
6B-OS	Sample	U-234	0.082 +/- 0.018	0.005	pCi/g	ASH	AS040802-4	8/5/2004	
6B-OS	Sample	U-235	0.0025 +/- 0.0038	0.0064	pCi/g	ASH	AS040802-4	8/5/2004	U
6B-OS	Sample	U-238	0.142 +/- 0.027	0.007	pCi/g	ASH	AS040802-4	8/5/2004	

ID: ur0407060-1

the sample specific MDC.

Requested MDC, greater than sample specific MDC.

1 control at 100-110%. Quantitative Yield is assumed.

side default limits.

was not met.

C 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: AREA G OS Vegetation
 Client Project Number: 7H02 C34A 3A00 0009

Laboratory Name: Paragon Analytics
 PAI Work Order: 0407060

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 Reported on: Monday, August 23, 2004
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Lab Sample ID	Client Sample ID	Sample Type	Nuclide	Result +/- 2 s TPU	MDC	Units	Matrix	Prep Batch	Date Analyzed	Flags
0407060-7	1-OS	Sample	U-234	0.060 +/- 0.014	0.004	pCi/g	ASH	AS040802-4	8/5/2004	
0407060-7	1-OS	Sample	U-235	0.0019 +/- 0.0024	0.0036	pCi/g	ASH	AS040802-4	8/5/2004	U
0407060-7	1-OS	Sample	U-238	0.121 +/- 0.024	0.004	pCi/g	ASH	AS040802-4	8/5/2004	
0407060-8	2-OS	Sample	U-234	0.107 +/- 0.021	0.001	pCi/g	ASH	AS040802-4	8/5/2004	
0407060-8	2-OS	Sample	U-235	0.0054 +/- 0.0033	0.0013	pCi/g	ASH	AS040802-4	8/5/2004	LT
0407060-8	2-OS	Sample	U-238	0.181 +/- 0.033	0.001	pCi/g	ASH	AS040802-4	8/5/2004	
0407060-9	8-OS	Sample	U-234	0.097 +/- 0.020	0.004	pCi/g	ASH	AS040802-4	8/8/2004	
0407060-9	8-OS	Sample	U-235	0.0044 +/- 0.0033	0.0036	pCi/g	ASH	AS040802-4	8/8/2004	LT
0407060-9	8-OS	Sample	U-238	0.123 +/- 0.024	0.004	pCi/g	ASH	AS040802-4	8/8/2004	

Comments:

ata Package ID: ur0407060-1

Differs/Flags:
 Result is less than the sample specific MDC.
 Result is less than Requested MDC, greater than sample specific MDC.
 Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.
 Chemical Yield outside default limits.
 The requested MDC was not met.
 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

Printed: Monday, August 23, 2004

Paragon Analytics
 LIMS Version: 5.053A

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Environmental Surveillance Team Chain-of-Custody Record

This form is from MAQ-711

Project Contact		Station Name/Number		Project Name		Facility Sampling		Account	
Date Collected	Time Collected			Soils, sediments, and vegetation	Soils, sediments, and vegetation	Soils, sediments, and vegetation	Soils, sediments, and vegetation	Code	Code
6/22/04	2:00	3-US	①	3H	AREA-G (TA-54) VEGETATION	AREA-G (TA-54) VEGETATION	AREA-G (TA-54) VEGETATION	0009	3A00
6/22/04	2:10	7A-US	②						
6/22/04	2:20	7A-US	③						
6/23/04	9:30	3b-US	④						
6/23/04	11:00	7C-US	⑤						
6/23/04	11:30	4-US	⑥						
6/23/04	11:55	6b-US	⑦						
6/23/04	3:49	1-US	⑧	✓					
Relinquished by (print and sign)		Relinquished by (print and sign)		Relinquished by (print and sign)		Relinquished by (print and sign)		Remarks	
LARRY NARANJO, Jr.		LARRY NARANJO, Jr.		LARRY NARANJO, Jr.		LARRY NARANJO, Jr.		Waters (Condensed)	
Date 7/02/04		Date 7/02/04		Date 7/02/04		Date 7/02/04		Vegetation	
Time 1:45		Time 1:45		Time 1:45		Time 1:45		D.L.	
Received by (print and sign)		Received by (print and sign)		Received by (print and sign)		Received by (print and sign)		700 pCi/mL	
Date		Date		Date		Date			
Time		Time		Time		Time			

Samplers (print names and initial)	Comments
Louis Navarrete, Jr.	

6505070

Environmental Surveillance Team Chain-of-Custody Record

MAQ, Meteorology and Air Quality

This form is from MAQ-711

[illegible]

Tritium Analysis By Liquid Scintillation Sample Results Summary

Client Name: ESH20_LANL
 Client Project Name: AREA G US Vegetation
 Client Project Number: 7H02 C34A 3A00 0009

Laboratory Name: Paragon Analytics
 PAI Work Order: 0407059

Page: 1 of 2
 Reported on: Saturday, August 07, 2004
 3:35:03 PM

Lab Sample ID	Client Sample ID	Sample Type	Nuclide	Result +/- 2 s TPU	MDC	Units	Matrix	Prep Batch	Date Analyzed	Flags
0407059-1	3-US	Sample	H-3	2.87 +/- 0.54	0.43	pCi/ml	LIQUID	3H040723-2	8/6/2004	
0407059-2	7B-US	Sample	H-3	12.7 +/- 2.0	0.4	pCi/ml	LIQUID	3H040723-2	8/6/2004	
0407059-3	7A-US	Sample	H-3	12.7 +/- 2.0	0.6	pCi/ml	LIQUID	3H040723-2	8/6/2004	
0407059-4	3B-US	Sample	H-3	1.99 +/- 0.49	0.56	pCi/ml	LIQUID	3H040723-2	8/6/2004	
0407059-5	7C-US	Sample	H-3	2.73 +/- 0.60	0.67	pCi/ml	LIQUID	3H040723-2	8/7/2004	M3
0407059-6	4-US	Sample	H-3	2.50 +/- 0.50	0.45	pCi/ml	LIQUID	3H040723-2	8/6/2004	
0407059-7	6B-US	Sample	H-3	1.35 +/- 0.38	0.50	pCi/ml	LIQUID	3H040723-2	8/6/2004	
0407059-8	1-US	Sample	H-3	465 +/- 71	1	pCi/ml	LIQUID	3H040723-2	8/6/2004	
0407059-9	2-US	Sample	H-3	390 +/- 59	1	pCi/ml	LIQUID	3H040723-2	8/6/2004	

Comments:

Data Package ID: h3w0407059-1

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

Date Printed: Saturday, August 07, 2004

Paragon Analytics
 LIMS Version: 5.052A

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Tritium Analysis By Liquid Scintillation Sample Results Summary

Client Name: ESH20_LANL
 Client Project Name: AREA G US Vegetation
 Client Project Number: 7H02 C34A 3A00 0009

Laboratory Name: Paragon Analytics
 PAI Work Order: 0407059

Page: 2 of 2
 Reported on: Saturday, August 07, 2004
 3:35:03 PM

Lab Sample ID	Client Sample ID	Sample Type	Nuclide	Result +/- 2 s TPU	MDC	Units	Matrix	Prep Batch	Date Analyzed	Flags
0407059-10	8-US	Sample	H-3	1.89 +/- 0.51	0.65	pCi/ml	LIQUID	3H040723-2	8/6/2004	M3

Comments:

Data Package ID: h3w0407059-1

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)
- BOL - Below Detection Limit

Date Printed: Saturday, August 07, 2004

Paragon Analytics
 LIMS Version: 5.052A

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MAQ, Meteorology and Air Quality									
Environmental Surveillance Team Chain-of-Custody Record									
Project Contact		Station Name/Number		Project Name		Facility Sampling		Account	
Contact Phone No.		Time Collected		Soils, sediments, and vegetation		Soils, sediments, and vegetation		Code	
Phillip Fresquez		3-45		Am-241, Cs-137, ISO Pu		AREA-G (TA-54) VEGETATION		Cost	
667-0815 MSJ978		2:00		ISO U, Sr-90		UNDERSTORY (US)		Center	
		2:10						Program	
		2:20						Code	
		9:30						Remarks	
		11:00						Asb Veg Samples	
		11:30						AREA-G	
		11:55						D.L.	
		3:49						Am-0.02	
								ISO Pu=0.02	
								ISO U=0.01	
								Sr=0.06	
								CS=1	
Relinquished by (print and sign)		Date		Relinquished by (print and sign)		Date		Date	
Louis Naranjo Jr.		7/6/04						Time	
Received by (print and sign)		Time		Received by (print and sign)		Date		Date	
Louis Naranjo Jr.		1:50						Time	
				Received by (print and sign)		Date		Date	
								Time	
								Time	
Samplers (print names and initial) Louis Naranjo Jr.									
Comments									

Isotopic Americium By Alpha Spectroscopy Sample Results Summary

Client Name: ESH20_LANL
 Client Project Name: AREA G US Vegetation
 Client Project Number: 7H02 C34A 3A00 0009

Laboratory Name: Paragon Analytics
 PAI Work Order: 0407061

Page: 1 of 2
 Reported on: Monday, August 23, 2004
 10:39:59 AM

Lab Sample ID	Client Sample ID	Sample Type	Nuclide	Result +/- 2 s TPU	MDC	Units	Matrix	Prep Batch	Date Analyzed	Flags
0407061-1	3-US	Sample	Am-241	0.0026 +/- 0.0049	0.0035	pCi/g	ASH	AS040730-1	8/11/2004	U
0407061-2	7B-US	Sample	Am-241	0.0007 +/- 0.0045	0.0069	pCi/g	ASH	AS040730-1	8/11/2004	U
0407061-3	7A-US	Sample	Am-241	0.0044 +/- 0.0045	0.0030	pCi/g	ASH	AS040730-1	8/11/2004	LT
0407061-4	3B-US	Sample	Am-241	0.0017 +/- 0.0041	0.0063	pCi/g	ASH	AS040730-1	8/11/2004	U
0407061-5	7C-US	Sample	Am-241	0.0060 +/- 0.0055	0.0062	pCi/g	ASH	AS040730-1	8/11/2004	U
0407061-6	4-US	Sample	Am-241	0.034 +/- 0.014	0.003	pCi/g	ASH	AS040730-1	8/11/2004	
0407061-7	6B-US	Sample	Am-241	0.0012 +/- 0.0044	0.0032	pCi/g	ASH	AS040730-1	8/11/2004	U
0407061-8	1-US	Sample	Am-241	0 +/- 0.0047	0.0034	pCi/g	ASH	AS040730-1	8/12/2004	U
0407061-9	2-US	Sample	Am-241	0.0037 +/- 0.0046	0.0033	pCi/g	ASH	AS040730-1	8/12/2004	LT

Comments:

Data Package ID: am0407061-1

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

Date Printed: Monday, August 23, 2004

Paragon Analytics
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Isotopic Americium By Alpha Spectroscopy Sample Results Summary

Client Name: ESH20_LANL
 Client Project Name: AREA G US Vegetation
 Client Project Number: 7H02 C34A 3A00 0009

Laboratory Name: Paragon Analytics
 PAI Work Order: 0407061

Page: 2 of 2
 Reported on: Monday, August 23, 2004
 10:39:59 AM

Lab Sample ID	Client Sample ID	Sample Type	Nuclide	Result +/- 2 s TPU	MDC	Units	Matrix	Prep Batch	Date Analyzed	Flags
0407081-10	8-US	Sample	Am-241	0.0062 +/- 0.0056	0.0063	pCi/g	ASH	AS040730-1	8/12/2004	U

Comments:

Data Package ID: am0407061-1

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.
- MS - 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

Date Printed: Monday, August 23, 2004

Paragon Analytics
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Gamma Spectroscopy Results

PAI 713 Rev 8

Sample Results

Lab Name: Paragon Analytics

Work Order Number: 0407061

Client Name: ESH20_LANL

ClientProject ID: AREA G US Vegetation 7H02 C34A 3A00 0009

Field ID: 3-US
Lab ID: 0407061-1

Sample Matrix: ASH
Prep SOP: PAI 739 Rev 8
Date Collected: 22-Jun-04
Date Prepared: 13-Jul-04
Date Analyzed: 27-Jul-04

Prep Batch: GS040713-5
QCBatchID: GS040713-5-1
Run ID: GS040713-5A
Count Time: 105 minutes
Report Basis: As Received

Final Aliquot: 10.1 g
Prep Basis: As Received
Moisture(%): NA
Result Units: pCi/g
File Name: 041274D10B

Library: USGS

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Lab Qualifier
10045-97-3	Cs-137	-0.07 +/- 0.53	0.91	U

Comments:

Qualifiers/Flags:

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

Abbreviations:

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

SQ - Spectral quality prevents accurate quantitation.
SI - Nuclide identification and/or quantitation is tentative.
TI - Nuclide identification is tentative.
R - Nuclide has exceeded 6 half-lives.
G - Sample density differs by more than 15% of LCS density.

Data Package ID: GSA0407061-1

Date Printed: Tuesday, August 24, 2004

Paragon Analytics
LIMS Version: 5.054A

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Gamma Spectroscopy Results

PAI 713 Rev 8

Sample Results

Lab Name: Paragon Analytics

Work Order Number: 0407061

Client Name: ESH20_LANL

Client/Project ID: AREA G US Vegetation 7H02 C34A 3A00 0009

Field ID:	7B-US
Lab ID:	0407061-2

Sample Matrix: ASH
Prep SOP: PAI 739 Rev 8
Date Collected: 22-Jun-04
Date Prepared: 13-Jul-04
Date Analyzed: 27-Jul-04

Prep Batch: GS040713-5
QCBatchID: GS040713-5-1
Run ID: GS040713-5A
Count Time: 180 minutes
Report Basis: As Received

Final Aliquot: 10.5 g
Prep Basis: As Received
Moisture(%): NA
Result Units: pCi/g
File Name: 041291D08B

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Lab Qualifier
10045-97-3	Cs-137	0.01 +/- 0.54	0.95	U

Comments:

Qualifiers/Flags:

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

Abbreviations:

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

SQ - Spectral quality prevents accurate quantitation.
SI - Nuclide identification and/or quantitation is tentative.
TI - Nuclide identification is tentative.
R - Nuclide has exceeded 8 half-lives.
G - Sample density differs by more than 15% of LCS density.

Data Package ID: GSA0407061-1

Date Printed: Tuesday, August 24, 2004

Paragon Analytics
LIMS Version: 5.054A

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Gamma Spectroscopy Results

PAI 713 Rev 8

Sample Results

Lab Name: Paragon Analytics
Work Order Number: 0407061
Client Name: ESH20_LANL
ClientProject ID: AREA G US Vegetation 7H02 C34A 3A00 0009

Field ID: 7A-US	Sample Matrix: ASH	Prep Batch: GS040713-5	Final Aliquot: 10.0 g
Lab ID: 0407061-3	Prep SOP: PAI 739 Rev 8	QCBatchID: GS040713-5-1	Prep Basis: As Received
	Date Collected: 22-Jun-04	Run ID: GS040713-5A	Moisture(%): NA
	Date Prepared: 13-Jul-04	Count Time: 105 minutes	Result Units: pCi/g
Library: USGS	Date Analyzed: 27-Jul-04	Report Basis: As Received	File Name: 041275D10B

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Lab Qualifier
10045-97-3	Cs-137	4.10 +/- 0.83	0.84	

Comments:

Qualifiers/Flags:

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

Abbreviations:

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

SQ - Spectral quality prevents accurate quantitation.
SI - Nuclide identification and/or quantitation is tentative.
TI - Nuclide identification is tentative.
R - Nuclide has exceeded 8 half-lives.
G - Sample density differs by more than 15% of LCS density.

Data Package ID: GSA0407061-1

Date Printed: Tuesday, August 24, 2004

Paragon Analytics
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Gamma Spectroscopy Results

PAI 713 Rev 8

Sample Results

Lab Name: Paragon Analytics
Work Order Number: 0407061
Client Name: ESH20_LANL
ClientProject ID: AREA G US Vegetation 7H02 C34A 3A00 0009

Field ID: 3B-US	Sample Matrix: ASH	Prep Batch: GS040713-5	Final Aliquot: 10.1 g
Lab ID: 0407061-4	Prep SOP: PAI 739 Rev 8	QCBatchID: GS040713-5-1	Prep Basis: As Received
	Date Collected: 23-Jun-04	Run ID: GS040713-5A	Moisture(%): NA
	Date Prepared: 13-Jul-04	Count Time: 180 minutes	Result Units: pCi/g
Library: USGS	Date Analyzed: 28-Jul-04	Report Basis: As Received	File Name: 041307D02B

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Lab Qualifier
10045-97-3	Cs-137	-0.11 +/- 0.53	0.96	U

Comments:

Qualifiers/Flags:

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

Abbreviations:

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

SQ - Spectral quality prevents accurate quantitation.
SI - Nuclide identification and/or quantitation is tentative.
TI - Nuclide identification is tentative.
R - Nuclide has exceeded 8 half-lives.
G - Sample density differs by more than 15% of LCS density.

Data Package ID: GSA0407061-1

Date Printed: Tuesday, August 24, 2004

Paragon Analytics
LIMS Version: 5.054A

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Gamma Spectroscopy Results

PAI 713 Rev 8

Sample Results

Lab Name: Paragon Analytics
Work Order Number: 0407061
Client Name: ESH20_LANL
ClientProject ID: AREA G US Vegetation 7H02 C34A 3A00 0009

Field ID: 7C-US	Sample Matrix: ASH	Prep Batch: GS040713-5	Final Aliquot: 10.3 g
Lab ID: 0407061-5	Prep SOP: PAI 739 Rev 8	QCBatchID: GS040713-5-1	Prep Basis: As Received
	Date Collected: 23-Jun-04	Run ID: GS040713-5A	Moisture(%): NA
	Date Prepared: 13-Jul-04	Count Time: 105 minutes	Result Units: pCi/g
	Date Analyzed: 28-Jul-04	Report Basis: As Received	File Name: 041279D10B

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Lab Qualifier
10045-97-3	Cs-137	0.49 +/- 0.52	0.84	U

Comments:

Qualifiers/Flags:

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

Abbreviations:

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

SQ - Spectral quality prevents accurate quantitation.
SI - Nuclide identification and/or quantitation is tentative.
TI - Nuclide identification is tentative.
R - Nuclide has exceeded 8 half-lives.
G - Sample density differs by more than 15% of LCS density.

Data Package ID: GSA0407061-1

Date Printed: Tuesday, August 24, 2004

Paragon Analytics
LIMS Version: 5.054A

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Gamma Spectroscopy Results

PAI 713 Rev 8
Sample Results

Lab Name: Paragon Analytics
Work Order Number: 0407061
Client Name: ESH20_LANL
Client/Project ID: AREA G US Vegetation 7H02 C34A 3A00 0009

Field ID: 4-US	Sample Matrix: ASH	Prep Batch: GS040713-5	Final Aliquot: 10.1 g
Lab ID: 0407061-6	Prep SOP: PAI 739 Rev 8	QCBatchID: GS040713-5-1	Prep Basis: As Received
	Date Collected: 23-Jun-04	Run ID: GS040713-5A	Moisture(%): NA
	Date Prepared: 13-Jul-04	Count Time: 180 minutes	Result Units: pCi/g
	Date Analyzed: 28-Jul-04	Report Basis: As Received	File Name: 041310D02A

Library: USGS

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Lab Qualifier
10045-97-3	Cs-137	0.25 +/- 0.59	1.00	U

Comments:

Qualifiers/Flags:

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

Abbreviations:

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

SQ - Spectral quality prevents accurate quantitation.
SI - Nuclide identification and/or quantitation is tentative.
TI - Nuclide identification is tentative.
R - Nuclide has exceeded 8 half-lives.
G - Sample density differs by more than 15% of LCS density.

Data Package ID: GSA0407061-1

Date Printed: Tuesday, August 24, 2004

Paragon Analytics
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Gamma Spectroscopy Results

PAI 713 Rev 8

Sample Results

Lab Name: Paragon Analytics
Work Order Number: 0407061
Client Name: ESH20_LANL
ClientProject ID: AREA G US Vegetation 7H02 C34A 3A00 0009

Field ID: 6B-US	Sample Matrix: ASH	Prep Batch: GS040713-5	Final Aliquot: 10.2 g
Lab ID: 0407061-7	Prep SOP: PAI 739 Rev 8	QCBatchID: GS040713-5-1	Prep Basis: As Received
	Date Collected: 23-Jun-04	Run ID: GS040713-5A	Moisture(%): NA
	Date Prepared: 13-Jul-04	Count Time: 105 minutes	Result Units: pCi/g
	Date Analyzed: 28-Jul-04	Report Basis: As Received	File Name: 041280D10B

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Lab Qualifier
10045-97-3	Cs-137	-0.24 +/- 0.51	0.90	U

Comments:

Qualifiers/Flags:

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

Abbreviations:

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

SQ - Spectral quality prevents accurate quantitation.
SI - Nuclide identification and/or quantitation is tentative.
TI - Nuclide identification is tentative.
R - Nuclide has exceeded 8 half-lives.
G - Sample density differs by more than 15% of LCS density.

Data Package ID: GSA0407061-1

Date Printed: Tuesday, August 24, 2004

Paragon Analytics
LIMS Version: 5.054A

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Gamma Spectroscopy Results

PAI 713 Rev 8

Sample Results

Lab Name: Paragon Analytics

Work Order Number: 0407061

Client Name: ESH20_LANL

Client/Project ID: AREA G US Vegetation 7H02 C34A 3A00 0009

Field ID: 1-US
Lab ID: 0407061-8

Sample Matrix: ASH
Prep SOP: PAI 739 Rev 8
Date Collected: 23-Jun-04
Date Prepared: 13-Jul-04
Date Analyzed: 28-Jul-04

Prep Batch: GS040713-5
QCBatchID: GS040713-5-1
Run ID: GS040713-5A
Count Time: 180 minutes
Report Basis: As Received

Final Aliquot: 10.2 g
Prep Basis: As Received
Moisture(%): NA
Result Units: pCi/g
File Name: 041299D08A

Library: USGS

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Lab Qualifier
10045-97-3	Cs-137	0.16 +/- 0.57	0.98	U

Comments:

Qualifiers/Flags:

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

Abbreviations:

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

SQ - Spectral quality prevents accurate quantitation.
SI - Nuclide identification and/or quantitation is tentative.
TI - Nuclide identification is tentative.
R - Nuclide has exceeded 8 half-lives.
G - Sample density differs by more than 15% of LCS density.

Data Package ID: GSA0407061-1

Date Printed: Tuesday, August 24, 2004

Paragon Analytics
LIMS Version: 5.054A

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Gamma Spectroscopy Results

PAI 713 Rev 8

Sample Results

Lab Name: Paragon Analytics

Work Order Number: 0407061

Client Name: ESH20_LANL

ClientProject ID: AREA G US Vegetation 7H02 C34A 3A00 0009

Field ID: 2-US	Sample Matrix: ASH	Prep Batch: GS040713-5	Final Aliquot: 10.1 g
Lab ID: 0407061-9	Prep SOP: PAI 739 Rev 8	QCBatchID: GS040713-5-1	Prep Basis: As Received
	Date Collected: 23-Jun-04	Run ID: GS040713-5A	Moisture(%): NA
	Date Prepared: 13-Jul-04	Count Time: 180 minutes	Result Units: pCi/g
Library: USGS	Date Analyzed: 28-Jul-04	Report Basis: As Received	File Name: 041298D08B

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Lab Qualifier
10045-97-3	Cs-137	-0.32 +/- 0.54	1.00	U

Comments:

Qualifiers/Flags:

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

Abbreviations:

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

SQ - Spectral quality prevents accurate quantitation.

SI - Nuclide identification and/or quantitation is tentative.

TI - Nuclide identification is tentative.

R - Nuclide has exceeded 8 half-lives.

G - Sample density differs by more than 15% of LCS density.

Data Package ID: GSA0407061-1

Date Printed: Tuesday, August 24, 2004

Paragon Analytics
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Gamma Spectroscopy Results

PAI 713 Rev 8

Sample Results

Lab Name: Paragon Analytics
Work Order Number: 0407061
Client Name: ESH20_LANL
ClientProject ID: AREA G US Vegetation 7H02 C34A 3A00 0009

Field ID: 8-US Lab ID: 0407061-10	Sample Matrix: ASH Prep SOP: PAI 739 Rev 8 Date Collected: 23-Jun-04 Date Prepared: 13-Jul-04 Date Analyzed: 28-Jul-04	Prep Batch: GS040713-5 QCBatchID: GS040713-5-1 Run ID: GS040713-5A Count Time: 105 minutes Report Basis: As Received	Final Aliquot: 10.3 g Prep Basis: As Received Moisture(%): NA Result Units: pCi/g File Name: 041281D10B
--------------------------------------	--	--	---

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Lab Qualifier
10045-97-3	Cs-137	-0.19 +/- 0.52	0.90	U

Comments:

Qualifiers/Flags:

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

Abbreviations:

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

SQ - Spectral quality prevents accurate quantitation.
SI - Nuclide identification and/or quantitation is tentative.
TI - Nuclide identification is tentative.
R - Nuclide has exceeded 8 half-lives.
G - Sample density differs by more than 15% of LCS density.

Data Package ID: GSA0407061-1

Date Printed: Tuesday, August 24, 2004

Paragon Analytics
LIMS Version: 5.054A

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Isotopic Plutonium By Alpha Spectroscopy Sample Results Summary

Client Name: ESH20_LANL
 Client Project Name: AREA G US Vegetation
 Client Project Number: 7H02 C34A 3A00 0009

Laboratory Name: Paragon Analytics
 PAI Work Order: 0407061

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 2:30:31 PM

Lab Sample ID	Client Sample ID	Sample Type	Nuclide	Result +/- 2 s TPU	MDC	Units	Matrix	Prep Batch	Date Analyzed	Flags
0407061-1	3-US	Sample	Pu-238	0 +/- 0.0049	0.0035	pCi/g	ASH	AS040730-1	8/11/2004	U
0407061-1	3-US	Sample	Pu-239	0.0052 +/- 0.0053	0.0035	pCi/g	ASH	AS040730-1	8/11/2004	LT
0407061-2	7B-US	Sample	Pu-238	0.0023 +/- 0.0040	0.0073	pCi/g	ASH	AS040730-1	8/11/2004	U
0407061-2	7B-US	Sample	Pu-239	-0.0018 +/- 0.0040	0.0092	pCi/g	ASH	AS040730-1	8/11/2004	U
0407061-3	7A-US	Sample	Pu-238	0.0034 +/- 0.0043	0.0031	pCi/g	ASH	AS040730-1	8/11/2004	LT
0407061-3	7A-US	Sample	Pu-239	0.0020 +/- 0.0043	0.0090	pCi/g	ASH	AS040730-1	8/11/2004	U
0407061-4	3B-US	Sample	Pu-238	-0.0014 +/- 0.0042	0.0089	pCi/g	ASH	AS040730-1	8/11/2004	U
0407061-4	3B-US	Sample	Pu-239	0 +/- 0.0042	0.0030	pCi/g	ASH	AS040730-1	8/11/2004	U
0407061-5	7C-US	Sample	Pu-238	0.0042 +/- 0.0048	0.0087	pCi/g	ASH	AS040730-1	8/11/2004	U

Comments:

Data Package ID: pu0407061-1

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 769)
 BDL - Below Detection Limit

Date Printed: Monday, August 23, 2004

Paragon Analytics
 LIMS Version: 5.053A

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Isotopic Plutonium By Alpha Spectroscopy Sample Results Summary

Client Name: ESH20_LANL
 Client Project Name: AREA G US Vegetation
 Client Project Number: 7H02 C34A 3A00 0009

Laboratory Name: Paragon Analytics
 PAI Work Order: 0407061

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 Reported on: Monday, August 23, 2004
 2:30:31 PM

Lab Sample ID	Client Sample ID	Sample Type	Nuclide	Result +/- 2 s TPU	MDC	Units	Matrix	Prep Batch	Date Analyzed	Flags
0407061-5	7C-US	Sample	Pu-239	0.0138 +/- 0.0089	0.0092	pCi/g	ASH	AS040730-1	8/11/2004	LT
0407061-6	4-US	Sample	Pu-238	0.0166 +/- 0.0096	0.0082	pCi/g	ASH	AS040730-1	8/11/2004	LT
0407061-6	4-US	Sample	Pu-239	0.0129 +/- 0.0081	0.0032	pCi/g	ASH	AS040730-1	8/11/2004	LT
0407061-7	6B-US	Sample	Pu-238	-0.0003 +/- 0.0042	0.0088	pCi/g	ASH	AS040730-1	8/11/2004	U
0407061-7	6B-US	Sample	Pu-239	0.0022 +/- 0.0042	0.0030	pCi/g	ASH	AS040730-1	8/11/2004	U
0407061-8	1-US	Sample	Pu-238	0.0007 +/- 0.0046	0.0070	pCi/g	ASH	AS040730-1	8/11/2004	U
0407061-8	1-US	Sample	Pu-239	0.0032 +/- 0.0046	0.0070	pCi/g	ASH	AS040730-1	8/11/2004	U
0407061-9	2-US	Sample	Pu-238	0 +/- 0.0042	0.0030	pCi/g	ASH	AS040730-1	8/11/2004	U
0407061-9	2-US	Sample	Pu-239	0.0022 +/- 0.0042	0.0030	pCi/g	ASH	AS040730-1	8/11/2004	U

Comments:

Data Package ID: pu0407061-1

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

Date Printed: Monday, August 23, 2004

Paragon Analytics
 LIMS Version: 5.053A

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Isotopic Plutonium By Alpha Spectroscopy Sample Results Summary

Client Name: ESH20_LANL
 Client Project Name: AREA G US Vegetation
 Client Project Number: 7H02 C34A 3A00 0009

Laboratory Name: Paragon Analytics
 PAI Work Order: 0407061

Page: 3 of 3
 Reported on: Monday, August 23, 2004
 2:30:31 PM

Lab Sample ID	Client Sample ID	Sample Type	Nuclide	Result +/- 2 s TPU	MDC	Units	Matrix	Prep Batch	Date Analyzed	Flags
0407061-10	8-US	Sample	Pu-238	0.0006 +/- 0.0041	0.0063	pCi/g	ASH	AS040730-1	8/11/2004	U
0407061-10	8-US	Sample	Pu-239	-0.0005 +/- 0.0041	0.0063	pCi/g	ASH	AS040730-1	8/11/2004	U

Comments:

Data Package ID: pu0407061-1

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

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Paragon Analytics
 LIMS Version: 5.053A

Strontium-90 Analysis by GFPC Sample Results Summary

Client Name: ESH20_LANL Laboratory Name: Paragon Analytics Page: 1 of 2
 Client Project Name: AREA G US Vegetation PAI Work Order: 0407061 Reported on: Monday, August 23, 2004
 Client Project Number: 7H02 C34A 3A00 0009 3:28:15 PM

Lab Sample ID	Client Sample ID	Sample Type	Nuclide	Result +/- 2 s TPU	MDC	Units	Matrix	Prep Batch	Date Analyzed	Flags
0407061-1	3-US	Sample	Sr-90	1.52 +/- 0.36	0.06	pCi/g	ASH	SR40803-1	8/21/2004	
0407061-2	7B-US	Sample	Sr-90	0.48 +/- 0.12	0.05	pCi/g	ASH	SR40803-1	8/21/2004	
0407061-3	7A-US	Sample	Sr-90	5.3 +/- 1.2	0	pCi/g	ASH	SR40803-1	8/21/2004	
0407061-4	3B-US	Sample	Sr-90	1.66 +/- 0.39	0.06	pCi/g	ASH	SR40803-1	8/21/2004	
0407061-5	7C-US	Sample	Sr-90	1.59 +/- 0.38	0.04	pCi/g	ASH	SR40803-1	8/21/2004	
0407061-6	4-US	Sample	Sr-90	1.63 +/- 0.39	0.04	pCi/g	ASH	SR40803-1	8/21/2004	
0407061-7	6B-US	Sample	Sr-90	1.45 +/- 0.35	0.05	pCi/g	ASH	SR40803-1	8/21/2004	
0407061-8	1-US	Sample	Sr-90	1.12 +/- 0.27	0.07	pCi/g	ASH	SR40803-1	8/21/2004	M3
0407061-9	2-US	Sample	Sr-90	1.05 +/- 0.25	0.05	pCi/g	ASH	SR40803-1	8/21/2004	

Comments:

Data Package ID: SR0407061-1

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

Date Printed: Monday, August 23, 2004

Paragon Analytics
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Strontium-90 Analysis by GFPC Sample Results Summary

Client Name: ESH20_LANL
 Client Project Name: AREA G US Vegetation
 Client Project Number: 7H02 C34A 3A00 0009

Laboratory Name: Paragon Analytics
 PAI Work Order: 0407061

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 Reported on: Monday, August 23, 2004
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Lab Sample ID	Client Sample ID	Sample Type	Nuclide	Result +/- 2 s TPU	MDC	Units	Matrix	Prep Batch	Date Analyzed	Flags
0407061-10	8-US	Sample	Sr-90	0.69 +/- 0.17	0.05	pCi/g	ASH	SR40803-1	8/21/2004	

Comments:

Data Package ID: SR0407061-1

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.
 MG - 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

Date Printed: Monday, August 23, 2004

Paragon Analytics
 LIMS Version: 5.053A

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Isotopic Uranium By Alpha Spectroscopy Sample Results Summary

Client Name: ESH20_LANL
 Client Project Name: AREA G US Vegetation
 Client Project Number: 7H02 C34A 3A00 0009

Laboratory Name: Paragon Analytics
 PAI Work Order: 0407061

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Lab Sample ID	Client Sample ID	Sample Type	Nuclide	Result +/- 2 s TPU	MDC	Units	Matrix	Prep Batch	Date Analyzed	Flags
0407061-1	3-US	Sample	U-234	0.070 +/- 0.016	0.001	pCi/g	ASH	AS040730-1	8/5/2004	
0407061-1	3-US	Sample	U-235	0.0016 +/- 0.0026	0.0014	pCi/g	ASH	AS040730-1	8/5/2004	LT
0407061-1	3-US	Sample	U-238	0.083 +/- 0.018	0.003	pCi/g	ASH	AS040730-1	8/5/2004	
0407061-2	7B-US	Sample	U-234	0.052 +/- 0.012	0.004	pCi/g	ASH	AS040730-1	8/5/2004	
0407061-2	7B-US	Sample	U-235	0.0028 +/- 0.0030	0.0043	pCi/g	ASH	AS040730-1	8/5/2004	U
0407061-2	7B-US	Sample	U-238	0.052 +/- 0.012	0.003	pCi/g	ASH	AS040730-1	8/5/2004	
0407061-3	7A-US	Sample	U-234	0.080 +/- 0.019	0.004	pCi/g	ASH	AS040730-1	8/5/2004	
0407061-3	7A-US	Sample	U-235	0.0019 +/- 0.0024	0.0035	pCi/g	ASH	AS040730-1	8/5/2004	U
0407061-3	7A-US	Sample	U-238	0.074 +/- 0.016	0.001	pCi/g	ASH	AS040730-1	8/5/2004	

Comments:

Data Package ID: ur0407061-1

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

Date Printed: Monday, August 23, 2004

Paragon Analytics
 LIMS Version: 5.063A

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Isotopic Uranium By Alpha Spectroscopy Sample Results Summary

Client Name: ESH20_LANL
 Client Project Name: AREA G US Vegetation
 Client Project Number: 7H02 C34A 3A00 0009

Laboratory Name: Paragon Analytics
 PAI Work Order: 0407061

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Lab Sample ID	Client Sample ID	Sample Type	Nuclide	Result +/- 2 s TPU	MDC	Units	Matrix	Prep Batch	Date Analyzed	Flags
0407061-4	3B-US	Sample	U-234	0.041 +/- 0.011	0.004	pCi/g	ASH	AS040730-1	8/5/2004	
0407061-4	3B-US	Sample	U-235	0.0041 +/- 0.0029	0.0014	pCi/g	ASH	AS040730-1	8/5/2004	LT
0407061-4	3B-US	Sample	U-238	0.041 +/- 0.011	0.004	pCi/g	ASH	AS040730-1	8/5/2004	
0407061-5	7C-US	Sample	U-234	0.061 +/- 0.014	0.005	pCi/g	ASH	AS040730-1	8/5/2004	
0407061-5	7C-US	Sample	U-235	0.0015 +/- 0.0025	0.0014	pCi/g	ASH	AS040730-1	8/5/2004	LT
0407061-5	7C-US	Sample	U-238	0.065 +/- 0.015	0.004	pCi/g	ASH	AS040730-1	8/5/2004	
0407061-6	4-US	Sample	U-234	0.046 +/- 0.013	0.011	pCi/g	ASH	AS040730-1	8/6/2004	M3
0407061-6	4-US	Sample	U-235	0.0005 +/- 0.0034	0.0067	pCi/g	ASH	AS040730-1	8/6/2004	U
0407061-6	4-US	Sample	U-238	0.0380 +/- 0.0100	0.0050	pCi/g	ASH	AS040730-1	8/6/2004	

Comments:

Data Package ID: ur0407061-1

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

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Isotopic Uranium By Alpha Spectroscopy Sample Results Summary

Client Name: ESH20_LANL
 Client Project Name: AREA G US Vegetation
 Client Project Number: 7H02 C34A 3A00 0009

Laboratory Name: Paragon Analytics
 PAI Work Order: 0407061

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Lab Sample ID	Client Sample ID	Sample Type	Nuclide	Result +/- 2 s TPU	MDC	Units	Matrix	Prep Batch	Date Analyzed	Flags
0407061-7	6B-US	Sample	U-234	0.0225 +/- 0.0074	0.0041	pCi/g	ASH	AS040730-1	8/5/2004	
0407061-7	6B-US	Sample	U-235	0.0010 +/- 0.0026	0.0038	pCi/g	ASH	AS040730-1	8/5/2004	U
0407061-7	6B-US	Sample	U-238	0.0212 +/- 0.0071	0.0033	pCi/g	ASH	AS040730-1	8/5/2004	
0407061-8	1-US	Sample	U-234	0.0282 +/- 0.0082	0.0037	pCi/g	ASH	AS040730-1	8/8/2004	
0407061-8	1-US	Sample	U-235	0.0033 +/- 0.0026	0.0013	pCi/g	ASH	AS040730-1	8/8/2004	LT
0407061-8	1-US	Sample	U-238	0.0245 +/- 0.0076	0.0043	pCi/g	ASH	AS040730-1	8/8/2004	
0407061-9	2-US	Sample	U-234	0.0256 +/- 0.0078	0.0012	pCi/g	ASH	AS040730-1	8/6/2004	
0407061-9	2-US	Sample	U-235	0.0010 +/- 0.0026	0.0014	pCi/g	ASH	AS040730-1	8/6/2004	U
0407061-9	2-US	Sample	U-238	0.0279 +/- 0.0084	0.0033	pCi/g	ASH	AS040730-1	8/6/2004	

Comments:

Data Package ID: ur0407061-1

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

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Isotopic Uranium By Alpha Spectroscopy Sample Results Summary

Client Name: ESH20_LANL
 Client Project Name: AREA G US Vegetation
 Client Project Number: 7H02 C34A 3A00 0009

Laboratory Name: Paragon Analytics
 PAI Work Order: 0407061
 Reported on: Monday, August 23, 2004
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Lab Sample ID	Client Sample ID	Sample Type	Nuclide	Result +/- 2 s TPU	MDC	Units	Matrix	Prep Batch	Date Analyzed	Flags
0407061-10	8-US	Sample	U-234	0.0273 +/- 0.0081	0.0043	pCi/g	ASH	AS040730-1	8/6/2004	
0407061-10	8-US	Sample	U-235	0.0038 +/- 0.0033	0.0044	pCi/g	ASH	AS040730-1	8/6/2004	U
0407061-10	8-US	Sample	U-238	0.0297 +/- 0.0084	0.0030	pCi/g	ASH	AS040730-1	8/6/2004	

Comments:

Data Package ID: ur0407061-1

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

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