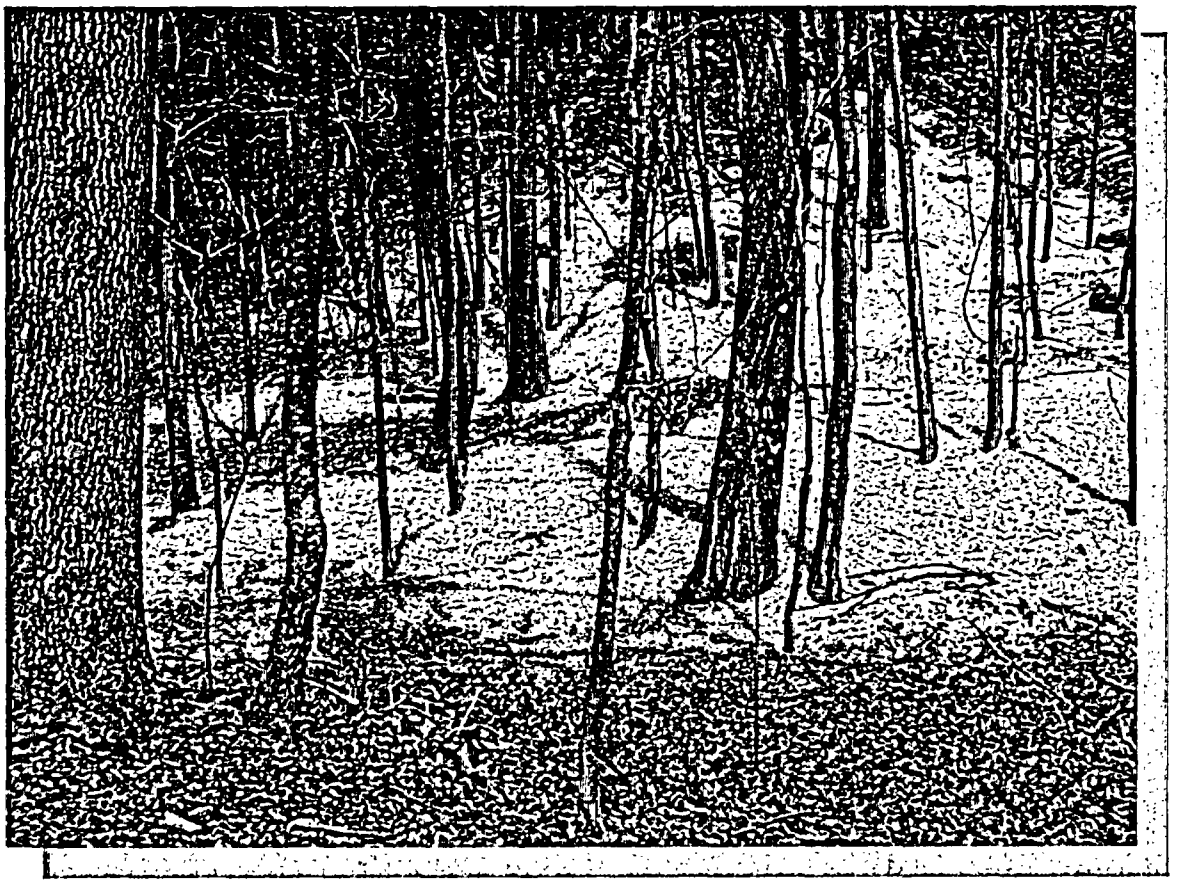


# Final Status Survey Final Report Phase II

## Appendix A5

***Survey Unit Release Record***
***9526-0001, Northeast Mountain Side***

**February 2005**

# CYAPCO
# FINAL STATUS SURVEY RELEASE RECORD
# NORTHEAST MOUNTAIN SIDE
# SURVEY UNIT 9526-0001

Prepared By: _____ Date: 2.18.05
FSS Engineer

Reviewed By: _____ Date: 2/18/05
FSS Engineer

Approved By: _____ Date: 2-18-05
FSS Project Lead

# TABLE OF CONTENTS

1. SURVEY UNIT DESCRIPTION ..... 3
2. CLASSIFICATION BASIS ..... 3
3. DATA QUALITY OBJECTIVES (DQO) ..... 6
4. SURVEY DESIGN ..... 7
5. SURVEY IMPLEMENTATION ..... 11
6. SURVEY RESULTS ..... 12
7. QUALITY CONTROL ..... 14
8. INVESTIGATIONS AND RESULTS ..... 14
9. REMEDIATION AND RESULTS ..... 15
10. CHANGES FROM THE FINAL STATUS SURVEY PLAN ..... 15
11. DATA QUALITY ASSESSMENT (DQA) ..... 16
12. ANOMALIES ..... 16
13. CONCLUSION ..... 18
14. ATTACHMENTS ..... 18
14.1 Attachment 1 – Figures (9 pages including cover)
14.2 Attachment 2 – Sample and Statistical Data (171 pages including covers)

## 1. SURVEY UNIT DESCRIPTION

Survey Unit (SU) 9526-0001, (Northeast Mountain Side) is designated as Final Status Survey (FSS) Class 2 and consists of approximately 6,535 $m^2$ (1.6 acres) of uninhabited, undeveloped land located about a tenth of a mile (0.09 miles) from the center of the Haddam Neck Plant (HNP) Containment Building (see Attachment 1-Figure 1). Survey Unit 9526-0001 is bounded on the west by SU 9521-0000 and on the east by SU 9526-0000. The northern boundary follows the bed of a small stream. SU 9526-0002 bounds the southern border. The area topography ranges from relatively flat open spaces to steep, rocky hillsides that are heavily wooded and overgrown with brush in several locations. The topography of the upper portion of this survey unit is mildly sloping to the west. Most of this area is wooded and covered with dense brush interspersed with patches of exposed rock, a small stream and a stone wall. In the relatively flat section of the survey unit near Cove Road, three soil mounds where dumping or excavation activities occurred are visible.

The reference coordinates associated with SU 9526-0001 are E019 through E021 by S080 through S083 (see License Termination Plan Section 5.4.4). The reference coordinates provide the maximum dimensions of a rectangle containing this survey unit. Some areas contained in this rectangle may not be part of this survey unit. The boundary of the survey unit was defined using a Global Positioning System (GPS).

The historic files indicate that this area was originally included as part of the Class 3 SU 9526-0000. During the FSS of SU 9526-0000, a soil sample identified Cs-137 above those concentrations identified at off site locations within the vicinity within the vicinity of the HNP as presented in Health Physics Technical Support Document (TSD) BCY-HP-0063, *"Background Cs-137 Concentrations in Soil."* Based on these sample results, a small section of Survey Unit 9526-0000 was subdivided and a new Class 2 SU 9526-0001 was created. Later, it was determined that the land area for SU 9526-0001 exceeded the License Termination Plan (LTP) size requirements for FSS Class 2 and the unit was split into two units designated as 9526-0001 and 9526-0002.

## 2. CLASSIFICATION BASIS

The survey unit was classified in accordance with Procedure RPM 5.1-10, *"Survey Unit Classification."* The data analysis completed for the classification SU 9526-0001 and 0002 were considered equivalent. The topography and locations of these units is generally the same, which allowed for the characterization data to be managed as a combined survey area. The historical information and scoping results provide sufficient data to designate SU 9526-0001 as Class 2 in November 2001.

The *"Classification Basis Summary"* conducted for SU 9538-0000 consisted of:

a) A review of the 10CFR50.75 (g) database,

b) A review of the *"Initial Characterization Report"* and *"Historic Site Assessment Supplement,"*

c) Historic and current survey records review,

d) Personal interviews,

e) Visual inspections and a "walk down."

A review of the 10CFR50.75 (g) database identified two radiological events associated with Survey Area 9526. Incident report PIR 80-37 describes the discovery of radioactive particles found on the hillside and other areas of the site. The investigation into the incident concluded that the particles were most likely ejected from the primary vent stack as a result of several operational events in 1979. Isotopic analysis of the particles indicated that the short-lived fission products Ce-144 and Ru-106 dominated the particle radioactivity. A comprehensive survey was performed in 1980 where all identified particles were removed at the time of detection. During that survey, essentially all of Survey Area 9526 was scanned.

The second event was detailed in the report ACR 97-0994. During the site characterization, radioactive material was found on the hillside area located immediately to the east of the station (Area 9526). Subsequently, in the fall of 1997, scoping surveys were performed on the hillside area and approximately forty-eight (48) soil samples were collected. Sample analysis indicated Cs-137 as the primary isotope of concern. The average concentration of Cs-137 in the 48 samples was 0.82 ± 0.35 pCi/g. These values are consistent with the concentrations of Cs-137 found in soil at off site locations within the vicinity of the HNP as presented in Health Physics TSD BCY-HP-0063.

A review of the *"Initial and Supplemental Characterization Reports"* as well as the previous *"Classification Basis Summaries"* provided no additional information pertinent to classification.

Characterization efforts in nearby areas have included analysis for Hard-to-Detect (HTD) radionuclides. In some cases, HTD radionuclides were reported above the accepted criteria for detection (i.e., a result greater than two standard deviations uncertainty). A comparison of HTD reported maximum concentrations to the soil Derived Concentration Guideline Levels (DCGL) shows no impact on classification.

Radionuclide-specific analyses of soil samples collected from this survey unit and adjacent land areas with similar history and physical characteristics have identified only a few of the radionuclides listed, principally Cs-137 and Co-60 infrequently. Analyses of soil samples collected during the FSS and follow-up investigation of Survey Area 9526 in November 2001 did not identify a majority of the Table 2 listed radionuclides. Only trace amounts of Eu-155, Pu-

238 and Pu-239/240 were reported. However, the concentrations were below the required sensitivities and could represent statistical fluctuations in background and therefore be "false positives". The Eu-155 was reported at 0.187 pCi/g, which is <0.05% of the Base Case DCGL. Plutonium-238 and Pu-239/240 are 0.11% and 0.13% of the corresponding Base Case DCGL. The aggregate is below 10% as well.

Seventeen (17) samples were used to determine the basic statistical quantities and variability. The results for Cs-137 included the two anomalous results from previous FSS activities in Survey Area 9526 (both were from the same location, one was a duplicate measurement). The two anomalous results increase the overall variability of Cs-137. Without the two anomalous results, the Cs-137 levels are consistent with those concentrations determined from off site locations as documented by Health Physics TSD BCY-HP-0063. The range and standard deviation for the Co-60 shows large variability as expected since the data set included results for Co-60 whether or not this radionuclide was identified. Cobalt-60 was identified in only a few soil samples with the highest reported concentration being 4% of the Base Case shown in Table 2.

**Table 1 – Basis Statistical Quantities for Cesium-137 and Cobalt-60 from the Characterization Survey**

| Parameter | Cesium-137 (pCi/g) | Cobalt-60 (pCi/g) |
|---|---|---|
| Minimum Value: | 0.1368 | 0.00482 |
| Maximum Value: | 3.89 | 0.15 |
| Mean: | 0.9496 | 0.03229 |
| Median: | 0.7294 | 0.0213 |
| Standard Deviation: | 0.9439 | 0.03644 |
| Measured Standard Deviation of the weighted sum(1): | 0.30 | |

(1) MARSSIM Section I.11.3 describes the use of the measured standard deviation of the weighted sum when measured concentrations of the various radionuclides are assumed to be uncorrelated (i.e., there is no fixed ratio between the concentrations).

Discussions with veteran HNP personnel provided no additional information relative to classification of SU 9526-0001.

The Site Radiological Release Supervisor performed a "walkdown" of the area prior to classification. The interior of the survey unit is wooded with dense brushy undergrowth interspersed with patches of exposed rock, a small stream and stone wall. In a relatively flat section of the survey unit near Cove Road are three mounds of soil where dumping and excavation seems to have occurred. There were no obvious or perceptible signs of recent dumping or excavation activities.

At the time of FSS, the dose impact from groundwater contamination was not considered. The classification basis shows that the expected residual radioactivity in the survey unit would be below the site remediation criteria and

are consistent with procedural guidance, thereby sufficient to justify final designation as Class 2.

## 3. DATA QUALITY OBJECTIVES (DQO)

The primary objective of the Final Status Survey Plan (FSSP) was to demonstrate that the level of residual radioactivity in SU 9526-0001 did not exceed the release criteria specified in the LTP, was below the 10 mrem/yr Administrative Level DCGLs, and that the potential dose from residual radioactivity is As Low As Reasonably Achievable (ALARA).

FSS design and planning endorsed the use of the Data Quality Objective (DQO) process as described by the LTP, Procedure RPM 5.1-11, *"Preparation of Final Status Survey Plan,"* and the *"Multi-Agency Radiation Survey and Site Investigation Manual"* (MARSSIM). A summary of the main features of the DQO process are provided herein.

The DQO process incorporated hypothesis testing and probabilistic sampling distributions to control decision errors during data analysis. Hypothesis testing is a process based on the scientific method that compares a baseline condition to an alternate condition. The baseline condition is technically known as the null hypothesis. Hypothesis testing rests on the premise that the null hypothesis is true and that sufficient evidence must be provided for rejection. In designing the survey plan, the underlying assumption, or null hypothesis was that residual activity in the survey unit exceeded the release criteria. Rejection of the null hypothesis would satisfy the release criteria objective of the FSS.

The DQO process determined that Cs-137 and Co-60 would be the radionuclides of concern during the 9526-0001 FSS process. Additionally, to provide conservatism, the Base Case DCGLs for radionuclides in soil was reduced by 60% to establish the Administrative Level DCGL. As multiple radionuclides were assumed to be present, the "unity rule" or "sum of the fractions," described by Equation 5-32 of the LTP, was used to show compliance with the release criteria.

Instrument DQOs included a verification of the ability of the survey instrument to detect the radiation(s) of interest relative to the DCGL. Survey instrument response checks were performed before issue and after the instrument had been used. Control and accountability of survey instruments were maintained to assure the quality and prevent the loss of data.

Laboratory DQOs and analysis results were reported as actual calculated results. Results reported as <MDC (i.e., less than Minimum Detectable Concentration) would not be accepted for FSS. Sample report summaries included unique sample identification, analytical method, radionuclide, result and uncertainty of two standard deviations ($2\sigma$), laboratory data qualifiers, units and the required and observed MDC (see Table 2).

**Table 2 – FSS DCGL Values and Required Minimum Detectable Concentrations**

| Radionuclide | Base Case Soil DCGL (pCi/g) (1) | Administrative Level DCGL (pCi/g) (2) | Required MDC (pCi/g) (3) |
|---|---|---|---|
| H-3 | 4.12E+02 | 1.65E+02 | 1.65E+01 |
| C-14 | 5.66E+00 | 2.26E+00 | 2.26E-01 |
| Mn-54 | 1.74E+01 | 6.96E+00 | 6.96E-01 |
| Fe-55 | 2.74E+04 | 1.10E+04 | 1.10E+03 |
| Co-60 | 3.81E+00 | 1.52E+00 | 1.52E-01 |
| Ag-108m | 7.14E+00 | 2.86E+00 | 2.86E-01 |
| Ni-63 | 7.23E+02 | 2.89E+02 | 2.89E+01 |
| Sr-90 | 1.55E+00 | 6.20E-01 | 6.20E-02 |
| Nb-94 | 7.12E+00 | 2.85E+00 | 2.85E-01 |
| Tc-99 | 1.26E+01 | 5.04E+00 | 5.04E-01 |
| Cs-134 | 4.67E+00 | 1.87E+00 | 1.87E-01 |
| Cs-137 | 7.91E+00 | 3.16E+00 | 3.16E-01 |
| Eu-152 | 1.01E+01 | 4.04E+00 | 4.04E-01 |
| Eu-154 | 9.29E+00 | 3.72E+00 | 3.72E-01 |
| Eu-155 | 3.92E+02 | 1.57E+02 | 1.57E+01 |
| Pu-238 | 2.96E+01 | 1.18E+01 | 1.18E+00 |
| Pu-239/240 | 2.67E+01 | 1.07E+01 | 1.07E+00 |
| Pu-241 | 8.70E+02 | 3.48E+02 | 3.48E+01 |
| Am-241 | 2.58E+01 | 1.03E+01 | 1.03E+00 |
| Cm-243/244 | 2.90E+01 | 1.16E+01 | 1.16E+00 |

(1) The Base Case DCGLs for soil are specified by the LTP in Chapter 6.
(2) The Administrative Level DCGL is 40% of the Base Case DCGL.
(3) The required MDC was 10% of the Administrative Level DCGL.

## 4. SURVEY DESIGN

The level of effort associated with planning a survey is based on the complexity of the survey and nature of the hazards. To assist the Final Status Survey Engineers when preparing survey plans for FSS, guidance is provided in Procedure RPM 5.1-11. By design, the FSSP meets the ALARA criteria for soils as specified in Chapter 4 of the LTP.

The LTP specifies that scanning will be performed in a combination of systematic and judgmental measurement for a Class 2 land area and cover 10% to 100% of the area. Based on conditions found during the area inspection tours, five (5) areas, totaling 663.36m$^2$ in area or 10.2% of the SU surface area, were selected for scanning.

The fraction of scanning coverage was determined during the DQO process with the total amount and location(s) based on the likelihood of finding elevated activity during FSS. Areas around piles, trenches and access points where it was determined to have the highest potential for elevated activity based on

process knowledge and previous sampling results were selected. For example, Scan Area 4 was selected where Co-60 was previously found during characterization. In addition, consideration was given to locations that are adjacent to areas containing plant radioactivity or elevated activity. The shape of several scan locations reflects the difficult topography of the region (e.g., exposed rock cliffs with steep banks). The shape had little impact on achieving the survey objectives since the locations were biased to identify areas with the highest potential for elevated activity. Scans were also prescribed for a 1-meter radius around each random and biased Sample Measurement Location (SML).

Seventeen (17) data points were used to determine the radiological concentration variability in this survey unit. The population data set included data from this and adjacent survey units collected during scoping and characterization. All survey units included in this assessment were part of the original Survey Area 9526.

Radionuclide-specific analyses of soil samples collected from this survey unit and adjacent land areas with similar history and physical characteristics have identified only a few radionuclides, principally Cs-137 and Co-60 infrequently. The data collected prior to FSS indicated that the remaining eighteen (18) radionuclides listed in Table 2 would not be present in quantities greater than 5% of the applicable Base Case DCGL in this survey unit at the time of FSS. It was unlikely that the aggregate concentration of the remaining radionuclides would exceed 10%; therefore, only Cs-137 and Co-60 were used in the survey planning of SU 9526-0001. The use of the 5% and 10% rule is consistent with the development of surrogate ratio DCGLs as described in the LTP.

Since multiple radionuclides were assumed to be present, the "unity rule" or "sum of the fractions" was used to demonstrate compliance with the release criteria. Therefore, the Operational DCGL is considered to be "1."

Surrogate DCGLs are not required for this survey unit because of the radionuclide specific analysis and radionuclide de-selection in accordance with the 5% and 10% rule.

The Elevated Measurement Comparison (EMC) does not apply to this survey unit since discrete, elevated areas of contamination are not expected.

The Sign Test was selected as the non-parametric statistical test. The use of the Sign Test did not require the selection or use of a background reference area, which simplified survey design and implementation. This approach was conservative since it included background Cs-137 as part of the sample set.

The number of soil samples for FSS was determined in accordance with Procedure RPM 5.1-12, *"Determination of the Number of Surface Samples for FSS."* Survey design specified seventeen (17) surface soil samples for the Sign Test non-parametric statistical testing.

For the FSS, five (5) biased soil SMLs were selected in the soil mounds and a trench found near Cove Road identified during the walkdown.

Although Procedure RPM 5.1-11 only specified that 5% of the samples be selected for HTD analysis, two (2) soil samples or 12% were randomly selected for HTD radionuclide analysis by using the Microsoft® Excel "RANDBETWEEN" function. Each sample would be sent for a full suite analysis of the HTD radionuclides specified in the LTP, Table 2-12, "Radionuclides Potentially Present at Haddam Neck Plant."

The implementation of survey specific quality control measures as referenced by Procedure RPM 5.1-24, *"Split Sample Assessment for Final Status Survey,"* included the collection of two (2) soil samples for "split sample" analysis by the off site laboratory. These locations were selected randomly using the Microsoft® Excel "RANDBETWEEN" function. The number of quality control soil samples was determined to be 12% of seventeen (17) samples, rounded up to the next whole number.

The grid pattern and locations of the soil samples were determined using Visual Sample Plan (VSP) in accordance with Procedure RPM 5.1-14, *"Identifying and Marking Surface Sample Locations for FSS."* Visual Sample Plan was created by Pacific Northwest National Laboratory (PNNL) for the United States Department of Energy. A systematic triangular grid pattern with a random starting point was selected for sample design, which is appropriate for a Class 2 area.

Sample location and scan areas were identified using AutoCAD-Lt© a commercially available plotting software with coordinates consistent with the Connecticut State Plane System. These coordinates were integrated with a GPS to locate sample and scan locations in the field. Sample Measurement Locations for the design are listed with the GPS coordinates in Table 3.

**Table 3 -Sample Measurement Locations (SML) with Associated GPS Coordinates.**

| Designation | Northing | Easting |
|---|---|---|
| 9526-0001-001F | 236828.7 | 670000.1 |
| 9526-0001-002F | 236768.9 | 669827.3 |
| 9526-0001-003F | 236768.9 | 669896.4 |
| 9526-0001-004F | 236768.9 | 669965.6 |
| 9526-0001-005F | 236768.9 | 670034.7 |
| 9526-0001-006F | 236709 | 669792.8 |
| 9526-0001-007F | 236709 | 669861.9 |
| 9526-0001-008F | 236709 | 669931 |
| 9526-0001-009F | 236709 | 670000.1 |
| 9526-0001-010F | 236649.2 | 669758.2 |
| 9526-0001-011F | 236649.2 | 669827.3 |
| 9526-0001-012F | 236649.2 | 669896.4 |
| 9526-0001-013F | 236589.3 | 669792.8 |
| 9526-0001-014F | 236589.3 | 669861.9 |
| 9526-0001-015F | 236529.4 | 669758.2 |
| 9526-0001-016F | 236529.4 | 669827.3 |
| 9526-0001-017F | 236469.6 | 669723.6 |

For this Class 2 survey unit, the "Investigation Level" for area scanning and soil sample measurement results are those levels specified in LTP, Table 5-8, "Investigation Levels."

The Lower Bound of the Gray Region (LBGR) was adjusted in accordance with Procedure RPM 5.1-11 to 0.5 to maintain the relative shift ($\Delta/\sigma$) in the range of 1 and 3. In a Class 2 survey unit the median concentration is expected to be below the LBGR, in which case a Prospective Power Curve would be unnecessary and was not generated. The mean concentrations for Co-60 and Cs-137 identified during the scoping and characterization indicate this assumption to be true.

Table 4 provides a synopsis of the survey design.

**Table 4 – Synopsis of the Survey Design**

| Feature | Design Criteria | Basis |
|---|---|---|
| Survey Unit Size | 6,535 $m^2$ | Based on AutoCAD and Visual Sample Plan calculations |
| Number of Measurements | 17 | Type I ($\alpha$) and Type II ($\beta$) error were 0.05; relative shift ($\Delta/\sigma$) set at 1.7 by procedure, the LBGR was set to 0.5. |
| Grid Spacing | 25.4 m | Based on triangular grid |
| Interval Spacing | 22.0 m | Based on triangular grid |
| DCGL | 1 | Operational DCGL applied to field data (1) |
| Scan Survey Coverage | 663 $m^2$ (10%) | Based on likelihood of finding elevated readings in this particular Class 2 survey unit |
| Scan Investigation Level | Detectable over background | Based on achieving the Administrative Level DCGL |

(1) The Operational DCGL was based on achieving an administrative level that was 40% of the soil DCGL and assuming no impact from radioactive contamination in groundwater or from buried concrete debris.

## 5. SURVEY IMPLEMENTATION

Final status survey field activities were conducted under Work Plan and Inspection Record (WP&IR) 24265-000-GEN-0000-00119-000. The WP&IR package included a detailed FSSP, job safety analysis, job planning checklist and related procedures for reference. Daily briefings were conducted to discuss the expectations for job performance and the safety aspects of the survey. The "Daily Survey Journal" was used to document field activities and other information pertaining to the FSS.

Survey activities occurred between November 6 and December 6, 2001. Additional field activities occurred in May 2004 under a separate addendum to the sample plan. Addendum 1 was issued May 11, 2004 to collect investigation or "confirmatory" soil samples. This is discussed further in Sections 8 and 10.

Five (5) land areas, Scan Areas 1 through 5, were marked out using GPS coordinates consistent with the Connecticut State Plane System and scanned for elevated readings (see Attachment 2 for Scan Area Results). Scanning was performed with an Eberline E-600 using a SPA-3 2x2 sodium iodide detector. The E-600 was operated in the rate-meter mode and used with audio response. The probe was positioned as close to the ground as possible and was moved at a scan speed of about 0.5 meters per second.

Using GPS coordinates, SMLs were identified and marked with a surveyor's flag for identification. At each SML, a one (1) meter radius around the sample flag was scanned for elevated radiation levels.

Seventeen (17) surface soil samples were collected and packaged in accordance with Procedure RPM 5.1-3, *"Collection of Surface and Subsurface Soil, Shoreline Sediment, Asphalt and Liquid Samples for Scoping, Characterization and Final Status Survey,"* and FSS design. Soil samples were controlled, transported, stored, and transferred to the off site laboratory using Chain-of-Custody (COC) protocol in accordance with Procedure RPM 5.1-5, *"Chain of Custody for Scoping, Characterization and Final Status Survey Samples."*

Two (2) soil samples (002F and 010F) were randomly selected for HTD radionuclide analysis.

Five (5) biased soil samples (018F, 019F, 020F, 021F, 022F) were collected in the small piles and a trench found near Cove road.

Two (2) "split samples" were collected at SML 001F and 006F for analysis by the off site laboratory.

## 6. SURVEY RESULTS

No elevated areas were identified during scanning at the SMLs. Scan Area 2, 3, 4, and 5 contained areas with elevated readings, which prompted the collection of investigation soil samples from these areas. The investigation results are discussed in Section 8 of this report. Table 5 provides a summary of the scan area survey. All scan area results are provided in Attachment 2.

**Table 5- Scan Area Results**

| Scan Area | Highest Logged Reading (cpm) | Investigation Level (MDC-cpm) | Elevated Reading Identification | Investigation Sample |
|---|---|---|---|---|
| 1 | 9990 | 12300 | - | - |
| 2 | 12500 | 12000 | ER-0001 | 9526-0001-0023F |
| | 12200 | 12000 | ER-0002 | 9526-0001-0024F |
| | 12800 | 12000 | ER-0003 | 9526-0001-0025F |
| | 12700 | 12000 | ER-0004 | Not sampled-Rock outcrop-naturally occurring rad materials |
| 3 | 13400 | 12300 | ER-0001 | 9526-0001-026F |
| 4 | 16800 | 13900 | ER-0001 | 9526-0001-027F |
| 5 | 12400 | 11200 | ER-0001 | 9526-0001-028F |

The off site laboratory employed for the radiological analyses of soil samples was Severn Trent Laboratories Richland (STL), Richland, Washington. The laboratory analyzed the seventeen (17) soil samples taken for non-parametric statistical testing, the associated duplicates, biased and scan area soil samples using gamma spectroscopy. Gamma spectroscopy analysis was performed to the required MDC. Cesium-137 was the only gamma-emitting radionuclides detected at statistically significant concentrations and in most cases greater than the MDC. A summary of the sample results is provided in Table 6.

**Table 6- Summary of Soil Sample Results**

| Sample Number | Cs-137 pCi/g | Co-60 pCi/g | f-DCGL (1) |
|---|---|---|---|
| 9526-0001-001F | 1.10 | 0.01 | 0.355 |
| 9526-0001-002F | 1.87 | -0.03 | 0.592 |
| 9526-0001-003F | 0.93 | 0.00 | 0.294 |
| 9526-0001-004F | 0.36 | 0.03 | 0.134 |
| 9526-0001-005F | 0.44 | 0.01 | 0.146 |
| 9526-0001-006F | 0.51 | 0.01 | 0.168 |
| 9526-0001-007F | 1.19 | 0.00 | 0.377 |
| 9526-0001-008F | 0.74 | -0.03 | 0.234 |
| 9526-0001-009F | 0.29 | 0.02 | 0.105 |
| 9526-0001-010F | 1.75 | 0.00 | 0.554 |
| 9526-0001-011F | 0.42 | -0.01 | 0.133 |
| 9526-0001-012F | 1.23 | 0.01 | 0.396 |
| 9526-0001-013F | 1.78 | 0.00 | 0.563 |
| 9526-0001-014F | 0.38 | 0.01 | 0.127 |
| 9526-0001-015F | 0.81 | -0.01 | 0.256 |
| 9526-0001-016F | 1.03 | -0.01 | 0.326 |
| 9526-0001-017F | 0.86 | 0.01 | 0.279 |

(1) f-DCGL-fraction of the Operational DCGL.

The off site laboratory processed two (2) soil samples, 9526-0001-002F and 010F, for HTD analysis including alpha spectroscopy, gas proportional counting and liquid scintillation depending on the radionuclide and the measurement method. Sample 002F contained two radionuclides above the analytical MDC (see Table 7). The Sr-90 levels reported in association with Cs-137 exceeded the Administrative Level DCGL. Addendum 1 to the FSSP was issued for confirmatory sampling of 002F. Results are discussed in Section 8.

**Table 7-Hard-to-Detect Sample Results in pCi/g**

| Sample Number | Pu239/240 | Sr-90 | f-DCGL (1) |
|---|---|---|---|
| 9526-0001-002F | 0.0252 | 0.294 | 0.47 |

(1) f-DCGL-fraction of the Administrative Level DCGL.

Sample 010F was reported at 5.29 times the $DCGL_{Sr90}$. The evaluation of sample 010F is discussed in Section 12 of this record.

The off site laboratory analyzed the five (5) biased soil samples collected in the small piles and a trench found near Cove Road using gamma spectroscopy. Gamma spectroscopy analysis was performed to the required MDC. Sample results ranged from 2% to 26% of the Operational DCGL, well below any investigation level. No further action or investigations were required. Results are summarized in Table 8.

**Table 8-Biased Sample Results**

| Sample Number | Cs-137 pCi/g | Co-60 pCi/g | f-DCGL(1) |
|---|---|---|---|
| 9526-0001-018F | 0.03 | 0.01 | 0.02 |
| 9526-0001-019F | 0.04 | 0.00 | 0.01 |
| 9526-0001-020F | 0.58 | 0.03 | 0.20 |
| 9526-0001-021F | 0.66 | 0.00 | 0.21 |
| 9526-0001-022F | 0.82 | 0.00 | 0.26 |

(1) f-DCGL-fraction of the Operational DCGL.

## 7. QUALITY CONTROL

The off site laboratory processed the split soil samples and performed gamma spectroscopy analysis. Twenty percent (20%) of the soil samples were selected for analysis, which exceeds the 5% minimum required by the LTP. The data were evaluated using USNRC acceptance criteria specified in Inspection Procedure 84750 as detailed in Procedure RPM 5.1-24. There was acceptable agreement between field split results. The sample analysis vendor, STL-Richland, maintains quality assurance and quality control plans as part of normal operation. Refer to Attachment 2 for data and data quality analysis results.

## 8. INVESTIGATIONS AND RESULTS

During Area 2 scanning, four (4) locations above the scan investigation level were identified and designated ER-0001 through ER-0004. Samples 023F, 024F and 025F were collected from these locations. ER-0004 was not sampled but indicated the presence of a rock formation that contained naturally occurring radioactive materials. The results of gamma spectrometry analyses of these soil samples indicated only Cs-137 at levels consistent with concentrations of Cs-137 found in soil at off site locations within the vicinity of the HNP. No further action or investigations were required.

An elevated location, above the scan investigation level, was identified in Areas 3, 4 and 5. Samples 026F, 027F and 028F were collected from these locations. The results of gamma spectrometry analyses of these soil samples indicate Cs-137 at levels consistent with concentrations of Cs-137 found in soil at off site locations within the vicinity of the HNP. Cobalt-60 did not exceed 1.3% of the $DCGL_{Co\text{-}60}$. Based on analytical results, no further action was required. Table 9 provides a summary of scan area sample results.

**Table 9- Scan Area Sample Results**

| Scan Area | Sample Number | Elevated Reading | Cs-137 pCi/g | Co-60 pCi/g | f-DCGL(1) |
|---|---|---|---|---|---|
| 2 | 9526-0001-023F | ER-0001 | 0.49 | 0.02 | 0.168 |
| | 9526-0001-024F | ER-0002 | 0.35 | 0.02 | 0.124 |
| | 9526-0001-025F | ER-0003 | 0.53 | -0.01 | 0.168 |
| 3 | 9526-0001-026F | ER-0001 | 0.98 | 0.01 | 0.317 |
| 4 | 9526-0001-027F | ER-0001 | 0.70 | 0.00 | 0.222 |
| 5 | 9526-0001-028F | ER-0001 | 0.71 | 0.02 | 0.238 |

(1) f-DCGL-fraction of the Operational DCGL.

During the Data Quality Assessment, it was determined that sample 9526-0001-002F results exceeded the Administrative Level DCGL. This prompted an evaluation, which basically requires the area to be re-sampled for results confirmation (see Table 10). Addendum 1 to the FSSP was issued May 11, 2004. SML 002F area was re-sampled for analysis and submitted to General Engineering Laboratories-LLC, Charleston, S.C. The off site laboratory processed the soil samples for HTD Sr-90 and gamma spectrometry analyses. The confirmatory sample results were below any required investigation levels established by the FSSP and LTP. The initial sample results for 002F could not be verified. No further action was required or taken.

**Table 10- Confirmatory Analysis Results for HTD and Gamma Emitting Radionuclides Compared to the DCGL.**

| Sample Number | Cs-137 pCi/g | Sr-90 pCi/g | f-DCGL(1) |
|---|---|---|---|
| 9526-0001-002F | 0.409 | 0.0847 | 0.266 |

(1) f-DCGL-fraction of the Administrative Level DCGL.

## 9. REMEDIATION AND RESULTS

Historically, no remediation was performed in this survey unit prior to or as a result of the FSS. Health Physics TSD BCY-HP-0078, "*ALARA Evaluation of Soil Remediation in Support of Final Status Survey,*" determined that remediation beyond that required to meet the release criteria to be unnecessary and that the remaining residual radioactivity in soil was ALARA.

## 10. CHANGES FROM THE FINAL STATUS SURVEY PLAN

The change made from the LTP, prior to this FSS, was a decrease in the concentrations for the Base Case $DCGL_{soils}$. The LTP presents DCGLs that correspond to a Total Effective Dose Equivalent (TEDE) of 25 mrem/yr. This survey unit was evaluated against Administrative Level DCGLs that correspond to 10 mrem/yr.

To perform confirmatory sampling at locations where soil analysis have exceeded the investigation level for evaluation as specified in the FSSP,

Addendum 1 to the FSSP was issued in May 2004 to collect a verification sample from location 9526-0000-002F. This sampling was completed the same day that the addendum was issued.

## 11. DATA QUALITY ASSESSMENT (DQA)

The DQO sample design and data were reviewed in accordance with Procedure RPM 5.1-23, *"Data Quality Assessment,"* for completeness and consistency. The sampling design had adequate power as indicated by the Retrospective Power Curve. The Sign Test was performed on the data and compared to the original assumptions of the DQOs. All sample results were less than the release criteria. Therefore, the Sign Test shows that the survey unit passes FSS.

Documentation was complete and legible. Surveys and sample collection were consistent with the DQOs and were sufficient to ensure that the survey unit was properly designated as Class 2.

The preliminary data review consisted of converting the data into units relative to the release criteria (i.e., pCi/g) and calculating basic statistical quantities (e.g., mean, median, standard deviation).

For Cs-137, the sample standard deviation was less than the value used for the survey design. This indicates that a sufficient number of samples were collected to achieve the desired power. The range of the data, about 3 standard deviations, was not unusually large. The difference between the mean and median was 12% of the standard deviation. The frequency plot indicates that the data is slightly skewed positive.

For Co-60, the sample standard deviation was less than the value used for the survey design. This indicates that a sufficient number of samples were collected to achieve the desired power. The range of the data is about 3.8 standard deviations. The difference between the mean and median was 11% of the standard deviation. The frequency plot indicates that the data is slightly skewed negative.

The frequency plot indicates a distribution of generally standard proportions with outliers both high and low. The samples represented by the low outliers may be attributed to the area being disturbed or the soil being removed or mixed with other materials, or lab variability in the analytical method. The samples in the high outlier locations were from the close vicinity of a stream that drains a vast open area and represent typical variability found in this type of terrain.

All data, assessments and graphical representations are provided in Attachment 2.

## 12. ANOMALIES

All data is considered valid including negative values, zeros, values reported below the MDC and values reported with uncertainties greater than two

standard deviations. Some radionuclides have been reported at low concentrations that are statistically significant at the 95% confidence level, but with a relatively high level of uncertainty.

Gamma spectroscopy results for all soil samples identified some radionuclides meeting the accepted criteria for detection (i.e., a result greater than 2 standard deviations uncertainty). Cesium-134 was frequently identified in sample results; whereas, Am-241, Eu-154, Eu-155 and Nb-94 were identified sporadically. The off site laboratory data qualifier unit shows that these radionuclides were analyzed for, however, either the result was less than the MDC or the gamma software did not identify the radionuclide. These very low-level "detections" may be attributed to false positive noise at the lower limit of the measuring technique.

Hard-to-Detect analyses results identified Sr-90 in one sample. The Sr-90 value compares favorably with research conducted in other regional areas concerning fallout resultant from nuclear testing in the past as referenced in EPRI Technical Report 1003030, *"Determining Background Radiation Levels in Support of Decommissioning Nuclear Power Plants."* No further actions were taken or needed.

Although present in sample 002F, the Pu-239/240 quantity was less than 1% of the Administrative Level DCGL. The likely source of Pu-239/240 was the release of plutonium from past atmospheric nuclear weapons testing and burn-up and vaporization of the United States SNAP 17A satellite in the atmosphere given the extremely low levels reported.

During the initial data review, it was noted that the required MDC for Sr-90 (sample 010F) in the February 27, 2004 report was not achieved by the off site laboratory. The lab also reported that the sample aliquot was taken in the improper amount in order to meet the requested MDC. The lab stated that since the results were greater than the Minimum Detectable Activity (MDA) the data was accepted. The lab reported value of 0.15 pCi/g Sr-90 meets the MDC value required by the LTP (10% of the Base Case DCGL of the 25 mrem/yr value) and is considered acceptable.

In the February 27, 2004 lab report for sample 9526-0001-010F, Sr-90 analytical results were 5.29 times the $DCGL_{Sr\text{-}90}$. This greatly exceeded the typical Cs-137/Sr-90 ratios (4:1) previously found in the outland areas around HNP. A request to re-analyze the sample was issued to the STL laboratory.

The re-analysis report dated March 26, 2004 indicates that Sr-90 for sample 010F was below the reported $MDC_{Sr90}$ of 0.156 pCi/g. Although this MDC is above the Table 2 required value of 0.062 pCi/g Sr-90, the results were considered acceptable as meeting the criteria for MDC in accordance with the LTP.

Conservatively estimated, the final calculated DCGL fraction for 010F was 0.81 or 81% of the 10 mrem/yr Administrative Level DCGL. This value assumes that Sr-90 was present at the reported MDC level of 0.156 pCi/g. No further action was required.

The data shows that the quantities of identified radionuclides do not represent quantities that would increase the requisite number of samples for non-parametric statistical sampling or cause the survey unit to fail to meet the release criteria. Most radionuclides were reported at levels near or below the required MDC.

During the survey of Scan Area 2 (ER-0004), an outcropping of rock was identified as containing naturally occurring radioactive materials. Initial survey with the Eberline E-600 using a SPA-3 2x2 sodium iodide detector gave a reading of 12,700 counts per minute (cpm). Geological occurrences of this type are discussed in the Health Physics TSD CY-HP-0150, *"Investigation of Rock Outcropping Exhibiting Elevated Activity."* This area designated as ER-0004 was not sampled, but noted.

## 13. CONCLUSION

Survey Unit 9526-0001 has met the DQOs of the FSS. For this survey unit, the ALARA criteria for soils as specified in Chapter 4 of the LTP were achieved. The Elevated Measurement Comparison and remediation was not required.

The sample data passed the Sign Test. The null hypothesis was rejected. Evaluation of the data shows that none of the FSS design radionuclides or HTD soil concentration values exceeded the Operational DCGL of "1" or unity. No large anomalies were observed in the graphical representation of the data. The survey unit was properly designated as Class 2. The Retrospective Power Curve generated using COMPASS shows adequate power was achieved.

This survey unit is not considered impacted by radioactive contamination in groundwater based on location, topography and current hydro-geologic sampling data as referenced in Health Physics TSD CY-HP-0193, *"Assessment of Existing Groundwater Dose for Phase II Release Areas of the Final Status Survey Report."*

## 14. ATTACHMENTS

14.1 Attachment 1 – Figures

14.2 Attachment 2 – Sample and Statistical Data

Attachment 1
Figures
(8 pages)

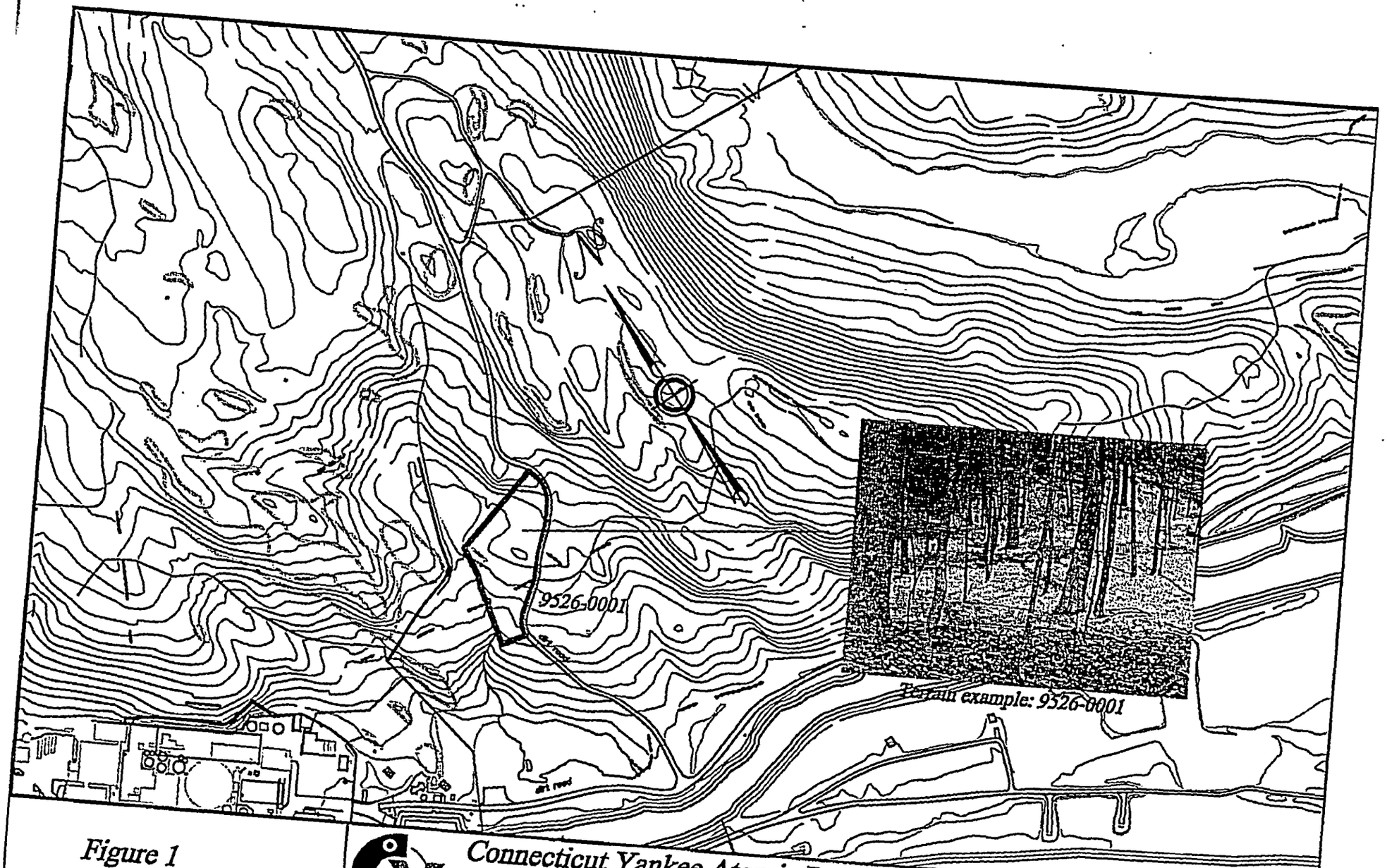



*Figure 1*

Connecticut Yankee Atomic Power Company

Site Map With Reference To Survey Unit 9526-0001

| Date | Rev |
|---|---|
| July 2004 | 0 |

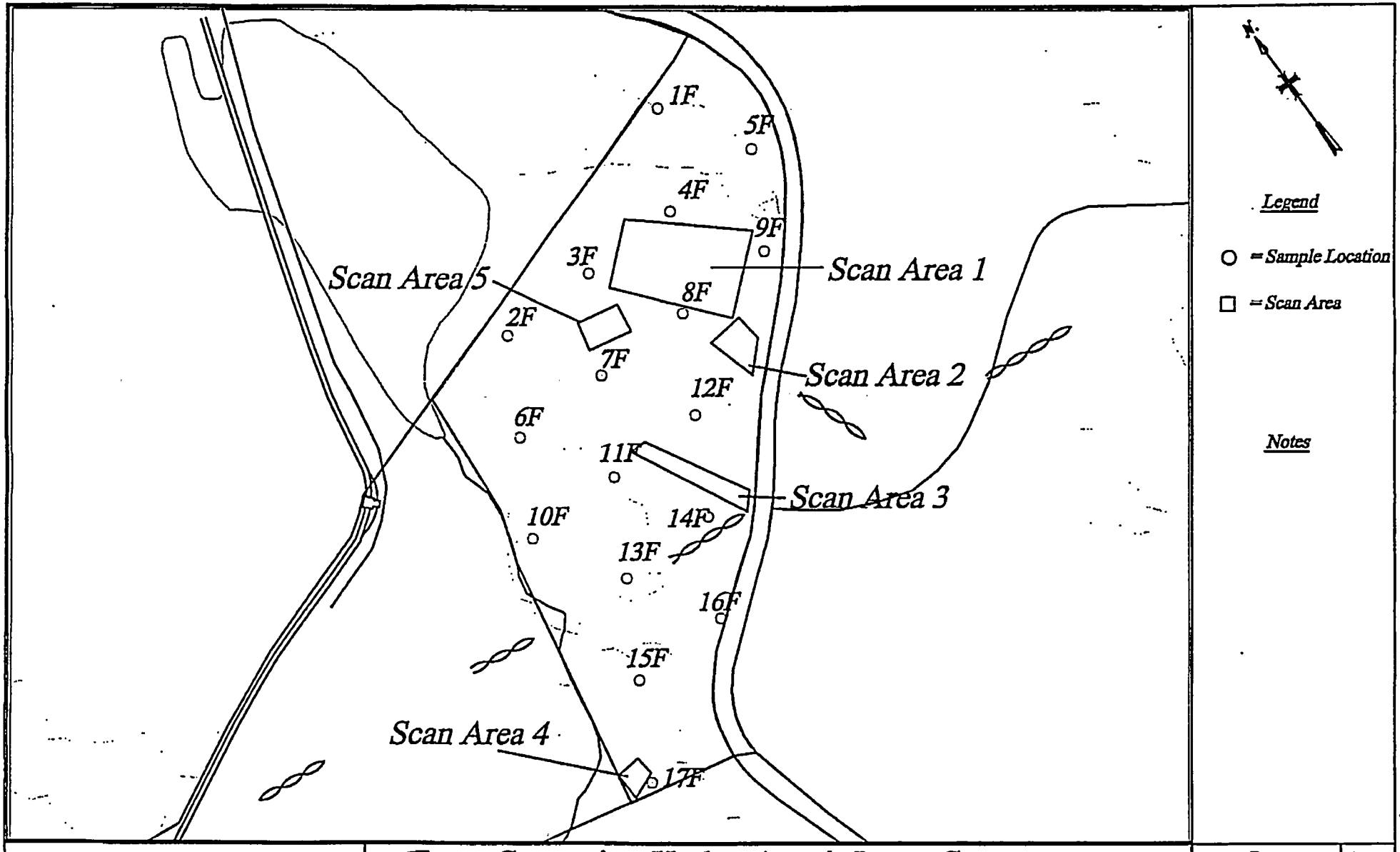
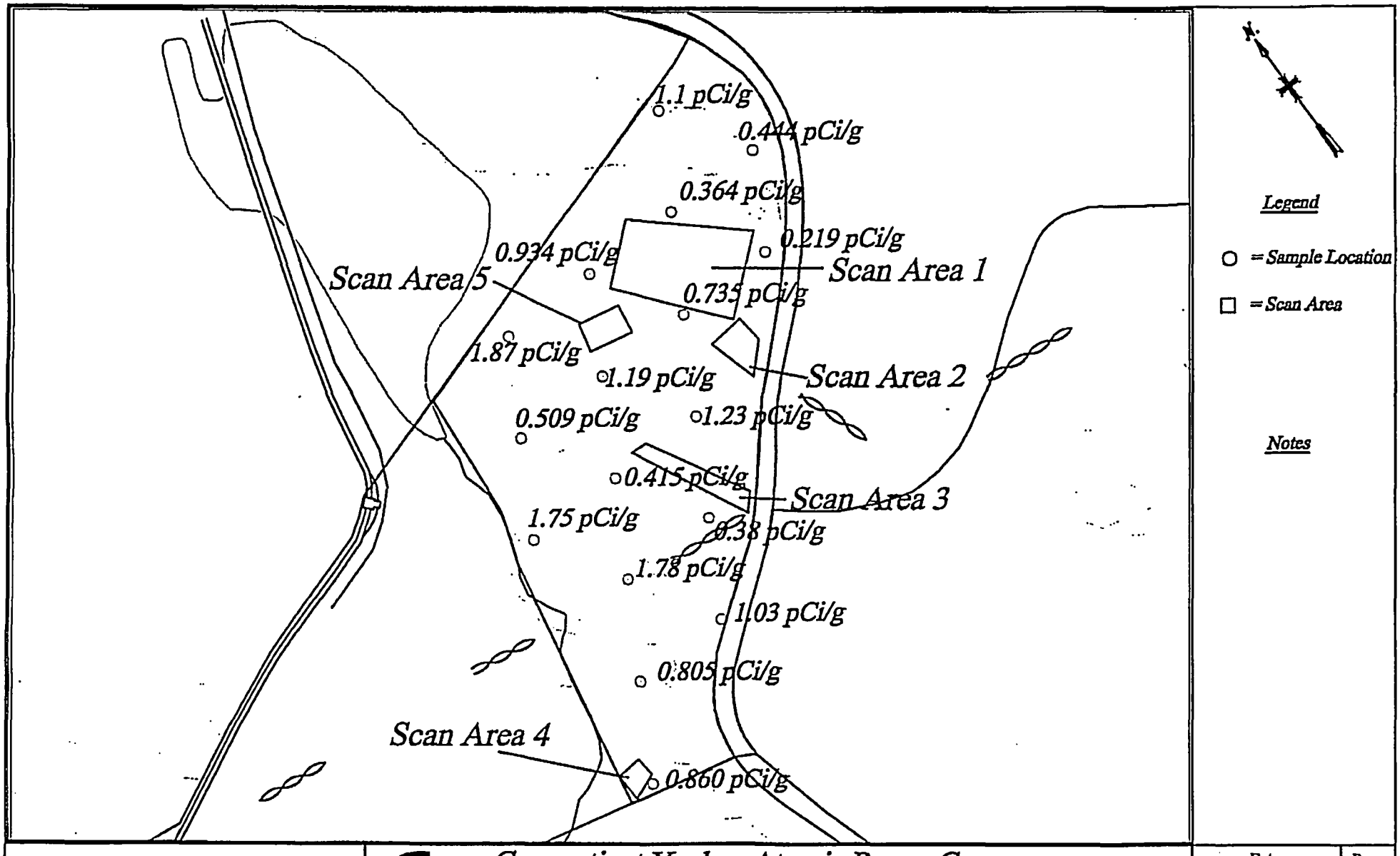


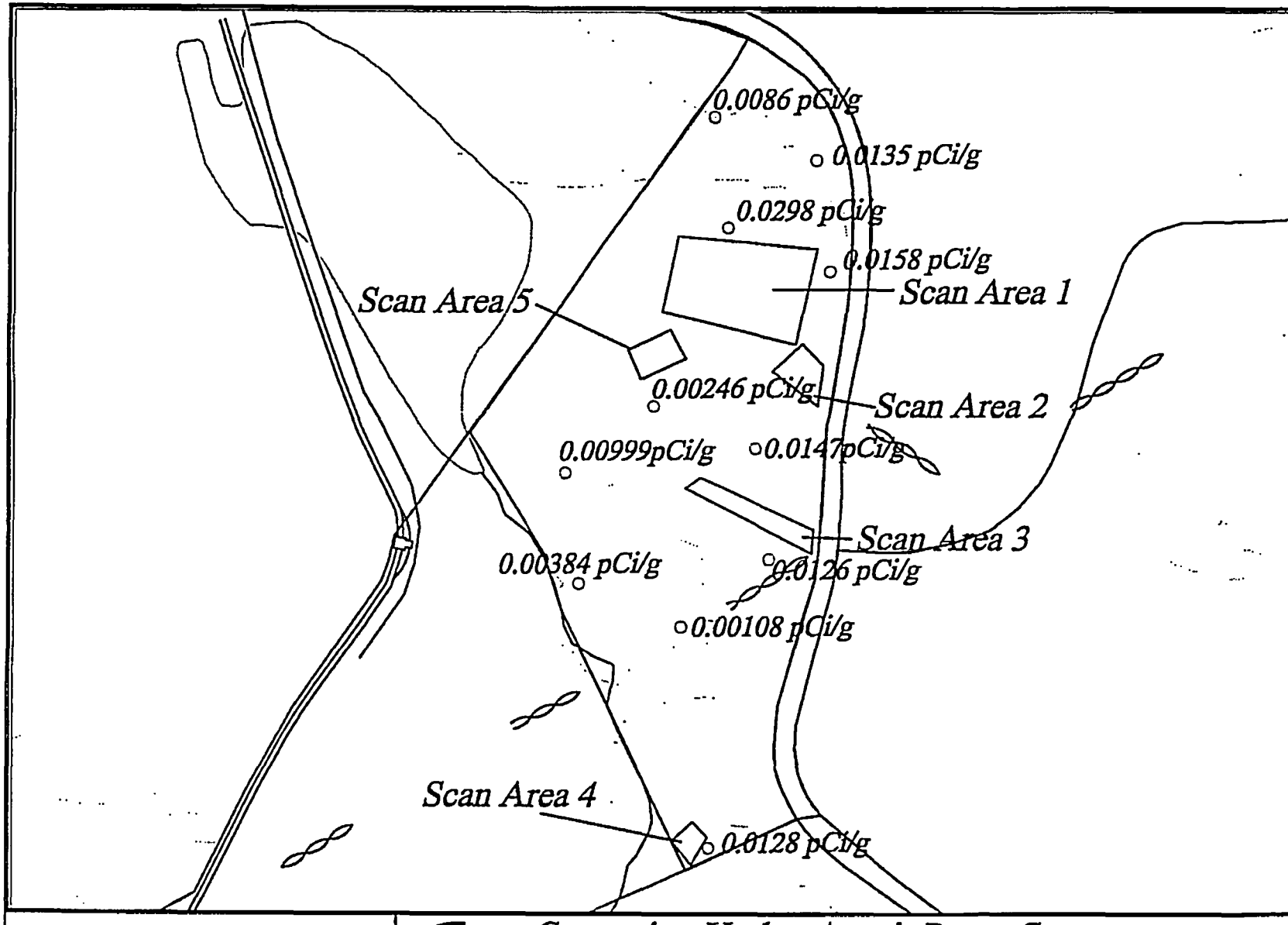

Figure 2

Connecticut Yankee Atomic Power Company
9526-0001 Final Status Survey Design

| Date | Rev |
|---|---|
| July 2004 | 0 |




| Figure 3 | Connecticut Yankee Atomic Power Company<br>9526-0001 Cs-137 Posting Plot | Date | Rev |
|---|---|---|---|
| | | April 2004 | 0 |




**Legend**

○ = Sample Location

□ = Scan Area

**Notes:**

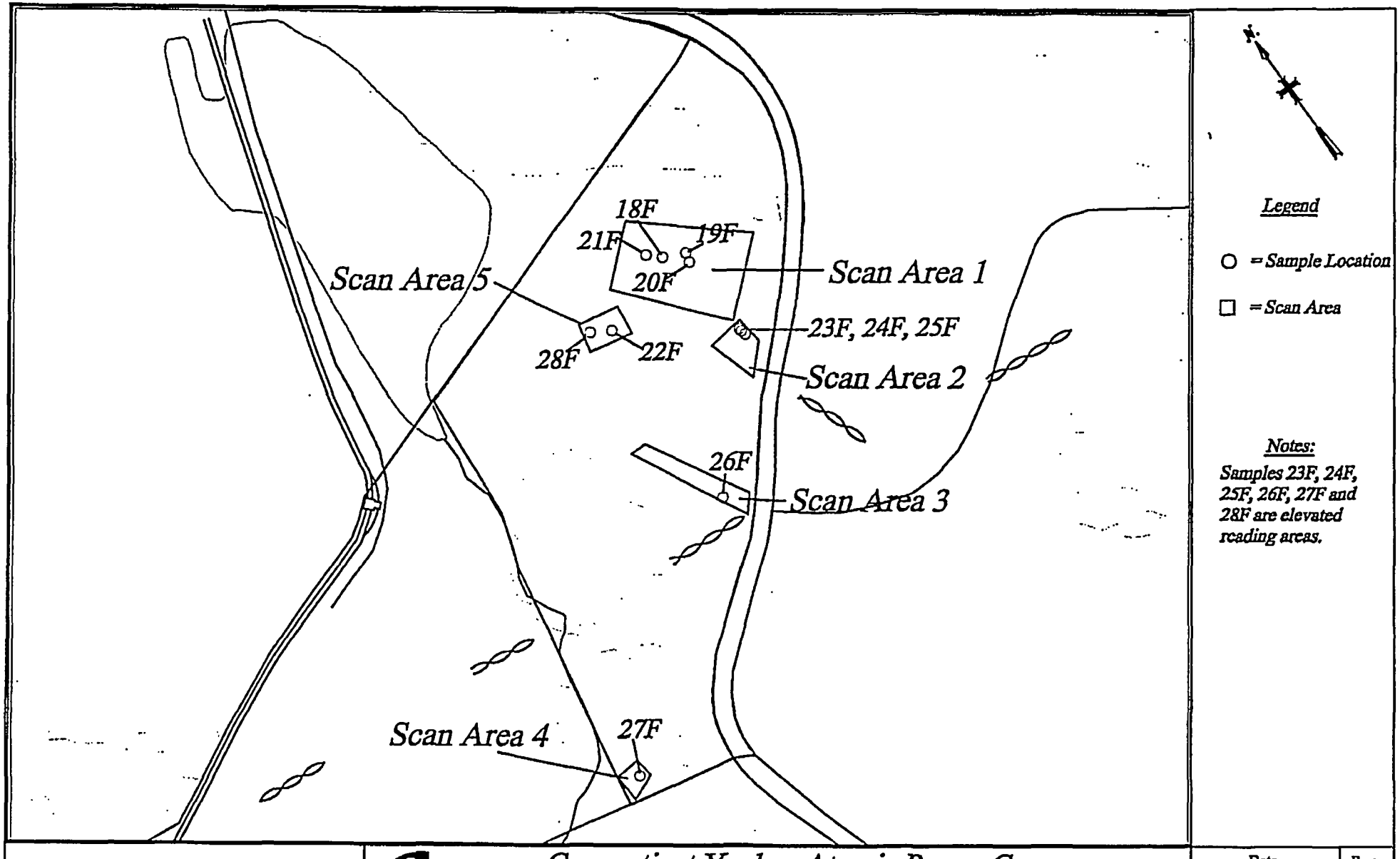
Negative values not posted.

Figure 4

Connecticut Yankee Atomic Power Company

9526-0001 Co-60 Posting Plot

| Date | Rev |
|---|---|
| July 2004 | 0 |




| Figure 5 | Connecticut Yankee Atomic Power Company<br>9526-0001 Biased Sample Locations and Scan Area Samples from Elevated Locations | Date | Rev |
|---|---|---|---|
| | | July 2004 | 0 |

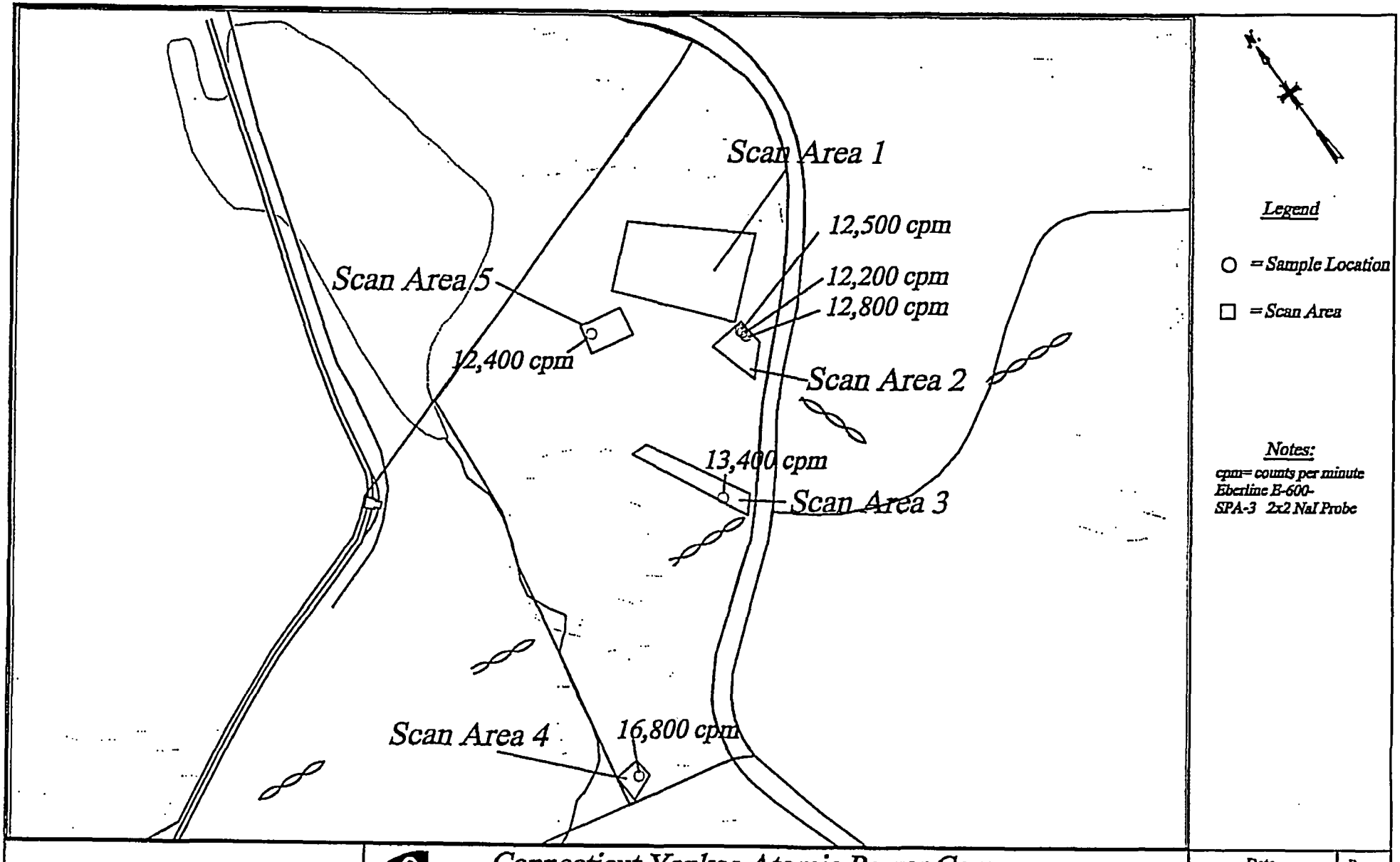



Figure 6

Connecticut Yankee Atomic Power Company

9526-0001 Scan Area Elevated Readings

| Date | Rev |
|---|---|
| July 2004 | 0 |

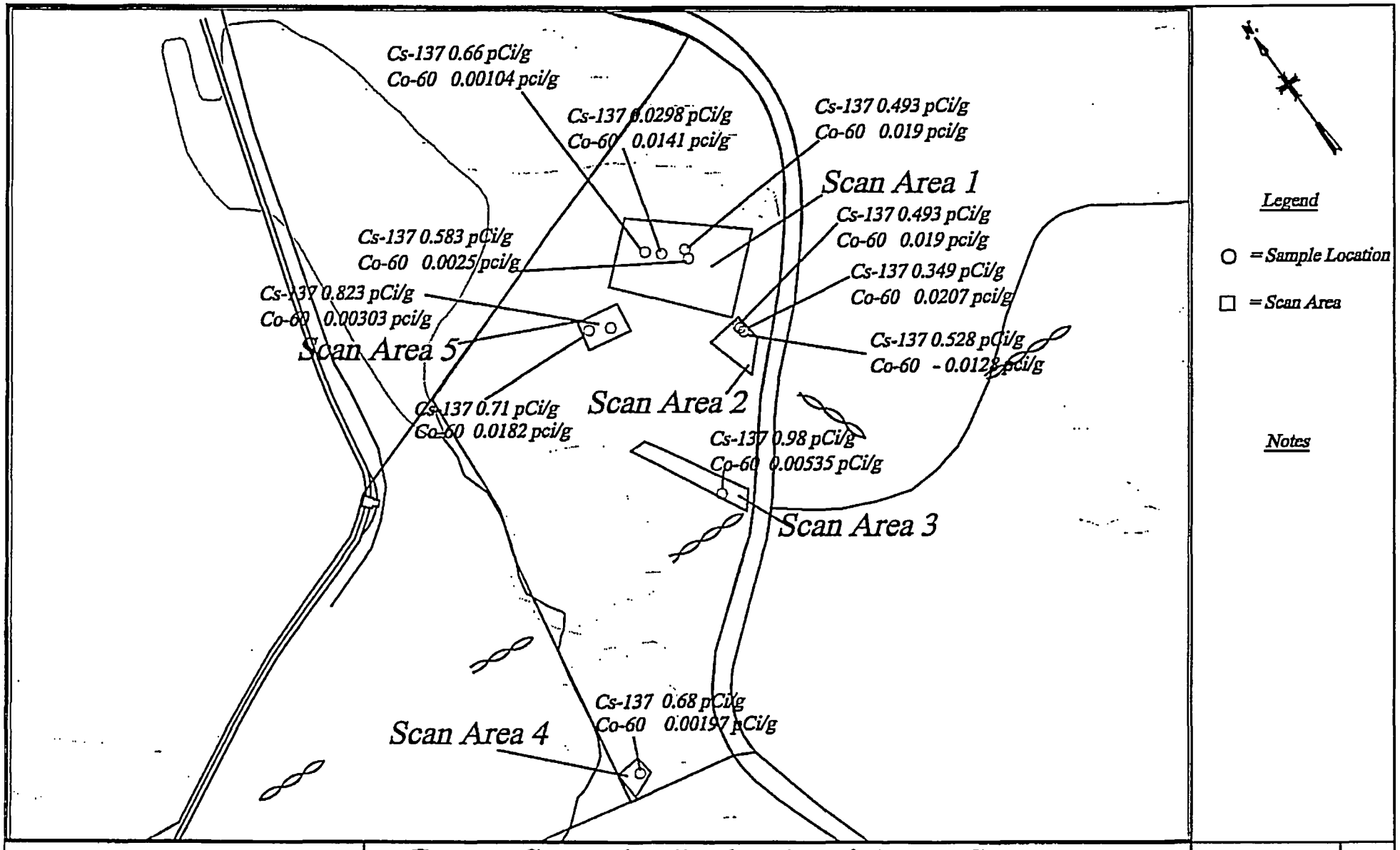



Figure 7

Connecticut Yankee Atomic Power Company

9526-0001 Biased and Scan Area Sample Results

| Date | Rev |
|---|---|
| July 2004 | 0 |

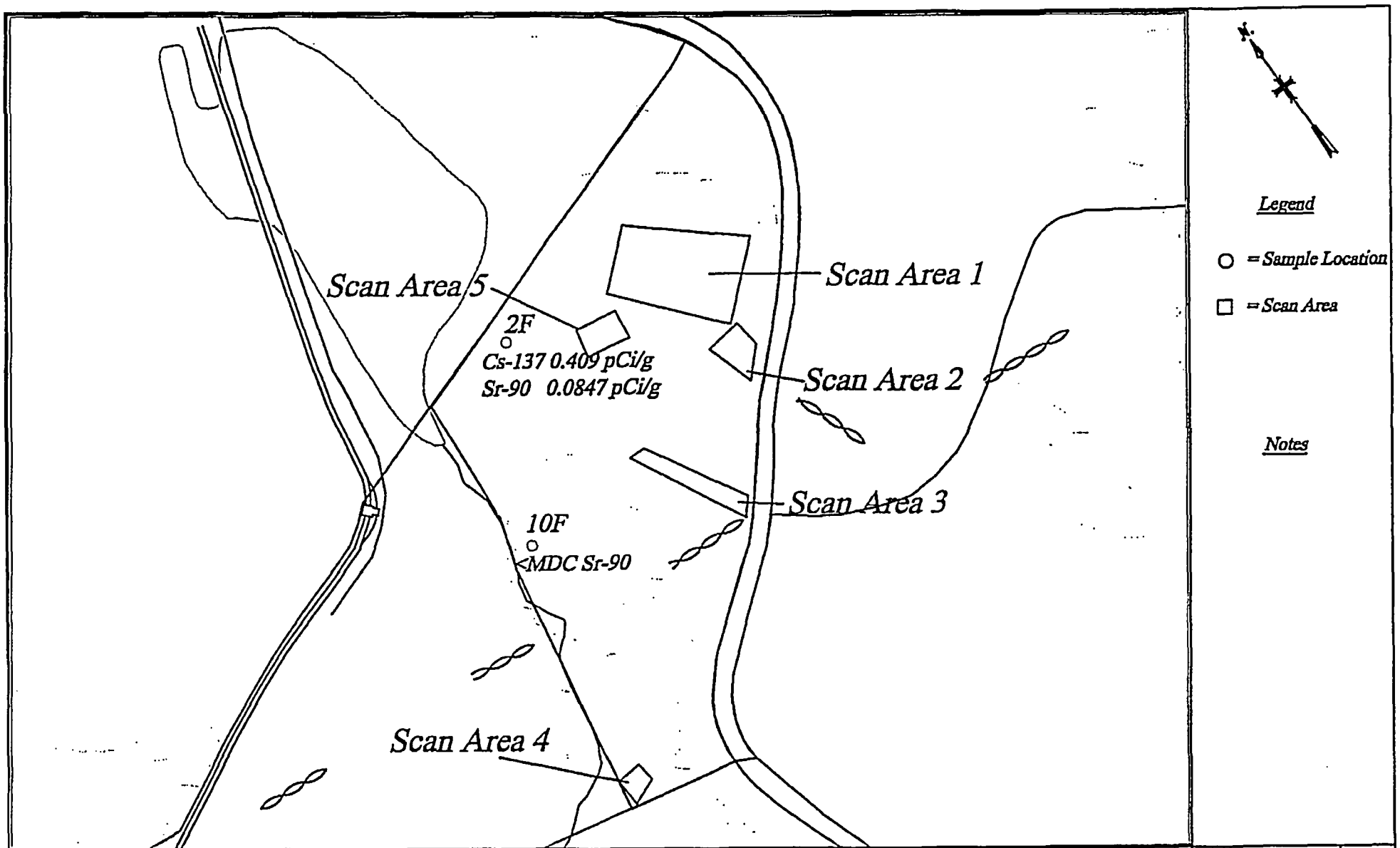



Figure 8

Connecticut Yankee Atomic Power Company
9526-0001 Hard-to-Detect and Addendum 1
Results

| Date | Rev |
|---|---|
| July 2004 | 0 |

# Attachment 2
# Sample and Statistical Data

Attachment 2a
Gamma Spectroscopy Data
(101 Pages)

Analytical Data Package Prepared For

# Bechtel CT Yankee Project

Radiochemical Analysis By

## STL Richland

*2800 G.W. Way, Richland Wa, 99352, (509)-375-3131.*

Assigned Laboratory Code: STLRL

*Data Package Contains 101 Pages*

Report No.: 22709

| SDG No. | Order No. | Client Sample ID (List Order) | Lot-Sa No. | Work Order | Report DB ID | Batch No. |
|---|---|---|---|---|---|---|
| 22862 | | 9526-0001-001 F,FS | J3D300240-30 | FMVV91AA | 9FMVV910 | 3122330 |
| | | 9526-0001-002 F | J3D300240-31 | FMVWG1AA | 9FMVWG10 | 3122330 |
| | | 9526-0001-003 F | J3D300240-19 | FMVVF1AA | 9FMVVF10 | 3122330 |
| | | 9526-0001-004 F | J3D300240-9 | FMVTK1AA | 9FMVTK10 | 3122327 |
| | | 9526-0001-005 F | J3D300240-29 | FMVV41AA | 9FMVV410 | 3122330 |
| | | 9526-0001-006 F,FS | J3D300240-32 | FMVWL1AA | 9FMVWL10 | 3122330 |
| | | 9526-0001-007 F | J3D300240-20 | FMVVK1AA | 9FMVVK10 | 3122330 |
| | | 9526-0001-008 F | J3D300240-7 | FMVTD1AA | 9FMVTD10 | 3122327 |
| | | 9526-0001-009 F | J3D300240-8 | FMVTG1AA | 9FMVTG10 | 3122327 |
| | | 9526-0001-010 F | J3D300240-33 | FMVWN1AA | 9FMVWN10 | 3122330 |
| | | 9526-0001-011 F | J3D300240-21 | FMVVN1AA | 9FMVVN10 | 3122330 |
| | | 9526-0001-012 F | J3D300240-14 | FMVT71AA | 9FMVT710 | 3122327 |
| | | 9526-0001-013 F | J3D300240-22 | FMVVP1AA | 9FMVVP10 | 3122330 |
| | | 9526-0001-014 F | J3D300240-6 | FMVR91AA | 9FMVR910 | 3122327 |
| | | 9526-0001-015 F | J3D300240-18 | FMVVD1AA | 9FMVVD10 | 3122330 |
| | | 9526-0001-016 F | J3D300240-16 | FMVT91AA | 9FMVT910 | 3122327 |
| | | 9526-0001-017 F | J3D300240-17 | FMVVC1AA | 9FMVVC10 | 3122327 |
| | | 9526-0001-018 F | J3D300240-12 | FMVT01AA | 9FMVT010 | 3122327 |
| | | 9526-0001-019 F | J3D300240-11 | FMVTR1AA | 9FMVTR10 | 3122327 |
| | | 9526-0001-020 F | J3D300240-10 | FMVTN1AA | 9FMVTN10 | 3122327 |
| | | 9526-0001-021 F | J3D300240-13 | FMVT31AA | 9FMVT310 | 3122327 |
| | | 9526-0001-022 F | J3D300240-15 | FMVT81AA | 9FMVT810 | 3122327 |
| | | 9526-0001-023 F | J3D300240-23 | FMVVT1AA | 9FMVVT10 | 3122330 |
| | | 9526-0001-024 F | J3D300240-24 | FMVVX1AA | 9FMVVX10 | 3122330 |
| | | 9526-0001-025 F | J3D300240-25 | FMVV01AA | 9FMVV010 | 3122330 |
| | | 9526-0001-026 F | J3D300240-26 | FMVV11AA | 9FMVV110 | 3122330 |

## Report No.: 22709

| SDG No. | Order No. | Client Sample ID (List Order) | Lot-Sa No. | Work Order | Report DB ID | Batch No. |
|---|---|---|---|---|---|---|
| 22862 | | 9526-0001-027 F | J3D300240-27 | FMVV21AA | 9FMVV210 | 3122330 |
| | | 9526-0001-028 F | J3D300240-28 | FMVV31AA | 9FMVV310 | 3122330 |
| | | 9526-0002-025 F | J3D300240-1 | FMVRV1AA | 9FMVRV10 | 3122327 |
| | | 9526-0002-026 F | J3D300240-2 | FMVR21AA | 9FMVR210 | 3122327 |
| | | 9526-0002-027 F | J3D300240-3 | FMVR31AA | 9FMVR310 | 3122327 |
| | | 9526-0002-028 F | J3D300240-4 | FMVR61AA | 9FMVR610 | 3122327 |
| | | 9526-0002-029 F | J3D300240-5 | FMVR71AA | 9FMVR710 | 3122327 |

SEVERN TRENT STL

# CERTIFICATE OF ANALYSIS

May 29, 2003

Bechtel Corporation
362 Injun Hollow Road
East Hampton, CT 06424

Attention: Alan Heter

| | | |
|---|---|---|
| SDG Number | : | 22862 |
| Date SDG Received | : | April 30, 2003 |
| Number of Samples | : | Thirty Three (33) |
| Sample Type | : | Soil |
| Data deliverable | : | Summary Report |

## I. Introduction

On April 30, 2003, thirty three soil samples were received at STL Richland (STLR) for radiochemical analysis on five COCs (2003-00106, 2003-00107, 2003-00108, 2003-00109 and 2003-00110). Upon receipt, the samples were assigned to Lot Number J3D300240 with the laboratory ID numbers to correspond with the Bechtel Corp. (BCT) specific IDs as listed on the cover page.

## II. Analytical Results/Methodology

The analytical results for this report are presented by laboratory sample ID. Each set of data includes sample identification information; analytical results and the appropriate associated statistical errors.

The requested analyses are: **Gamma Spectroscopy**
Gamma Spec by method RICH-RC-5017

## III. Quality Control

The analytical results for each analysis performed under SDG 22862 includes a minimum of one Laboratory Control Sample (LCS) and one method (reagent) blank and one duplicate sample analysis. Any exceptions have been noted in the "Comments" section.

QC and sample results are reported in the same units.

IV. Comments

**Gamma Spectroscopy**

Gamma Spec by method RICH-RC-5017:

The samples were analyzed in two batches. Radionuclides Bi-212, Bi-214, Ac-228, Ra-226, Tl-208 and in one case Cs-134 my be false positive result as the key-line activity is greater than the MDA but identification of the radionuclide is rejected based on abundance criteria the software. Except as noted, the LCS, sample duplicate, batch blank and sample results are within required limits.

I certify that this Certificate of Analysis is in compliance with the SOW, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hard copy data package has been authorized by the Laboratory Manager, or a designee as verified by the following signature.

Reviewed and approved:

Barbara M. Gillespie
Project Manager

## Drinking Water Method Cross References

| | DRINKING WATER ASTM METHOD CROSS REFERENCES | |
|---|---|---|
| | | |
| **Referenced Method** | **Isotope(s)** | **STL Richland's SOP number** |
| EPA 901.1 | Cs-134, I-131 | RICH-RC-5017 |
| EPA 900.0 | Alpha & Beta | RICH-RC-5014 |
| EPA 903.1 | Ra-226 | RICH-RC-5005 |
| EPA 904.0 | Ra-228 | RICH-RC-5005 |
| EPA 905.0 | Sr89/90 | RICH-RC-5006 |
| ASTM D2460 | Total Radium | RICH-RC-5027 |
| Standard Method 7500-U-C & ASTM D5174 | Uranium | RICH-RC-5058 |
| EPA 906.0 | Tritium | RICH-RC-5007 |
| | | |
| | | |
| | | |
| | | |
| NOTE: | | |
| The Gross Alpha LCS is prepared with Am-241 (unless otherwise specified in the case narrative) | | |
| The Gross Beta LCS is prepared with Sr/Y-90 (unless otherwise specified in the case narrative) | | |

## Uncertainty Estimation

STL Richland has adopted the internationally accepted approach to estimating uncertainties described in "NIST Technical Note 1297, 1994 Edition". The approach, "Law of Propagation of Errors", involves the identification of all variables in an analytical method which are used to derive a result. These variables are related to the analytical result (R) by some functional relationship, R = constants * f(x,y,z,...). The components (x,y,z) are evaluated to determine their contribution to the overall method uncertainty. The individual component uncertainties ($u_i$) are then combined using a statistical model that provides the most probable overall uncertainty value. All component uncertainties are categorized as type A, evaluated by statistical methods, or type B, evaluated by other means. Uncertainties not included in the components, such as sample homogeneity, are combined with the component uncertainty as the square root of the sum-of-the-squares of the individual uncertainties. The uncertainty associated with the derived result is the combined uncertainty ($u_c$) multiplied by the coverage factor (1,2, or 3).

When three or more sample replicates are used to derive the analytical result, the type A uncertainty is the standard deviation of the mean value (S/vn), where S is the standard deviation of the derived results. The type B uncertainties are all other random or non-random components that are not included in the standard deviation.

The derivation of the general "Law of Propagation of Errors" equations and specific example are available on request.

## Report Definitions

| | |
|---|---|
| **Action Lev** | An agreed upon activity level used to trigger some action when the final result is greater than or equal to the Action Level. Often the Action Level is related to the Decision Limit. |
| **Batch** | The QC preparation batch number that relates laboratory samples to QC samples that were prepared and analyzed together. |
| **Bias** | Defined by the equation (Result/Expected)-1 as defined by ANSI N13.30. |
| **COC No** | Chain of Custody Number assigned by the Client or STL Richland. |
| **Count Error (#s)** | Poisson counting statistics of the gross sample count and background. The uncertainty is absolute and in the same units as the result. For Liquid Scintillation Counting (LSC) the batch blank count is the background. |
| **Total Uncert (#s)** *$u_c$ - Combined Uncertainty.* | All known uncertainties associated with the preparation and analysis of the sample are propagated to give a measure of the uncertainty associated with the result, *$u_c$ the combined uncertainty.* The uncertainty is absolute and in the same units as the result. |
| **(#s), Coverage Factor** | The coverage factor defines the width of the confidence interval, 1, 2 or 3 standard deviations. |
| **CRDL (RL)** | Contractual Required Detection Limit as defined in the Client's Statement Of Work or STL Richland "default" nominal detection limit. Often referred to the reporting level (RL) |
| **Lc** | Decision Level based on instrument background or blank, adjusted by the Efficiency, Chemical Yield, and Volume associated with the sample. The Type I error probability is approximately 5%. Lc=(1.645 * Sqrt(2*(BkgrndCnt/BkgrndCntMin)/SCntMin)) * (ConvFct/(Eff*Yld*Abn*Vol) * IngrFct). For LSC methods the batch blank is used as a measure of the background variability. Lc cannot be calculated when the background count is zero. |
| **Lot-Sample No** | The number assigned by the LIMS software to track samples received on the same day for a given client. The sample number is a sequential number assigned to each sample in the Lot. |
| **MDC\|MDA** | Detection Level based on instrument background or blank, adjusted by the Efficiency, Chemical Yield, and Volume with a Type I and II error probability of approximately 5%. MDC= (4.65 * Sqrt((BkgrndCnt/BkgrndCntMin)/SCntMin) + 2.71/SCntMin) * (ConvFct/(Eff * Yld * Abn * Vol) * IngrFct). For LSC methods the batch blank is used as a measure of the background variability. |
| **Primary Detector** | The instrument identifier associated with the analysis of the sample aliquot. |
| **Ratio U-234/U-238** | The U-234 result divided by the U-238 result. The U-234/U-238 ratio for natural uranium in NIST SRM 4321C is 1.038. |
| **Rst/MDC** | Ratio of the Result to the MDC. A value greater than 1 may indicate activity above background at a high level of confidence. Caution should be used when applying this factor and it should be used in concert with the qualifiers associated with the result. |
| **Rst/TotUcert** | Ratio of the Result to the Total Uncertainty. If the uncertainty has a coverage factor of 2 a value greater than 1 may indicate activity above background at approximately the 95% level of confidence assuming a two-sided confidence interval. Caution should be used when applying this factor and it should be used in concert with the qualifiers associated with the result. |
| **Report DB No** | Sample Identifier used by the report system. The number is based upon the first five digits of the Work Order Number. |
| **RER** | The equation Replicate Error Ratio = (S-D)/[sqrt($TPUs^2$ + $TPUd^2$)] as defined by ICPT BOA where S is the original sample result, D is the result of the duplicate, TPUs is the total uncertainty of the original sample and TPUd is the total uncertainty of the duplicate sample. |
| **SDG** | Sample Delivery Group Number assigned by the Client or assigned by STL Richland upon sample receipt. |
| **Sum Rpt Alpha Spec Rst(s)** | The sum of the reported alpha spec results for tests derived from the same sample excluding duplicate result where the results are in the same units. |
| **Work Order** | The LIMS software assign test specific identifier. |
| **Yield** | The recovery of the tracer added to the sample such as Pu-242 used to trace a Pu-239/40 method. |

# Sample Results Summary

Date: 29-May-03

## STL Richland STLRL

Ordered by Method, Batch No., Client Sample ID.

Report No. : 22709

SDG No: 22862

| Batch | Client Id Work Order | Parameter | Result +- Uncertainty ( 2s) | Qual | Units | Yield | MDC or MDA | CRDL | RER2 |
|---|---|---|---|---|---|---|---|---|---|
| 3122327 | E901.1 | | | | | | | | |
| 9526-0001-004 F | | | | | | | | | |
| | FMVTK1AA | ACTINIUM-228 | 1.23E+00 +- 3.0E-01 | | pCi/g | | 2.50E-01 | | |
| | | AG-108M | 3.20E-02 +- 3.5E-02 | U | pCi/g | | 6.45E-02 | 2.86E-01 | |
| | | AMERICIUM-241 | -6.75E-02 +- 8.9E-02 | U | pCi/g | | 1.31E-01 | 1.03E+00 | |
| | | BISMUTH-212 | 1.47E+00 +- 7.1E-01 | U | pCi/g | | 1.38E+00 | | |
| | | BISMUTH-214 | 1.42E+00 +- 2.5E-01 | | pCi/g | | 1.24E-01 | | |
| | | COBALT-60 | 2.98E-02 +- 3.8E-02 | U | pCi/g | | 7.76E-02 | 1.50E-01 | |
| | | CESIUM-134 | 5.65E-02 +- 5.0E-02 | U | pCi/g | | 9.63E-02 | 1.90E-01 | |
| | | CESIUM-137 | 3.64E-01 +- 1.4E-01 | | pCi/g | | 8.01E-02 | 3.20E-01 | |
| | | EUROPIUM-152 | -2.39E-02 +- 1.1E-01 | U | pCi/g | | 1.86E-01 | 4.04E-01 | |
| | | EUROPIUM-154 | 2.13E-02 +- 1.2E-01 | U | pCi/g | | 2.22E-01 | 3.70E-01 | |
| | | EUROPIUM-155 | 3.33E-02 +- 1.0E-01 | U | pCi/g | | 1.77E-01 | 1.57E+01 | |
| | | POTASSIUM-40 | 1.03E+01 +- 1.8E+00 | | pCi/g | | 6.03E-01 | | |
| | | MANGANESE-54 | 3.31E-02 +- 4.7E-02 | U | pCi/g | | 8.66E-02 | 6.96E-01 | |
| | | NIOBIUM-94 | 1.16E-02 +- 3.2E-02 | U | pCi/g | | 6.06E-02 | 2.85E-01 | |
| | | LEAD-212 | 1.14E+00 +- 2.5E-01 | | pCi/g | | 1.15E-01 | | |
| | | LEAD-214 | 1.35E+00 +- 2.7E-01 | | pCi/g | | 1.39E-01 | | |
| | | RADIUM-226 | 1.42E+00 +- 2.5E-01 | | pCi/g | | 1.24E-01 | | |
| | | THALLIUM-208 | 3.90E-01 +- 1.2E-01 | | pCi/g | | 6.47E-02 | | |
| 9526-0001-008 F | | | | | | | | | |
| | FMVTD1AA | ACTINIUM-228 | 1.49E+00 +- 3.1E-01 | | pCi/g | | 2.02E-01 | | |
| | | AG-108M | 4.04E-03 +- 3.0E-02 | U | pCi/g | | 5.38E-02 | 2.86E-01 | |
| | | AMERICIUM-241 | 8.23E-02 +- 8.8E-02 | U | pCi/g | | 1.41E-01 | 1.03E+00 | |
| | | BISMUTH-212 | 1.06E+00 +- 6.9E-01 | U | pCi/g | | 1.25E+00 | | |
| | | BISMUTH-214 | 1.25E+00 +- 2.4E-01 | U | pCi/g | | 3.40E-01 | | |
| | | COBALT-60 | -2.53E-02 +- 3.8E-02 | U | pCi/g | | 6.24E-02 | 1.50E-01 | |
| | | CESIUM-134 | 7.48E-02 +- 4.3E-02 | U | pCi/g | | 8.80E-02 | 1.90E-01 | |
| | | CESIUM-137 | 7.35E-01 +- 1.3E-01 | | pCi/g | | 6.41E-02 | 3.20E-01 | |
| | | EUROPIUM-152 | -3.30E-02 +- 1.0E-01 | U | pCi/g | | 1.71E-01 | 4.04E-01 | |
| | | EUROPIUM-154 | 1.05E-01 +- 1.1E-01 | U | pCi/g | | 2.34E-01 | 3.70E-01 | |
| | | EUROPIUM-155 | 3.09E-02 +- 1.0E-01 | U | pCi/g | | 1.75E-01 | 1.57E+01 | |
| | | POTASSIUM-40 | 1.12E+01 +- 1.9E+00 | | pCi/g | | 6.62E-01 | | |
| | | MANGANESE-54 | -9.42E-03 +- 3.9E-02 | U | pCi/g | | 6.73E-02 | 6.96E-01 | |
| | | NIOBIUM-94 | 6.07E-03 +- 3.4E-02 | U | pCi/g | | 6.22E-02 | 2.85E-01 | |
| | | LEAD-212 | 1.21E+00 +- 2.4E-01 | | pCi/g | | 1.06E-01 | | |
| | | LEAD-214 | 1.22E+00 +- 2.5E-01 | | pCi/g | | 1.21E-01 | | |
| | | RADIUM-226 | 1.25E+00 +- 2.4E-01 | | pCi/g | | 1.16E-01 | | |

STL Richland
rptSTLRchSaSummary2 V4.03 A97

RER2 - Replicate Error Ratio = (S-D)/[sqrt(sq(TPUs)+sq(TPUd))] as defined by ICPT BOA.
U Qual - Analyzed for, but the result is less than the Mdc/Mda|Total Uncert or gamma scan software did not identify the nuclide.

# Sample Results Summary

Date: 29-May-03

## STL Richland STLRL

Ordered by Method, Batch No., Client Sample ID.

Report No. : 22709

SDG No: 22862

| Batch | Client Id Work Order | Parameter | Result +- Uncertainty ( 2s) | Qual | Units | Yield | MDC or MDA | CRDL | RER2 |
|---|---|---|---|---|---|---|---|---|---|
| 3122327 | E901.1 | | | | | | | | |
| | 9526-0001-008 F | | | | | | | | |
| | FMVTD1AA | THALLIUM-208 | 4.22E-01 +- 8.9E-02 | | pCi/g | | 6.30E-02 | | |
| | 9526-0001-009 F | | | | | | | | |
| | FMVTG1AA | ACTINIUM-228 | 1.65E+00 +- 3.8E-01 | | pCi/g | | 2.31E-01 | | |
| | | AG-108M | -1.74E-02 +- 3.6E-02 | U | pCi/g | | 6.18E-02 | 2.86E-01 | |
| | | AMERICIUM-241 | 1.28E-01 +- 4.7E-01 | U | pCi/g | | 8.03E-01 | 1.03E+00 | |
| | | BISMUTH-212 | 1.94E+00 +- 7.2E-01 | U | pCi/g | | 1.40E+00 | | |
| | | BISMUTH-214 | 1.68E+00 +- 2.9E-01 | U | pCi/g | | 3.60E-01 | | |
| | | COBALT-60 | 1.58E-02 +- 3.7E-02 | U | pCi/g | | 7.13E-02 | 1.50E-01 | |
| | | CESIUM-134 | 7.31E-02 +- 5.5E-02 | U | pCi/g | | 1.04E-01 | 1.90E-01 | |
| | | CESIUM-137 | 2.91E-01 +- 1.1E-01 | J | pCi/g | | 7.64E-02 | 3.20E-01 | |
| | | EUROPIUM-152 | -1.23E-02 +- 1.7E-01 | U | pCi/g | | 2.10E-01 | 4.04E-01 | |
| | | EUROPIUM-154 | -4.32E-02 +- 1.4E-01 | U | pCi/g | | 2.42E-01 | 3.70E-01 | |
| | | EUROPIUM-155 | 1.24E-01 +- 1.9E-01 | U | pCi/g | | 3.21E-01 | 1.57E+01 | |
| | | POTASSIUM-40 | 1.19E+01 +- 2.0E+00 | | pCi/g | | 6.41E-01 | | |
| | | MANGANESE-54 | 3.00E-03 +- 4.8E-02 | U | pCi/g | | 8.59E-02 | 6.96E-01 | |
| | | NIOBIUM-94 | -3.21E-02 +- 3.8E-02 | U | pCi/g | | 6.25E-02 | 2.85E-01 | |
| | | LEAD-212 | 1.45E+00 +- 2.9E-01 | | pCi/g | | 1.23E-01 | | |
| | | LEAD-214 | 1.48E+00 +- 3.0E-01 | | pCi/g | | 1.53E-01 | | |
| | | RADIUM-226 | 1.68E+00 +- 2.9E-01 | U | pCi/g | | 3.60E-01 | | |
| | | THALLIUM-208 | 4.88E-01 +- 1.2E-01 | | pCi/g | | 7.67E-02 | | |
| | 9526-0001-012 F | | | | | | | | |
| | FMVT71AA | ACTINIUM-228 | 7.50E-01 +- 2.6E-01 | U | pCi/g | | 4.77E-01 | | |
| | | AG-108M | 2.83E-02 +- 3.8E-02 | U | pCi/g | | 6.85E-02 | 2.86E-01 | |
| | | AMERICIUM-241 | 1.30E-02 +- 7.7E-02 | U | pCi/g | | 1.31E-01 | 1.03E+00 | |
| | | BISMUTH-212 | 2.21E+00 +- 1.1E+00 | U | pCi/g | | 1.31E+00 | | |
| | | BISMUTH-214 | 1.52E+00 +- 2.9E-01 | | pCi/g | | 1.20E-01 | | |
| | | COBALT-60 | 1.47E-02 +- 4.1E-02 | U | pCi/g | | 7.92E-02 | 1.50E-01 | |
| | | CESIUM-134 | 5.00E-02 +- 4.6E-02 | U | pCi/g | | 9.01E-02 | 1.90E-01 | |
| | | CESIUM-137 | 1.23E+00 +- 2.1E-01 | | pCi/g | | 7.66E-02 | 3.20E-01 | |
| | | EUROPIUM-152 | 8.63E-02 +- 1.1E-01 | U | pCi/g | | 2.05E-01 | 4.04E-01 | |
| | | EUROPIUM-154 | -1.15E-01 +- 1.0E-01 | U | pCi/g | | 1.59E-01 | 3.70E-01 | |
| | | EUROPIUM-155 | -5.37E-02 +- 1.0E-01 | U | pCi/g | | 1.71E-01 | 1.57E+01 | |
| | | POTASSIUM-40 | 8.59E+00 +- 1.7E+00 | | pCi/g | | 8.07E-01 | | |
| | | MANGANESE-54 | -2.48E-02 +- 4.7E-02 | U | pCi/g | | 7.75E-02 | 6.96E-01 | |
| | | NIOBIUM-94 | 1.03E-02 +- 3.8E-02 | U | pCi/g | | 7.10E-02 | 2.85E-01 | |
| | | LEAD-212 | 8.88E-01 +- 2.0E-01 | | pCi/g | | 1.19E-01 | | |
| | | LEAD-214 | 1.67E+00 +- 3.0E-01 | | pCi/g | | 1.39E-01 | | |

STL Richland

rptSTLRchSaSummary2 V4.03 A97

RER2 - Replicate Error Ratio = (S-D)/[sqrt(sq(TPUs)+sq(TPUd))] as defined by ICPT BOA.

J Qual - No U qualifier has been assigned and the result is below the Reporting Limit, RL (CRDL) or Report Value is Estimated.

U Qual - Analyzed for; but the result is less than the Mdc/Mda|Total Uncert or gamma scan software did not identify the nuclide.

# Sample Results Summary

Date: 29-May-03

## STL Richland STLRL

Ordered by Method, Batch No., Client Sample ID.

Report No. : 22709

SDG No: 22862

| Batch | Client Id Work Order | Parameter | Result +- Uncertainty ( 2s) | Qual | Units | Yield | MDC or MDA | CRDL | RER2 |
|---|---|---|---|---|---|---|---|---|---|
| 3122327 | E901.1 | | | | | | | | |
| 9526-0001-012 F | | | | | | | | | |
| | FMVT71AA | RADIUM-226 | 1.52E+00 +- 2.9E-01 | | pCi/g | | 1.20E-01 | | |
| | | THALLIUM-208 | 3.38E-01 +- 8.3E-02 | | pCi/g | | 6.79E-02 | | |
| 9526-0001-014 F | | | | | | | | | |
| | FMVR91AA | ACTINIUM-228 | 1.06E+00 +- 2.8E-01 | | pCi/g | | 2.13E-01 | | |
| | | AG-108M | 4.76E-03 +- 2.9E-02 | U | pCi/g | | 5.21E-02 | 2.86E-01 | |
| | | AMERICIUM-241 | -5.76E-02 +- 1.2E-01 | U | pCi/g | | 2.08E-01 | 1.03E+00 | |
| | | BISMUTH-212 | 1.44E+00 +- 6.4E-01 | U | pCi/g | | 1.16E+00 | | |
| | | BISMUTH-214 | 1.12E+00 +- 2.0E-01 | | pCi/g | | 1.04E-01 | | |
| | | COBALT-60 | 1.26E-02 +- 3.0E-02 | U | pCi/g | | 6.08E-02 | 1.50E-01 | |
| | | CESIUM-134 | 7.42E-02 +- 5.1E-02 | U | pCi/g | | 8.50E-02 | 1.90E-01 | |
| | | CESIUM-137 | 3.80E-01 +- 8.2E-02 | | pCi/g | | 6.50E-02 | 3.20E-01 | |
| | | EUROPIUM-152 | -2.18E-02 +- 9.8E-02 | U | pCi/g | | 1.65E-01 | 4.04E-01 | |
| | | EUROPIUM-154 | 9.75E-03 +- 1.1E-01 | U | pCi/g | | 2.07E-01 | 3.70E-01 | |
| | | EUROPIUM-155 | 3.25E-02 +- 9.9E-02 | U | pCi/g | | 1.69E-01 | 1.57E+01 | |
| | | POTASSIUM-40 | 9.10E+00 +- 1.7E+00 | | pCi/g | | 6.21E-01 | | |
| | | MANGANESE-54 | 1.96E-02 +- 4.0E-02 | U | pCi/g | | 7.50E-02 | 6.96E-01 | |
| | | NIOBIUM-94 | -1.70E-02 +- 3.2E-02 | U | pCi/g | | 5.40E-02 | 2.85E-01 | |
| | | LEAD-212 | 1.12E+00 +- 2.1E-01 | | pCi/g | | 1.00E-01 | | |
| | | LEAD-214 | 1.31E+00 +- 2.7E-01 | | pCi/g | | 1.20E-01 | | |
| | | RADIUM-226 | 1.12E+00 +- 2.0E-01 | | pCi/g | | 1.04E-01 | | |
| | | THALLIUM-208 | 3.94E-01 +- 8.9E-02 | | pCi/g | | 5.42E-02 | | |
| 9526-0001-016 F | | | | | | | | | |
| | FMVT91AA | ACTINIUM-228 | 1.12E+00 +- 3.0E-01 | | pCi/g | | 2.17E-01 | | |
| | | AG-108M | 7.01E-04 +- 3.5E-02 | U | pCi/g | | 6.07E-02 | 2.86E-01 | |
| | | AMERICIUM-241 | 1.03E-01 +- 7.7E-02 | U | pCi/g | | 1.22E-01 | 1.03E+00 | |
| | | BISMUTH-212 | 1.57E+00 +- 8.3E-01 | U | pCi/g | | 1.21E+00 | | |
| | | BISMUTH-214 | 9.53E-01 +- 2.1E-01 | U | pCi/g | | 2.91E-01 | | |
| | | COBALT-60 | -6.23E-03 +- 3.3E-02 | U | pCi/g | | 5.98E-02 | 1.50E-01 | |
| | | CESIUM-134 | 8.78E-02 +- 6.7E-02 | U | pCi/g | | 9.25E-02 | 1.90E-01 | |
| | | CESIUM-137 | 1.03E+00 +- 1.6E-01 | | pCi/g | | 7.77E-02 | 3.20E-01 | |
| | | EUROPIUM-152 | 6.55E-02 +- 1.1E-01 | U | pCi/g | | 1.90E-01 | 4.04E-01 | |
| | | EUROPIUM-154 | 2.32E-02 +- 1.1E-01 | U | pCi/g | | 2.06E-01 | 3.70E-01 | |
| | | EUROPIUM-155 | 6.86E-02 +- 9.8E-02 | U | pCi/g | | 1.70E-01 | 1.57E+01 | |
| | | POTASSIUM-40 | 8.65E+00 +- 1.7E+00 | | pCi/g | | 7.04E-01 | | |
| | | MANGANESE-54 | 1.42E-02 +- 4.1E-02 | U | pCi/g | | 7.49E-02 | 6.96E-01 | |
| | | NIOBIUM-94 | -3.81E-04 +- 3.0E-02 | U | pCi/g | | 5.43E-02 | 2.85E-01 | |
| | | LEAD-212 | 1.07E+00 +- 2.1E-01 | | pCi/g | | 1.54E-01 | | |

STL Richland

rptSTLRchSaSummary2 V4.03 A97

RER2 - Replicate Error Ratio = (S-D)/[sqrt(sq(TPUs)+sq(TPUd))] as defined by ICPT BOA.

U Qual - Analyzed for, but the result is less than the Mdc/Mda/Total Uncert or gamma scan software did not identify the nuclide.

# Sample Results Summary

Date: 29-May-03

## STL Richland STLRL

Ordered by Method, Batch No., Client Sample ID.

Report No. : 22709

SDG No: 22862

| Batch | Client Id Work Order | Parameter | Result +- Uncertainty ( 2s) | Qual | Units | Yield | MDC or MDA | CRDL | RER2 |
|---|---|---|---|---|---|---|---|---|---|
| 3122327 | E901.1 | | | | | | | | |
| | 9526-0001-016 F | | | | | | | | |
| | FMVT91AA | LEAD-214 | 1.06E+00 +- 2.1E-01 | | pCi/g | | 1.30E-01 | | |
| | | RADIUM-226 | 9.53E-01 +- 2.1E-01 | | pCi/g | | 1.16E-01 | | |
| | | THALLIUM-208 | 3.75E-01 +- 9.4E-02 | U | pCi/g | | 1.37E-01 | | |
| | 9526-0001-017 F | | | | | | | | |
| | FMVVC1AA | ACTINIUM-228 | 8.49E-01 +- 2.4E-01 | | pCi/g | | 1.83E-01 | | |
| | | AG-108M | -1.73E-02 +- 3.0E-02 | U | pCi/g | | 4.92E-02 | 2.86E-01 | |
| | | AMERICIUM-241 | -3.19E-03 +- 6.6E-02 | U | pCi/g | | 1.05E-01 | 1.03E+00 | |
| | | BISMUTH-212 | 1.60E+00 +- 5.5E-01 | U | pCi/g | | 1.11E+00 | | |
| | | BISMUTH-214 | 9.21E-01 +- 1.9E-01 | | pCi/g | | 1.10E-01 | | |
| | | COBALT-60 | 1.28E-02 +- 2.8E-02 | U | pCi/g | | 5.69E-02 | 1.50E-01 | |
| | | CESIUM-134 | 7.08E-02 +- 4.0E-02 | U | pCi/g | | 7.83E-02 | 1.90E-01 | |
| | | CESIUM-137 | 8.60E-01 +- 1.5E-01 | | pCi/g | | 6.51E-02 | 3.20E-01 | |
| | | EUROPIUM-152 | -3.29E-02 +- 9.2E-02 | U | pCi/g | | 1.58E-01 | 4.04E-01 | |
| | | EUROPIUM-154 | -7.24E-02 +- 9.0E-02 | U | pCi/g | | 1.48E-01 | 3.70E-01 | |
| | | EUROPIUM-155 | 2.69E-02 +- 8.6E-02 | U | pCi/g | | 1.48E-01 | 1.57E+01 | |
| | | POTASSIUM-40 | 8.86E+00 +- 1.5E+00 | | pCi/g | | 4.97E-01 | | |
| | | MANGANESE-54 | 2.85E-03 +- 3.2E-02 | U | pCi/g | | 5.68E-02 | 6.96E-01 | |
| | | NIOBIUM-94 | 9.32E-03 +- 2.9E-02 | U | pCi/g | | 5.38E-02 | 2.85E-01 | |
| | | LEAD-212 | 9.76E-01 +- 2.0E-01 | | pCi/g | | 9.56E-02 | | |
| | | LEAD-214 | 1.05E+00 +- 2.1E-01 | | pCi/g | | 1.13E-01 | | |
| | | RADIUM-226 | 9.21E-01 +- 1.9E-01 | | pCi/g | | 1.10E-01 | | |
| | | THALLIUM-208 | 3.14E-01 +- 8.0E-02 | | pCi/g | | 5.48E-02 | | |
| | 9526-0001-018 F | | | | | | | | |
| | FMVT01AA | ACTINIUM-228 | 1.44E+00 +- 3.8E-01 | | pCi/g | | 2.15E-01 | | |
| | | AG-108M | -1.52E-02 +- 2.9E-02 | U | pCi/g | | 4.76E-02 | 2.86E-01 | |
| | | AMERICIUM-241 | 7.18E-03 +- 8.7E-02 | U | pCi/g | | 1.34E-01 | 1.03E+00 | |
| | | BISMUTH-212 | 2.37E+00 +- 1.0E+00 | U | pCi/g | | 1.27E+00 | | |
| | | BISMUTH-214 | 1.44E+00 +- 2.4E-01 | | pCi/g | | 1.06E-01 | | |
| | | COBALT-60 | 1.41E-02 +- 3.7E-02 | U | pCi/g | | 7.07E-02 | 1.50E-01 | |
| | | CESIUM-134 | 1.20E-01 +- 7.5E-02 | U | pCi/g | | 9.72E-02 | 1.90E-01 | |
| | | CESIUM-137 | 2.98E-02 +- 4.3E-02 | U | pCi/g | | 7.96E-02 | 3.20E-01 | |
| | | EUROPIUM-152 | -5.92E-02 +- 9.2E-02 | U | pCi/g | | 1.52E-01 | 4.04E-01 | |
| | | EUROPIUM-154 | -2.62E-02 +- 1.1E-01 | U | pCi/g | | 1.89E-01 | 3.70E-01 | |
| | | EUROPIUM-155 | 7.80E-02 +- 1.0E-01 | U | pCi/g | | 1.76E-01 | 1.57E+01 | |
| | | POTASSIUM-40 | 1.21E+01 +- 2.0E+00 | | pCi/g | | 5.31E-01 | | |
| | | MANGANESE-54 | 1.42E-02 +- 3.6E-02 | U | pCi/g | | 6.69E-02 | 6.96E-01 | |
| | | NIOBIUM-94 | -5.37E-03 +- 3.3E-02 | U | pCi/g | | 5.82E-02 | 2.85E-01 | |

STL Richland

rptSTLRchSaSummary2 V4.03 A97

RER2 - Replicate Error Ratio = (S-D)/[sqrt(sq(TPUs)+sq(TPUd))] as defined by ICPT BOA.

U Qual - Analyzed for, but the result is less than the Mdc/Mda/Total Uncert or gamma scan software did not identify the nuclide.

# Sample Results Summary

Date: 29-May-03

## STL Richland STLRL

Ordered by Method, Batch No., Client Sample ID.

Report No. : 22709

SDG No: 22862

| Batch | Client Id Work Order | Parameter | Result +- Uncertainty ( 2s) | Qual | Units | Yield | MDC or MDA | CRDL | RER2 |
|---|---|---|---|---|---|---|---|---|---|
| 3122327 | E901.1 | | | | | | | | |
| | 9526-0001-018 F | | | | | | | | |
| | FMVT01AA | LEAD-212 | 1.57E+00 +- 2.8E-01 | | pCi/g | | 9.56E-02 | | |
| | | LEAD-214 | 1.44E+00 +- 2.7E-01 | | pCi/g | | 1.22E-01 | | |
| | | RADIUM-226 | 1.44E+00 +- 2.4E-01 | | pCi/g | | 1.06E-01 | | |
| | | THALLIUM-208 | 4.73E-01 +- 1.1E-01 | | pCi/g | | 5.89E-02 | | |
| | 9526-0001-019 F | | | | | | | | |
| | FMVTR1AA | ACTINIUM-228 | 1.56E+00 +- 3.6E-01 | | pCi/g | | 2.38E-01 | | |
| | | AG-108M | 1.33E-02 +- 3.4E-02 | U | pCi/g | | 6.14E-02 | 2.86E-01 | |
| | | AMERICIUM-241 | 5.52E-02 +- 1.4E-01 | U | pCi/g | | 2.49E-01 | 1.03E+00 | |
| | | BISMUTH-212 | 2.16E+00 +- 7.8E-01 | U | pCi/g | | 1.39E+00 | | |
| | | BISMUTH-214 | 1.34E+00 +- 2.6E-01 | | pCi/g | | 1.25E-01 | | |
| | | COBALT-60 | -7.56E-05 +- 3.8E-02 | U | pCi/g | | 7.04E-02 | 1.50E-01 | |
| | | CESIUM-134 | 7.29E-02 +- 6.4E-02 | U | pCi/g | | 1.04E-01 | 1.90E-01 | |
| | | CESIUM-137 | 3.73E-02 +- 4.5E-02 | U | pCi/g | | 8.48E-02 | 3.20E-01 | |
| | | EUROPIUM-152 | -1.23E-02 +- 1.1E-01 | U | pCi/g | | 1.88E-01 | 4.04E-01 | |
| | | EUROPIUM-154 | 1.33E-02 +- 1.2E-01 | U | pCi/g | | 2.18E-01 | 3.70E-01 | |
| | | EUROPIUM-155 | 4.96E-02 +- 1.2E-01 | U | pCi/g | | 2.01E-01 | 1.57E+01 | |
| | | POTASSIUM-40 | 1.27E+01 +- 2.1E+00 | | pCi/g | | 6.08E-01 | | |
| | | MANGANESE-54 | -2.31E-02 +- 4.9E-02 | U | pCi/g | | 8.42E-02 | 6.96E-01 | |
| | | NIOBIUM-94 | -1.96E-02 +- 3.3E-02 | U | pCi/g | | 5.64E-02 | 2.85E-01 | |
| | | LEAD-212 | 1.57E+00 +- 2.8E-01 | | pCi/g | | 1.08E-01 | | |
| | | LEAD-214 | 1.47E+00 +- 2.8E-01 | | pCi/g | | 1.36E-01 | | |
| | | RADIUM-226 | 1.34E+00 +- 2.6E-01 | | pCi/g | | 1.25E-01 | | |
| | | THALLIUM-208 | 5.33E-01 +- 1.2E-01 | | pCi/g | | 7.03E-02 | | |
| | 9526-0001-020 F | | | | | | | | |
| | FMVTN1AA | ACTINIUM-228 | 1.46E+00 +- 3.2E-01 | | pCi/g | | 2.31E-01 | | |
| | | AG-108M | -1.89E-02 +- 3.2E-02 | U | pCi/g | | 5.33E-02 | 2.86E-01 | |
| | | AMERICIUM-241 | 1.65E-01 +- 1.2E-01 | U | pCi/g | | 2.15E-01 | 1.03E+00 | |
| | | BISMUTH-212 | 2.55E+00 +- 9.0E-01 | U | pCi/g | | 1.37E+00 | | |
| | | BISMUTH-214 | 1.41E+00 +- 2.6E-01 | | pCi/g | | 1.26E-01 | | |
| | | COBALT-60 | 2.50E-02 +- 3.7E-02 | U | pCi/g | | 7.49E-02 | 1.50E-01 | |
| | | CESIUM-134 | 1.15E-01 +- 5.8E-02 | U | pCi/g | | 9.29E-02 | 1.90E-01 | |
| | | CESIUM-137 | 5.83E-01 +- 1.3E-01 | | pCi/g | | 6.65E-02 | 3.20E-01 | |
| | | EUROPIUM-152 | -3.05E-02 +- 1.1E-01 | U | pCi/g | | 1.82E-01 | 4.04E-01 | |
| | | EUROPIUM-154 | -4.55E-02 +- 1.1E-01 | U | pCi/g | | 1.96E-01 | 3.70E-01 | |
| | | EUROPIUM-155 | 1.12E-01 +- 1.0E-01 | U | pCi/g | | 1.80E-01 | 1.57E+01 | |
| | | POTASSIUM-40 | 1.12E+01 +- 1.9E+00 | | pCi/g | | 6.14E-01 | | |
| | | MANGANESE-54 | -1.18E-02 +- 4.2E-02 | U | pCi/g | | 7.10E-02 | 6.96E-01 | |

STL Richland

rptSTLRchSaSummary2 V4.03 A97

RER2 - Replicate Error Ratio = (S-D)/[sqrt(sq(TPUs)+sq(TPUd))] as defined by ICPT BOA.

U Qual - Analyzed for, but the result is less than the Mdc/Mda|Total Uncert or gamma scan software did not identify the nuclide.

# Sample Results Summary

Date: 29-May-03

## STL Richland STLRL

Ordered by Method, Batch No., Client Sample ID.

Report No. : 22709

SDG No: 22862

| Batch | Client Id Work Order | Parameter | Result +- Uncertainty ( 2s) | Qual | Units | Yield | MDC or MDA | CRDL | RER2 |
|---|---|---|---|---|---|---|---|---|---|
| 3122327 | E901.1 | | | | | | | | |
| 9526-0001-020 | F | | | | | | | | |
| | FMVTN1AA | NIOBIUM-94 | -3.21E-02 +- 3.6E-02 | U | pCi/g | | 5.83E-02 | 2.85E-01 | |
| | | LEAD-212 | 1.55E+00 +- 2.9E-01 | | pCi/g | | 9.75E-02 | | |
| | | LEAD-214 | 1.56E+00 +- 3.3E-01 | | pCi/g | | 1.29E-01 | | |
| | | RADIUM-226 | 1.41E+00 +- 2.6E-01 | | pCi/g | | 1.26E-01 | | |
| | | THALLIUM-208 | 4.92E-01 +- 1.0E-01 | | pCi/g | | 6.42E-02 | | |
| 9526-0001-021 | F | | | | | | | | |
| | FMVT31AA | ACTINIUM-228 | 1.32E+00 +- 3.5E-01 | U | pCi/g | | 5.52E-01 | | |
| | | AG-108M | 1.18E-02 +- 4.1E-02 | U | pCi/g | | 7.39E-02 | 2.86E-01 | |
| | | AMERICIUM-241 | -3.94E-01 +- 5.2E-01 | U | pCi/g | | 8.55E-01 | 1.03E+00 | |
| | | BISMUTH-212 | 2.42E+00 +- 8.7E-01 | U | pCi/g | | 1.68E+00 | | |
| | | BISMUTH-214 | 1.50E+00 +- 2.7E-01 | U | pCi/g | | 3.72E-01 | | |
| | | COBALT-60 | 1.04E-03 +- 4.5E-02 | U | pCi/g | | 8.30E-02 | 1.50E-01 | |
| | | CESIUM-134 | 8.67E-02 +- 5.7E-02 | U | pCi/g | | 1.11E-01 | 1.90E-01 | |
| | | CESIUM-137 | 6.60E-01 +- 1.2E-01 | | pCi/g | | 9.45E-02 | 3.20E-01 | |
| | | EUROPIUM-152 | 1.22E-02 +- 2.0E-01 | U | pCi/g | | 2.47E-01 | 4.04E-01 | |
| | | EUROPIUM-154 | -1.78E-02 +- 1.3E-01 | U | pCi/g | | 2.39E-01 | 3.70E-01 | |
| | | EUROPIUM-155 | -1.74E-01 +- 2.0E-01 | U | pCi/g | | 3.30E-01 | 1.57E+01 | |
| | | POTASSIUM-40 | 1.03E+01 +- 1.9E+00 | | pCi/g | | 7.39E-01 | | |
| | | MANGANESE-54 | 8.38E-03 +- 5.0E-02 | U | pCi/g | | 9.03E-02 | 6.96E-01 | |
| | | NIOBIUM-94 | 2.39E-02 +- 4.1E-02 | U | pCi/g | | 7.89E-02 | 2.85E-01 | |
| | | LEAD-212 | 1.72E+00 +- 3.6E-01 | | pCi/g | | 1.41E-01 | | |
| | | LEAD-214 | 1.34E+00 +- 3.0E-01 | | pCi/g | | 1.77E-01 | | |
| | | RADIUM-226 | 1.50E+00 +- 2.7E-01 | U | pCi/g | | 3.72E-01 | | |
| | | THALLIUM-208 | 4.83E-01 +- 1.1E-01 | U | pCi/g | | 1.74E-01 | | |
| 9526-0001-022 | F | | | | | | | | |
| | FMVT81AA | ACTINIUM-228 | 1.17E+00 +- 3.4E-01 | U | pCi/g | | 5.05E-01 | | |
| | | AG-108M | 2.73E-02 +- 3.5E-02 | U | pCi/g | | 6.42E-02 | 2.86E-01 | |
| | | AMERICIUM-241 | 5.38E-02 +- 4.7E-01 | U | pCi/g | | 7.94E-01 | 1.03E+00 | |
| | | BISMUTH-212 | 1.37E+00 +- 6.4E-01 | U | pCi/g | | 1.25E+00 | | |
| | | BISMUTH-214 | 1.34E+00 +- 2.8E-01 | U | pCi/g | | 3.36E-01 | | |
| | | COBALT-60 | 3.03E-03 +- 3.9E-02 | U | pCi/g | | 7.18E-02 | 1.50E-01 | |
| | | CESIUM-134 | 2.59E-02 +- 5.0E-02 | U | pCi/g | | 9.07E-02 | 1.90E-01 | |
| | | CESIUM-137 | 8.23E-01 +- 1.7E-01 | | pCi/g | | 7.50E-02 | 3.20E-01 | |
| | | EUROPIUM-152 | 9.94E-02 +- 1.9E-01 | U | pCi/g | | 2.20E-01 | 4.04E-01 | |
| | | EUROPIUM-154 | -9.40E-02 +- 1.3E-01 | U | pCi/g | | 2.11E-01 | 3.70E-01 | |
| | | EUROPIUM-155 | -1.62E-01 +- 1.8E-01 | U | pCi/g | | 2.90E-01 | 1.57E+01 | |
| | | POTASSIUM-40 | 9.98E+00 +- 1.8E+00 | | pCi/g | | 6.52E-01 | | |

STL Richland

rptSTLRchSaSummary2 V4.03 A97

RER2 - Replicate Error Ratio = (S-D)/[sqrt(sq(TPUs)+sq(TPUd))] as defined by ICPT BOA.

U Qual - Analyzed for, but the result is less than the Mdc/Mda/Total Uncert or gamma scan software did not identify the nuclide.

# Sample Results Summary

## STL Richland STLRL

Ordered by Method, Batch No., Client Sample ID.

Date: 29-May-03

Report No. : 22709

SDG No: 22862

| Batch | Client Id Work Order | Parameter | Result +- Uncertainty ( 2s) | Qual | Units | Yield | MDC or MDA | CRDL | RER2 |
|---|---|---|---|---|---|---|---|---|---|
| 3122327 | E901.1 | | | | | | | | |
| | 9526-0001-022 F | | | | | | | | |
| | FMVT81AA | MANGANESE-54 | -2.74E-02 +- 4.6E-02 | U | pCi/g | | 7.76E-02 | 6.96E-01 | |
| | | NIOBIUM-94 | 1.34E-02 +- 3.6E-02 | U | pCi/g | | 6.75E-02 | 2.85E-01 | |
| | | LEAD-212 | 1.21E+00 +- 2.6E-01 | | pCi/g | | 1.29E-01 | | |
| | | LEAD-214 | 1.62E+00 +- 3.0E-01 | | pCi/g | | 1.47E-01 | | |
| | | RADIUM-226 | 1.34E+00 +- 2.8E-01 | U | pCi/g | | 3.36E-01 | | |
| | | THALLIUM-208 | 4.22E-01 +- 1.1E-01 | U | pCi/g | | 1.48E-01 | | |
| | 9526-0002-025 F | | | | | | | | |
| | FMVRV1AA | ACTINIUM-228 | 1.15E+00 +- 2.9E-01 | | pCi/g | | 2.04E-01 | | |
| | | AG-108M | 8.30E-04 +- 3.0E-02 | U | pCi/g | | 5.32E-02 | 2.86E-01 | |
| | | AMERICIUM-241 | 1.47E-03 +- 3.8E-01 | U | pCi/g | | 6.37E-01 | 1.03E+00 | |
| | | BISMUTH-212 | 1.67E+00 +- 6.1E-01 | U | pCi/g | | 1.15E+00 | | |
| | | BISMUTH-214 | 1.24E+00 +- 2.2E-01 | | pCi/g | | 1.19E-01 | | |
| | | COBALT-60 | -1.28E-02 +- 3.2E-02 | U | pCi/g | | 5.55E-02 | 1.50E-01 | |
| | | CESIUM-134 | 5.93E-02 +- 4.0E-02 | U | pCi/g | | 7.59E-02 | 1.90E-01 | |
| | | CESIUM-137 | 5.28E-01 +- 9.8E-02 | | pCi/g | | 6.32E-02 | 3.20E-01 | |
| | | EUROPIUM-152 | 6.10E-02 +- 1.3E-01 | U | pCi/g | | 1.78E-01 | 4.04E-01 | |
| | | EUROPIUM-154 | -4.74E-02 +- 1.1E-01 | U | pCi/g | | 1.81E-01 | 3.70E-01 | |
| | | EUROPIUM-155 | 3.92E-02 +- 1.5E-01 | U | pCi/g | | 2.57E-01 | 1.57E+01 | |
| | | POTASSIUM-40 | 1.29E+01 +- 1.9E+00 | | pCi/g | | 5.20E-01 | | |
| | | MANGANESE-54 | -1.84E-02 +- 3.7E-02 | U | pCi/g | | 6.25E-02 | 6.96E-01 | |
| | | NIOBIUM-94 | 7.78E-03 +- 2.8E-02 | U | pCi/g | | 5.09E-02 | 2.85E-01 | |
| | | LEAD-212 | 1.14E+00 +- 2.3E-01 | | pCi/g | | 9.75E-02 | | |
| | | LEAD-214 | 1.42E+00 +- 2.5E-01 | | pCi/g | | 1.25E-01 | | |
| | | RADIUM-226 | 1.24E+00 +- 2.2E-01 | | pCi/g | | 1.19E-01 | | |
| | | THALLIUM-208 | 4.05E-01 +- 9.5E-02 | | pCi/g | | 6.04E-02 | | |
| | 9526-0002-025 F DUP | | | | | | | | |
| | FMVRV1AC | ACTINIUM-228 | 1.21E+00 +- 2.5E-01 | | pCi/g | | 1.78E-01 | | |
| | | AG-108M | 2.57E-02 +- 2.6E-02 | U | pCi/g | | 4.73E-02 | 2.86E-01 | |
| | | AMERICIUM-241 | 1.72E-02 +- 7.5E-02 | U | pCi/g | | 1.07E-01 | 1.03E+00 | |
| | | BISMUTH-212 | 1.62E+00 +- 7.0E-01 | U | pCi/g | | 1.01E+00 | | |
| | | BISMUTH-214 | 1.30E+00 +- 2.2E-01 | | pCi/g | | 9.28E-02 | | |
| | | COBALT-60 | -3.59E-02 +- 3.0E-02 | U | pCi/g | | 4.44E-02 | 1.50E-01 | |
| | | CESIUM-134 | 4.03E-02 +- 3.6E-02 | U | pCi/g | | 6.79E-02 | 1.90E-01 | |
| | | CESIUM-137 | 5.06E-01 +- 9.7E-02 | | pCi/g | | 5.47E-02 | 3.20E-01 | |
| | | EUROPIUM-152 | -2.51E-02 +- 7.7E-02 | U | pCi/g | | 1.31E-01 | 4.04E-01 | |
| | | EUROPIUM-154 | -7.84E-02 +- 9.1E-02 | U | pCi/g | | 1.45E-01 | 3.70E-01 | |
| | | EUROPIUM-155 | 6.29E-02 +- 8.4E-02 | U | pCi/g | | 1.46E-01 | 1.57E+01 | |

STL Richland

rptSTLRchSaSummary2 V4.03 A97

RER2 - Replicate Error Ratio = (S-D)/[sqrt(sq(TPUs)+sq(TPUd))] as defined by ICPT BOA.

*U Qual - Analyzed for, but the result is less than the Mdc/Mda|Total Uncert or gamma scan software did not identify the nuclide.*

# Sample Results Summary

Date: 29-May-03

## STL Richland STLRL

Ordered by Method, Batch No., Client Sample ID.

Report No. : 22709

SDG No: 22862

| Batch | Client Id Work Order | Parameter | Result +- Uncertainty ( 2s) | Qual | Units | Yield | MDC or MDA | CRDL | RER2 |
|---|---|---|---|---|---|---|---|---|---|
| 3122327 | E901.1 | | | | | | | | |
| | 9526-0002-025 F DUP | | | | | | | | |
| | FMVRV1AC | POTASSIUM-40 | 1.25E+01 +- 1.8E+00 | | pCi/g | | 4.10E-01 | | |
| | | MANGANESE-54 | -1.65E-02 +- 3.1E-02 | U | pCi/g | | 5.17E-02 | 6.96E-01 | |
| | | NIOBIUM-94 | -3.34E-03 +- 2.7E-02 | U | pCi/g | | 4.71E-02 | 2.85E-01 | |
| | | LEAD-212 | 1.12E+00 +- 2.0E-01 | | pCi/g | | 7.75E-02 | | |
| | | LEAD-214 | 1.39E+00 +- 2.3E-01 | | pCi/g | | 9.45E-02 | | |
| | | RADIUM-226 | 1.30E+00 +- 2.2E-01 | | pCi/g | | 9.28E-02 | | |
| | | THALLIUM-208 | 3.38E-01 +- 8.5E-02 | | pCi/g | | 4.95E-02 | | |
| | 9526-0002-026 F | | | | | | | | |
| | FMVR21AA | ACTINIUM-228 | 1.30E+00 +- 3.7E-01 | U | pCi/g | | 5.53E-01 | | |
| | | AG-108M | 6.95E-03 +- 3.6E-02 | U | pCi/g | | 6.40E-02 | 2.86E-01 | |
| | | AMERICIUM-241 | 1.19E-01 +- 9.1E-02 | U | pCi/g | | 1.47E-01 | 1.03E+00 | |
| | | BISMUTH-212 | 1.94E+00 +- 7.3E-01 | U | pCi/g | | 1.44E+00 | | |
| | | BISMUTH-214 | 1.88E+00 +- 3.2E-01 | | pCi/g | | 1.35E-01 | | |
| | | COBALT-60 | 5.35E-03 +- 4.2E-02 | U | pCi/g | | 7.91E-02 | 1.50E-01 | |
| | | CESIUM-134 | 9.05E-02 +- 5.2E-02 | U | pCi/g | | 1.03E-01 | 1.90E-01 | |
| | | CESIUM-137 | 9.80E-01 +- 1.7E-01 | | pCi/g | | 9.16E-02 | 3.20E-01 | |
| | | EUROPIUM-152 | -1.01E-01 +- 1.2E-01 | U | pCi/g | | 1.96E-01 | 4.04E-01 | |
| | | EUROPIUM-154 | -1.11E-02 +- 1.1E-01 | U | pCi/g | | 2.05E-01 | 3.70E-01 | |
| | | EUROPIUM-155 | 1.12E-01 +- 1.1E-01 | U | pCi/g | | 1.90E-01 | 1.57E+01 | |
| | | POTASSIUM-40 | 1.27E+01 +- 2.1E+00 | | pCi/g | | 5.09E-01 | | |
| | | MANGANESE-54 | 3.34E-02 +- 4.7E-02 | U | pCi/g | | 8.67E-02 | 6.96E-01 | |
| | | NIOBIUM-94 | -6.64E-03 +- 3.7E-02 | U | pCi/g | | 6.62E-02 | 2.85E-01 | |
| | | LEAD-212 | 1.41E+00 +- 2.7E-01 | | pCi/g | | 1.11E-01 | | |
| | | LEAD-214 | 2.34E+00 +- 4.0E-01 | | pCi/g | | 1.50E-01 | | |
| | | RADIUM-226 | 1.88E+00 +- 3.2E-01 | | pCi/g | | 1.35E-01 | | |
| | | THALLIUM-208 | 4.83E-01 +- 1.1E-01 | | pCi/g | | 7.10E-02 | | |
| | 9526-0002-027 F | | | | | | | | |
| | FMVR31AA | ACTINIUM-228 | 1.46E+00 +- 3.5E-01 | | pCi/g | | 2.90E-01 | | |
| | | AG-108M | -2.49E-02 +- 4.3E-02 | U | pCi/g | | 7.27E-02 | 2.86E-01 | |
| | | AMERICIUM-241 | -2.91E-01 +- 5.1E-01 | U | pCi/g | | 8.42E-01 | 1.03E+00 | |
| | | BISMUTH-212 | 1.25E+00 +- 7.6E-01 | U | pCi/g | | 1.45E+00 | | |
| | | BISMUTH-214 | 1.66E+00 +- 3.1E-01 | U | pCi/g | | 3.94E-01 | | |
| | | COBALT-60 | 1.97E-03 +- 4.5E-02 | U | pCi/g | | 8.18E-02 | 1.50E-01 | |
| | | CESIUM-134 | 3.55E-02 +- 5.3E-02 | U | pCi/g | | 9.80E-02 | 1.90E-01 | |
| | | CESIUM-137 | 6.98E-01 +- 1.4E-01 | | pCi/g | | 1.13E-01 | 3.20E-01 | |
| | | EUROPIUM-152 | 6.77E-03 +- 2.1E-01 | U | pCi/g | | 2.42E-01 | 4.04E-01 | |
| | | EUROPIUM-154 | -3.70E-02 +- 1.3E-01 | U | pCi/g | | 2.22E-01 | 3.70E-01 | |

STL Richland

rptSTLRchSaSummary2 V4.03 A97

RER2 - Replicate Error Ratio = (S-D)/[sqrt(sq(TPUs)+sq(TPUd))] as defined by ICPT BOA.

U Qual - Analyzed for, but the result is less than the Mdc/Mda/Total Uncert or gamma scan software did not identify the nuclide.

# Sample Results Summary

Date: 29-May-03

## STL Richland STLRL

Ordered by Method, Batch No., Client Sample ID.

Report No. : 22709

SDG No: 22862

| Batch | Client Id Work Order | Parameter | Result +- Uncertainty ( 2s) | Qual | Units | Yield | MDC or MDA | CRDL | RER2 |
|---|---|---|---|---|---|---|---|---|---|
| 3122327 E901.1 | | | | | | | | | |
| 9526-0002-027 F | | | | | | | | | |
| | FMVR31AA | EUROPIUM-155 | 1.96E-01 +- 2.0E-01 | U | pCi/g | | 3.50E-01 | 1.57E+01 | |
| | | POTASSIUM-40 | 1.03E+01 +- 1.8E+00 | | pCi/g | | 7.19E-01 | | |
| | | MANGANESE-54 | -1.03E-02 +- 4.8E-02 | U | pCi/g | | 8.49E-02 | 6.96E-01 | |
| | | NIOBIUM-94 | 1.21E-02 +- 4.1E-02 | U | pCi/g | | 7.68E-02 | 2.85E-01 | |
| | | LEAD-212 | 9.30E-01 +- 2.5E-01 | | pCi/g | | 2.07E-01 | | |
| | | LEAD-214 | 1.98E+00 +- 3.7E-01 | | pCi/g | | 1.75E-01 | | |
| | | RADIUM-226 | 1.66E+00 +- 3.1E-01 | U | pCi/g | | 3.94E-01 | | |
| | | THALLIUM-208 | 3.75E-01 +- 1.3E-01 | U | pCi/g | | 1.61E-01 | | |
| 9526-0002-028 F | | | | | | | | | |
| | FMVR61AA | ACTINIUM-228 | 1.44E+00 +- 3.1E-01 | | pCi/g | | 2.22E-01 | | |
| | | AG-108M | -7.93E-03 +- 3.5E-02 | U | pCi/g | | 6.08E-02 | 2.86E-01 | |
| | | AMERICIUM-241 | 1.84E-02 +- 8.5E-02 | U | pCi/g | | 1.40E-01 | 1.03E+00 | |
| | | BISMUTH-212 | 1.25E+00 +- 6.7E-01 | U | pCi/g | | 1.30E+00 | | |
| | | BISMUTH-214 | 1.29E+00 +- 2.7E-01 | U | pCi/g | | 3.65E-01 | | |
| | | COBALT-60 | 1.82E-02 +- 4.3E-02 | U | pCi/g | | 8.24E-02 | 1.50E-01 | |
| | | CESIUM-134 | 8.53E-02 +- 4.9E-02 | U | pCi/g | | 9.80E-02 | 1.90E-01 | |
| | | CESIUM-137 | 7.10E-01 +- 1.3E-01 | | pCi/g | | 7.76E-02 | 3.20E-01 | |
| | | EUROPIUM-152 | -3.18E-02 +- 1.2E-01 | U | pCi/g | | 1.96E-01 | 4.04E-01 | |
| | | EUROPIUM-154 | -8.24E-02 +- 1.3E-01 | U | pCi/g | | 2.17E-01 | 3.70E-01 | |
| | | EUROPIUM-155 | 1.14E-01 +- 1.0E-01 | U | pCi/g | | 1.82E-01 | 1.57E+01 | |
| | | POTASSIUM-40 | 9.73E+00 +- 1.8E+00 | | pCi/g | | 6.11E-01 | | |
| | | MANGANESE-54 | 1.70E-02 +- 4.4E-02 | U | pCi/g | | 7.98E-02 | 6.96E-01 | |
| | | NIOBIUM-94 | -1.17E-02 +- 3.2E-02 | U | pCi/g | | 5.66E-02 | 2.85E-01 | |
| | | LEAD-212 | 1.26E+00 +- 2.4E-01 | | pCi/g | | 1.13E-01 | | |
| | | LEAD-214 | 1.81E+00 +- 3.2E-01 | | pCi/g | | 1.31E-01 | | |
| | | RADIUM-226 | 1.29E+00 +- 2.7E-01 | | pCi/g | | 1.31E-01 | | |
| | | THALLIUM-208 | 3.98E-01 +- 9.6E-02 | | pCi/g | | 7.75E-02 | | |
| 9526-0002-029 F | | | | | | | | | |
| | FMVR71AA | ACTINIUM-228 | 1.05E+00 +- 2.6E-01 | | pCi/g | | 2.03E-01 | | |
| | | AG-108M | 8.13E-03 +- 2.6E-02 | U | pCi/g | | 4.62E-02 | 2.86E-01 | |
| | | AMERICIUM-241 | -4.59E-02 +- 9.9E-02 | U | pCi/g | | 1.68E-01 | 1.03E+00 | |
| | | BISMUTH-212 | 1.24E+00 +- 7.1E-01 | U | pCi/g | | 1.06E+00 | | |
| | | BISMUTH-214 | 1.08E+00 +- 2.0E-01 | U | pCi/g | | 2.76E-01 | | |
| | | COBALT-60 | -3.68E-05 +- 3.3E-02 | U | pCi/g | | 6.20E-02 | 1.50E-01 | |
| | | CESIUM-134 | 4.52E-02 +- 4.4E-02 | U | pCi/g | | 8.24E-02 | 1.90E-01 | |
| | | CESIUM-137 | 7.02E-01 +- 1.2E-01 | | pCi/g | | 6.26E-02 | 3.20E-01 | |
| | | EUROPIUM-152 | 2.61E-02 +- 8.9E-02 | U | pCi/g | | 1.58E-01 | 4.04E-01 | |

STL Richland

rptSTLRchSaSummary2 V4.03 A97

RER2 - Replicate Error Ratio = (S-D)/[sqrt(sq(TPUs)+sq(TPUd))] as defined by ICPT BOA.

U Qual - Analyzed for, but the result is less than the Mdc/Mda/Total Uncert or gamma scan software did not identify the nuclide.

# Sample Results Summary

Date: 29-May-03

## STL Richland STLRL

Ordered by Method, Batch No., Client Sample ID.

Report No. : 22709

SDG No: 22862

| Batch | Client Id Work Order | Parameter | Result +- Uncertainty ( 2s) | Qual | Units | Yield | MDC or MDA | CRDL | RER2 |
|---|---|---|---|---|---|---|---|---|---|
| 3122327 E901.1 | | | | | | | | | |
| 9526-0002-029 F | | | | | | | | | |
| | FMVR71AA | EUROPIUM-154 | -4.34E-02 +- 1.0E-01 | U | pCi/g | | 1.74E-01 | 3.70E-01 | |
| | | EUROPIUM-155 | 4.48E-02 +- 8.5E-02 | U | pCi/g | | 1.46E-01 | 1.57E+01 | |
| | | POTASSIUM-40 | 8.70E+00 +- 1.6E+00 | | pCi/g | | 5.26E-01 | | |
| | | MANGANESE-54 | 2.54E-02 +- 3.4E-02 | U | pCi/g | | 6.42E-02 | 6.96E-01 | |
| | | NIOBIUM-94 | -2.80E-02 +- 3.2E-02 | U | pCi/g | | 5.32E-02 | 2.85E-01 | |
| | | LEAD-212 | 9.96E-01 +- 1.9E-01 | | pCi/g | | 8.45E-02 | | |
| | | LEAD-214 | 1.13E+00 +- 2.5E-01 | | pCi/g | | 1.07E-01 | | |
| | | RADIUM-226 | 1.08E+00 +- 2.0E-01 | | pCi/g | | 1.09E-01 | | |
| | | THALLIUM-208 | 3.70E-01 +- 8.8E-02 | | pCi/g | | 5.04E-02 | | |
| 3122330 E901.1 | | | | | | | | | |
| 9526-0001-001 F,FS | | | | | | | | | |
| | FMVV91AA | ACTINIUM-228 | 8.79E-01 +- 2.6E-01 | | pCi/g | | 2.36E-01 | | |
| | | AG-108M | 1.47E-02 +- 4.0E-02 | U | pCi/g | | 6.95E-02 | 2.86E-01 | |
| | | AMERICIUM-241 | -1.34E-01 +- 4.6E-01 | U | pCi/g | | 7.67E-01 | 1.03E+00 | |
| | | BISMUTH-212 | 1.66E+00 +- 8.4E-01 | U | pCi/g | | 1.31E+00 | | |
| | | BISMUTH-214 | 1.24E+00 +- 2.9E-01 | U | pCi/g | | 3.40E-01 | | |
| | | COBALT-60 | 8.60E-03 +- 4.0E-02 | U | pCi/g | | 7.57E-02 | 1.50E-01 | |
| | | CESIUM-134 | 5.22E-02 +- 5.2E-02 | U | pCi/g | | 9.90E-02 | 1.90E-01 | |
| | | CESIUM-137 | 1.10E+00 +- 1.8E-01 | | pCi/g | | 7.50E-02 | 3.20E-01 | |
| | | EUROPIUM-152 | -1.27E-01 +- 2.2E-01 | U | pCi/g | | 2.07E-01 | 4.04E-01 | |
| | | EUROPIUM-154 | -6.20E-02 +- 1.4E-01 | U | pCi/g | | 2.35E-01 | 3.70E-01 | |
| | | EUROPIUM-155 | -6.81E-02 +- 1.8E-01 | U | pCi/g | | 2.99E-01 | 1.57E+01 | |
| | | POTASSIUM-40 | 1.05E+01 +- 1.8E+00 | | pCi/g | | 7.62E-01 | | |
| | | MANGANESE-54 | 2.17E-02 +- 4.3E-02 | U | pCi/g | | 8.01E-02 | 6.96E-01 | |
| | | NIOBIUM-94 | 1.96E-02 +- 3.9E-02 | U | pCi/g | | 7.24E-02 | 2.85E-01 | |
| | | LEAD-212 | 9.06E-01 +- 2.1E-01 | | pCi/g | | 1.19E-01 | | |
| | | LEAD-214 | 1.33E+00 +- 2.9E-01 | | pCi/g | | 1.57E-01 | | |
| | | RADIUM-226 | 1.24E+00 +- 2.9E-01 | | pCi/g | | 1.32E-01 | | |
| | | THALLIUM-208 | 3.85E-01 +- 1.3E-01 | U | pCi/g | | 1.38E-01 | | |
| 9526-0001-002 F | | | | | | | | | |
| | FMVWG1AA | ACTINIUM-228 | 9.87E-01 +- 2.9E-01 | | pCi/g | | 2.29E-01 | | |
| | | AG-108M | 1.03E-02 +- 3.9E-02 | U | pCi/g | | 6.93E-02 | 2.86E-01 | |
| | | AMERICIUM-241 | -3.04E-02 +- 8.5E-02 | U | pCi/g | | 1.28E-01 | 1.03E+00 | |
| | | BISMUTH-212 | 7.68E-01 +- 8.7E-01 | U | pCi/g | | 1.33E+00 | | |
| | | BISMUTH-214 | 1.23E+00 +- 2.4E-01 | U | pCi/g | | 3.42E-01 | | |
| | | COBALT-60 | -2.91E-02 +- 3.8E-02 | U | pCi/g | | 6.11E-02 | 1.50E-01 | |
| | | CESIUM-134 | 8.85E-02 +- 5.1E-02 | U | pCi/g | | 1.02E-01 | 1.90E-01 | |

STL Richland

rptSTLRchSaSummary2 V4.03 A97

RER2 - Replicate Error Ratio = (S-D)/[sqrt(sq(TPUs)+sq(TPUd))] as defined by ICPT BOA.

U Qual - Analyzed for, but the result is less than the Mdc/Mda|Total Uncert or gamma scan software did not identify the nuclide.

# Sample Results Summary

Date: 29-May-03

## STL Richland STLRL

Ordered by Method, Batch No., Client Sample ID.

Report No. : 22709

SDG No: 22862

| Batch | Client Id Work Order | Parameter | Result +- Uncertainty ( 2s) | Qual | Units | Yield | MDC or MDA | CRDL | RER2 |
|---|---|---|---|---|---|---|---|---|---|
| 3122330 E901.1 | | | | | | | | | |
| | 9526-0001-002 F | | | | | | | | |
| | FMVWG1AA | CESIUM-137 | 1.87E+00 +- 2.7E-01 | | pCi/g | | 7.18E-02 | 3.20E-01 | |
| | | EUROPIUM-152 | -9.92E-02 +- 1.2E-01 | U | pCi/g | | 2.05E-01 | 4.04E-01 | |
| | | EUROPIUM-154 | 4.29E-02 +- 1.2E-01 | U | pCi/g | | 2.34E-01 | 3.70E-01 | |
| | | EUROPIUM-155 | 8.73E-02 +- 1.1E-01 | U | pCi/g | | 1.83E-01 | 1.57E+01 | |
| | | POTASSIUM-40 | 9.08E+00 +- 1.8E+00 | | pCi/g | | 7.59E-01 | | |
| | | MANGANESE-54 | -2.04E-02 +- 4.2E-02 | U | pCi/g | | 7.28E-02 | 6.96E-01 | |
| | | NIOBIUM-94 | -1.23E-02 +- 4.0E-02 | U | pCi/g | | 6.93E-02 | 2.85E-01 | |
| | | LEAD-212 | 1.09E+00 +- 2.3E-01 | | pCi/g | | 1.65E-01 | | |
| | | LEAD-214 | 1.18E+00 +- 2.6E-01 | | pCi/g | | 1.65E-01 | | |
| | | RADIUM-226 | 1.23E+00 +- 2.4E-01 | | pCi/g | | 1.21E-01 | | |
| | | THALLIUM-208 | 3.60E-01 +- 9.6E-02 | | pCi/g | | 6.72E-02 | | |
| | 9526-0001-003 F | | | | | | | | |
| | FMVVF1AA | ACTINIUM-228 | 1.37E+00 +- 3.6E-01 | | pCi/g | | 2.28E-01 | | |
| | | AG-108M | -1.31E-02 +- 3.7E-02 | U | pCi/g | | 6.30E-02 | 2.86E-01 | |
| | | AMERICIUM-241 | 5.81E-02 +- 8.4E-02 | U | pCi/g | | 1.42E-01 | 1.03E+00 | |
| | | BISMUTH-212 | 1.44E+00 +- 6.3E-01 | U | pCi/g | | 1.27E+00 | | |
| | | BISMUTH-214 | 1.28E+00 +- 2.7E-01 | U | pCi/g | | 3.49E-01 | | |
| | | COBALT-60 | -3.09E-03 +- 4.2E-02 | U | pCi/g | | 7.64E-02 | 1.50E-01 | |
| | | CESIUM-134 | 7.14E-02 +- 5.1E-02 | U | pCi/g | | 1.01E-01 | 1.90E-01 | |
| | | CESIUM-137 | 9.34E-01 +- 1.6E-01 | | pCi/g | | 8.06E-02 | 3.20E-01 | |
| | | EUROPIUM-152 | 5.49E-02 +- 1.1E-01 | U | pCi/g | | 2.04E-01 | 4.04E-01 | |
| | | EUROPIUM-154 | 3.12E-02 +- 1.1E-01 | U | pCi/g | | 2.09E-01 | 3.70E-01 | |
| | | EUROPIUM-155 | 2.27E-02 +- 1.1E-01 | U | pCi/g | | 1.81E-01 | 1.57E+01 | |
| | | POTASSIUM-40 | 1.13E+01 +- 1.9E+00 | | pCi/g | | 6.30E-01 | | |
| | | MANGANESE-54 | -1.17E-02 +- 4.5E-02 | U | pCi/g | | 7.83E-02 | 6.96E-01 | |
| | | NIOBIUM-94 | 4.45E-03 +- 3.1E-02 | U | pCi/g | | 5.79E-02 | 2.85E-01 | |
| | | LEAD-212 | 1.24E+00 +- 2.5E-01 | | pCi/g | | 1.43E-01 | | |
| | | LEAD-214 | 1.53E+00 +- 2.9E-01 | | pCi/g | | 1.37E-01 | | |
| | | RADIUM-226 | 1.28E+00 +- 2.7E-01 | | pCi/g | | 1.44E-01 | | |
| | | THALLIUM-208 | 4.22E-01 +- 9.5E-02 | | pCi/g | | 7.26E-02 | | |
| | 9526-0001-005 F | | | | | | | | |
| | FMVV41AA | ACTINIUM-228 | 1.33E+00 +- 2.9E-01 | | pCi/g | | 2.63E-01 | | |
| | | AG-108M | -2.99E-02 +- 3.3E-02 | U | pCi/g | | 5.33E-02 | 2.86E-01 | |
| | | AMERICIUM-241 | 2.10E-01 +- 1.3E-01 | U | pCi/g | | 2.16E-01 | 1.03E+00 | |
| | | BISMUTH-212 | 1.41E+00 +- 6.5E-01 | U | pCi/g | | 1.27E+00 | | |
| | | BISMUTH-214 | 1.25E+00 +- 2.4E-01 | U | pCi/g | | 3.22E-01 | | |
| | | COBALT-60 | 1.35E-02 +- 3.5E-02 | U | pCi/g | | 6.97E-02 | 1.50E-01 | |

STL Richland

rplSTLRchSaSummary2 V4.03 A97

RER2 - Replicate Error Ratio = (S-D)/[sqrt(sq(TPUs)+sq(TPUd))] as defined by ICPT BOA.

U Qual - Analyzed for, but the result is less than the Mdc/Mda/Total Uncert or gamma scan software did not identify the nuclide.

# Sample Results Summary

Date: 29-May-03

## STL Richland STLRL

Ordered by Method, Batch No., Client Sample ID.

Report No. : 22709

SDG No: 22862

| Batch | Client Id Work Order | Parameter | Result +- Uncertainty ( 2s) | Qual | Units | Yield | MDC or MDA | CRDL | RER2 |
|---|---|---|---|---|---|---|---|---|---|
| 3122330 | E901.1 | | | | | | | | |
| 9526-0001-005 F | | | | | | | | | |
| | FMVV41AA | CESIUM-134 | 6.35E-02 +- 4.8E-02 | U | pCi/g | | 9.20E-02 | 1.90E-01 | |
| | | CESIUM-137 | 4.44E-01 +- 1.1E-01 | | pCi/g | | 7.32E-02 | 3.20E-01 | |
| | | EUROPIUM-152 | -4.75E-03 +- 1.1E-01 | U | pCi/g | | 1.84E-01 | 4.04E-01 | |
| | | EUROPIUM-154 | 5.30E-02 +- 1.2E-01 | U | pCi/g | | 2.30E-01 | 3.70E-01 | |
| | | EUROPIUM-155 | 2.93E-02 +- 9.9E-02 | U | pCi/g | | 1.68E-01 | 1.57E+01 | |
| | | POTASSIUM-40 | 1.13E+01 +- 1.9E+00 | | pCi/g | | 7.20E-01 | | |
| | | MANGANESE-54 | -7.37E-03 +- 4.0E-02 | U | pCi/g | | 7.09E-02 | 6.96E-01 | |
| | | NIOBIUM-94 | 3.71E-02 +- 3.6E-02 | U | pCi/g | | 6.98E-02 | 2.85E-01 | |
| | | LEAD-212 | 1.35E+00 +- 2.5E-01 | | pCi/g | | 9.54E-02 | | |
| | | LEAD-214 | 1.47E+00 +- 2.9E-01 | | pCi/g | | 1.19E-01 | | |
| | | RADIUM-226 | 1.25E+00 +- 2.4E-01 | | pCi/g | | 1.15E-01 | | |
| | | THALLIUM-208 | 4.46E-01 +- 1.0E-01 | | pCi/g | | 6.64E-02 | | |
| 9526-0001-006 F,FS | | | | | | | | | |
| | FMVWL1AA | ACTINIUM-228 | 1.41E+00 +- 3.1E-01 | U | pCi/g | | 5.27E-01 | | |
| | | AG-108M | 1.46E-03 +- 3.8E-02 | U | pCi/g | | 6.53E-02 | 2.86E-01 | |
| | | AMERICIUM-241 | -2.14E-01 +- 4.7E-01 | U | pCi/g | | 7.80E-01 | 1.03E+00 | |
| | | BISMUTH-212 | 1.55E+00 +- 7.3E-01 | U | pCi/g | | 1.39E+00 | | |
| | | BISMUTH-214 | 1.53E+00 +- 2.8E-01 | | pCi/g | | 1.46E-01 | | |
| | | COBALT-60 | -9.99E-03 +- 4.5E-02 | U | pCi/g | | 8.03E-02 | 1.50E-01 | |
| | | CESIUM-134 | 6.18E-02 +- 5.3E-02 | U | pCi/g | | 1.00E-01 | 1.90E-01 | |
| | | CESIUM-137 | 5.09E-01 +- 1.0E-01 | | pCi/g | | 9.03E-02 | 3.20E-01 | |
| | | EUROPIUM-152 | 4.33E-02 +- 1.6E-01 | U | pCi/g | | 2.26E-01 | 4.04E-01 | |
| | | EUROPIUM-154 | -1.83E-02 +- 1.2E-01 | U | pCi/g | | 2.16E-01 | 3.70E-01 | |
| | | EUROPIUM-155 | 1.48E-01 +- 1.9E-01 | U | pCi/g | | 3.26E-01 | 1.57E+01 | |
| | | POTASSIUM-40 | 1.13E+01 +- 1.9E+00 | | pCi/g | | 6.48E-01 | | |
| | | MANGANESE-54 | -2.03E-02 +- 4.5E-02 | U | pCi/g | | 7.69E-02 | 6.96E-01 | |
| | | NIOBIUM-94 | -2.80E-02 +- 3.9E-02 | U | pCi/g | | 6.53E-02 | 2.85E-01 | |
| | | LEAD-212 | 1.65E+00 +- 3.5E-01 | | pCi/g | | 1.24E-01 | | |
| | | LEAD-214 | 1.56E+00 +- 2.9E-01 | | pCi/g | | 1.61E-01 | | |
| | | RADIUM-226 | 1.53E+00 +- 2.8E-01 | | pCi/g | | 1.46E-01 | | |
| | | THALLIUM-208 | 4.81E-01 +- 1.1E-01 | | pCi/g | | 7.42E-02 | | |
| 9526-0001-007 F | | | | | | | | | |
| | FMVVK1AA | ACTINIUM-228 | 7.40E-01 +- 2.0E-01 | | pCi/g | | 1.78E-01 | | |
| | | AG-108M | -4.06E-02 +- 2.9E-02 | U | pCi/g | | 4.32E-02 | 2.86E-01 | |
| | | AMERICIUM-241 | -1.57E-02 +- 1.1E-01 | U | pCi/g | | 1.83E-01 | 1.03E+00 | |
| | | BISMUTH-212 | 1.02E+00 +- 5.5E-01 | U | pCi/g | | 1.02E+00 | | |
| | | BISMUTH-214 | 6.67E-01 +- 1.5E-01 | U | pCi/g | | 2.55E-01 | | |

STL Richland

rptSTLRchSaSummary2 V4.03 A97

RER2 - Replicate Error Ratio = (S-D)/[sqrt(sq(TPUs)+sq(TPUd))] as defined by ICPT BOA.

U Qual - Analyzed for, but the result is less than the Mdc/Mda/Total Uncert or gamma scan software did not identify the nuclide.

# Sample Results Summary

Date: 29-May-03

## STL Richland STLRL

Ordered by Method, Batch No., Client Sample ID.

Report No. : 22709

SDG No: 22862

| Batch | Client Id Work Order | Parameter | Result +- Uncertainty ( 2s) | Qual | Units | Yield | MDC or MDA | CRDL | RER2 |
|---|---|---|---|---|---|---|---|---|---|
| 3122330 | E801.1 | | | | | | | | |
| 9526-0001-007 F | | | | | | | | | |
| | FMVVK1AA | COBALT-60 | 2.46E-02 +- 3.2E-02 | U | pCi/g | | 6.89E-02 | 1.50E-01 | |
| | | CESIUM-134 | 3.06E-02 +- 3.5E-02 | U | pCi/g | | 7.07E-02 | 1.90E-01 | |
| | | CESIUM-137 | 1.19E+00 +- 1.8E-01 | | pCi/g | | 6.19E-02 | 3.20E-01 | |
| | | EUROPIUM-152 | -2.96E-02 +- 9.5E-02 | U | pCi/g | | 1.60E-01 | 4.04E-01 | |
| | | EUROPIUM-154 | -9.41E-02 +- 1.1E-01 | U | pCi/g | | 1.73E-01 | 3.70E-01 | |
| | | EUROPIUM-155 | 8.35E-02 +- 8.7E-02 | U | pCi/g | | 1.60E-01 | 1.57E+01 | |
| | | POTASSIUM-40 | 4.80E+00 +- 1.1E+00 | | pCi/g | | 4.91E-01 | | |
| | | MANGANESE-54 | -6.55E-03 +- 3.1E-02 | U | pCi/g | | 5.67E-02 | 6.96E-01 | |
| | | NIOBIUM-94 | 1.36E-02 +- 2.8E-02 | U | pCi/g | | 5.63E-02 | 2.85E-01 | |
| | | LEAD-212 | 5.46E-01 +- 1.5E-01 | | pCi/g | | 1.36E-01 | | |
| | | LEAD-214 | 7.50E-01 +- 1.7E-01 | | pCi/g | | 1.09E-01 | | |
| | | RADIUM-226 | 6.67E-01 +- 1.5E-01 | U | pCi/g | | 2.55E-01 | | |
| | | THALLIUM-208 | 2.30E-01 +- 7.3E-02 | U | pCi/g | | 1.10E-01 | | |
| 9526-0001-010 F | | | | | | | | | |
| | FMVWN1AA | ACTINIUM-228 | 1.44E+00 +- 3.7E-01 | | pCi/g | | 2.55E-01 | | |
| | | AG-108M | 2.73E-02 +- 4.0E-02 | U | pCi/g | | 7.23E-02 | 2.86E-01 | |
| | | AMERICIUM-241 | 3.66E-02 +- 8.7E-02 | U | pCi/g | | 1.45E-01 | 1.03E+00 | |
| | | BISMUTH-212 | 2.50E+00 +- 9.7E-01 | U | pCi/g | | 1.42E+00 | | |
| | | BISMUTH-214 | 1.41E+00 +- 2.7E-01 | | pCi/g | | 1.32E-01 | | |
| | | COBALT-60 | 3.84E-03 +- 4.3E-02 | U | pCi/g | | 7.92E-02 | 1.50E-01 | |
| | | CESIUM-134 | 9.00E-02 +- 5.5E-02 | U | pCi/g | | 1.08E-01 | 1.90E-01 | |
| | | CESIUM-137 | 1.75E+00 +- 2.5E-01 | | pCi/g | | 7.63E-02 | 3.20E-01 | |
| | | EUROPIUM-152 | 6.38E-02 +- 1.3E-01 | U | pCi/g | | 2.20E-01 | 4.04E-01 | |
| | | EUROPIUM-154 | 9.12E-03 +- 1.2E-01 | U | pCi/g | | 2.26E-01 | 3.70E-01 | |
| | | EUROPIUM-155 | 3.12E-02 +- 1.2E-01 | U | pCi/g | | 2.00E-01 | 1.57E+01 | |
| | | POTASSIUM-40 | 1.24E+01 +- 2.1E+00 | | pCi/g | | 6.15E-01 | | |
| | | MANGANESE-54 | -1.46E-02 +- 4.3E-02 | U | pCi/g | | 7.54E-02 | 6.96E-01 | |
| | | NIOBIUM-94 | 3.57E-02 +- 3.6E-02 | U | pCi/g | | 7.17E-02 | 2.85E-01 | |
| | | LEAD-212 | 1.57E+00 +- 2.9E-01 | | pCi/g | | 1.23E-01 | | |
| | | LEAD-214 | 1.61E+00 +- 3.2E-01 | | pCi/g | | 1.40E-01 | | |
| | | RADIUM-226 | 1.41E+00 +- 2.7E-01 | | pCi/g | | 1.39E-01 | | |
| | | THALLIUM-208 | 4.95E-01 +- 1.1E-01 | U | pCi/g | | 1.68E-01 | | |
| 9526-0001-011 F | | | | | | | | | |
| | FMVVN1AA | ACTINIUM-228 | 1.94E+00 +- 3.6E-01 | U | pCi/g | | 5.23E-01 | | |
| | | AG-108M | 5.63E-03 +- 3.9E-02 | U | pCi/g | | 6.86E-02 | 2.86E-01 | |
| | | AMERICIUM-241 | 1.78E-01 +- 4.6E-01 | U | pCi/g | | 7.91E-01 | 1.03E+00 | |
| | | BISMUTH-212 | 1.40E+00 +- 7.0E-01 | U | pCi/g | | 1.36E+00 | | |

STL Richland

rptSTLRchSaSummary2 V4.03 A97

RER2 - Replicate Error Ratio = (S-D)/[sqrt(sq(TPUs)+sq(TPUd))] as defined by ICPT BOA.

U Qual - Analyzed for, but the result is less than the Mdc/Mda|Total Uncert or gamma scan software did not identify the nuclide.

# Sample Results Summary

Date: 29-May-03

## STL Richland STLRL

Ordered by Method, Batch No., Client Sample ID.

Report No. : 22709

SDG No: 22862

| Batch | Client Id Work Order | Parameter | Result +- Uncertainty ( 2s) | Qual | Units | Yield | MDC or MDA | CRDL | RER2 |
|---|---|---|---|---|---|---|---|---|---|
| 3122330 E901.1 | | | | | | | | | |
| 9526-0001-011 F | | | | | | | | | |
| | FMVVN1AA | BISMUTH-214 | 9.38E-01 +- 2.0E-01 | U | pCi/g | | 3.28E-01 | | |
| | | COBALT-60 | -1.24E-02 +- 4.3E-02 | U | pCi/g | | 7.60E-02 | 1.50E-01 | |
| | | CESIUM-134 | 5.66E-02 +- 4.9E-02 | U | pCi/g | | 9.58E-02 | 1.90E-01 | |
| | | CESIUM-137 | 4.15E-01 +- 1.0E-01 | | pCi/g | | 8.35E-02 | 3.20E-01 | |
| | | EUROPIUM-152 | -1.84E-01 +- 1.5E-01 | U | pCi/g | | 2.13E-01 | 4.04E-01 | |
| | | EUROPIUM-154 | -4.37E-02 +- 1.3E-01 | U | pCi/g | | 2.26E-01 | 3.70E-01 | |
| | | EUROPIUM-155 | 7.29E-02 +- 1.8E-01 | U | pCi/g | | 3.11E-01 | 1.57E+01 | |
| | | POTASSIUM-40 | 8.89E+00 +- 1.7E+00 | | pCi/g | | 7.31E-01 | | |
| | | MANGANESE-54 | -5.65E-02 +- 4.6E-02 | U | pCi/g | | 7.16E-02 | 6.96E-01 | |
| | | NIOBIUM-94 | 6.53E-03 +- 3.8E-02 | U | pCi/g | | 6.96E-02 | 2.85E-01 | |
| | | LEAD-212 | 1.33E+00 +- 2.9E-01 | | pCi/g | | 1.28E-01 | | |
| | | LEAD-214 | 1.16E+00 +- 2.4E-01 | | pCi/g | | 1.42E-01 | | |
| | | RADIUM-226 | 9.38E-01 +- 2.0E-01 | U | pCi/g | | 3.28E-01 | | |
| | | THALLIUM-208 | 2.75E-01 +- 1.1E-01 | | pCi/g | | 8.03E-02 | | |
| 9526-0001-013 F | | | | | | | | | |
| | FMVVP1AA | ACTINIUM-228 | 1.44E+00 +- 3.7E-01 | | pCi/g | | 2.37E-01 | | |
| | | AG-108M | -2.00E-02 +- 4.4E-02 | U | pCi/g | | 7.35E-02 | 2.86E-01 | |
| | | AMERICIUM-241 | -5.07E-03 +- 9.6E-02 | U | pCi/g | | 1.53E-01 | 1.03E+00 | |
| | | BISMUTH-212 | 2.23E+00 +- 1.2E+00 | U | pCi/g | | 1.66E+00 | | |
| | | BISMUTH-214 | 1.52E+00 +- 2.9E-01 | | pCi/g | | 1.64E-01 | | |
| | | COBALT-60 | 1.80E-03 +- 4.0E-02 | U | pCi/g | | 7.52E-02 | 1.50E-01 | |
| | | CESIUM-134 | 9.51E-02 +- 8.0E-02 | U | pCi/g | | 1.12E-01 | 1.90E-01 | |
| | | CESIUM-137 | 1.78E+00 +- 2.6E-01 | | pCi/g | | 9.76E-02 | 3.20E-01 | |
| | | EUROPIUM-152 | -1.02E-01 +- 1.5E-01 | U | pCi/g | | 2.15E-01 | 4.04E-01 | |
| | | EUROPIUM-154 | 9.09E-03 +- 1.3E-01 | U | pCi/g | | 2.38E-01 | 3.70E-01 | |
| | | EUROPIUM-155 | 1.17E-01 +- 1.2E-01 | U | pCi/g | | 2.14E-01 | 1.57E+01 | |
| | | POTASSIUM-40 | 9.55E+00 +- 1.8E+00 | | pCi/g | | 7.17E-01 | | |
| | | MANGANESE-54 | 6.16E-02 +- 5.0E-02 | U | pCi/g | | 9.88E-02 | 6.96E-01 | |
| | | NIOBIUM-94 | -1.83E-02 +- 4.2E-02 | U | pCi/g | | 7.30E-02 | 2.85E-01 | |
| | | LEAD-212 | 1.74E+00 +- 3.2E-01 | | pCi/g | | 1.18E-01 | | |
| | | LEAD-214 | 1.67E+00 +- 3.2E-01 | | pCi/g | | 1.64E-01 | | |
| | | RADIUM-226 | 1.52E+00 +- 2.9E-01 | | pCi/g | | 1.64E-01 | | |
| | | THALLIUM-208 | 4.76E-01 +- 1.6E-01 | U | pCi/g | | 1.84E-01 | | |
| 9526-0001-015 F | | | | | | | | | |
| | FMVVD1AA | ACTINIUM-228 | 1.14E+00 +- 3.3E-01 | | pCi/g | | 2.13E-01 | | |
| | | AG-108M | -6.40E-03 +- 4.0E-02 | U | pCi/g | | 6.74E-02 | 2.86E-01 | |
| | | AMERICIUM-241 | -2.63E-01 +- 4.6E-01 | U | pCi/g | | 7.52E-01 | 1.03E+00 | |

STL Richland

rptSTLRchSaSummary2 V4.03 A97

RER2 - Replicate Error Ratio = (S-D)/[sqrt(sq(TPUs)+sq(TPUd))] as defined by ICPT BOA.

U Qual - Analyzed for, but the result is less than the Mdc/Mda|Total Uncert or gamma scan software did not identify the nuclide.

# Sample Results Summary

Date: 29-May-03

## STL Richland STLRL

Ordered by Method, Batch No., Client Sample ID.

Report No. : 22709

SDG No: 22862

| Batch | Client Id Work Order | Parameter | Result +- Uncertainty ( 2s) | Qual | Units | Yield | MDC or MDA | CRDL | RER2 |
|---|---|---|---|---|---|---|---|---|---|
| 3122330 | E901.1 | | | | | | | | |
| | 9526-0001-015 F | | | | | | | | |
| | FMVVD1AA | BISMUTH-212 | 1.57E+00 +- 7.2E-01 | U | pCi/g | | 1.38E+00 | | |
| | | BISMUTH-214 | 1.22E+00 +- 2.3E-01 | U | pCi/g | | 3.13E-01 | | |
| | | COBALT-60 | -1.42E-02 +- 4.6E-02 | U | pCi/g | | 7.97E-02 | 1.50E-01 | |
| | | CESIUM-134 | -1.20E-03 +- 4.8E-02 | U | pCi/g | | 8.46E-02 | 1.90E-01 | |
| | | CESIUM-137 | 8.05E-01 +- 1.4E-01 | | pCi/g | | 8.61E-02 | 3.20E-01 | |
| | | EUROPIUM-152 | 8.19E-02 +- 1.7E-01 | U | pCi/g | | 1.93E-01 | 4.04E-01 | |
| | | EUROPIUM-154 | -3.55E-02 +- 1.2E-01 | U | pCi/g | | 2.18E-01 | 3.70E-01 | |
| | | EUROPIUM-155 | 8.09E-02 +- 1.7E-01 | U | pCi/g | | 2.94E-01 | 1.57E+01 | |
| | | POTASSIUM-40 | 9.53E+00 +- 1.7E+00 | | pCi/g | | 3.89E-01 | | |
| | | MANGANESE-54 | 1.41E-02 +- 4.6E-02 | U | pCi/g | | 8.36E-02 | 6.96E-01 | |
| | | NIOBIUM-94 | -1.96E-02 +- 3.7E-02 | U | pCi/g | | 6.27E-02 | 2.85E-01 | |
| | | LEAD-212 | 1.17E+00 +- 2.4E-01 | | pCi/g | | 1.14E-01 | | |
| | | LEAD-214 | 1.22E+00 +- 2.5E-01 | | pCi/g | | 1.39E-01 | | |
| | | RADIUM-226 | 1.22E+00 +- 2.3E-01 | U | pCi/g | | 3.13E-01 | | |
| | | THALLIUM-208 | 4.27E-01 +- 9.7E-02 | | pCi/g | | 7.15E-02 | | |
| | 9526-0001-015 F DUP | | | | | | | | |
| | FMVVD1AC | ACTINIUM-228 | 9.42E-01 +- 3.0E-01 | | pCi/g | | 2.36E-01 | | |
| | | AG-108M | 1.63E-02 +- 3.2E-02 | U | pCi/g | | 5.74E-02 | 2.86E-01 | |
| | | AMERICIUM-241 | -5.46E-02 +- 2.3E-01 | U | pCi/g | | 3.84E-01 | 1.03E+00 | |
| | | BISMUTH-212 | 7.60E-01 +- 5.6E-01 | U | pCi/g | | 1.10E+00 | | |
| | | BISMUTH-214 | 1.20E+00 +- 2.1E-01 | | pCi/g | | 1.17E-01 | | |
| | | COBALT-60 | 4.97E-03 +- 4.0E-02 | U | pCi/g | | 7.49E-02 | 1.50E-01 | |
| | | CESIUM-134 | 8.28E-02 +- 4.8E-02 | U | pCi/g | | 9.64E-02 | 1.90E-01 | |
| | | CESIUM-137 | 7.25E-01 +- 1.5E-01 | | pCi/g | | 7.08E-02 | 3.20E-01 | |
| | | EUROPIUM-152 | -2.32E-03 +- 1.1E-01 | U | pCi/g | | 1.71E-01 | 4.04E-01 | |
| | | EUROPIUM-154 | 6.90E-03 +- 1.1E-01 | U | pCi/g | | 1.98E-01 | 3.70E-01 | |
| | | EUROPIUM-155 | 5.05E-02 +- 1.1E-01 | U | pCi/g | | 1.93E-01 | 1.57E+01 | |
| | | POTASSIUM-40 | 9.54E+00 +- 1.7E+00 | | pCi/g | | 4.55E-01 | | |
| | | MANGANESE-54 | -1.74E-02 +- 3.9E-02 | U | pCi/g | | 6.67E-02 | 6.96E-01 | |
| | | NIOBIUM-94 | -1.82E-02 +- 3.4E-02 | U | pCi/g | | 5.68E-02 | 2.85E-01 | |
| | | LEAD-212 | 1.25E+00 +- 2.3E-01 | | pCi/g | | 9.23E-02 | | |
| | | LEAD-214 | 1.28E+00 +- 2.5E-01 | | pCi/g | | 1.27E-01 | | |
| | | RADIUM-226 | 1.20E+00 +- 2.1E-01 | | pCi/g | | 1.17E-01 | | |
| | | THALLIUM-208 | 4.34E-01 +- 1.1E-01 | U | pCi/g | | 1.45E-01 | | |
| | 9526-0001-023 F | | | | | | | | |
| | FMVVT1AA | ACTINIUM-228 | 1.65E+00 +- 3.6E-01 | U | pCi/g | | 5.89E-01 | | |
| | | AG-108M | -4.57E-03 +- 4.0E-02 | U | pCi/g | | 6.85E-02 | 2.86E-01 | |

STL Richland

rptSTLRchSaSummary2 V4.03 A97

RER2 - Replicate Error Ratio = (S-D)/[sqrt(sq(TPUs)+sq(TPUd))] as defined by ICPT BOA.

U Qual - Analyzed for, but the result is less than the Mdc/Mda|Total Uncert or gamma scan software did not identify the nuclide.

# Sample Results Summary

Date: 29-May-03

## STL Richland STLRL

Ordered by Method, Batch No., Client Sample ID.

Report No. : 22709

SDG No: 22862

| Batch | Client Id Work Order | Parameter | Result +- Uncertainty ( 2s) | | Qual | Units | Yield | MDC or MDA | CRDL | RER2 |
|---|---|---|---|---|---|---|---|---|---|---|
| 3122330 | E901.1 | | | | | | | | | |
| 9526-0001-023 F | | | | | | | | | | |
| | FMVVT1AA | AMERICIUM-241 | -5.50E-01 | +- 5.2E-01 | U | pCi/g | | 8.23E-01 | 1.03E+00 | |
| | | BISMUTH-212 | 1.46E+00 | +- 7.5E-01 | U | pCi/g | | 1.44E+00 | | |
| | | BISMUTH-214 | 1.18E+00 | +- 2.7E-01 | U | pCi/g | | 3.52E-01 | | |
| | | COBALT-60 | 1.90E-02 | +- 4.2E-02 | U | pCi/g | | 8.15E-02 | 1.50E-01 | |
| | | CESIUM-134 | 8.77E-02 | +- 5.7E-02 | U | pCi/g | | 1.11E-01 | 1.90E-01 | |
| | | CESIUM-137 | 4.93E-01 | +- 1.2E-01 | | pCi/g | | 9.06E-02 | 3.20E-01 | |
| | | EUROPIUM-152 | -5.08E-02 | +- 2.0E-01 | U | pCi/g | | 2.43E-01 | 4.04E-01 | |
| | | EUROPIUM-154 | -2.86E-02 | +- 1.4E-01 | U | pCi/g | | 2.47E-01 | 3.70E-01 | |
| | | EUROPIUM-155 | 1.39E-02 | +- 2.0E-01 | U | pCi/g | | 3.41E-01 | 1.57E+01 | |
| | | POTASSIUM-40 | 1.10E+01 | +- 2.0E+00 | | pCi/g | | 6.52E-01 | | |
| | | MANGANESE-54 | 1.78E-02 | +- 4.6E-02 | U | pCi/g | | 8.56E-02 | 6.96E-01 | |
| | | NIOBIUM-94 | 8.49E-03 | +- 4.1E-02 | U | pCi/g | | 7.58E-02 | 2.85E-01 | |
| | | LEAD-212 | 1.62E+00 | +- 3.3E-01 | | pCi/g | | 1.35E-01 | | |
| | | LEAD-214 | 1.43E+00 | +- 2.8E-01 | | pCi/g | | 1.62E-01 | | |
| | | RADIUM-226 | 1.18E+00 | +- 2.7E-01 | U | pCi/g | | 3.52E-01 | | |
| | | THALLIUM-208 | 5.42E-01 | +- 1.3E-01 | | pCi/g | | 8.43E-02 | | |
| 9526-0001-024 F | | | | | | | | | | |
| | FMVVX1AA | ACTINIUM-228 | 1.56E+00 | +- 3.6E-01 | | pCi/g | | 2.37E-01 | | |
| | | AG-108M | 1.36E-02 | +- 3.5E-02 | U | pCi/g | | 6.26E-02 | 2.86E-01 | |
| | | AMERICIUM-241 | 4.79E-02 | +- 8.3E-02 | U | pCi/g | | 1.39E-01 | 1.03E+00 | |
| | | BISMUTH-212 | 1.91E+00 | +- 8.9E-01 | U | pCi/g | | 1.43E+00 | | |
| | | BISMUTH-214 | 1.24E+00 | +- 2.5E-01 | | pCi/g | | 1.28E-01 | | |
| | | COBALT-60 | 2.07E-02 | +- 4.0E-02 | U | pCi/g | | 7.83E-02 | 1.50E-01 | |
| | | CESIUM-134 | 6.98E-02 | +- 5.0E-02 | U | pCi/g | | 9.92E-02 | 1.90E-01 | |
| | | CESIUM-137 | 3.49E-01 | +- 1.1E-01 | | pCi/g | | 8.23E-02 | 3.20E-01 | |
| | | EUROPIUM-152 | -1.83E-02 | +- 1.2E-01 | U | pCi/g | | 1.96E-01 | 4.04E-01 | |
| | | EUROPIUM-154 | 4.00E-02 | +- 1.2E-01 | U | pCi/g | | 2.30E-01 | 3.70E-01 | |
| | | EUROPIUM-155 | 1.14E-01 | +- 1.1E-01 | U | pCi/g | | 1.88E-01 | 1.57E+01 | |
| | | POTASSIUM-40 | 1.10E+01 | +- 1.9E+00 | | pCi/g | | 5.22E-01 | | |
| | | MANGANESE-54 | -3.30E-02 | +- 4.2E-02 | U | pCi/g | | 6.99E-02 | 6.96E-01 | |
| | | NIOBIUM-94 | -1.78E-02 | +- 3.7E-02 | U | pCi/g | | 6.35E-02 | 2.85E-01 | |
| | | LEAD-212 | 1.51E+00 | +- 2.8E-01 | | pCi/g | | 1.07E-01 | | |
| | | LEAD-214 | 1.53E+00 | +- 2.8E-01 | | pCi/g | | 1.42E-01 | | |
| | | RADIUM-226 | 1.24E+00 | +- 2.5E-01 | | pCi/g | | 1.28E-01 | | |
| | | THALLIUM-208 | 4.91E-01 | +- 1.1E-01 | | pCi/g | | 7.07E-02 | | |
| 9526-0001-025 F | | | | | | | | | | |
| | FMVV01AA | ACTINIUM-228 | 1.15E+00 | +- 3.4E-01 | U | pCi/g | | 5.47E-01 | | |

STL Richland

rptSTLRchSaSummary2 V4.03 A97

RER2 - Replicate Error Ratio = (S-D)/[sqrt(sq(TPUs)+sq(TPUd))] as defined by ICPT BOA.

U Qual - Analyzed for, but the result is less than the Mdc/Mda/Total Uncert or gamma scan software did not identify the nuclide.

# Sample Results Summary

Date: 29-May-03

## STL Richland STLRL

Ordered by Method, Batch No., Client Sample ID.

Report No. : 22709

SDG No: 22862

| Batch | Client Id Work Order | Parameter | Result +- Uncertainty ( 2s) | Qual | Units | Yield | MDC or MDA | CRDL | RER2 |
|---|---|---|---|---|---|---|---|---|---|
| 3122330 | E901.1 | | | | | | | | |
| | 9526-0001-025 F | | | | | | | | |
| | FMVV01AA | AG-108M | -9.19E-03 +- 3.7E-02 | U | pCi/g | | 6.35E-02 | 2.86E-01 | |
| | | AMERICIUM-241 | -4.80E-01 +- 4.8E-01 | U | pCi/g | | 7.74E-01 | 1.03E+00 | |
| | | BISMUTH-212 | 1.46E+00 +- 7.7E-01 | U | pCi/g | | 1.45E+00 | | |
| | | BISMUTH-214 | 1.52E+00 +- 2.7E-01 | | pCi/g | | 1.44E-01 | | |
| | | COBALT-60 | 2.31E-02 +- 4.3E-02 | U | pCi/g | | 8.38E-02 | 1.50E-01 | |
| | | CESIUM-134 | 4.14E-02 +- 4.7E-02 | U | pCi/g | | 9.03E-02 | 1.90E-01 | |
| | | CESIUM-137 | 3.68E-01 +- 1.1E-01 | | pCi/g | | 8.16E-02 | 3.20E-01 | |
| | | EUROPIUM-152 | -3.86E-02 +- 1.8E-01 | U | pCi/g | | 2.04E-01 | 4.04E-01 | |
| | | EUROPIUM-154 | 8.74E-02 +- 1.3E-01 | U | pCi/g | | 2.53E-01 | 3.70E-01 | |
| | | EUROPIUM-155 | 3.12E-02 +- 1.8E-01 | U | pCi/g | | 3.19E-01 | 1.57E+01 | |
| | | POTASSIUM-40 | 1.30E+01 +- 2.1E+00 | | pCi/g | | 7.41E-01 | | |
| | | MANGANESE-54 | -1.47E-02 +- 4.8E-02 | U | pCi/g | | 8.32E-02 | 6.96E-01 | |
| | | NIOBIUM-94 | 1.16E-03 +- 3.8E-02 | U | pCi/g | | 6.89E-02 | 2.85E-01 | |
| | | LEAD-212 | 1.43E+00 +- 2.9E-01 | | pCi/g | | 1.29E-01 | | |
| | | LEAD-214 | 1.41E+00 +- 2.9E-01 | | pCi/g | | 1.41E-01 | | |
| | | RADIUM-226 | 1.52E+00 +- 2.7E-01 | | pCi/g | | 1.44E-01 | | |
| | | THALLIUM-208 | 4.56E-01 +- 1.2E-01 | U | pCi/g | | 1.62E-01 | | |
| | 9526-0001-026 F | | | | | | | | |
| | FMVV11AA | ACTINIUM-228 | 1.29E+00 +- 3.3E-01 | | pCi/g | | 2.00E-01 | | |
| | | AG-108M | 3.50E-02 +- 3.2E-02 | U | pCi/g | | 5.95E-02 | 2.86E-01 | |
| | | AMERICIUM-241 | 4.68E-02 +- 8.4E-02 | U | pCi/g | | 1.29E-01 | 1.03E+00 | |
| | | BISMUTH-212 | 1.28E+00 +- 8.2E-01 | U | pCi/g | | 1.26E+00 | | |
| | | BISMUTH-214 | 1.32E+00 +- 2.6E-01 | | pCi/g | | 1.27E-01 | | |
| | | COBALT-60 | 9.99E-03 +- 3.3E-02 | U | pCi/g | | 6.37E-02 | 1.50E-01 | |
| | | CESIUM-134 | 5.80E-02 +- 4.8E-02 | U | pCi/g | | 9.31E-02 | 1.90E-01 | |
| | | CESIUM-137 | 2.69E-01 +- 7.8E-02 | J | pCi/g | | 7.56E-02 | 3.20E-01 | |
| | | EUROPIUM-152 | 9.48E-03 +- 1.1E-01 | U | pCi/g | | 1.93E-01 | 4.04E-01 | |
| | | EUROPIUM-154 | -1.46E-02 +- 1.2E-01 | U | pCi/g | | 2.22E-01 | 3.70E-01 | |
| | | EUROPIUM-155 | 1.32E-01 +- 1.0E-01 | U | pCi/g | | 1.79E-01 | 1.57E+01 | |
| | | POTASSIUM-40 | 9.68E+00 +- 1.7E+00 | | pCi/g | | 4.73E-01 | | |
| | | MANGANESE-54 | -4.01E-03 +- 4.0E-02 | U | pCi/g | | 7.19E-02 | 6.96E-01 | |
| | | NIOBIUM-94 | -8.80E-03 +- 3.5E-02 | U | pCi/g | | 6.19E-02 | 2.85E-01 | |
| | | LEAD-212 | 1.48E+00 +- 2.7E-01 | | pCi/g | | 9.54E-02 | | |
| | | LEAD-214 | 1.53E+00 +- 2.8E-01 | | pCi/g | | 1.22E-01 | | |
| | | RADIUM-226 | 1.32E+00 +- 2.6E-01 | | pCi/g | | 1.27E-01 | | |
| | | THALLIUM-208 | 4.56E-01 +- 1.1E-01 | | pCi/g | | 6.33E-02 | | |
| | 9526-0001-027 F | | | | | | | | |

STL Richland

rptSTLRchSaSummary2 V4.03 A97

RER2 - Replicate Error Ratio = (S-D)/[sqrt(sq(TPUs)+sq(TPUd))] as defined by ICPT BOA.

J Qual - No U qualifier has been assigned and the result is below the Reporting Limit, RL (CRDL) or Report Value is Estimated.

U Qual - Analyzed for, but the result is less than the Mdc/Mda/Total Uncert or gamma scan software did not identify the nuclide.

# Sample Results Summary

Date: 29-May-03

## STL Richland STLRL

Ordered by Method, Batch No., Client Sample ID.

Report No. : 22709

SDG No: 22862

| Batch | Client Id Work Order | Parameter | Result +- Uncertainty ( 2s) | Qual | Units | Yield | MDC or MDA | CRDL | RER2 |
|---|---|---|---|---|---|---|---|---|---|
| 3122330 | E901.1 | | | | | | | | |
| 9526-0001-027 | F | | | | | | | | |
| | FMVV21AA | ACTINIUM-228 | 1.18E+00 +- 3.1E-01 | | pCi/g | | 2.31E-01 | | |
| | | AG-108M | -2.93E-03 +- 4.2E-02 | U | pCi/g | | 7.14E-02 | 2.86E-01 | |
| | | AMERICIUM-241 | 6.25E-02 +- 4.6E-01 | U | pCi/g | | 7.83E-01 | 1.03E+00 | |
| | | BISMUTH-212 | 1.57E+00 +- 6.9E-01 | U | pCi/g | | 1.33E+00 | | |
| | | BISMUTH-214 | 1.11E+00 +- 2.2E-01 | U | pCi/g | | 3.02E-01 | | |
| | | COBALT-60 | 1.63E-02 +- 4.0E-02 | U | pCi/g | | 7.60E-02 | 1.50E-01 | |
| | | CESIUM-134 | 5.22E-02 +- 4.9E-02 | U | pCi/g | | 9.33E-02 | 1.90E-01 | |
| | | CESIUM-137 | 1.61E+00 +- 2.3E-01 | | pCi/g | | 8.09E-02 | 3.20E-01 | |
| | | EUROPIUM-152 | -7.11E-02 +- 2.0E-01 | U | pCi/g | | 2.23E-01 | 4.04E-01 | |
| | | EUROPIUM-154 | -5.33E-02 +- 1.2E-01 | U | pCi/g | | 2.07E-01 | 3.70E-01 | |
| | | EUROPIUM-155 | -6.55E-02 +- 1.8E-01 | U | pCi/g | | 2.99E-01 | 1.57E+01 | |
| | | POTASSIUM-40 | 1.04E+01 +- 1.7E+00 | | pCi/g | | 6.29E-01 | | |
| | | MANGANESE-54 | -1.12E-02 +- 4.2E-02 | U | pCi/g | | 7.38E-02 | 6.96E-01 | |
| | | NIOBIUM-94 | 1.44E-02 +- 3.7E-02 | U | pCi/g | | 6.86E-02 | 2.85E-01 | |
| | | LEAD-212 | 1.10E+00 +- 2.4E-01 | | pCi/g | | 1.26E-01 | | |
| | | LEAD-214 | 1.20E+00 +- 2.4E-01 | | pCi/g | | 1.55E-01 | | |
| | | RADIUM-226 | 1.11E+00 +- 2.2E-01 | | pCi/g | | 1.35E-01 | | |
| | | THALLIUM-208 | 4.40E-01 +- 1.1E-01 | | pCi/g | | 6.67E-02 | | |
| 9526-0001-028 | F | | | | | | | | |
| | FMVV31AA | ACTINIUM-228 | 1.42E+00 +- 3.4E-01 | | pCi/g | | 2.61E-01 | | |
| | | AG-108M | -1.81E-02 +- 3.3E-02 | U | pCi/g | | 5.46E-02 | 2.86E-01 | |
| | | AMERICIUM-241 | 6.20E-02 +- 9.0E-02 | U | pCi/g | | 1.39E-01 | 1.03E+00 | |
| | | BISMUTH-212 | 2.18E+00 +- 9.8E-01 | U | pCi/g | | 1.50E+00 | | |
| | | BISMUTH-214 | 1.40E+00 +- 2.6E-01 | | pCi/g | | 1.36E-01 | | |
| | | COBALT-60 | -3.05E-02 +- 4.5E-02 | U | pCi/g | | 7.54E-02 | 1.50E-01 | |
| | | CESIUM-134 | 7.98E-02 +- 5.2E-02 | U | pCi/g | | 1.03E-01 | 1.90E-01 | |
| | | CESIUM-137 | 4.51E-01 +- 1.1E-01 | | pCi/g | | 7.55E-02 | 3.20E-01 | |
| | | EUROPIUM-152 | -6.69E-02 +- 1.1E-01 | U | pCi/g | | 1.88E-01 | 4.04E-01 | |
| | | EUROPIUM-154 | -1.61E-02 +- 1.2E-01 | U | pCi/g | | 2.22E-01 | 3.70E-01 | |
| | | EUROPIUM-155 | 2.09E-01 +- 1.1E-01 | U | pCi/g | | 2.01E-01 | 1.57E+01 | |
| | | POTASSIUM-40 | 1.20E+01 +- 2.0E+00 | | pCi/g | | 4.71E-01 | | |
| | | MANGANESE-54 | 1.40E-02 +- 4.2E-02 | U | pCi/g | | 7.89E-02 | 6.96E-01 | |
| | | NIOBIUM-94 | 2.65E-02 +- 3.9E-02 | U | pCi/g | | 7.51E-02 | 2.85E-01 | |
| | | LEAD-212 | 1.35E+00 +- 2.6E-01 | | pCi/g | | 1.11E-01 | | |
| | | LEAD-214 | 1.54E+00 +- 3.2E-01 | | pCi/g | | 1.43E-01 | | |
| | | RADIUM-226 | 1.40E+00 +- 2.6E-01 | | pCi/g | | 1.36E-01 | | |

STL Richland

rptSTLRchSaSummary2 V4.03 A97

RER2 - Replicate Error Ratio = (S-D)/[sqrt(sq(TPUs)+sq(TPUd))] as defined by ICPT BOA.

U Qual - Analyzed for, but the result is less than the Mdc/Mda/Total Uncert or gamma scan software did not identify the nuclide.

# Sample Results Summary

## STL Richland STLRL

Ordered by Method, Batch No., Client Sample ID.

Date: 29-May-03

Report No. : 22709

SDG No: 22862

| Batch | Client Id Work Order | Parameter | Result +- Uncertainty ( 2s) | Qual | Units | Yield | MDC or MDA | CRDL | RER2 |
|---|---|---|---|---|---|---|---|---|---|
| 3122330 | E901.1 | | | | | | | | |
| | 9526-0001-028 F | | | | | | | | |
| | FMVV31AA | THALLIUM-208 | 4.48E-01 +- 1.1E-01 | U | pCi/g | | 1.56E-01 | | |

No. of Results: 630

STL Richland
rptSTLRchSaSummary2 V4.03 A97

RER2 - Replicate Error Ratio = (S-D)/[sqrt(sq(TPUs)+sq(TPUd))] as defined by ICPT BOA.
U Qual - Analyzed for, but the result is less than the Mdc/Mda/Total Uncert or gamma scan software did not identify the nuclide.

# QC Results Summary
## STL Richland STLRL

Date: 29-May-03

Ordered by Method, Batch No, QC Type,.

Report No. : 22709

SDG No.: 22862

| Batch Work Order | Parameter | Result +- Uncertainty ( 2s) | Qual | Units | Yield | Recovery | Bias | MDC\|MDA |
|---|---|---|---|---|---|---|---|---|
| E901.1 | | | | | | | | |
| 3122327 BLANK QC | | | | | | | | |
| FM2FF1AA | ACTINIUM-228 | -6.54E-03 +- 1.1E-01 | U | pCi/g | | | | 2.04E-01 |
| | AG-108M | -2.98E-02 +- 2.6E-02 | U | pCi/g | | | | 4.08E-02 |
| | AMERICIUM-241 | -7.18E-02 +- 3.2E-01 | U | pCi/g | | | | 5.49E-01 |
| | BISMUTH-212 | 5.49E-02 +- 4.7E-01 | U | pCi/g | | | | 8.68E-01 |
| | BISMUTH-214 | 4.35E-02 +- 6.8E-02 | U | pCi/g | | | | 1.31E-01 |
| | COBALT-60 | 4.45E-02 +- 3.6E-02 | U | pCi/g | | | | 8.24E-02 |
| | CESIUM-134 | -2.02E-02 +- 3.7E-02 | U | pCi/g | | | | 6.19E-02 |
| | CESIUM-137 | 9.84E-03 +- 3.6E-02 | U | pCi/g | | | | 6.81E-02 |
| | EUROPIUM-152 | -4.90E-02 +- 8.6E-02 | U | pCi/g | | | | 1.43E-01 |
| | EUROPIUM-154 | 5.01E-02 +- 6.9E-02 | U | pCi/g | | | | 1.62E-01 |
| | EUROPIUM-155 | 1.05E-02 +- 1.1E-01 | U | pCi/g | | | | 1.94E-01 |
| | POTASSIUM-40 | -5.16E-01 +- 6.5E-01 | U | pCi/g | | | | 1.41E+00 |
| | MANGANESE-54 | -2.64E-02 +- 3.5E-02 | U | pCi/g | | | | 5.75E-02 |
| | NIOBIUM-94 | -7.77E-03 +- 3.4E-02 | U | pCi/g | | | | 6.23E-02 |
| | LEAD-212 | 5.48E-02 +- 6.0E-02 | U | pCi/g | | | | 1.11E-01 |
| | LEAD-214 | 2.07E-02 +- 7.0E-02 | U | pCi/g | | | | 1.26E-01 |
| | RADIUM-226 | 4.34E-02 +- 6.8E-02 | U | pCi/g | | | | 1.31E-01 |
| | THALLIUM-208 | 1.67E-02 +- 4.4E-02 | U | pCi/g | | | | 8.53E-02 |
| 3122327 LCS | | | | | | | | |
| FM2FF1AC | CESIUM-137 | 1.10E+00 +- 1.8E-01 | | pCi/g | | 109% | 0.1 | 7.32E-02 |
| E901.1 | | | | | | | | |
| 3122330 BLANK QC | | | | | | | | |
| FM2FK1AA | ACTINIUM-228 | -1.54E-01 +- 1.2E-01 | U | pCi/g | | | | 1.97E-01 |
| | AG-108M | -7.13E-03 +- 2.8E-02 | U | pCi/g | | | | 4.78E-02 |
| | AMERICIUM-241 | 7.44E-03 +- 6.5E-02 | U | pCi/g | | | | 1.19E-01 |
| | BISMUTH-212 | 3.44E-01 +- 4.0E-01 | U | pCi/g | | | | 8.33E-01 |
| | BISMUTH-214 | -1.22E-02 +- 7.0E-02 | U | pCi/g | | | | 1.28E-01 |
| | COBALT-60 | 2.36E-02 +- 2.6E-02 | U | pCi/g | | | | 6.27E-02 |
| | CESIUM-134 | -1.27E-02 +- 3.4E-02 | U | pCi/g | | | | 5.97E-02 |
| | CESIUM-137 | -2.32E-03 +- 2.9E-02 | U | pCi/g | | | | 5.33E-02 |
| | EUROPIUM-152 | -2.23E-02 +- 7.6E-02 | U | pCi/g | | | | 1.35E-01 |
| | EUROPIUM-154 | 1.38E-02 +- 9.1E-02 | U | pCi/g | | | | 1.80E-01 |
| | EUROPIUM-155 | 5.57E-03 +- 5.5E-02 | U | pCi/g | | | | 9.85E-02 |
| | POTASSIUM-40 | -9.06E-01 +- 7.0E-01 | U | pCi/g | | | | 1.53E+00 |
| | MANGANESE-54 | -1.79E-02 +- 2.9E-02 | U | pCi/g | | | | 4.76E-02 |
| | NIOBIUM-94 | -1.08E-03 +- 2.2E-02 | U | pCi/g | | | | 4.30E-02 |
| | LEAD-212 | -4.32E-02 +- 4.9E-02 | U | pCi/g | | | | 7.99E-02 |

STL Richland
rptSTLRchQcSummary V4.03 A97

Bias - (Result/Expected)-1 as defined by ANSI N13.30.
U Qual - Analyzed for, but the result is less than the Mdc/Mda|Total Uncert or gamma scan software did not identify the nuclide.

# QC Results Summary
## STL Richland STLRL

Date: 29-May-03

Ordered by Method, Batch No, QC Type,.

Report No. : 22709

SDG No.: 22862

| Batch Work Order | Parameter | Result +- Uncertainty ( 2s) | Qual | Units | Yield | Recovery | Bias | MDC\|MDA |
|---|---|---|---|---|---|---|---|---|
| FM2FK1AA | LEAD-214 | -2.90E-03 +- 5.9E-02 | U | pCi/g | | | | 9.99E-02 |
| | RADIUM-226 | -1.17E-02 +- 7.0E-02 | U | pCi/g | | | | 1.28E-01 |
| | THALLIUM-208 | -1.08E-02 +- 3.2E-02 | U | pCi/g | | | | 5.77E-02 |
| 3122330 LCS | | | | | | | | |
| FM2FK1AC | CESIUM-137 | 1.12E+00 +- 1.8E-01 | | pCi/g | | 112% | 0.1 | 5.68E-02 |

No. of Results: 38

STL Richland
rptSTLRchQcSummary V4.03 A97

Bias - (Result/Expected)-1 as defined by ANSI N13.30.
U Qual - Analyzed for, but the result is less than the Mdc/Mda|Total Uncert or gamma scan software did not identify the nuclide.

# FORM I

## SAMPLE RESULTS

Date: 29-May-03

| | | | | | |
|---|---|---|---|---|---|
| Lab Name: | STL Richland | SDG: | 22862 | Collection Date: | 4/10/2003 1:55:00 PM |
| Lot-Sample No.: | J3D300240-30 | Report No. : | 22709 | Received Date: | 4/30/2003 11:10:00 AM |
| Client Sample ID: | 9526-0001-001 F,FS | COC No. : | 2003-00110 | Matrix: | SOIL |

Ordered by Client Sample ID, Batch No.

| Parameter | Result | Qual | Count Error ( 2 s) | Total Uncert( 2 s) | MDC\|MDA, Action Lev | Rpt Unit, Lc | Yield CRDL(RL) | Rst/MDC, Rst/TotUcert | Analysis, Prep Date | Total Sa Size | Aliquot Size | Primary Detector |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Batch: 3122330 | E901.1 | | | Work Order: FMVV91AA | | | Report DB ID: 9FMVV910 | | | | | |
| ACTINIUM-228 | 8.79E-01 | | 2.6E-01 | 2.6E-01 | 2.36E-01 | pCi/g | | (3.7) | 5/22/03 08:22 p | | 261.2 | GER2$1 |
| | | | | | | | | (6.8) | | | g | |
| AG-108M | 1.47E-02 | U | 4.0E-02 | 4.0E-02 | 6.95E-02 | pCi/g | | 0.21 | 5/22/03 08:22 p | | 261.2 | GER2$1 |
| | | | | | | | 2.86E-01 | 0.74 | | | g | |
| AMERICIUM-241 | -1.34E-01 | U | 4.6E-01 | 4.6E-01 | 7.67E-01 | pCi/g | | -0.18 | 5/22/03 08:22 p | | 261.2 | GER2$1 |
| | | | | | | | 1.03E+00 | -0.59 | | | g | |
| BISMUTH-212 | 1.66E+00 | U | 8.4E-01 | 8.4E-01 | 1.31E+00 | pCi/g | | (1.3) | 5/22/03 08:22 p | | 261.2 | GER2$1 |
| | | | | | | | | (4.) | | | g | |
| BISMUTH-214 | 1.24E+00 | U | 2.9E-01 | 2.9E-01 | 3.40E-01 | pCi/g | | (3.6) | 5/22/03 08:22 p | | 261.2 | GER2$1 |
| | | | | | | | | (8.6) | | | g | |
| COBALT-60 | 8.60E-03 | U | 4.0E-02 | 4.0E-02 | 7.57E-02 | pCi/g | | 0.11 | 5/22/03 08:22 p | | 261.2 | GER2$1 |
| | | | | | | | 1.50E-01 | 0.43 | | | g | |
| CESIUM-134 | 5.22E-02 | U | 5.2E-02 | 5.2E-02 | 9.90E-02 | pCi/g | | 0.53 | 5/22/03 08:22 p | | 261.2 | GER2$1 |
| | | | | | | | 1.90E-01 | (2.) | | | g | |
| CESIUM-137 | 1.10E+00 | | 1.8E-01 | 1.8E-01 | 7.50E-02 | pCi/g | | (14.7) | 5/22/03 08:22 p | | 261.2 | GER2$1 |
| | | | | | | | 3.20E-01 | (12.3) | | | g | |
| EUROPIUM-152 | -1.27E-01 | U | 2.2E-01 | 2.2E-01 | 2.07E-01 | pCi/g | | -0.61 | 5/22/03 08:22 p | | 261.2 | GER2$1 |
| | | | | | | | 4.04E-01 | -(1.2) | | | g | |
| EUROPIUM-154 | -6.20E-02 | U | 1.4E-01 | 1.4E-01 | 2.35E-01 | pCi/g | | -0.26 | 5/22/03 08:22 p | | 261.2 | GER2$1 |
| | | | | | | | 3.70E-01 | -0.9 | | | g | |

STL Richland
rptSTLRchSample
V4.03 A97

MDC|MDA,Lc - Detection, Decision Level based on instrument background or blank, adjusted by the sample Efficiency, Yield, and Volume.
U Qual - Analyzed for, but the result is less than the Mdc/Mda|Total Uncert or gamma scan software did not identify the nuclide.

# FORM I

## SAMPLE RESULTS

Date: 29-May-03

| | | | | | |
|---|---|---|---|---|---|
| Lab Name: | STL Richland | SDG: | 22862 | Collection Date: | 4/10/2003 1:55:00 PM |
| Lot-Sample No.: | J3D300240-30 | Report No. : | 22709 | Received Date: | 4/30/2003 11:10:00 AM |
| Client Sample ID: | 9526-0001-001 F,FS | COC No. : | 2003-00110 | Matrix: | SOIL |

Ordered by Client Sample ID, Batch No.

| Parameter | Result | Qual | Count Error (2 s) | Total Uncert(2 s) | MDC\|MDA, Action Lev | Rpt Unit, Lc | Yield CRDL(RL) | Rst/MDC, Rst/TotUcert | Analysis, Prep Date | Total Sa Size | Aliquot Size | Primary Detector |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| EUROPIUM-155 | -6.81E-02 | U | 1.8E-01 | 1.8E-01 | 2.99E-01 | pCi/g | | -0.23 | 5/22/03 08:22 p | | 261.2 | GER2$1 |
| | | | | | | | 1.57E+01 | -0.77 | | | g | |
| POTASSIUM-40 | 1.05E+01 | | 1.8E+00 | 1.8E+00 | 7.62E-01 | pCi/g | | (13.8) | 5/22/03 08:22 p | | 261.2 | GER2$1 |
| | | | | | | | | (11.8) | | | g | |
| MANGANESE-54 | 2.17E-02 | U | 4.3E-02 | 4.3E-02 | 8.01E-02 | pCi/g | | 0.27 | 5/22/03 08:22 p | | 261.2 | GER2$1 |
| | | | | | | | 6.96E-01 | (1.) | | | g | |
| NIOBIUM-94 | 1.96E-02 | U | 3.9E-02 | 3.9E-02 | 7.24E-02 | pCi/g | | 0.27 | 5/22/03 08:22 p | | 261.2 | GER2$1 |
| | | | | | | | 2.85E-01 | (1.) | | | g | |
| LEAD-212 | 9.06E-01 | | 2.1E-01 | 2.1E-01 | 1.19E-01 | pCi/g | | (7.6) | 5/22/03 08:22 p | | 261.2 | GER2$1 |
| | | | | | | | | (8.7) | | | g | |
| LEAD-214 | 1.33E+00 | | 2.9E-01 | 2.9E-01 | 1.57E-01 | pCi/g | | (8.5) | 5/22/03 08:22 p | | 261.2 | GER2$1 |
| | | | | | | | | (9.3) | | | g | |
| RADIUM-226 | 1.24E+00 | | 2.9E-01 | 2.9E-01 | 1.32E-01 | pCi/g | | (9.4) | 5/22/03 08:22 p | | 261.2 | GER2$1 |
| | | | | | | | | (8.6) | | | g | |
| THALLIUM-208 | 3.85E-01 | U | 1.3E-01 | 1.3E-01 | 1.38E-01 | pCi/g | | (2.8) | 5/22/03 08:22 p | | 261.2 | GER2$1 |
| | | | | | | | | (6.) | | | g | |

No. of Results: 18 Comments:

STL Richland
rptSTLRchSample
V4.03 A97

MDC|MDA,Lc - Detection, Decision Level based on instrument background or blank, adjusted by the sample Efficiency, Yield, and Volume.
U Qual - Analyzed for, but the result is less than the Mdc/Mda|Total Uncert or gamma scan software did not identify the nuclide.

# FORM I

## SAMPLE RESULTS

Date: 29-May-03

| | | | | | |
|---|---|---|---|---|---|
| Lab Name: | STL Richland | SDG: | 22862 | Collection Date: | 4/10/2003 2:08:00 PM |
| Lot-Sample No.: | J3D300240-31 | Report No. : | 22709 | Received Date: | 4/30/2003 11:10:00 AM |
| Client Sample ID: | 9526-0001-002 F | COC No. : | 2003-00110 | Matrix: | SOIL |

Ordered by Client Sample ID, Batch No.

| Parameter | Result | Qual | Count Error ( 2 s) | Total Uncert( 2 s) | MDC\|MDA, Action Lev | Rpt Unit, Lc | Yield CRDL(RL) | Rst/MDC, Rst/TotUcert | Analysis, Prep Date | Total Sa Size | Aliquot Size | Primary Detector |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Batch: 3122330 | E901.1 | | | Work Order: | FMVWG1AA | | Report DB ID: | 9FMVWG10 | | | | |
| ACTINIUM-228 | 9.87E-01 | | 2.9E-01 | 2.9E-01 | 2.29E-01 | pCi/g | | (4.3) | 5/22/03 08:25 p | | 249.9 | GER5$1 |
| | | | | | | | | (6.8) | | | g | |
| AG-108M | 1.03E-02 | U | 3.9E-02 | 3.9E-02 | 6.93E-02 | pCi/g | | 0.15 | 5/22/03 08:25 p | | 249.9 | GER5$1 |
| | | | | | | | 2.86E-01 | 0.52 | | | g | |
| AMERICIUM-241 | -3.04E-02 | U | 8.5E-02 | 8.5E-02 | 1.28E-01 | pCi/g | | -0.24 | 5/22/03 08:25 p | | 249.9 | GER5$1 |
| | | | | | | | 1.03E+00 | -0.72 | | | g | |
| BISMUTH-212 | 7.68E-01 | U | 8.7E-01 | 8.7E-01 | 1.33E+00 | pCi/g | | 0.58 | 5/22/03 08:25 p | | 249.9 | GER5$1 |
| | | | | | | | | (1.8) | | | g | |
| BISMUTH-214 | 1.23E+00 | U | 2.4E-01 | 2.4E-01 | 3.42E-01 | pCi/g | | (3.6) | 5/22/03 08:25 p | | 249.9 | GER5$1 |
| | | | | | | | | (10.2) | | | g | |
| COBALT-60 | -2.91E-02 | U | 3.8E-02 | 3.8E-02 | 6.11E-02 | pCi/g | | -0.48 | 5/22/03 08:25 p | | 249.9 | GER5$1 |
| | | | | | | | 1.50E-01 | -(1.6) | | | g | |
| CESIUM-134 | 8.85E-02 | U | 5.1E-02 | 5.1E-02 | 1.02E-01 | pCi/g | | 0.86 | 5/22/03 08:25 p | | 249.9 | GER5$1 |
| | | | | | | | 1.90E-01 | (3.5) | | | g | |
| CESIUM-137 | 1.87E+00 | | 2.7E-01 | 2.7E-01 | 7.18E-02 | pCi/g | | (26.1) | 5/22/03 08:25 p | | 249.9 | GER5$1 |
| | | | | | | | 3.20E-01 | (14.1) | | | g | |
| EUROPIUM-152 | -9.92E-02 | U | 1.2E-01 | 1.2E-01 | 2.05E-01 | pCi/g | | -0.48 | 5/22/03 08:25 p | | 249.9 | GER5$1 |
| | | | | | | | 4.04E-01 | -(1.6) | | | g | |
| EUROPIUM-154 | 4.29E-02 | U | 1.2E-01 | 1.2E-01 | 2.34E-01 | pCi/g | | 0.18 | 5/22/03 08:25 p | | 249.9 | GER5$1 |
| | | | | | | | 3.70E-01 | 0.7 | | | g | |

STL Richland
rptSTLRchSample
V4.03 A97

MDC|MDA,Lc - Detection, Decision Level based on instrument background or blank, adjusted by the sample Efficiency, Yield, and Volume.
U Qual - Analyzed for, but the result is less than the Mdc/Mda|Total Uncert or gamma scan software did not identify the nuclide.

# FORM I

## SAMPLE RESULTS

Date: 29-May-03

| | | | | | |
|---|---|---|---|---|---|
| Lab Name: | STL Richland | SDG: | 22862 | Collection Date: | 4/10/2003 2:08:00 PM |
| Lot-Sample No.: | J3D300240-31 | Report No. : | 22709 | Received Date: | 4/30/2003 11:10:00 AM |
| Client Sample ID: | 9526-0001-002 F | COC No. : | 2003-00110 | Matrix: | SOIL |

Ordered by Client Sample ID, Batch No.

| Parameter | Result | Qual | Count Error ( 2 s) | Total Uncert( 2 s) | MDC\|MDA, Action Lev | Rpt Unit, Lc | Yield CRDL(RL) | Rst/MDC, Rst/TotUcert | Analysis, Prep Date | Total Sa Size | Aliquot Size | Primary Detector |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| EUROPIUM-155 | 8.73E-02 | U | 1.1E-01 | 1.1E-01 | 1.83E-01 | pCi/g | | *0.48* | 5/22/03 08:25 p | | 249.9 | GER5$1 |
| | | | | | | | 1.57E+01 | *(1.7)* | | | g | |
| POTASSIUM-40 | 9.08E+00 | | 1.8E+00 | 1.8E+00 | 7.59E-01 | pCi/g | | *(12.)* | 5/22/03 08:25 p | | 249.9 | GER5$1 |
| | | | | | | | | *(10.2)* | | | g | |
| MANGANESE-54 | -2.04E-02 | U | 4.2E-02 | 4.2E-02 | 7.28E-02 | pCi/g | | *-0.28* | 5/22/03 08:25 p | | 249.9 | GER5$1 |
| | | | | | | | 6.96E-01 | *-0.96* | | | g | |
| NIOBIUM-94 | -1.23E-02 | U | 4.0E-02 | 4.0E-02 | 6.93E-02 | pCi/g | | *-0.18* | 5/22/03 08:25 p | | 249.9 | GER5$1 |
| | | | | | | | 2.85E-01 | *-0.62* | | | g | |
| LEAD-212 | 1.09E+00 | | 2.3E-01 | 2.3E-01 | 1.65E-01 | pCi/g | | *(6.6)* | 5/22/03 08:25 p | | 249.9 | GER5$1 |
| | | | | | | | | *(9.6)* | | | g | |
| LEAD-214 | 1.18E+00 | | 2.6E-01 | 2.6E-01 | 1.65E-01 | pCi/g | | *(7.1)* | 5/22/03 08:25 p | | 249.9 | GER5$1 |
| | | | | | | | | *(9.1)* | | | g | |
| RADIUM-226 | 1.23E+00 | | 2.4E-01 | 2.4E-01 | 1.21E-01 | pCi/g | | *(10.1)* | 5/22/03 08:25 p | | 249.9 | GER5$1 |
| | | | | | | | | *(10.2)* | | | g | |
| THALLIUM-208 | 3.60E-01 | | 9.6E-02 | 9.6E-02 | 6.72E-02 | pCi/g | | *(5.3)* | 5/22/03 08:25 p | | 249.9 | GER5$1 |
| | | | | | | | | *(7.5)* | | | g | |

No. of Results: 18 Comments:

STL Richland
rptSTLRchSample
V4.03 A97

MDC|MDA,Lc - Detection, Decision Level based on instrument background or blank, adjusted by the sample Efficiency, Yield, and Volume.
U Qual - Analyzed for, but the result is less than the Mdc/Mda|Total Uncert or gamma scan software did not identify the nuclide.

# FORM I

## SAMPLE RESULTS

Date: 29-May-03

| | | | | | |
|---|---|---|---|---|---|
| Lab Name: | STL Richland | SDG: | 22862 | Collection Date: | 4/10/2003 10:05:00 AM |
| Lot-Sample No.: | J3D300240-19 | Report No. : | 22709 | Received Date: | 4/30/2003 11:10:00 AM |
| Client Sample ID: | 9526-0001-003 F | COC No.: | 2003-00108 | Matrix: | SOIL |

Ordered by Client Sample ID, Batch No.

| Parameter | Result | Qual | Count Error ( 2 s) | Total Uncert( 2 s) | MDC\|MDA, Action Lev | Rpt Unit, Lc | Yield CRDL(RL) | Rst/MDC, Rst/TotUcert | Analysis, Prep Date | Total Sa Size | Aliquot Size | Primary Detector |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Batch: 3122330 | E901.1 | | | Work Order: | FMVVF1AA | | Report DB ID: 9FMVVF10 | | | | | |
| ACTINIUM-228 | 1.37E+00 | | 3.6E-01 | 3.6E-01 | 2.28E-01 | pCi/g | | (6.) | 5/22/03 10:25 a | | 251.9 | GER5$1 |
| | | | | | | | | (7.6) | | | g | |
| AG-108M | -1.31E-02 | U | 3.7E-02 | 3.7E-02 | 6.30E-02 | pCi/g | | -0.21 | 5/22/03 10:25 a | | 251.9 | GER5$1 |
| | | | | | | | 2.86E-01 | -0.7 | | | g | |
| AMERICIUM-241 | 5.81E-02 | U | 8.4E-02 | 8.4E-02 | 1.42E-01 | pCi/g | | 0.41 | 5/22/03 10:25 a | | 251.9 | GER5$1 |
| | | | | | | | 1.03E+00 | (1.4) | | | g | |
| BISMUTH-212 | 1.44E+00 | U | 6.3E-01 | 6.3E-01 | 1.27E+00 | pCi/g | | (1.1) | 5/22/03 10:25 a | | 251.9 | GER5$1 |
| | | | | | | | | (4.6) | | | g | |
| BISMUTH-214 | 1.28E+00 | U | 2.7E-01 | 2.7E-01 | 3.49E-01 | pCi/g | | (3.7) | 5/22/03 10:25 a | | 251.9 | GER5$1 |
| | | | | | | | | (9.6) | | | g | |
| COBALT-60 | -3.09E-03 | U | 4.2E-02 | 4.2E-02 | 7.64E-02 | pCi/g | | -0.04 | 5/22/03 10:25 a | | 251.9 | GER5$1 |
| | | | | | | | 1.50E-01 | -0.15 | | | g | |
| CESIUM-134 | 7.14E-02 | U | 5.1E-02 | 5.1E-02 | 1.01E-01 | pCi/g | | 0.71 | 5/22/03 10:25 a | | 251.9 | GER5$1 |
| | | | | | | | 1.90E-01 | (2.8) | | | g | |
| CESIUM-137 | 9.34E-01 | | 1.6E-01 | 1.6E-01 | 8.06E-02 | pCi/g | | (11.6) | 5/22/03 10:25 a | | 251.9 | GER5$1 |
| | | | | | | | 3.20E-01 | (11.7) | | | g | |
| EUROPIUM-152 | 5.49E-02 | U | 1.1E-01 | 1.1E-01 | 2.04E-01 | pCi/g | | 0.27 | 5/22/03 10:25 a | | 251.9 | GER5$1 |
| | | | | | | | 4.04E-01 | 0.95 | | | g | |
| EUROPIUM-154 | 3.12E-02 | U | 1.1E-01 | 1.1E-01 | 2.09E-01 | pCi/g | | 0.15 | 5/22/03 10:25 a | | 251.9 | GER5$1 |
| | | | | | | | 3.70E-01 | 0.58 | | | g | |

STL Richland
rptSTLRchSample
V4.03 A97

MDC|MDA,Lc - Detection, Decision Level based on instrument background or blank, adjusted by the sample Efficiency, Yield, and Volume.
U Qual - Analyzed for, but the result is less than the Mdc/Mda|Total Uncert or gamma scan software did not identify the nuclide.

# FORM I

## SAMPLE RESULTS

Date: 29-May-03

| | | | | | |
|---|---|---|---|---|---|
| Lab Name: | STL Richland | SDG: | 22862 | Collection Date: | 4/10/2003 10:05:00 AM |
| Lot-Sample No.: | J3D300240-19 | Report No. : | 22709 | Received Date: | 4/30/2003 11:10:00 AM |
| Client Sample ID: | 9526-0001-003 F | COC No.: | 2003-00108 | Matrix: | SOIL |

Ordered by Client Sample ID, Batch No.

| Parameter | Result | Qual | Count Error ( 2 s) | Total Uncert( 2 s) | MDC\|MDA, Action Lev | Rpt Unit, Lc | Yield CRDL(RL) | Rst/MDC, Rst/TotUcert | Analysis, Prep Date | Total Sa Size | Aliquot Size | Primary Detector |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| EUROPIUM-155 | 2.27E-02 | U | 1.1E-01 | 1.1E-01 | 1.81E-01 | pCi/g | | *0.13* | 5/22/03 10:25 a | | 251.9 | GER5$1 |
| | | | | | | | 1.57E+01 | *0.43* | | | g | |
| POTASSIUM-40 | 1.13E+01 | | 1.9E+00 | 1.9E+00 | 6.30E-01 | pCi/g | | *(17.9)* | 5/22/03 10:25 a | | 251.9 | GER5$1 |
| | | | | | | | | *(11.6)* | | | g | |
| MANGANESE-54 | -1.17E-02 | U | 4.5E-02 | 4.5E-02 | 7.83E-02 | pCi/g | | *-0.15* | 5/22/03 10:25 a | | 251.9 | GER5$1 |
| | | | | | | | 6.96E-01 | *-0.52* | | | g | |
| NIOBIUM-94 | 4.45E-03 | U | 3.1E-02 | 3.1E-02 | 5.79E-02 | pCi/g | | *0.08* | 5/22/03 10:25 a | | 251.9 | GER5$1 |
| | | | | | | | 2.85E-01 | *0.29* | | | g | |
| LEAD-212 | 1.24E+00 | | 2.5E-01 | 2.5E-01 | 1.43E-01 | pCi/g | | *(8.7)* | 5/22/03 10:25 a | | 251.9 | GER5$1 |
| | | | | | | | | *(9.9)* | | | g | |
| LEAD-214 | 1.53E+00 | | 2.9E-01 | 2.9E-01 | 1.37E-01 | pCi/g | | *(11.2)* | 5/22/03 10:25 a | | 251.9 | GER5$1 |
| | | | | | | | | *(10.6)* | | | g | |
| RADIUM-226 | 1.28E+00 | | 2.7E-01 | 2.7E-01 | 1.44E-01 | pCi/g | | *(8.9)* | 5/22/03 10:25 a | | 251.9 | GER5$1 |
| | | | | | | | | *(9.6)* | | | g | |
| THALLIUM-208 | 4.22E-01 | | 9.5E-02 | 9.5E-02 | 7.26E-02 | pCi/g | | *(5.8)* | 5/22/03 10:25 a | | 251.9 | GER5$1 |
| | | | | | | | | *(8.9)* | | | g | |

No. of Results: 18 Comments:

STL Richland
rptSTLRchSample
V4.03 A97

MDC|MDA,Lc - Detection, Decision Level based on instrument background or blank, adjusted by the sample Efficiency, Yield, and Volume.
U Qual - Analyzed for, but the result is less than the Mdc/Mda|Total Uncert or gamma scan software did not identify the nuclide.

# FORM I

## SAMPLE RESULTS

Date: 29-May-03

Lab Name: STL Richland
Lot-Sample No.: J3D300240-9
Client Sample ID: 9526-0001-004 F

SDG: 22862
Report No. : 22709
COC No. : 2003-00107

Collection Date: 4/7/2003 11:06:00 AM
Received Date: 4/30/2003 11:10:00 AM
Matrix: SOIL

Ordered by Client Sample ID, Batch No.

Batch: 3122327 E901.1 Work Order: FMVTK1AA Report DB ID: 9FMVTK10

| Parameter | Result | Qual | Count Error (2 s) | Total Uncert(2 s) | MDC\|MDA, Action Lev | Rpt Unit, Lc | Yield CRDL(RL) | Rst/MDC, Rst/TotUcert | Analysis, Prep Date | Total Sa Size | Aliquot Size | Primary Detector |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ACTINIUM-228 | 1.23E+00 | | 3.0E-01 | 3.0E-01 | 2.50E-01 | pCi/g | | (4.9) | 5/23/03 11:03 a | | 255.7 | GER5$1 |
| | | | | | | | | (8.2) | | | g | |
| AG-108M | 3.20E-02 | U | 3.5E-02 | 3.5E-02 | 6.45E-02 | pCi/g | | 0.5 | 5/23/03 11:03 a | | 255.7 | GER5$1 |
| | | | | | | | 2.86E-01 | (1.8) | | | g | |
| AMERICIUM-241 | -6.75E-02 | U | 8.9E-02 | 8.9E-02 | 1.31E-01 | pCi/g | | -0.51 | 5/23/03 11:03 a | | 255.7 | GER5$1 |
| | | | | | | | 1.03E+00 | -(1.5) | | | g | |
| BISMUTH-212 | 1.47E+00 | U | 7.1E-01 | 7.1E-01 | 1.38E+00 | pCi/g | | (1.1) | 5/23/03 11:03 a | | 255.7 | GER5$1 |
| | | | | | | | | (4.1) | | | g | |
| BISMUTH-214 | 1.42E+00 | | 2.5E-01 | 2.5E-01 | 1.24E-01 | pCi/g | | (11.5) | 5/23/03 11:03 a | | 255.7 | GER5$1 |
| | | | | | | | | (11.5) | | | g | |
| COBALT-60 | 2.98E-02 | U | 3.8E-02 | 3.8E-02 | 7.76E-02 | pCi/g | | 0.38 | 5/23/03 11:03 a | | 255.7 | GER5$1 |
| | | | | | | | 1.50E-01 | (1.6) | | | g | |
| CESIUM-134 | 5.65E-02 | U | 5.0E-02 | 5.0E-02 | 9.63E-02 | pCi/g | | 0.59 | 5/23/03 11:03 a | | 255.7 | GER5$1 |
| | | | | | | | 1.90E-01 | (2.2) | | | g | |
| CESIUM-137 | 3.64E-01 | | 1.4E-01 | 1.4E-01 | 8.01E-02 | pCi/g | | (4.6) | 5/23/03 11:03 a | | 255.7 | GER5$1 |
| | | | | | | | 3.20E-01 | (5.1) | | | g | |
| EUROPIUM-152 | -2.39E-02 | U | 1.1E-01 | 1.1E-01 | 1.86E-01 | pCi/g | | -0.13 | 5/23/03 11:03 a | | 255.7 | GER5$1 |
| | | | | | | | 4.04E-01 | -0.44 | | | g | |
| EUROPIUM-154 | 2.13E-02 | U | 1.2E-01 | 1.2E-01 | 2.22E-01 | pCi/g | | 0.1 | 5/23/03 11:03 a | | 255.7 | GER5$1 |
| | | | | | | | 3.70E-01 | 0.36 | | | g | |

STL Richland
rptSTLRchSample
V4.03 A97

MDC|MDA,Lc - Detection, Decision Level based on instrument background or blank, adjusted by the sample Efficiency, Yield, and Volume.
U Qual - Analyzed for, but the result is less than the Mdc/Mda|Total Uncert or gamma scan software did not identify the nuclide.

# FORM I

## SAMPLE RESULTS

Date: 29-May-03

| | | | | | |
|---|---|---|---|---|---|
| Lab Name: | STL Richland | SDG: | 22862 | Collection Date: | 4/7/2003 11:06:00 AM |
| Lot-Sample No.: | J3D300240-9 | Report No.: | 22709 | Received Date: | 4/30/2003 11:10:00 AM |
| Client Sample ID: | 9526-0001-004 F | COC No.: | 2003-00107 | Matrix: | SOIL |

Ordered by Client Sample ID, Batch No.

| Parameter | Result | Qual | Count Error (2 s) | Total Uncert(2 s) | MDC\|MDA, Action Lev | Rpt Unit, Lc | Yield CRDL(RL) | Rst/MDC, Rst/TotUcert | Analysis, Prep Date | Total Sa Size | Aliquot Size | Primary Detector |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| EUROPIUM-155 | 3.33E-02 | U | 1.0E-01 | 1.0E-01 | 1.77E-01 | pCi/g | 1.57E+01 | 0.19<br>0.65 | 5/23/03 11:03 a | | 255.7 g | GER5$1 |
| POTASSIUM-40 | 1.03E+01 | | 1.8E+00 | 1.8E+00 | 6.03E-01 | pCi/g | | (17.1)<br>(11.3) | 5/23/03 11:03 a | | 255.7 g | GER5$1 |
| MANGANESE-54 | 3.31E-02 | U | 4.7E-02 | 4.7E-02 | 8.66E-02 | pCi/g | 6.96E-01 | 0.38<br>(1.4) | 5/23/03 11:03 a | | 255.7 g | GER5$1 |
| NIOBIUM-94 | 1.16E-02 | U | 3.2E-02 | 3.2E-02 | 6.06E-02 | pCi/g | 2.85E-01 | 0.19<br>0.73 | 5/23/03 11:03 a | | 255.7 g | GER5$1 |
| LEAD-212 | 1.14E+00 | | 2.5E-01 | 2.5E-01 | 1.15E-01 | pCi/g | | (9.9)<br>(9.1) | 5/23/03 11:03 a | | 255.7 g | GER5$1 |
| LEAD-214 | 1.35E+00 | | 2.7E-01 | 2.7E-01 | 1.39E-01 | pCi/g | | (9.7)<br>(10.2) | 5/23/03 11:03 a | | 255.7 g | GER5$1 |
| RADIUM-226 | 1.42E+00 | | 2.5E-01 | 2.5E-01 | 1.24E-01 | pCi/g | | (11.5)<br>(11.5) | 5/23/03 11:03 a | | 255.7 g | GER5$1 |
| THALLIUM-208 | 3.90E-01 | | 1.2E-01 | 1.2E-01 | 6.47E-02 | pCi/g | | (6.)<br>(6.7) | 5/23/03 11:03 a | | 255.7 g | GER5$1 |

No. of Results: 18 Comments:

STL Richland
rptSTLRchSample
V4.03 A97

MDC|MDA,Lc - Detection, Decision Level based on instrument background or blank, adjusted by the sample Efficiency, Yield, and Volume.
U Qual - Analyzed for, but the result is less than the Mdc/Mda|Total Uncert or gamma scan software did not identify the nuclide.

# FORM I

## SAMPLE RESULTS

Date: 29-May-03

| | | | | | |
|---|---|---|---|---|---|
| Lab Name: | STL Richland | SDG: | 22862 | Collection Date: | 4/10/2003 1:40:00 PM |
| Lot-Sample No.: | J3D300240-29 | Report No. : | 22709 | Received Date: | 4/30/2003 11:10:00 AM |
| Client Sample ID: | 9526-0001-005 F | COC No.: | 2003-00110 | Matrix: | SOIL |

Ordered by Client Sample ID, Batch No.

| Parameter | Result | Qual | Count Error ( 2 s) | Total Uncert( 2 s) | MDC\|MDA, Action Lev | Rpt Unit, Lc | Yield CRDL(RL) | Rst/MDC, Rst/TotUcert | Analysis, Prep Date | Total Sa Size | Aliquot Size | Primary Detector |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Batch: 3122330 | E901.1 | | | Work Order: | FMVV41AA | | Report DB ID: 9FMVV410 | | | | | |
| ACTINIUM-228 | 1.33E+00 | | 2.9E-01 | 2.9E-01 | 2.63E-01 | pCi/g | | (5.1) | 5/22/03 07:22 p | | 266.4 | GER6$1 |
| | | | | | | | | (9.1) | | | g | |
| AG-108M | -2.99E-02 | U | 3.3E-02 | 3.3E-02 | 5.33E-02 | pCi/g | | -0.56 | 5/22/03 07:22 p | | 266.4 | GER6$1 |
| | | | | | | | 2.86E-01 | -(1.8) | | | g | |
| AMERICIUM-241 | 2.10E-01 | U | 1.3E-01 | 1.3E-01 | 2.16E-01 | pCi/g | | 0.97 | 5/22/03 07:22 p | | 266.4 | GER6$1 |
| | | | | | | | 1.03E+00 | (3.3) | | | g | |
| BISMUTH-212 | 1.41E+00 | U | 6.5E-01 | 6.5E-01 | 1.27E+00 | pCi/g | | (1.1) | 5/22/03 07:22 p | | 266.4 | GER6$1 |
| | | | | | | | | (4.3) | | | g | |
| BISMUTH-214 | 1.25E+00 | U | 2.4E-01 | 2.4E-01 | 3.22E-01 | pCi/g | | (3.9) | 5/22/03 07:22 p | | 266.4 | GER6$1 |
| | | | | | | | | (10.6) | | | g | |
| COBALT-60 | 1.35E-02 | U | 3.5E-02 | 3.5E-02 | 6.97E-02 | pCi/g | | 0.19 | 5/22/03 07:22 p | | 266.4 | GER6$1 |
| | | | | | | | 1.50E-01 | 0.76 | | | g | |
| CESIUM-134 | 6.35E-02 | U | 4.8E-02 | 4.8E-02 | 9.20E-02 | pCi/g | | 0.69 | 5/22/03 07:22 p | | 266.4 | GER6$1 |
| | | | | | | | 1.90E-01 | (2.7) | | | g | |
| CESIUM-137 | 4.44E-01 | | 1.1E-01 | 1.1E-01 | 7.32E-02 | pCi/g | | (6.1) | 5/22/03 07:22 p | | 266.4 | GER6$1 |
| | | | | | | | 3.20E-01 | (8.3) | | | g | |
| EUROPIUM-152 | -4.75E-03 | U | 1.1E-01 | 1.1E-01 | 1.84E-01 | pCi/g | | -0.03 | 5/22/03 07:22 p | | 266.4 | GER6$1 |
| | | | | | | | 4.04E-01 | -0.09 | | | g | |
| EUROPIUM-154 | 5.30E-02 | U | 1.2E-01 | 1.2E-01 | 2.30E-01 | pCi/g | | 0.23 | 5/22/03 07:22 p | | 266.4 | GER6$1 |
| | | | | | | | 3.70E-01 | 0.87 | | | g | |

STL Richland
rptSTLRchSample
V4.03 A97

MDC|MDA,Lc - Detection, Decision Level based on instrument background or blank, adjusted by the sample Efficiency, Yield, and Volume.
U Qual - Analyzed for, but the result is less than the Mdc/Mda|Total Uncert or gamma scan software did not identify the nuclide.

# FORM I

## SAMPLE RESULTS

Date: 29-May-03

| | | | | | |
|---|---|---|---|---|---|
| Lab Name: | STL Richland | SDG: | 22862 | Collection Date: | 4/10/2003 1:40:00 PM |
| Lot-Sample No.: | J3D300240-29 | Report No. : | 22709 | Received Date: | 4/30/2003 11:10:00 AM |
| Client Sample ID: | 9526-0001-005 F | COC No. : | 2003-00110 | Matrix: | SOIL |

Ordered by Client Sample ID, Batch No.

| Parameter | Result | Qual | Count Error ( 2 s) | Total Uncert( 2 s) | MDC\|MDA, Action Lev | Rpt Unit, Lc | Yield CRDL(RL) | Rst/MDC, Rst/TotUcert | Analysis, Prep Date | Total Sa Size | Aliquot Size | Primary Detector |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| EUROPIUM-155 | 2.93E-02 | U | 9.9E-02 | 9.9E-02 | 1.68E-01 | pCi/g | | *0.17* | 5/22/03 07:22 p | | 266.4 | GER6$1 |
| | | | | | | | 1.57E+01 | *0.59* | | | g | |
| POTASSIUM-40 | 1.13E+01 | | 1.9E+00 | 1.9E+00 | 7.20E-01 | pCi/g | | *(15.7)* | 5/22/03 07:22 p | | 266.4 | GER6$1 |
| | | | | | | | | *(11.7)* | | | g | |
| MANGANESE-54 | -7.37E-03 | U | 4.0E-02 | 4.0E-02 | 7.09E-02 | pCi/g | | *-0.1* | 5/22/03 07:22 p | | 266.4 | GER6$1 |
| | | | | | | | 6.96E-01 | *-0.37* | | | g | |
| NIOBIUM-94 | 3.71E-02 | U | 3.6E-02 | 3.6E-02 | 6.98E-02 | pCi/g | | *0.53* | 5/22/03 07:22 p | | 266.4 | GER6$1 |
| | | | | | | | 2.85E-01 | *(2.1)* | | | g | |
| LEAD-212 | 1.35E+00 | | 2.5E-01 | 2.5E-01 | 9.54E-02 | pCi/g | | *(14.2)* | 5/22/03 07:22 p | | 266.4 | GER6$1 |
| | | | | | | | | *(10.7)* | | | g | |
| LEAD-214 | 1.47E+00 | | 2.9E-01 | 2.9E-01 | 1.19E-01 | pCi/g | | *(12.3)* | 5/22/03 07:22 p | | 266.4 | GER6$1 |
| | | | | | | | | *(10.1)* | | | g | |
| RADIUM-226 | 1.25E+00 | | 2.4E-01 | 2.4E-01 | 1.15E-01 | pCi/g | | *(10.9)* | 5/22/03 07:22 p | | 266.4 | GER6$1 |
| | | | | | | | | *(10.6)* | | | g | |
| THALLIUM-208 | 4.46E-01 | | 1.0E-01 | 1.0E-01 | 6.64E-02 | pCi/g | | *(6.7)* | 5/22/03 07:22 p | | 266.4 | GER6$1 |
| | | | | | | | | *(8.8)* | | | g | |

No. of Results: 18 Comments:

STL Richland
rptSTLRchSample
V4.03 A97

MDC|MDA,Lc - Detection, Decision Level based on instrument background or blank, adjusted by the sample Efficiency, Yield, and Volume.
U Qual - Analyzed for, but the result is less than the Mdc/Mda|Total Uncert or gamma scan software did not identify the nuclide.

# FORM I

## SAMPLE RESULTS

Date: 29-May-03

| | | | | | |
|---|---|---|---|---|---|
| Lab Name: | STL Richland | SDG: | 22862 | Collection Date: | 4/10/2003 2:20:00 PM |
| Lot-Sample No.: | J3D300240-32 | Report No. : | 22709 | Received Date: | 4/30/2003 11:10:00 AM |
| Client Sample ID: | 9526-0001-006 F,FS | COC No.: | 2003-00110 | Matrix: | SOIL |

Ordered by Client Sample ID, Batch No.

| Parameter | Result | Qual | Count Error ( 2 s) | Total Uncert( 2 s) | MDC\|MDA, Action Lev | Rpt Unit, Lc | Yield CRDL(RL) | Rst/MDC, Rst/TotUcert | Analysis, Prep Date | Total Sa Size | Aliquot Size | Primary Detector |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Batch: 3122330 | E901.1 | | | Work Order: | FMVWL1AA | | Report DB ID: | 9FMVWL10 | | | | |
| ACTINIUM-228 | 1.41E+00 | U | 3.1E-01 | 3.1E-01 | 5.27E-01 | pCi/g | | (2.7) | 5/22/03 10:11 p | | 264.5 | GER2$1 |
| | | | | | | | | (9.2) | | | g | |
| AG-108M | 1.46E-03 | U | 3.8E-02 | 3.8E-02 | 6.53E-02 | pCi/g | | 0.02 | 5/22/03 10:11 p | | 264.5 | GER2$1 |
| | | | | | | | 2.86E-01 | 0.08 | | | g | |
| AMERICIUM-241 | -2.14E-01 | U | 4.7E-01 | 4.7E-01 | 7.80E-01 | pCi/g | | -0.27 | 5/22/03 10:11 p | | 264.5 | GER2$1 |
| | | | | | | | 1.03E+00 | -0.91 | | | g | |
| BISMUTH-212 | 1.55E+00 | U | 7.3E-01 | 7.3E-01 | 1.39E+00 | pCi/g | | (1.1) | 5/22/03 10:11 p | | 264.5 | GER2$1 |
| | | | | | | | | (4.3) | | | g | |
| BISMUTH-214 | 1.53E+00 | | 2.8E-01 | 2.8E-01 | 1.46E-01 | pCi/g | | (10.5) | 5/22/03 10:11 p | | 264.5 | GER2$1 |
| | | | | | | | | (10.7) | | | g | |
| COBALT-60 | -9.99E-03 | U | 4.5E-02 | 4.5E-02 | 8.03E-02 | pCi/g | | -0.12 | 5/22/03 10:11 p | | 264.5 | GER2$1 |
| | | | | | | | 1.50E-01 | -0.44 | | | g | |
| CESIUM-134 | 6.18E-02 | U | 5.3E-02 | 5.3E-02 | 1.00E-01 | pCi/g | | 0.62 | 5/22/03 10:11 p | | 264.5 | GER2$1 |
| | | | | | | | 1.90E-01 | (2.4) | | | g | |
| CESIUM-137 | 5.09E-01 | | 1.0E-01 | 1.0E-01 | 9.03E-02 | pCi/g | | (5.6) | 5/22/03 10:11 p | | 264.5 | GER2$1 |
| | | | | | | | 3.20E-01 | (9.8) | | | g | |
| EUROPIUM-152 | 4.33E-02 | U | 1.6E-01 | 1.6E-01 | 2.26E-01 | pCi/g | | 0.19 | 5/22/03 10:11 p | | 264.5 | GER2$1 |
| | | | | | | | 4.04E-01 | 0.55 | | | g | |
| EUROPIUM-154 | -1.83E-02 | U | 1.2E-01 | 1.2E-01 | 2.16E-01 | pCi/g | | -0.08 | 5/22/03 10:11 p | | 264.5 | GER2$1 |
| | | | | | | | 3.70E-01 | -0.3 | | | g | |

STL Richland
rptSTLRchSample
V4.03 A97

MDC|MDA,Lc - Detection, Decision Level based on instrument background or blank, adjusted by the sample Efficiency, Yield, and Volume.
U Qual - Analyzed for, but the result is less than the Mdc/Mda|Total Uncert or gamma scan software did not identify the nuclide.

# FORM I

## SAMPLE RESULTS

Date: 29-May-03

| | | | | | |
|---|---|---|---|---|---|
| Lab Name: | STL Richland | SDG: | 22862 | Collection Date: | 4/10/2003 2:20:00 PM |
| Lot-Sample No.: | J3D300240-32 | Report No.: | 22709 | Received Date: | 4/30/2003 11:10:00 AM |
| Client Sample ID: | 9526-0001-006 F,FS | COC No.: | 2003-00110 | Matrix: | SOIL |

Ordered by Client Sample ID, Batch No.

| Parameter | Result | Qual | Count Error (2 s) | Total Uncert(2 s) | MDC\|MDA, Action Lev | Rpt Unit, Lc | Yield CRDL(RL) | Rst/MDC, Rst/TotUcert | Analysis, Prep Date | Total Sa Size | Aliquot Size | Primary Detector |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| EUROPIUM-155 | 1.48E-01 | U | 1.9E-01 | 1.9E-01 | 3.26E-01 | pCi/g | 1.57E+01 | 0.45 (1.6) | 5/22/03 10:11 p | | 264.5 g | GER2$1 |
| POTASSIUM-40 | 1.13E+01 | | 1.9E+00 | 1.9E+00 | 6.48E-01 | pCi/g | | (17.4) (11.8) | 5/22/03 10:11 p | | 264.5 g | GER2$1 |
| MANGANESE-54 | -2.03E-02 | U | 4.5E-02 | 4.5E-02 | 7.69E-02 | pCi/g | 6.96E-01 | -0.26 -0.9 | 5/22/03 10:11 p | | 264.5 g | GER2$1 |
| NIOBIUM-94 | -2.80E-02 | U | 3.9E-02 | 3.9E-02 | 6.53E-02 | pCi/g | 2.85E-01 | -0.43 -(1.4) | 5/22/03 10:11 p | | 264.5 g | GER2$1 |
| LEAD-212 | 1.65E+00 | | 3.5E-01 | 3.5E-01 | 1.24E-01 | pCi/g | | (13.2) (9.5) | 5/22/03 10:11 p | | 264.5 g | GER2$1 |
| LEAD-214 | 1.56E+00 | | 2.9E-01 | 2.9E-01 | 1.61E-01 | pCi/g | | (9.7) (10.8) | 5/22/03 10:11 p | | 264.5 g | GER2$1 |
| RADIUM-226 | 1.53E+00 | | 2.8E-01 | 2.8E-01 | 1.46E-01 | pCi/g | | (10.5) (10.7) | 5/22/03 10:11 p | | 264.5 g | GER2$1 |
| THALLIUM-208 | 4.81E-01 | | 1.1E-01 | 1.1E-01 | 7.42E-02 | pCi/g | | (6.5) (8.4) | 5/22/03 10:11 p | | 264.5 g | GER2$1 |

No. of Results: 18 Comments:

STL Richland
rptSTLRchSample
V4.03 · A97

MDC|MDA,Lc - Detection, Decision Level based on instrument background or blank, adjusted by the sample Efficiency, Yield, and Volume.
U Qual - Analyzed for, but the result is less than the Mdc/Mda|Total Uncert or gamma scan software did not identify the nuclide.

# FORM I

## SAMPLE RESULTS

Date: 29-May-03

| | | | | | |
|---|---|---|---|---|---|
| Lab Name: | STL Richland | SDG: | 22862 | Collection Date: | 4/10/2003 10:15:00 AM |
| Lot-Sample No.: | J3D300240-20 | Report No. : | 22709 | Received Date: | 4/30/2003 11:10:00 AM |
| Client Sample ID: | 9526-0001-007 F | COC No. : | 2003-00108 | Matrix: | SOIL |

Ordered by Client Sample ID, Batch No.

| Parameter | Result | Qual | Count Error ( 2 s) | Total Uncert( 2 s) | MDC\|MDA, Action Lev | Rpt Unit, Lc | Yield CRDL(RL) | Rst/MDC, Rst/TotUcert | Analysis, Prep Date | Total Sa Size | Aliquot Size | Primary Detector |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Batch: 3122330 | E901.1 | | | Work Order: | FMVVK1AA | | Report DB ID: | 9FMVVK10 | | | | |
| ACTINIUM-228 | 7.40E-01 | | 2.0E-01 | 2.0E-01 | 1.78E-01 | pCi/g | | (4.2) | 5/22/03 10:28 a | | 246.3 | GER7$1 |
| | | | | | | | | (7.3) | | | g | |
| AG-108M | -4.06E-02 | U | 2.9E-02 | 2.9E-02 | 4.32E-02 | pCi/g | | -0.94 | 5/22/03 10:28 a | | 246.3 | GER7$1 |
| | | | | | | | 2.86E-01 | -(2.8) | | | g | |
| AMERICIUM-241 | -1.57E-02 | U | 1.1E-01 | 1.1E-01 | 1.83E-01 | pCi/g | | -0.09 | 5/22/03 10:28 a | | 246.3 | GER7$1 |
| | | | | | | | 1.03E+00 | -0.29 | | | g | |
| BISMUTH-212 | 1.02E+00 | U | 5.5E-01 | 5.5E-01 | 1.02E+00 | pCi/g | | (1.) | 5/22/03 10:28 a | | 246.3 | GER7$1 |
| | | | | | | | | (3.7) | | | g | |
| BISMUTH-214 | 6.67E-01 | U | 1.5E-01 | 1.5E-01 | 2.55E-01 | pCi/g | | (2.6) | 5/22/03 10:28 a | | 246.3 | GER7$1 |
| | | | | | | | | (8.9) | | | g | |
| COBALT-60 | 2.46E-02 | U | 3.2E-02 | 3.2E-02 | 6.89E-02 | pCi/g | | 0.36 | 5/22/03 10:28 a | | 246.3 | GER7$1 |
| | | | | | | | 1.50E-01 | (1.5) | | | g | |
| CESIUM-134 | 3.06E-02 | U | 3.5E-02 | 3.5E-02 | 7.07E-02 | pCi/g | | 0.43 | 5/22/03 10:28 a | | 246.3 | GER7$1 |
| | | | | | | | 1.90E-01 | (1.7) | | | g | |
| CESIUM-137 | 1.19E+00 | | 1.8E-01 | 1.8E-01 | 6.19E-02 | pCi/g | | (19.2) | 5/22/03 10:28 a | | 246.3 | GER7$1 |
| | | | | | | | 3.20E-01 | (13.3) | | | g | |
| EUROPIUM-152 | -2.96E-02 | U | 9.5E-02 | 9.5E-02 | 1.60E-01 | pCi/g | | -0.19 | 5/22/03 10:28 a | | 246.3 | GER7$1 |
| | | | | | | | 4.04E-01 | -0.63 | | | g | |
| EUROPIUM-154 | -9.41E-02 | U | 1.1E-01 | 1.1E-01 | 1.73E-01 | pCi/g | | -0.54 | 5/22/03 10:28 a | | 246.3 | GER7$1 |
| | | | | | | | 3.70E-01 | -(1.7) | | | g | |

STL Richland
rptSTLRchSample
V4.03 A97

MDC|MDA,Lc - Detection, Decision Level based on instrument background or blank, adjusted by the sample Efficiency, Yield, and Volume.
U Qual - Analyzed for, but the result is less than the Mdc/Mda|Total Uncert or gamma scan software did not identify the nuclide.

# FORM I

## SAMPLE RESULTS

Date: 29-May-03

| | | | | | |
|---|---|---|---|---|---|
| Lab Name: | STL Richland | SDG: | 22862 | Collection Date: | 4/10/2003 10:15:00 AM |
| Lot-Sample No.: | J3D300240-20 | Report No. : | 22709 | Received Date: | 4/30/2003 11:10:00 AM |
| Client Sample ID: | 9526-0001-007 F | COC No. : | 2003-00108 | Matrix: | SOIL |

Ordered by Client Sample ID, Batch No.

| Parameter | Result | Qual | Count Error ( 2 s) | Total Uncert( 2 s) | MDC\|MDA, Action Lev | Rpt Unit, Lc | Yield CRDL(RL) | Rst/MDC, Rst/TotUcert | Analysis, Prep Date | Total Sa Size | Aliquot Size | Primary Detector |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| EUROPIUM-155 | 8.35E-02 | U | 8.7E-02 | 8.7E-02 | 1.60E-01 | pCi/g | | 0.52 | 5/22/03 10:28 a | | 246.3 | GER7$1 |
| | | | | | | | 1.57E+01 | (1.9) | | | g | |
| POTASSIUM-40 | 4.80E+00 | | 1.1E+00 | 1.1E+00 | 4.91E-01 | pCi/g | | (9.8) | 5/22/03 10:28 a | | 246.3 | GER7$1 |
| | | | | | | | | (8.5) | | | g | |
| MANGANESE-54 | -6.55E-03 | U | 3.1E-02 | 3.1E-02 | 5.67E-02 | pCi/g | | -0.12 | 5/22/03 10:28 a | | 246.3 | GER7$1 |
| | | | | | | | 6.96E-01 | -0.42 | | | g | |
| NIOBIUM-94 | 1.36E-02 | U | 2.8E-02 | 2.8E-02 | 5.63E-02 | pCi/g | | 0.24 | 5/22/03 10:28 a | | 246.3 | GER7$1 |
| | | | | | | | 2.85E-01 | 0.96 | | | g | |
| LEAD-212 | 5.46E-01 | | 1.5E-01 | 1.5E-01 | 1.36E-01 | pCi/g | | (4.) | 5/22/03 10:28 a | | 246.3 | GER7$1 |
| | | | | | | | | (7.5) | | | g | |
| LEAD-214 | 7.50E-01 | | 1.7E-01 | 1.7E-01 | 1.09E-01 | pCi/g | | (6.9) | 5/22/03 10:28 a | | 246.3 | GER7$1 |
| | | | | | | | | (9.) | | | g | |
| RADIUM-226 | 6.67E-01 | U | 1.5E-01 | 1.5E-01 | 2.55E-01 | pCi/g | | (2.6) | 5/22/03 10:28 a | | 246.3 | GER7$1 |
| | | | | | | | | (8.9) | | | g | |
| THALLIUM-208 | 2.30E-01 | U | 7.3E-02 | 7.3E-02 | 1.10E-01 | pCi/g | | (2.1) | 5/22/03 10:28 a | | 246.3 | GER7$1 |
| | | | | | | | | (6.3) | | | g | |

No. of Results: 18 Comments:

STL Richland
rptSTLRchSample
V4.03 A97

MDC|MDA,Lc - Detection, Decision Level based on instrument background or blank, adjusted by the sample Efficiency, Yield, and Volume.
U Qual - Analyzed for, but the result is less than the Mdc/Mda|Total Uncert or gamma scan software did not identify the nuclide.

# FORM I

## SAMPLE RESULTS

Date: 29-May-03

| | | | | | |
|---|---|---|---|---|---|
| Lab Name: | STL Richland | SDG: | 22862 | Collection Date: | 4/7/2003 10:50:00 AM |
| Lot-Sample No.: | J3D300240-7 | Report No. : | 22709 | Received Date: | 4/30/2003 11:10:00 AM |
| Client Sample ID: | 9526-0001-008 F | COC No. : | 2003-00107 | Matrix: | SOIL |

Ordered by Client Sample ID, Batch No.

| Parameter | Result | Qual | Count Error ( 2 s) | Total Uncert( 2 s) | MDC\|MDA, Action Lev | Rpt Unit, Lc | Yield CRDL(RL) | Rst/MDC, Rst/TotUcert | Analysis, Prep Date | Total Sa Size | Aliquot Size | Primary Detector |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Batch: 3122327 | E901.1 | | | Work Order: | FMVTD1AA | | Report DB ID: | 9FMVTD10 | | | | |
| ACTINIUM-228 | 1.49E+00 | | 3.1E-01 | 3.1E-01 | 2.02E-01 | pCi/g | | (7.4) | 5/23/03 09:19 a | | 231.8 | GER8$1 |
| | | | | | | | | (9.5) | | | g | |
| AG-108M | 4.04E-03 | U | 3.0E-02 | 3.0E-02 | 5.38E-02 | pCi/g | | 0.08 | 5/23/03 09:19 a | | 231.8 | GER8$1 |
| | | | | | | | 2.86E-01 | 0.27 | | | g | |
| AMERICIUM-241 | 8.23E-02 | U | 8.8E-02 | 8.8E-02 | 1.41E-01 | pCi/g | | 0.59 | 5/23/03 09:19 a | | 231.8 | GER8$1 |
| | | | | | | | 1.03E+00 | (1.9) | | | g | |
| BISMUTH-212 | 1.06E+00 | U | 6.9E-01 | 6.9E-01 | 1.25E+00 | pCi/g | | 0.85 | 5/23/03 09:19 a | | 231.8 | GER8$1 |
| | | | | | | | | (3.1) | | | g | |
| BISMUTH-214 | 1.25E+00 | U | 2.4E-01 | 2.4E-01 | 3.40E-01 | pCi/g | | (3.7) | 5/23/03 09:19 a | | 231.8 | GER8$1 |
| | | | | | | | | (10.5) | | | g | |
| COBALT-60 | -2.53E-02 | U | 3.8E-02 | 3.8E-02 | 6.24E-02 | pCi/g | | -0.41 | 5/23/03 09:19 a | | 231.8 | GER8$1 |
| | | | | | | | 1.50E-01 | -(1.3) | | | g | |
| CESIUM-134 | 7.48E-02 | U | 4.3E-02 | 4.3E-02 | 8.80E-02 | pCi/g | | 0.85 | 5/23/03 09:19 a | | 231.8 | GER8$1 |
| | | | | | | | 1.90E-01 | (3.5) | | | g | |
| CESIUM-137 | 7.35E-01 | | 1.3E-01 | 1.3E-01 | 6.41E-02 | pCi/g | | (11.5) | 5/23/03 09:19 a | | 231.8 | GER8$1 |
| | | | | | | | 3.20E-01 | (10.9) | | | g | |
| EUROPIUM-152 | -3.30E-02 | U | 1.0E-01 | 1.0E-01 | 1.71E-01 | pCi/g | | -0.19 | 5/23/03 09:19 a | | 231.8 | GER8$1 |
| | | | | | | | 4.04E-01 | -0.66 | | | g | |
| EUROPIUM-154 | 1.05E-01 | U | 1.1E-01 | 1.1E-01 | 2.34E-01 | pCi/g | | 0.45 | 5/23/03 09:19 a | | 231.8 | GER8$1 |
| | | | | | | | 3.70E-01 | (1.8) | | | g | |

STL Richland
rptSTLRchSample
V4.03 A97

MDC|MDA,Lc - Detection, Decision Level based on instrument background or blank, adjusted by the sample Efficiency, Yield, and Volume.
U Qual - Analyzed for, but the result is less than the Mdc/Mda|Total Uncert or gamma scan software did not identify the nuclide.

# FORM I

## SAMPLE RESULTS

Date: 29-May-03

| | | | | | |
|---|---|---|---|---|---|
| Lab Name: | STL Richland | SDG: | 22862 | Collection Date: | 4/7/2003 10:50:00 AM |
| Lot-Sample No.: | J3D300240-7 | Report No. : | 22709 | Received Date: | 4/30/2003 11:10:00 AM |
| Client Sample ID: | 9526-0001-008 F | COC No. : | 2003-00107 | Matrix: | SOIL |

Ordered by Client Sample ID, Batch No.

| Parameter | Result | Qual | Count Error ( 2 s) | Total Uncert( 2 s) | MDC\|MDA, Action Lev | Rpt Unit, Lc | Yield CRDL(RL) | Rst/MDC, Rst/TotUcert | Analysis, Prep Date | Total Sa Size | Aliquot Size | Primary Detector |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| EUROPIUM-155 | 3.09E-02 | U | 1.0E-01 | 1.0E-01 | 1.75E-01 | pCi/g | | *0.18* | 5/23/03 09:19 a | | 231.8 | GER8$1 |
| | | | | | | | 1.57E+01 | *0.62* | | | g | |
| POTASSIUM-40 | 1.12E+01 | | 1.9E+00 | 1.9E+00 | 6.62E-01 | pCi/g | | *(16.9)* | 5/23/03 09:19 a | | 231.8 | GER8$1 |
| | | | | | | | | *(12.1)* | | | g | |
| MANGANESE-54 | -9.42E-03 | U | 3.9E-02 | 3.9E-02 | 6.73E-02 | pCi/g | | *-0.14* | 5/23/03 09:19 a | | 231.8 | GER8$1 |
| | | | | | | | 6.96E-01 | *-0.49* | | | g | |
| NIOBIUM-94 | 6.07E-03 | U | 3.4E-02 | 3.4E-02 | 6.22E-02 | pCi/g | | *0.1* | 5/23/03 09:19 a | | 231.8 | GER8$1 |
| | | | | | | | 2.85E-01 | *0.36* | | | g | |
| LEAD-212 | 1.21E+00 | | 2.4E-01 | 2.4E-01 | 1.06E-01 | pCi/g | | *(11.5)* | 5/23/03 09:19 a | | 231.8 | GER8$1 |
| | | | | | | | | *(10.2)* | | | g | |
| LEAD-214 | 1.22E+00 | | 2.5E-01 | 2.5E-01 | 1.21E-01 | pCi/g | | *(10.1)* | 5/23/03 09:19 a | | 231.8 | GER8$1 |
| | | | | | | | | *(9.7)* | | | g | |
| RADIUM-226 | 1.25E+00 | | 2.4E-01 | 2.4E-01 | 1.16E-01 | pCi/g | | *(10.8)* | 5/23/03 09:19 a | | 231.8 | GER8$1 |
| | | | | | | | | *(10.5)* | | | g | |
| THALLIUM-208 | 4.22E-01 | | 8.9E-02 | 8.9E-02 | 6.30E-02 | pCi/g | | *(6.7)* | 5/23/03 09:19 a | | 231.8 | GER8$1 |
| | | | | | | | | *(9.5)* | | | g | |

No. of Results: 18 Comments:

STL Richland
rptSTLRchSample
V4.03 A97

MDC|MDA,Lc - Detection, Decision Level based on instrument background or blank, adjusted by the sample Efficiency, Yield, and Volume.
U Qual - Analyzed for, but the result is less than the Mdc/Mda|Total Uncert or gamma scan software did not identify the nuclide.

# FORM I

## SAMPLE RESULTS

Date: 29-May-03

| | | | | | |
|---|---|---|---|---|---|
| Lab Name: | STL Richland | SDG: | 22862 | Collection Date: | 4/7/2003 11:00:00 AM |
| Lot-Sample No.: | J3D300240-8 | Report No. : | 22709 | Received Date: | 4/30/2003 11:10:00 AM |
| Client Sample ID: | 9526-0001-009 F | COC No. : | 2003-00107 | Matrix: | SOIL |

Ordered by Client Sample ID, Batch No.

| Parameter | Result | Qual | Count Error ( 2 s) | Total Uncert( 2 s) | MDC\|MDA, Action Lev | Rpt Unit, Lc | Yield CRDL(RL) | Rst/MDC, Rst/TotUcert | Analysis, Prep Date | Total Sa Size | Aliquot Size | Primary Detector |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Batch: 3122327 | E901.1 | | | Work Order: | FMVTG1AA | | Report DB ID: | 9FMVTG10 | | | | |
| ACTINIUM-228 | 1.65E+00 | | 3.8E-01 | 3.8E-01 | 2.31E-01 | pCi/g | | *(7.1)* | 5/23/03 11:01 a | | 264.0 | GER2$1 |
| | | | | | | | | *(8.8)* | | | g | |
| AG-108M | -1.74E-02 | U | 3.6E-02 | 3.6E-02 | 6.18E-02 | pCi/g | | *-0.28* | 5/23/03 11:01 a | | 264.0 | GER2$1 |
| | | | | | | | 2.86E-01 | *-0.95* | | | g | |
| AMERICIUM-241 | 1.28E-01 | U | 4.7E-01 | 4.7E-01 | 8.03E-01 | pCi/g | | *0.16* | 5/23/03 11:01 a | | 264.0 | GER2$1 |
| | | | | | | | 1.03E+00 | *0.54* | | | g | |
| BISMUTH-212 | 1.94E+00 | U | 7.2E-01 | 7.2E-01 | 1.40E+00 | pCi/g | | *(1.4)* | 5/23/03 11:01 a | | 264.0 | GER2$1 |
| | | | | | | | | *(5.4)* | | | g | |
| BISMUTH-214 | 1.68E+00 | U | 2.9E-01 | 2.9E-01 | 3.60E-01 | pCi/g | | *(4.7)* | 5/23/03 11:01 a | | 264.0 | GER2$1 |
| | | | | | | | | *(11.7)* | | | g | |
| COBALT-60 | 1.58E-02 | U | 3.7E-02 | 3.7E-02 | 7.13E-02 | pCi/g | | *0.22* | 5/23/03 11:01 a | | 264.0 | GER2$1 |
| | | | | | | | 1.50E-01 | *0.86* | | | g | |
| CESIUM-134 | 7.31E-02 | U | 5.5E-02 | 5.5E-02 | 1.04E-01 | pCi/g | | *0.7* | 5/23/03 11:01 a | | 264.0 | GER2$1 |
| | | | | | | | 1.90E-01 | *(2.7)* | | | g | |
| CESIUM-137 | 2.91E-01 | J | 1.1E-01 | 1.1E-01 | 7.64E-02 | pCi/g | | *(3.8)* | 5/23/03 11:01 a | | 264.0 | GER2$1 |
| | | | | | | | 3.20E-01 | *(5.3)* | | | g | |
| EUROPIUM-152 | -1.23E-02 | U | 1.7E-01 | 1.7E-01 | 2.10E-01 | pCi/g | | *-0.06* | 5/23/03 11:01 a | | 264.0 | GER2$1 |
| | | | | | | | 4.04E-01 | *-0.14* | | | g | |
| EUROPIUM-154 | -4.32E-02 | U | 1.4E-01 | 1.4E-01 | 2.42E-01 | pCi/g | | *-0.18* | 5/23/03 11:01 a | | 264.0 | GER2$1 |
| | | | | | | | 3.70E-01 | *-0.61* | | | g | |

STL Richland
rptSTLRchSample
V4.03 A97

MDC|MDA,Lc - Detection, Decision Level based on instrument background or blank, adjusted by the sample Efficiency, Yield, and Volume.
J Qual - No U qualifier has been assigned and the result is below the Reporting Limit, RL (CRDL) or Report Value is Estimated.
U Qual - Analyzed for, but the result is less than the Mdc/Mda|Total Uncert or gamma scan software did not identify the nuclide.

# FORM I

## SAMPLE RESULTS

Date: 29-May-03

| | | | | | |
|---|---|---|---|---|---|
| Lab Name: | STL Richland | SDG: | 22862 | Collection Date: | 4/7/2003 11:00:00 AM |
| Lot-Sample No.: | J3D300240-8 | Report No. : | 22709 | Received Date: | 4/30/2003 11:10:00 AM |
| Client Sample ID: | 9526-0001-009 F | COC No.: | 2003-00107 | Matrix: | SOIL |

Ordered by Client Sample ID, Batch No.

| Parameter | Result | Qual | Count Error ( 2 s) | Total Uncert( 2 s) | MDC\|MDA, Action Lev | Rpt Unit, Lc | Yield CRDL(RL) | Rst/MDC, Rst/TotUcert | Analysis, Prep Date | Total Sa Size | Aliquot Size | Primary Detector |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| EUROPIUM-155 | 1.24E-01 | U | 1.9E-01 | 1.9E-01 | 3.21E-01 | pCi/g | | *0.39* | 5/23/03 11:01 a | | 264.0 | GER2$1 |
| | | | | | | | 1.57E+01 | *(1.3)* | | | g | |
| POTASSIUM-40 | 1.19E+01 | | 2.0E+00 | 2.0E+00 | 6.41E-01 | pCi/g | | *(18.5)* | 5/23/03 11:01 a | | 264.0 | GER2$1 |
| | | | | | | | | *(12.1)* | | | g | |
| MANGANESE-54 | 3.00E-03 | U | 4.8E-02 | 4.8E-02 | 8.59E-02 | pCi/g | | *0.03* | 5/23/03 11:01 a | | 264.0 | GER2$1 |
| | | | | | | | 6.96E-01 | *0.12* | | | g | |
| NIOBIUM-94 | -3.21E-02 | U | 3.8E-02 | 3.8E-02 | 6.25E-02 | pCi/g | | *-0.51* | 5/23/03 11:01 a | | 264.0 | GER2$1 |
| | | | | | | | 2.85E-01 | *-(1.7)* | | | g | |
| LEAD-212 | 1.45E+00 | | 2.9E-01 | 2.9E-01 | 1.23E-01 | pCi/g | | *(11.8)* | 5/23/03 11:01 a | | 264.0 | GER2$1 |
| | | | | | | | | *(9.9)* | | | g | |
| LEAD-214 | 1.48E+00 | | 3.0E-01 | 3.0E-01 | 1.53E-01 | pCi/g | | *(9.6)* | 5/23/03 11:01 a | | 264.0 | GER2$1 |
| | | | | | | | | *(10.)* | | | g | |
| RADIUM-226 | 1.68E+00 | U | 2.9E-01 | 2.9E-01 | 3.60E-01 | pCi/g | | *(4.7)* | 5/23/03 11:01 a | | 264.0 | GER2$1 |
| | | | | | | | | *(11.7)* | | | g | |
| THALLIUM-208 | 4.88E-01 | | 1.2E-01 | 1.2E-01 | 7.67E-02 | pCi/g | | *(6.4)* | 5/23/03 11:01 a | | 264.0 | GER2$1 |
| | | | | | | | | *(8.3)* | | | g | |

No. of Results: 18 Comments:

STL Richland
rptSTLRchSample
V4.03 A97

MDC|MDA,Lc - Detection, Decision Level based on instrument background or blank, adjusted by the sample Efficiency, Yield, and Volume.
J Qual - No U qualifier has been assigned and the result is below the Reporting Limit, RL (CRDL) or Report Value is Estimated.
U Qual - Analyzed for, but the result is less than the Mdc/Mda|Total Uncert or gamma scan software did not identify the nuclide.

# FORM I

## SAMPLE RESULTS

Date: 29-May-03

| | | | | | |
|---|---|---|---|---|---|
| Lab Name: | STL Richland | SDG: | 22862 | Collection Date: | 4/10/2003 2:37:00 PM |
| Lot-Sample No.: | J3D300240-33 | Report No. : | 22709 | Received Date: | 4/30/2003 11:10:00 AM |
| Client Sample ID: | 9526-0001-010 F | COC No. : | 2003-00110 | Matrix: | SOIL |

Ordered by Client Sample ID, Batch No.

| Parameter | Result | Qual | Count Error ( 2 s) | Total Uncert( 2 s) | MDC\|MDA, Action Lev | Rpt Unit, Lc | Yield CRDL(RL) | Rst/MDC, Rst/TotUcert | Analysis, Prep Date | Total Sa Size | Aliquot Size | Primary Detector |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Batch: 3122330 | E901.1 | | | Work Order: | FMVWN1AA | | Report DB ID: | 9FMVWN10 | | | | |
| ACTINIUM-228 | 1.44E+00 | | 3.7E-01 | 3.7E-01 | 2.55E-01 | pCi/g | | (5.6) | 5/22/03 10:13 p | | 258.1 | GER5$1 |
| | | | | | | | | (7.7) | | | g | |
| AG-108M | 2.73E-02 | U | 4.0E-02 | 4.0E-02 | 7.23E-02 | pCi/g | | 0.38 | 5/22/03 10:13 p | | 258.1 | GER5$1 |
| | | | | | | | 2.86E-01 | (1.4) | | | g | |
| AMERICIUM-241 | 3.66E-02 | U | 8.7E-02 | 8.7E-02 | 1.45E-01 | pCi/g | | 0.25 | 5/22/03 10:13 p | | 258.1 | GER5$1 |
| | | | | | | | 1.03E+00 | 0.84 | | | g | |
| BISMUTH-212 | 2.50E+00 | U | 9.7E-01 | 9.7E-01 | 1.42E+00 | pCi/g | | (1.8) | 5/22/03 10:13 p | | 258.1 | GER5$1 |
| | | | | | | | | (5.2) | | | g | |
| BISMUTH-214 | 1.41E+00 | | 2.7E-01 | 2.7E-01 | 1.32E-01 | pCi/g | | (10.7) | 5/22/03 10:13 p | | 258.1 | GER5$1 |
| | | | | | | | | (10.5) | | | g | |
| COBALT-60 | 3.84E-03 | U | 4.3E-02 | 4.3E-02 | 7.92E-02 | pCi/g | | 0.05 | 5/22/03 10:13 p | | 258.1 | GER5$1 |
| | | | | | | | 1.50E-01 | 0.18 | | | g | |
| CESIUM-134 | 9.00E-02 | U | 5.5E-02 | 5.5E-02 | 1.08E-01 | pCi/g | | 0.83 | 5/22/03 10:13 p | | 258.1 | GER5$1 |
| | | | | | | | 1.90E-01 | (3.3) | | | g | |
| CESIUM-137 | 1.75E+00 | | 2.5E-01 | 2.5E-01 | 7.63E-02 | pCi/g | | (23.) | 5/22/03 10:13 p | | 258.1 | GER5$1 |
| | | | | | | | 3.20E-01 | (14.1) | | | g | |
| EUROPIUM-152 | 6.38E-02 | U | 1.3E-01 | 1.3E-01 | 2.20E-01 | pCi/g | | 0.29 | 5/22/03 10:13 p | | 258.1 | GER5$1 |
| | | | | | | | 4.04E-01 | 0.97 | | | g | |
| EUROPIUM-154 | 9.12E-03 | U | 1.2E-01 | 1.2E-01 | 2.26E-01 | pCi/g | | 0.04 | 5/22/03 10:13 p | | 258.1 | GER5$1 |
| | | | | | | | 3.70E-01 | 0.15 | | | g | |

STL Richland
rptSTL.RchSample
V4.03 A97

MDC|MDA,Lc - Detection, Decision Level based on instrument background or blank, adjusted by the sample Efficiency, Yield, and Volume.
J Qual - No U qualifier has been assigned and the result is below the Reporting Limit, RL (CRDL) or Report Value is Estimated.
U Qual - Analyzed for, but the result is less than the Mdc/Mda|Total Uncert or gamma scan software did not identify the nuclide.

# FORM I

## SAMPLE RESULTS

Date: 29-May-03

| | | | | | |
|---|---|---|---|---|---|
| Lab Name: | STL Richland | SDG: | 22862 | Collection Date: | 4/10/2003 2:37:00 PM |
| Lot-Sample No.: | J3D300240-33 | Report No. : | 22709 | Received Date: | 4/30/2003 11:10:00 AM |
| Client Sample ID: | 9526-0001-010 F | COC No. : | 2003-00110 | Matrix: | SOIL |

Ordered by Client Sample ID, Batch No.

| Parameter | Result | Qual | Count Error ( 2 s) | Total Uncert( 2 s) | MDC\|MDA, Action Lev | Rpt Unit, Lc | Yield CRDL(RL) | Rst/MDC, Rst/TotUcert | Analysis, Prep Date | Total Sa Size | Aliquot Size | Primary Detector |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| EUROPIUM-155 | 3.12E-02 | U | 1.2E-01 | 1.2E-01 | 2.00E-01 | pCi/g | 1.57E+01 | 0.16<br>0.53 | 5/22/03 10:13 p | | 258.1 g | GER5$1 |
| POTASSIUM-40 | 1.24E+01 | | 2.1E+00 | 2.1E+00 | 6.15E-01 | pCi/g | | (20.2)<br>(12.) | 5/22/03 10:13 p | | 258.1 g | GER5$1 |
| MANGANESE-54 | -1.46E-02 | U | 4.3E-02 | 4.3E-02 | 7.54E-02 | pCi/g | 6.96E-01 | -0.19<br>-0.67 | 5/22/03 10:13 p | | 258.1 g | GER5$1 |
| NIOBIUM-94 | 3.57E-02 | U | 3.6E-02 | 3.6E-02 | 7.17E-02 | pCi/g | 2.85E-01 | 0.5<br>(2.) | 5/22/03 10:13 p | | 258.1 g | GER5$1 |
| LEAD-212 | 1.57E+00 | | 2.9E-01 | 2.9E-01 | 1.23E-01 | pCi/g | | (12.8)<br>(10.7) | 5/22/03 10:13 p | | 258.1 g | GER5$1 |
| LEAD-214 | 1.61E+00 | | 3.2E-01 | 3.2E-01 | 1.40E-01 | pCi/g | | (11.5)<br>(10.2) | 5/22/03 10:13 p | | 258.1 g | GER5$1 |
| RADIUM-226 | 1.41E+00 | | 2.7E-01 | 2.7E-01 | 1.39E-01 | pCi/g | | (10.1)<br>(10.5) | 5/22/03 10:13 p | | 258.1 g | GER5$1 |
| THALLIUM-208 | 4.95E-01 | U | 1.1E-01 | 1.1E-01 | 1.68E-01 | pCi/g | | (3.)<br>(8.8) | 5/22/03 10:13 p | | 258.1 g | GER5$1 |

No. of Results: 18 Comments:

STL Richland
rptSTL.RchSample
V4.03 A97

MDC|MDA,Lc - Detection, Decision Level based on instrument background or blank, adjusted by the sample Efficiency, Yield, and Volume.
J Qual - No U qualifier has been assigned and the result is below the Reporting Limit, RL (CRDL) or Report Value is Estimated.
U Qual - Analyzed for, but the result is less than the Mdc/Mda|Total Uncert or gamma scan software did not identify the nuclide.

# FORM I

## SAMPLE RESULTS

Date: 29-May-03

| | | | | | |
|---|---|---|---|---|---|
| Lab Name: | STL Richland | SDG: | 22862 | Collection Date: | 4/10/2003 10:25:00 AM |
| Lot-Sample No.: | J3D300240-21 | Report No. : | 22709 | Received Date: | 4/30/2003 11:10:00 AM |
| Client Sample ID: | 9526-0001-011 F | COC No. : | 2003-00108 | Matrix: | SOIL |

Ordered by Client Sample ID, Batch No.

| Parameter | Result | Qual | Count Error ( 2 s) | Total Uncert( 2 s) | MDC\|MDA, Action Lev | Rpt Unit, Lc | Yield CRDL(RL) | Rst/MDC, Rst/TotUcert | Analysis, Prep Date | Total Sa Size | Aliquot Size | Primary Detector |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Batch: 3122330 | E901.1 | | | Work Order: | FMVVN1AA | | Report DB ID: 9FMVVN10 | | | | | |
| ACTINIUM-228 | 1.94E+00 | U | 3.6E-01 | 3.6E-01 | 5.23E-01 | pCi/g | | (3.7) | 5/22/03 12:23 p | | 241.6 | GER2$1 |
| | | | | | | | | (10.7) | | | g | |
| AG-108M | 5.63E-03 | U | 3.9E-02 | 3.9E-02 | 6.86E-02 | pCi/g | | 0.08 | 5/22/03 12:23 p | | 241.6 | GER2$1 |
| | | | | | | | 2.86E-01 | 0.29 | | | g | |
| AMERICIUM-241 | 1.78E-01 | U | 4.6E-01 | 4.6E-01 | 7.91E-01 | pCi/g | | 0.23 | 5/22/03 12:23 p | | 241.6 | GER2$1 |
| | | | | | | | 1.03E+00 | 0.78 | | | g | |
| BISMUTH-212 | 1.40E+00 | U | 7.0E-01 | 7.0E-01 | 1.36E+00 | pCi/g | | (1.) | 5/22/03 12:23 p | | 241.6 | GER2$1 |
| | | | | | | | | (4.) | | | g | |
| BISMUTH-214 | 9.38E-01 | U | 2.0E-01 | 2.0E-01 | 3.28E-01 | pCi/g | | (2.9) | 5/22/03 12:23 p | | 241.6 | GER2$1 |
| | | | | | | | | (9.6) | | | g | |
| COBALT-60 | -1.24E-02 | U | 4.3E-02 | 4.3E-02 | 7.60E-02 | pCi/g | | -0.16 | 5/22/03 12:23 p | | 241.6 | GER2$1 |
| | | | | | | | 1.50E-01 | -0.58 | | | g | |
| CESIUM-134 | 5.66E-02 | U | 4.9E-02 | 4.9E-02 | 9.58E-02 | pCi/g | | 0.59 | 5/22/03 12:23 p | | 241.6 | GER2$1 |
| | | | | | | | 1.90E-01 | (2.3) | | | g | |
| CESIUM-137 | 4.15E-01 | | 1.0E-01 | 1.0E-01 | 8.35E-02 | pCi/g | | (5.) | 5/22/03 12:23 p | | 241.6 | GER2$1 |
| | | | | | | | 3.20E-01 | (8.2) | | | g | |
| EUROPIUM-152 | -1.84E-01 | U | 1.5E-01 | 1.5E-01 | 2.13E-01 | pCi/g | | -0.86 | 5/22/03 12:23 p | | 241.6 | GER2$1 |
| | | | | | | | 4.04E-01 | -(2.4) | | | g | |
| EUROPIUM-154 | -4.37E-02 | U | 1.3E-01 | 1.3E-01 | 2.26E-01 | pCi/g | | -0.19 | 5/22/03 12:23 p | | 241.6 | GER2$1 |
| | | | | | | | 3.70E-01 | -0.68 | | | g | |

STL Richland
rptSTI.RchSample
V4.03 A97

MDC|MDA,Lc - Detection, Decision Level based on instrument background or blank, adjusted by the sample Efficiency, Yield, and Volume.
J Qual - No U qualifier has been assigned and the result is below the Reporting Limit, RL (CRDL) or Report Value is Estimated.
U Qual - Analyzed for, but the result is less than the Mdc/Mda|Total Uncert or gamma scan software did not identify the nuclide.

# FORM I

## SAMPLE RESULTS

Date: 29-May-03

| | | | | | |
|---|---|---|---|---|---|
| Lab Name: | STL Richland | SDG: | 22862 | Collection Date: | 4/10/2003 10:25:00 AM |
| Lot-Sample No.: | J3D300240-21 | Report No. : | 22709 | Received Date: | 4/30/2003 11:10:00 AM |
| Client Sample ID: | 9526-0001-011 F | COC No. : | 2003-00108 | Matrix: | SOIL |

Ordered by Client Sample ID, Batch No.

| Parameter | Result | Qual | Count Error ( 2 s) | Total Uncert( 2 s) | MDC\|MDA, Action Lev | Rpt Unit, Lc | Yield CRDL(RL) | Rst/MDC, Rst/TotUcert | Analysis, Prep Date | Total Sa Size | Aliquot Size | Primary Detector |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| EUROPIUM-155 | 7.29E-02 | U | 1.8E-01 | 1.8E-01 | 3.11E-01 | pCi/g | | 0.23 | 5/22/03 12:23 p | | 241.6 | GER2$1 |
| | | | | | | | 1.57E+01 | 0.82 | | | g | |
| POTASSIUM-40 | 8.89E+00 | | 1.7E+00 | 1.7E+00 | 7.31E-01 | pCi/g | | (12.2) | 5/22/03 12:23 p | | 241.6 | GER2$1 |
| | | | | | | | | (10.3) | | | g | |
| MANGANESE-54 | -5.65E-02 | U | 4.6E-02 | 4.6E-02 | 7.16E-02 | pCi/g | | -0.79 | 5/22/03 12:23 p | | 241.6 | GER2$1 |
| | | | | | | | 6.96E-01 | -(2.5) | | | g | |
| NIOBIUM-94 | 6.53E-03 | U | 3.8E-02 | 3.8E-02 | 6.96E-02 | pCi/g | | 0.09 | 5/22/03 12:23 p | | 241.6 | GER2$1 |
| | | | | | | | 2.85E-01 | 0.34 | | | g | |
| LEAD-212 | 1.33E+00 | | 2.9E-01 | 2.9E-01 | 1.28E-01 | pCi/g | | (10.3) | 5/22/03 12:23 p | | 241.6 | GER2$1 |
| | | | | | | | | (9.) | | | g | |
| LEAD-214 | 1.16E+00 | | 2.4E-01 | 2.4E-01 | 1.42E-01 | pCi/g | | (8.1) | 5/22/03 12:23 p | | 241.6 | GER2$1 |
| | | | | | | | | (9.6) | | | g | |
| RADIUM-226 | 9.38E-01 | U | 2.0E-01 | 2.0E-01 | 3.28E-01 | pCi/g | | (2.9) | 5/22/03 12:23 p | | 241.6 | GER2$1 |
| | | | | | | | | (9.6) | | | g | |
| THALLIUM-208 | 2.75E-01 | | 1.1E-01 | 1.1E-01 | 8.03E-02 | pCi/g | | (3.4) | 5/22/03 12:23 p | | 241.6 | GER2$1 |
| | | | | | | | | (5.1) | | | g | |

No. of Results: 18 Comments:

STL Richland
rptSTLRchSample
V4.03 A97

MDC|MDA,Lc - Detection, Decision Level based on instrument background or blank, adjusted by the sample Efficiency, Yield, and Volume.
J Qual - No U qualifier has been assigned and the result is below the Reporting Limit, RL (CRDL) or Report Value is Estimated.
U Qual - Analyzed for, but the result is less than the Mdc/Mda|Total Uncert or gamma scan software did not identify the nuclide.

# FORM I

## SAMPLE RESULTS

Date: 29-May-03

| | | | | | |
|---|---|---|---|---|---|
| Lab Name: | STL Richland | SDG: | 22862 | Collection Date: | 4/7/2003 2:15:00 PM |
| Lot-Sample No.: | J3D300240-14 | Report No. : | 22709 | Received Date: | 4/30/2003 11:10:00 AM |
| Client Sample ID: | 9526-0001-012 F | COC No. : | 2003-00107 | Matrix: | SOIL |

Ordered by Client Sample ID, Batch No.

| Parameter | Result | Qual | Count Error ( 2 s) | Total Uncert( 2 s) | MDC\|MDA, Action Lev | Rpt Unit, Lc | Yield CRDL(RL) | Rst/MDC, Rst/TotUcert | Analysis, Prep Date | Total Sa Size | Aliquot Size | Primary Detector |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Batch: 3122327 | E901.1 | | | Work Order: | FMVT71AA | | Report DB ID: | 9FMVT710 | | | | |
| ACTINIUM-228 | 7.50E-01 | U | 2.6E-01 | 2.6E-01 | 4.77E-01 | pCi/g | | (1.6) | 5/23/03 12:53 p | | 249.6 | GER5$1 |
| | | | | | | | | (5.8) | | | g | |
| AG-108M | 2.83E-02 | U | 3.8E-02 | 3.8E-02 | 6.85E-02 | pCi/g | | 0.41 | 5/23/03 12:53 p | | 249.6 | GER5$1 |
| | | | | | | | 2.86E-01 | (1.5) | | | g | |
| AMERICIUM-241 | 1.30E-02 | U | 7.7E-02 | 7.7E-02 | 1.31E-01 | pCi/g | | 0.1 | 5/23/03 12:53 p | | 249.6 | GER5$1 |
| | | | | | | | 1.03E+00 | 0.34 | | | g | |
| BISMUTH-212 | 2.21E+00 | U | 1.1E+00 | 1.1E+00 | 1.31E+00 | pCi/g | | (1.7) | 5/23/03 12:53 p | | 249.6 | GER5$1 |
| | | | | | | | | (4.) | | | g | |
| BISMUTH-214 | 1.52E+00 | | 2.9E-01 | 2.9E-01 | 1.20E-01 | pCi/g | | (12.7) | 5/23/03 12:53 p | | 249.6 | GER5$1 |
| | | | | | | | | (10.4) | | | g | |
| COBALT-60 | 1.47E-02 | U | 4.1E-02 | 4.1E-02 | 7.92E-02 | pCi/g | | 0.19 | 5/23/03 12:53 p | | 249.6 | GER5$1 |
| | | | | | | | 1.50E-01 | 0.72 | | | g | |
| CESIUM-134 | 5.00E-02 | U | 4.6E-02 | 4.6E-02 | 9.01E-02 | pCi/g | | 0.56 | 5/23/03 12:53 p | | 249.6 | GER5$1 |
| | | | | | | | 1.90E-01 | (2.2) | | | g | |
| CESIUM-137 | 1.23E+00 | | 2.1E-01 | 2.1E-01 | 7.66E-02 | pCi/g | | (16.1) | 5/23/03 12:53 p | | 249.6 | GER5$1 |
| | | | | | | | 3.20E-01 | (11.6) | | | g | |
| EUROPIUM-152 | 8.63E-02 | U | 1.1E-01 | 1.1E-01 | 2.05E-01 | pCi/g | | 0.42 | 5/23/03 12:53 p | | 249.6 | GER5$1 |
| | | | | | | | 4.04E-01 | (1.5) | | | g | |
| EUROPIUM-154 | -1.15E-01 | U | 1.0E-01 | 1.0E-01 | 1.59E-01 | pCi/g | | -0.73 | 5/23/03 12:53 p | | 249.6 | GER5$1 |
| | | | | | | | 3.70E-01 | -(2.2) | | | g | |

STL Richland
rptSTLRchSample
V4.03 A97

MDC|MDA,Lc - Detection, Decision Level based on instrument background or blank, adjusted by the sample Efficiency, Yield, and Volume.
J Qual - No U qualifier has been assigned and the result is below the Reporting Limit, RL (CRDL) or Report Value is Estimated.
U Qual - Analyzed for, but the result is less than the Mdc/Mda|Total Uncert or gamma scan software did not identify the nuclide.

# FORM I

## SAMPLE RESULTS

Date: 29-May-03

| | | | | | |
|---|---|---|---|---|---|
| Lab Name: | STL Richland | SDG: | 22862 | Collection Date: | 4/7/2003 2:15:00 PM |
| Lot-Sample No.: | J3D300240-14 | Report No. : | 22709 | Received Date: | 4/30/2003 11:10:00 AM |
| Client Sample ID: | 9526-0001-012 F | COC No.: | 2003-00107 | Matrix: | SOIL |

Ordered by Client Sample ID, Batch No.

| Parameter | Result | Qual | Count Error ( 2 s) | Total Uncert( 2 s) | MDC\|MDA, Action Lev | Rpt Unit, Lc | Yield CRDL(RL) | Rst/MDC, Rst/TotUcert | Analysis, Prep Date | Total Sa Size | Aliquot Size | Primary Detector |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| EUROPIUM-155 | -5.37E-02 | U | 1.0E-01 | 1.0E-01 | 1.71E-01 | pCi/g | | -0.31 | 5/23/03 12:53 p | | 249.6 | GER5$1 |
| | | | | | | | 1.57E+01 | -(1.) | | | g | |
| POTASSIUM-40 | 8.59E+00 | | 1.7E+00 | 1.7E+00 | 8.07E-01 | pCi/g | | (10.6) | 5/23/03 12:53 p | | 249.6 | GER5$1 |
| | | | | | | | | (9.8) | | | g | |
| MANGANESE-54 | -2.48E-02 | U | 4.7E-02 | 4.7E-02 | 7.75E-02 | pCi/g | | -0.32 | 5/23/03 12:53 p | | 249.6 | GER5$1 |
| | | | | | | | 6.96E-01 | -(1.1) | | | g | |
| NIOBIUM-94 | 1.03E-02 | U | 3.8E-02 | 3.8E-02 | 7.10E-02 | pCi/g | | 0.15 | 5/23/03 12:53 p | | 249.6 | GER5$1 |
| | | | | | | | 2.85E-01 | 0.54 | | | g | |
| LEAD-212 | 8.88E-01 | | 2.0E-01 | 2.0E-01 | 1.19E-01 | pCi/g | | (7.5) | 5/23/03 12:53 p | | 249.6 | GER5$1 |
| | | | | | | | | (8.9) | | | g | |
| LEAD-214 | 1.67E+00 | | 3.0E-01 | 3.0E-01 | 1.39E-01 | pCi/g | | (12.) | 5/23/03 12:53 p | | 249.6 | GER5$1 |
| | | | | | | | | (11.2) | | | g | |
| RADIUM-226 | 1.52E+00 | | 2.9E-01 | 2.9E-01 | 1.20E-01 | pCi/g | | (12.7) | 5/23/03 12:53 p | | 249.6 | GER5$1 |
| | | | | | | | | (10.4) | | | g | |
| THALLIUM-208 | 3.38E-01 | | 8.3E-02 | 8.3E-02 | 6.79E-02 | pCi/g | | (5.) | 5/23/03 12:53 p | | 249.6 | GER5$1 |
| | | | | | | | | (8.2) | | | g | |

No. of Results: 18 Comments:

STL Richland
rptSTLRchSample
V4.03 A97

MDC|MDA,Lc - Detection, Decision Level based on instrument background or blank, adjusted by the sample Efficiency, Yield, and Volume.
J Qual - No U qualifier has been assigned and the result is below the Reporting Limit, RL (CRDL) or Report Value is Estimated.
U Qual - Analyzed for, but the result is less than the Mdc/Mda|Total Uncert or gamma scan software did not identify the nuclide.

# FORM I

## SAMPLE RESULTS

Date: 29-May-03

| | | | | | |
|---|---|---|---|---|---|
| Lab Name: | STL Richland | SDG: | 22862 | Collection Date: | 4/10/2003 10:42:00 AM |
| Lot-Sample No.: | J3D300240-22 | Report No. : | 22709 | Received Date: | 4/30/2003 11:10:00 AM |
| Client Sample ID: | 9526-0001-013 F | COC No. : | 2003-00108 | Matrix: | SOIL |

Ordered by Client Sample ID, Batch No.

Batch: 3122330 E901.1 Work Order: FMVVP1AA Report DB ID: 9FMVVP10

| Parameter | Result | Qual | Count Error (2 s) | Total Uncert(2 s) | MDC\|MDA, Action Lev | Rpt Unit, Lc | Yield CRDL(RL) | Rst/MDC, Rst/TotUcert | Analysis, Prep Date | Total Sa Size | Aliquot Size | Primary Detector |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ACTINIUM-228 | 1.44E+00 | | 3.7E-01 | 3.7E-01 | 2.37E-01 | pCi/g | | (6.1) | 5/22/03 12:26 p | | 221.3 | GER5$1 |
| | | | | | | | | (7.7) | | | g | |
| AG-108M | -2.00E-02 | U | 4.4E-02 | 4.4E-02 | 7.35E-02 | pCi/g | | -0.27 | 5/22/03 12:26 p | | 221.3 | GER5$1 |
| | | | | | | | 2.86E-01 | -0.91 | | | g | |
| AMERICIUM-241 | -5.07E-03 | U | 9.6E-02 | 9.6E-02 | 1.53E-01 | pCi/g | | -0.03 | 5/22/03 12:26 p | | 221.3 | GER5$1 |
| | | | | | | | 1.03E+00 | -0.11 | | | g | |
| BISMUTH-212 | 2.23E+00 | U | 1.2E+00 | 1.2E+00 | 1.66E+00 | pCi/g | | (1.3) | 5/22/03 12:26 p | | 221.3 | GER5$1 |
| | | | | | | | | (3.7) | | | g | |
| BISMUTH-214 | 1.52E+00 | | 2.9E-01 | 2.9E-01 | 1.64E-01 | pCi/g | | (9.2) | 5/22/03 12:26 p | | 221.3 | GER5$1 |
| | | | | | | | | (10.4) | | | g | |
| COBALT-60 | 1.80E-03 | U | 4.0E-02 | 4.0E-02 | 7.52E-02 | pCi/g | | 0.02 | 5/22/03 12:26 p | | 221.3 | GER5$1 |
| | | | | | | | 1.50E-01 | 0.09 | | | g | |
| CESIUM-134 | 9.51E-02 | U | 8.0E-02 | 8.0E-02 | 1.12E-01 | pCi/g | | 0.85 | 5/22/03 12:26 p | | 221.3 | GER5$1 |
| | | | | | | | 1.90E-01 | (2.4) | | | g | |
| CESIUM-137 | 1.78E+00 | | 2.6E-01 | 2.6E-01 | 9.76E-02 | pCi/g | | (18.2) | 5/22/03 12:26 p | | 221.3 | GER5$1 |
| | | | | | | | 3.20E-01 | (13.5) | | | g | |
| EUROPIUM-152 | -1.02E-01 | U | 1.5E-01 | 1.5E-01 | 2.15E-01 | pCi/g | | -0.47 | 5/22/03 12:26 p | | 221.3 | GER5$1 |
| | | | | | | | 4.04E-01 | -(1.3) | | | g | |
| EUROPIUM-154 | 9.09E-03 | U | 1.3E-01 | 1.3E-01 | 2.38E-01 | pCi/g | | 0.04 | 5/22/03 12:26 p | | 221.3 | GER5$1 |
| | | | | | | | 3.70E-01 | 0.14 | | | g | |

STL Richland
rptSTLRchSample
V4.03 A97

MDC|MDA,Lc - Detection, Decision Level based on instrument background or blank, adjusted by the sample Efficiency, Yield, and Volume.
J Qual - No U qualifier has been assigned and the result is below the Reporting Limit, RL (CRDL) or Report Value is Estimated.
U Qual - Analyzed for, but the result is less than the Mdc/Mda|Total Uncert or gamma scan software did not identify the nuclide.

# FORM I

## SAMPLE RESULTS

Date: 29-May-03

| | | | | | |
|---|---|---|---|---|---|
| Lab Name: | STL Richland | SDG: | 22862 | Collection Date: | 4/10/2003 10:42:00 AM |
| Lot-Sample No.: | J3D300240-22 | Report No. : | 22709 | Received Date: | 4/30/2003 11:10:00 AM |
| Client Sample ID: | 9526-0001-013 F | COC No. : | 2003-00108 | Matrix: | SOIL |

Ordered by Client Sample ID, Batch No.

| Parameter | Result | Qual | Count Error ( 2 s) | Total Uncert( 2 s) | MDC\|MDA, Action Lev | Rpt Unit, Lc | Yield CRDL(RL) | Rst/MDC, Rst/TotUcert | Analysis, Prep Date | Total Sa Size | Aliquot Size | Primary Detector |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| EUROPIUM-155 | 1.17E-01 | U | 1.2E-01 | 1.2E-01 | 2.14E-01 | pCi/g | 1.57E+01 | 0.55 (1.9) | 5/22/03 12:26 p | | 221.3 g | GER5$1 |
| POTASSIUM-40 | 9.55E+00 | | 1.8E+00 | 1.8E+00 | 7.17E-01 | pCi/g | | (13.3) (10.7) | 5/22/03 12:26 p | | 221.3 g | GER5$1 |
| MANGANESE-54 | 6.16E-02 | U | 5.0E-02 | 5.0E-02 | 9.88E-02 | pCi/g | 6.96E-01 | 0.62 (2.5) | 5/22/03 12:26 p | | 221.3 g | GER5$1 |
| NIOBIUM-94 | -1.83E-02 | U | 4.2E-02 | 4.2E-02 | 7.30E-02 | pCi/g | 2.85E-01 | -0.25 -0.86 | 5/22/03 12:26 p | | 221.3 g | GER5$1 |
| LEAD-212 | 1.74E+00 | | 3.2E-01 | 3.2E-01 | 1.18E-01 | pCi/g | | (14.8) (10.7) | 5/22/03 12:26 p | | 221.3 g | GER5$1 |
| LEAD-214 | 1.67E+00 | | 3.2E-01 | 3.2E-01 | 1.64E-01 | pCi/g | | (10.2) (10.5) | 5/22/03 12:26 p | | 221.3 g | GER5$1 |
| RADIUM-226 | 1.52E+00 | | 2.9E-01 | 2.9E-01 | 1.64E-01 | pCi/g | | (9.2) (10.4) | 5/22/03 12:26 p | | 221.3 g | GER5$1 |
| THALLIUM-208 | 4.76E-01 | U | 1.6E-01 | 1.6E-01 | 1.84E-01 | pCi/g | | (2.6) (5.9) | 5/22/03 12:26 p | | 221.3 g | GER5$1 |

No. of Results: 18 Comments:

STL Richland
rptSTLRchSample
V4.03 A97

MDC|MDA,Lc - Detection, Decision Level based on instrument background or blank, adjusted by the sample Efficiency, Yield, and Volume.
J Qual - No U qualifier has been assigned and the result is below the Reporting Limit, RL (CRDL) or Report Value is Estimated.
U Qual - Analyzed for, but the result is less than the Mdc/Mda|Total Uncert or gamma scan software did not identify the nuclide.

# FORM I

## SAMPLE RESULTS

Date: 29-May-03

Lab Name: STL Richland
Lot-Sample No.: J3D300240-6
Client Sample ID: 9526-0001-014 F

SDG: 22862
Report No. : 22709
COC No. : 2003-00107

Collection Date: 4/7/2003 10:40:00 AM
Received Date: 4/30/2003 11:10:00 AM
Matrix: SOIL

Ordered by Client Sample ID, Batch No.

| Parameter | Result | Qual | Count Error ( 2 s) | Total Uncert( 2 s) | MDC\|MDA, Action Lev | Rpt Unit, Lc | Yield CRDL(RL) | Rst/MDC, Rst/TotUcert | Analysis, Prep Date | Total Sa Size | Aliquot Size | Primary Detector |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Batch: 3122327 | E901.1 | | | Work Order: | FMVR91AA | | Report DB ID: 9FMVR910 | | | | | |
| ACTINIUM-228 | 1.06E+00 | | 2.8E-01 | 2.8E-01 | 2.13E-01 | pCi/g | | (5.) | 5/23/03 09:18 a | | 280.7 | GER7$1 |
| | | | | | | | | (7.6) | | | g | |
| AG-108M | 4.76E-03 | U | 2.9E-02 | 2.9E-02 | 5.21E-02 | pCi/g | | 0.09 | 5/23/03 09:18 a | | 280.7 | GER7$1 |
| | | | | | | | 2.86E-01 | 0.33 | | | g | |
| AMERICIUM-241 | -5.76E-02 | U | 1.2E-01 | 1.2E-01 | 2.08E-01 | pCi/g | | -0.28 | 5/23/03 09:18 a | | 280.7 | GER7$1 |
| | | | | | | | 1.03E+00 | -0.93 | | | g | |
| BISMUTH-212 | 1.44E+00 | U | 6.4E-01 | 6.4E-01 | 1.16E+00 | pCi/g | | (1.2) | 5/23/03 09:18 a | | 280.7 | GER7$1 |
| | | | | | | | | (4.5) | | | g | |
| BISMUTH-214 | 1.12E+00 | | 2.0E-01 | 2.0E-01 | 1.04E-01 | pCi/g | | (10.7) | 5/23/03 09:18 a | | 280.7 | GER7$1 |
| | | | | | | | | (11.1) | | | g | |
| COBALT-60 | 1.26E-02 | U | 3.0E-02 | 3.0E-02 | 6.08E-02 | pCi/g | | 0.21 | 5/23/03 09:18 a | | 280.7 | GER7$1 |
| | | | | | | | 1.50E-01 | 0.83 | | | g | |
| CESIUM-134 | 7.42E-02 | U | 5.1E-02 | 5.1E-02 | 8.50E-02 | pCi/g | | 0.87 | 5/23/03 09:18 a | | 280.7 | GER7$1 |
| | | | | | | | 1.90E-01 | (2.9) | | | g | |
| CESIUM-137 | 3.80E-01 | | 8.2E-02 | 8.2E-02 | 6.50E-02 | pCi/g | | (5.9) | 5/23/03 09:18 a | | 280.7 | GER7$1 |
| | | | | | | | 3.20E-01 | (9.3) | | | g | |
| EUROPIUM-152 | -2.18E-02 | U | 9.8E-02 | 9.8E-02 | 1.65E-01 | pCi/g | | -0.13 | 5/23/03 09:18 a | | 280.7 | GER7$1 |
| | | | | | | | 4.04E-01 | -0.45 | | | g | |
| EUROPIUM-154 | 9.75E-03 | U | 1.1E-01 | 1.1E-01 | 2.07E-01 | pCi/g | | 0.05 | 5/23/03 09:18 a | | 280.7 | GER7$1 |
| | | | | | | | 3.70E-01 | 0.17 | | | g | |

STL Richland
rptSTLRchSample
V4.03 A97

MDC|MDA,Lc - Detection, Decision Level based on instrument background or blank, adjusted by the sample Efficiency, Yield, and Volume.
J Qual - No U qualifier has been assigned and the result is below the Reporting Limit, RL (CRDL) or Report Value is Estimated.
U Qual - Analyzed for, but the result is less than the Mdc/Mda|Total Uncert or gamma scan software did not identify the nuclide.

# FORM I

## SAMPLE RESULTS

Date: 29-May-03

| | | | | | |
|---|---|---|---|---|---|
| Lab Name: | STL Richland | SDG: | 22862 | Collection Date: | 4/7/2003 10:40:00 AM |
| Lot-Sample No.: | J3D300240-6 | Report No.: | 22709 | Received Date: | 4/30/2003 11:10:00 AM |
| Client Sample ID: | 9526-0001-014 F | COC No.: | 2003-00107 | Matrix: | SOIL |

Ordered by Client Sample ID, Batch No.

| Parameter | Result | Qual | Count Error (2 s) | Total Uncert(2 s) | MDC\|MDA, Action Lev | Rpt Unit, Lc | Yield CRDL(RL) | Rst/MDC, Rst/TotUcert | Analysis, Prep Date | Total Sa Size | Aliquot Size | Primary Detector |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| EUROPIUM-155 | 3.25E-02 | U | 9.9E-02 | 9.9E-02 | 1.69E-01 | pCi/g | | *0.19* | 5/23/03 09:18 a | | 280.7 | GER7$1 |
| | | | | | | | 1.57E+01 | *0.66* | | | g | |
| POTASSIUM-40 | 9.10E+00 | | 1.7E+00 | 1.7E+00 | 6.21E-01 | pCi/g | | *(14.7)* | 5/23/03 09:18 a | | 280.7 | GER7$1 |
| | | | | | | | | *(10.9)* | | | g | |
| MANGANESE-54 | 1.96E-02 | U | 4.0E-02 | 4.0E-02 | 7.50E-02 | pCi/g | | *0.26* | 5/23/03 09:18 a | | 280.7 | GER7$1 |
| | | | | | | | 6.96E-01 | *0.98* | | | g | |
| NIOBIUM-94 | -1.70E-02 | U | 3.2E-02 | 3.2E-02 | 5.40E-02 | pCi/g | | *-0.31* | 5/23/03 09:18 a | | 280.7 | GER7$1 |
| | | | | | | | 2.85E-01 | *-(1.1)* | | | g | |
| LEAD-212 | 1.12E+00 | | 2.1E-01 | 2.1E-01 | 1.00E-01 | pCi/g | | *(11.2)* | 5/23/03 09:18 a | | 280.7 | GER7$1 |
| | | | | | | | | *(10.8)* | | | g | |
| LEAD-214 | 1.31E+00 | | 2.7E-01 | 2.7E-01 | 1.20E-01 | pCi/g | | *(10.9)* | 5/23/03 09:18 a | | 280.7 | GER7$1 |
| | | | | | | | | *(9.6)* | | | g | |
| RADIUM-226 | 1.12E+00 | | 2.0E-01 | 2.0E-01 | 1.04E-01 | pCi/g | | *(10.7)* | 5/23/03 09:18 a | | 280.7 | GER7$1 |
| | | | | | | | | *(11.1)* | | | g | |
| THALLIUM-208 | 3.94E-01 | | 8.9E-02 | 8.9E-02 | 5.42E-02 | pCi/g | | *(7.3)* | 5/23/03 09:18 a | | 280.7 | GER7$1 |
| | | | | | | | | *(8.8)* | | | g | |

No. of Results: 18 Comments:

STL Richland
rptSTLRchSample
V4.03 A97

MDC|MDA,Lc - Detection, Decision Level based on instrument background or blank, adjusted by the sample Efficiency, Yield, and Volume.
J Qual - No U qualifier has been assigned and the result is below the Reporting Limit, RL (CRDL) or Report Value is Estimated.
U Qual - Analyzed for, but the result is less than the Mdc/Mda|Total Uncert or gamma scan software did not identify the nuclide.

# FORM I

## SAMPLE RESULTS

Date: 29-May-03

| | | | | | |
|---|---|---|---|---|---|
| Lab Name: | STL Richland | SDG: | 22862 | Collection Date: | 4/10/2003 9:55:00 AM |
| Lot-Sample No.: | J3D300240-18 | Report No. : | 22709 | Received Date: | 4/30/2003 11:10:00 AM |
| Client Sample ID: | 9526-0001-015 F | COC No. : | 2003-00108 | Matrix: | SOIL |

Ordered by Client Sample ID, Batch No.

| Parameter | Result | Qual | Count Error ( 2 s) | Total Uncert( 2 s) | MDC\|MDA, Action Lev | Rpt Unit, Lc | Yield CRDL(RL) | Rst/MDC, Rst/TotUcert | Analysis, Prep Date | Total Sa Size | Aliquot Size | Primary Detector |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Batch: 3122330 | E901.1 | | | Work Order: | FMVVD1AA | | Report DB ID: 9FMVVD10 | | | | | |
| ACTINIUM-228 | 1.14E+00 | | 3.3E-01 | 3.3E-01 | 2.13E-01 | pCi/g | | (5.4) | 5/22/03 10:27 a | | 264.5 | GER2$1 |
| | | | | | | | | (6.9) | | | g | |
| AG-108M | -6.40E-03 | U | 4.0E-02 | 4.0E-02 | 6.74E-02 | pCi/g | | -0.09 | 5/22/03 10:27 a | | 264.5 | GER2$1 |
| | | | | | | | 2.86E-01 | -0.32 | | | g | |
| AMERICIUM-241 | -2.63E-01 | U | 4.6E-01 | 4.6E-01 | 7.52E-01 | pCi/g | | -0.35 | 5/22/03 10:27 a | | 264.5 | GER2$1 |
| | | | | | | | 1.03E+00 | -(1.2) | | | g | |
| BISMUTH-212 | 1.57E+00 | U | 7.2E-01 | 7.2E-01 | 1.38E+00 | pCi/g | | (1.1) | 5/22/03 10:27 a | | 264.5 | GER2$1 |
| | | | | | | | | (4.3) | | | g | |
| BISMUTH-214 | 1.22E+00 | U | 2.3E-01 | 2.3E-01 | 3.13E-01 | pCi/g | | (3.9) | 5/22/03 10:27 a | | 264.5 | GER2$1 |
| | | | | | | | | (10.8) | | | g | |
| COBALT-60 | -1.42E-02 | U | 4.6E-02 | 4.6E-02 | 7.97E-02 | pCi/g | | -0.18 | 5/22/03 10:27 a | | 264.5 | GER2$1 |
| | | | | | | | 1.50E-01 | -0.62 | | | g | |
| CESIUM-134 | -1.20E-03 | U | 4.8E-02 | 4.8E-02 | 8.46E-02 | pCi/g | | -0.01 | 5/22/03 10:27 a | | 264.5 | GER2$1 |
| | | | | | | | 1.90E-01 | -0.05 | | | g | |
| CESIUM-137 | 8.05E-01 | | 1.4E-01 | 1.4E-01 | 8.61E-02 | pCi/g | | (9.4) | 5/22/03 10:27 a | | 264.5 | GER2$1 |
| | | | | | | | 3.20E-01 | (11.8) | | | g | |
| EUROPIUM-152 | 8.19E-02 | U | 1.7E-01 | 1.7E-01 | 1.93E-01 | pCi/g | | 0.42 | 5/22/03 10:27 a | | 264.5 | GER2$1 |
| | | | | | | | 4.04E-01 | 0.97 | | | g | |
| EUROPIUM-154 | -3.55E-02 | U | 1.2E-01 | 1.2E-01 | 2.18E-01 | pCi/g | | -0.16 | 5/22/03 10:27 a | | 264.5 | GER2$1 |
| | | | | | | | 3.70E-01 | -0.57 | | | g | |

STL Richland
rptSTLRchSample
V4.03 A97

MDC|MDA,Lc - Detection, Decision Level based on instrument background or blank, adjusted by the sample Efficiency, Yield, and Volume.
J Qual - No U qualifier has been assigned and the result is below the Reporting Limit, RL (CRDL) or Report Value is Estimated.
U Qual - Analyzed for, but the result is less than the Mdc/Mda|Total Uncert or gamma scan software did not identify the nuclide.

# FORM I

## SAMPLE RESULTS

Date: 29-May-03

| | | | | | |
|---|---|---|---|---|---|
| Lab Name: | STL Richland | SDG: | 22862 | Collection Date: | 4/10/2003 9:55:00 AM |
| Lot-Sample No.: | J3D300240-18 | Report No. : | 22709 | Received Date: | 4/30/2003 11:10:00 AM |
| Client Sample ID: | 9526-0001-015 F | COC No. : | 2003-00108 | Matrix: | SOIL |

Ordered by Client Sample ID, Batch No.

| Parameter | Result | Qual | Count Error ( 2 s) | Total Uncert( 2 s) | MDC\|MDA, Action Lev | Rpt Unit, Lc | Yield CRDL(RL) | Rst/MDC, Rst/TotUcert | Analysis, Prep Date | Total Sa Size | Aliquot Size | Primary Detector |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| EUROPIUM-155 | 8.09E-02 | U | 1.7E-01 | 1.7E-01 | 2.94E-01 | pCi/g | | *0.28* | 5/22/03 10:27 a | | 264.5 | GER2$1 |
| | | | | | | | 1.57E+01 | *0.96* | | | g | |
| POTASSIUM-40 | 9.53E+00 | | 1.7E+00 | 1.7E+00 | 3.89E-01 | pCi/g | | *(24.5)* | 5/22/03 10:27 a | | 264.5 | GER2$1 |
| | | | | | | | | *(11.2)* | | | g | |
| MANGANESE-54 | 1.41E-02 | U | 4.6E-02 | 4.6E-02 | 8.36E-02 | pCi/g | | *0.17* | 5/22/03 10:27 a | | 264.5 | GER2$1 |
| | | | | | | | 6.96E-01 | *0.61* | | | g | |
| NIOBIUM-94 | -1.96E-02 | U | 3.7E-02 | 3.7E-02 | 6.27E-02 | pCi/g | | *-0.31* | 5/22/03 10:27 a | | 264.5 | GER2$1 |
| | | | | | | | 2.85E-01 | *-(1.1)* | | | g | |
| LEAD-212 | 1.17E+00 | | 2.4E-01 | 2.4E-01 | 1.14E-01 | pCi/g | | *(10.3)* | 5/22/03 10:27 a | | 264.5 | GER2$1 |
| | | | | | | | | *(9.7)* | | | g | |
| LEAD-214 | 1.22E+00 | | 2.5E-01 | 2.5E-01 | 1.39E-01 | pCi/g | | *(8.8)* | 5/22/03 10:27 a | | 264.5 | GER2$1 |
| | | | | | | | | *(9.6)* | | | g | |
| RADIUM-226 | 1.22E+00 | U | 2.3E-01 | 2.3E-01 | 3.13E-01 | pCi/g | | *(3.9)* | 5/22/03 10:27 a | | 264.5 | GER2$1 |
| | | | | | | | | *(10.8)* | | | g | |
| THALLIUM-208 | 4.27E-01 | | 9.7E-02 | 9.7E-02 | 7.15E-02 | pCi/g | | *(6.)* | 5/22/03 10:27 a | | 264.5 | GER2$1 |
| | | | | | | | | *(8.8)* | | | g | |

No. of Results: 18 Comments:

STL Richland
rptSTLRchSample
V4.03 A97

MDC|MDA,Lc - Detection, Decision Level based on instrument background or blank, adjusted by the sample Efficiency, Yield, and Volume.
J Qual - No U qualifier has been assigned and the result is below the Reporting Limit, RL (CRDL) or Report Value is Estimated.
U Qual - Analyzed for, but the result is less than the Mdc/Mda|Total Uncert or gamma scan software did not identify the nuclide.

STL RICHLAND

# FORM I

## SAMPLE RESULTS

Date: 29-May-03

| | | | | | |
|---|---|---|---|---|---|
| Lab Name: | STL Richland | SDG: | 22862 | Collection Date: | 4/10/2003 9:35:00 AM |
| Lot-Sample No.: | J3D300240-16 | Report No. : | 22709 | Received Date: | 4/30/2003 11:10:00 AM |
| Client Sample ID: | 9526-0001-016 F | COC No. : | 2003-00108 | Matrix: | SOIL |

Ordered by Client Sample ID, Batch No.

| Parameter | Result | Qual | Count Error ( 2 s) | Total Uncert( 2 s) | MDC\|MDA, Action Lev | Rpt Unit, Lc | Yield CRDL(RL) | Rst/MDC, Rst/TotUcert | Analysis, Prep Date | Total Sa Size | Aliquot Size | Primary Detector |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Batch: 3122327 | E901.1 | | | Work Order: | FMVT91AA | | Report DB ID: 9FMVT910 | | | | | |
| ACTINIUM-228 | 1.12E+00 | | 3.0E-01 | 3.0E-01 | 2.17E-01 | pCi/g | | (5.2) | 5/23/03 02:40 p | | 277.5 | GER5$1 |
| | | | | | | | | (7.6) | | | g | |
| AG-108M | 7.01E-04 | U | 3.5E-02 | 3.5E-02 | 6.07E-02 | pCi/g | | 0.01 | 5/23/03 02:40 p | | 277.5 | GER5$1 |
| | | | | | | | 2.86E-01 | 0.04 | | | g | |
| AMERICIUM-241 | 1.03E-01 | U | 7.7E-02 | 7.7E-02 | 1.22E-01 | pCi/g | | 0.84 | 5/23/03 02:40 p | | 277.5 | GER5$1 |
| | | | | | | | 1.03E+00 | (2.7) | | | g | |
| BISMUTH-212 | 1.57E+00 | U | 8.3E-01 | 8.3E-01 | 1.21E+00 | pCi/g | | (1.3) | 5/23/03 02:40 p | | 277.5 | GER5$1 |
| | | | | | | | | (3.8) | | | g | |
| BISMUTH-214 | 9.53E-01 | U | 2.1E-01 | 2.1E-01 | 2.91E-01 | pCi/g | | (3.3) | 5/23/03 02:40 p | | 277.5 | GER5$1 |
| | | | | | | | | (9.) | | | g | |
| COBALT-60 | -6.23E-03 | U | 3.3E-02 | 3.3E-02 | 5.98E-02 | pCi/g | | -0.1 | 5/23/03 02:40 p | | 277.5 | GER5$1 |
| | | | | | | | 1.50E-01 | -0.38 | | | g | |
| CESIUM-134 | 8.78E-02 | U | 6.7E-02 | 6.7E-02 | 9.25E-02 | pCi/g | | 0.95 | 5/23/03 02:40 p | | 277.5 | GER5$1 |
| | | | | | | | 1.90E-01 | (2.6) | | | g | |
| CESIUM-137 | 1.03E+00 | | 1.6E-01 | 1.6E-01 | 7.77E-02 | pCi/g | | (13.2) | 5/23/03 02:40 p | | 277.5 | GER5$1 |
| | | | | | | | 3.20E-01 | (12.8) | | | g | |
| EUROPIUM-152 | 6.55E-02 | U | 1.1E-01 | 1.1E-01 | 1.90E-01 | pCi/g | | 0.34 | 5/23/03 02:40 p | | 277.5 | GER5$1 |
| | | | | | | | 4.04E-01 | (1.2) | | | g | |
| EUROPIUM-154 | 2.32E-02 | U | 1.1E-01 | 1.1E-01 | 2.06E-01 | pCi/g | | 0.11 | 5/23/03 02:40 p | | 277.5 | GER5$1 |
| | | | | | | | 3.70E-01 | 0.43 | | | g | |

STL Richland
rptSTLRchSample
V4.03 A97

MDC|MDA,Lc - Detection, Decision Level based on instrument background or blank, adjusted by the sample Efficiency, Yield, and Volume.
J Qual - No U qualifier has been assigned and the result is below the Reporting Limit, RL (CRDL) or Report Value is Estimated.
U Qual - Analyzed for, but the result is less than the Mdc/Mda|Total Uncert or gamma scan software did not identify the nuclide.

# FORM I

## SAMPLE RESULTS

Date: 29-May-03

| | | | | | |
|---|---|---|---|---|---|
| Lab Name: | STL Richland | SDG: | 22862 | Collection Date: | 4/10/2003 9:35:00 AM |
| Lot-Sample No.: | J3D300240-16 | Report No.: | 22709 | Received Date: | 4/30/2003 11:10:00 AM |
| Client Sample ID: | 9526-0001-016 F | COC No.: | 2003-00108 | Matrix: | SOIL |

Ordered by Client Sample ID, Batch No.

| Parameter | Result | Qual | Count Error (2 s) | Total Uncert(2 s) | MDC\|MDA, Action Lev | Rpt Unit, Lc | Yield CRDL(RL) | Rst/MDC, Rst/TotUcert | Analysis, Prep Date | Total Sa Size | Aliquot Size | Primary Detector |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| EUROPIUM-155 | 6.86E-02 | U | 9.8E-02 | 9.8E-02 | 1.70E-01 | pCi/g | | 0.4 | 5/23/03 02:40 p | | 277.5 | GER5$1 |
| | | | | | | | 1.57E+01 | (1.4) | | | g | |
| POTASSIUM-40 | 8.65E+00 | | 1.7E+00 | 1.7E+00 | 7.04E-01 | pCi/g | | (12.3) | 5/23/03 02:40 p | | 277.5 | GER5$1 |
| | | | | | | | | (10.1) | | | g | |
| MANGANESE-54 | 1.42E-02 | U | 4.1E-02 | 4.1E-02 | 7.49E-02 | pCi/g | | 0.19 | 5/23/03 02:40 p | | 277.5 | GER5$1 |
| | | | | | | | 6.96E-01 | 0.69 | | | g | |
| NIOBIUM-94 | -3.81E-04 | U | 3.0E-02 | 3.0E-02 | 5.43E-02 | pCi/g | | -0.01 | 5/23/03 02:40 p | | 277.5 | GER5$1 |
| | | | | | | | 2.85E-01 | -0.03 | | | g | |
| LEAD-212 | 1.07E+00 | | 2.1E-01 | 2.1E-01 | 1.54E-01 | pCi/g | | (6.9) | 5/23/03 02:40 p | | 277.5 | GER5$1 |
| | | | | | | | | (10.) | | | g | |
| LEAD-214 | 1.06E+00 | | 2.1E-01 | 2.1E-01 | 1.30E-01 | pCi/g | | (8.2) | 5/23/03 02:40 p | | 277.5 | GER5$1 |
| | | | | | | | | (10.1) | | | g | |
| RADIUM-226 | 9.53E-01 | | 2.1E-01 | 2.1E-01 | 1.16E-01 | pCi/g | | (8.2) | 5/23/03 02:40 p | | 277.5 | GER5$1 |
| | | | | | | | | (9.) | | | g | |
| THALLIUM-208 | 3.75E-01 | U | 9.4E-02 | 9.4E-02 | 1.37E-01 | pCi/g | | (2.7) | 5/23/03 02:40 p | | 277.5 | GER5$1 |
| | | | | | | | | (8.) | | | g | |

No. of Results: 18 Comments:

STL Richland
rptSTLRchSample
V4.03 A97

MDC|MDA,Lc - Detection, Decision Level based on instrument background or blank, adjusted by the sample Efficiency, Yield, and Volume.
J Qual - No U qualifier has been assigned and the result is below the Reporting Limit, RL (CRDL) or Report Value is Estimated.
U Qual - Analyzed for, but the result is less than the Mdc/Mda|Total Uncert or gamma scan software did not identify the nuclide.

# FORM I

## SAMPLE RESULTS

Date: 29-May-03

| | | | | | |
|---|---|---|---|---|---|
| Lab Name: | STL Richland | SDG: | 22862 | Collection Date: | 4/10/2003 9:45:00 AM |
| Lot-Sample No.: | J3D300240-17 | Report No. : | 22709 | Received Date: | 4/30/2003 11:10:00 AM |
| Client Sample ID: | 9526-0001-017 F | COC No. : | 2003-00108 | Matrix: | SOIL |

Ordered by Client Sample ID, Batch No.

| Parameter | Result | Qual | Count Error ( 2 s) | Total Uncert( 2 s) | MDC\|MDA, Action Lev | Rpt Unit, Lc | Yield CRDL(RL) | Rst/MDC, Rst/TotUcert | Analysis, Prep Date | Total Sa Size | Aliquot Size | Primary Detector |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Batch: 3122327 | E901.1 | | | Work Order: | FMVVC1AA | | Report DB ID: | 9FMVVC10 | | | | |
| ACTINIUM-228 | 8.49E-01 | | 2.4E-01 | 2.4E-01 | 1.83E-01 | pCi/g | | (4.6) | 5/23/03 04:26 p | | 310.1 | GER5S1 |
| | | | | | | | | (7.) | | | g | |
| AG-108M | -1.73E-02 | U | 3.0E-02 | 3.0E-02 | 4.92E-02 | pCi/g | | -0.35 | 5/23/03 04:26 p | | 310.1 | GER5S1 |
| | | | | | | | 2.86E-01 | -(1.2) | | | g | |
| AMERICIUM-241 | -3.19E-03 | U | 6.6E-02 | 6.6E-02 | 1.05E-01 | pCi/g | | -0.03 | 5/23/03 04:26 p | | 310.1 | GER5S1 |
| | | | | | | | 1.03E+00 | -0.1 | | | g | |
| BISMUTH-212 | 1.60E+00 | U | 5.5E-01 | 5.5E-01 | 1.11E+00 | pCi/g | | (1.4) | 5/23/03 04:26 p | | 310.1 | GER5S1 |
| | | | | | | | | (5.8) | | | g | |
| BISMUTH-214 | 9.21E-01 | | 1.9E-01 | 1.9E-01 | 1.10E-01 | pCi/g | | (8.4) | 5/23/03 04:26 p | | 310.1 | GER5S1 |
| | | | | | | | | (9.6) | | | g | |
| COBALT-60 | 1.28E-02 | U | 2.8E-02 | 2.8E-02 | 5.69E-02 | pCi/g | | 0.23 | 5/23/03 04:26 p | | 310.1 | GER5S1 |
| | | | | | | | 1.50E-01 | 0.9 | | | g | |
| CESIUM-134 | 7.08E-02 | U | 4.0E-02 | 4.0E-02 | 7.83E-02 | pCi/g | | 0.9 | 5/23/03 04:26 p | | 310.1 | GER5S1 |
| | | | | | | | 1.90E-01 | (3.6) | | | g | |
| CESIUM-137 | 8.60E-01 | | 1.5E-01 | 1.5E-01 | 6.51E-02 | pCi/g | | (13.2) | 5/23/03 04:26 p | | 310.1 | GER5S1 |
| | | | | | | | 3.20E-01 | (11.4) | | | g | |
| EUROPIUM-152 | -3.29E-02 | U | 9.2E-02 | 9.2E-02 | 1.58E-01 | pCi/g | | -0.21 | 5/23/03 04:26 p | | 310.1 | GER5S1 |
| | | | | | | | 4.04E-01 | -0.71 | | | g | |
| EUROPIUM-154 | -7.24E-02 | U | 9.0E-02 | 9.0E-02 | 1.48E-01 | pCi/g | | -0.49 | 5/23/03 04:26 p | | 310.1 | GER5S1 |
| | | | | | | | 3.70E-01 | -(1.6) | | | g | |

STL Richland
rptSTLRchSample
V4.03 A97

MDC|MDA,Lc - Detection, Decision Level based on instrument background or blank, adjusted by the sample Efficiency, Yield, and Volume.
J Qual - No U qualifier has been assigned and the result is below the Reporting Limit, RL (CRDL) or Report Value is Estimated.
U Qual - Analyzed for, but the result is less than the Mdc/Mda|Total Uncert or gamma scan software did not identify the nuclide.

# FORM I

## SAMPLE RESULTS

Date: 29-May-03

| | | | | | |
|---|---|---|---|---|---|
| Lab Name: | STL Richland | SDG: | 22862 | Collection Date: | 4/10/2003 9:45:00 AM |
| Lot-Sample No.: | J3D300240-17 | Report No. : | 22709 | Received Date: | 4/30/2003 11:10:00 AM |
| Client Sample ID: | 9526-0001-017 F | COC No. : | 2003-00108 | Matrix: | SOIL |

Ordered by Client Sample ID, Batch No.

| Parameter | Result | Qual | Count Error ( 2 s) | Total Uncert( 2 s) | MDC\|MDA, Action Lev | Rpt Unit, Lc | Yield CRDL(RL) | Rst/MDC, Rst/TotUcert | Analysis, Prep Date | Total Sa Size | Aliquot Size | Primary Detector |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| EUROPIUM-155 | 2.69E-02 | U | 8.6E-02 | 8.6E-02 | 1.48E-01 | pCi/g | | *0.18* | 5/23/03 04:26 p | | 310.1 | GER5$1 |
| | | | | | | | 1.57E+01 | *0.62* | | | g | |
| POTASSIUM-40 | 8.86E+00 | | 1.5E+00 | 1.5E+00 | 4.97E-01 | pCi/g | | *(17.8)* | 5/23/03 04:26 p | | 310.1 | GER5$1 |
| | | | | | | | | *(11.6)* | | | g | |
| MANGANESE-54 | 2.85E-03 | U | 3.2E-02 | 3.2E-02 | 5.68E-02 | pCi/g | | *0.05* | 5/23/03 04:26 p | | 310.1 | GER5$1 |
| | | | | | | | 6.96E-01 | *0.18* | | | g | |
| NIOBIUM-94 | 9.32E-03 | U | 2.9E-02 | 2.9E-02 | 5.38E-02 | pCi/g | | *0.17* | 5/23/03 04:26 p | | 310.1 | GER5$1 |
| | | | | | | | 2.85E-01 | *0.65* | | | g | |
| LEAD-212 | 9.76E-01 | | 2.0E-01 | 2.0E-01 | 9.56E-02 | pCi/g | | *(10.2)* | 5/23/03 04:26 p | | 310.1 | GER5$1 |
| | | | | | | | | *(9.9)* | | | g | |
| LEAD-214 | 1.05E+00 | | 2.1E-01 | 2.1E-01 | 1.13E-01 | pCi/g | | *(9.4)* | 5/23/03 04:26 p | | 310.1 | GER5$1 |
| | | | | | | | | *(10.)* | | | g | |
| RADIUM-226 | 9.21E-01 | | 1.9E-01 | 1.9E-01 | 1.10E-01 | pCi/g | | *(8.4)* | 5/23/03 04:26 p | | 310.1 | GER5$1 |
| | | | | | | | | *(9.6)* | | | g | |
| THALLIUM-208 | 3.14E-01 | | 8.0E-02 | 8.0E-02 | 5.48E-02 | pCi/g | | *(5.7)* | 5/23/03 04:26 p | | 310.1 | GER5$1 |
| | | | | | | | | *(7.8)* | | | g | |

No. of Results: 18 Comments:

STL Richland
rptSTLRchSample
V4.03 A97

MDC|MDA,Lc - Detection, Decision Level based on instrument background or blank, adjusted by the sample Efficiency, Yield, and Volume.
J Qual - No U qualifier has been assigned and the result is below the Reporting Limit, RL (CRDL) or Report Value is Estimated.
U Qual - Analyzed for, but the result is less than the Mdc/Mda|Total Uncert or gamma scan software did not identify the nuclide.

# FORM I

## SAMPLE RESULTS

Date: 29-May-03

| | | | | | |
|---|---|---|---|---|---|
| Lab Name: | STL Richland | SDG: | 22862 | Collection Date: | 4/7/2003 1:35:00 PM |
| Lot-Sample No.: | J3D300240-12 | Report No. : | 22709 | Received Date: | 4/30/2003 11:10:00 AM |
| Client Sample ID: | 9526-0001-018 F | COC No. : | 2003-00107 | Matrix: | SOIL |

Ordered by Client Sample ID, Batch No.

| Parameter | Result | Qual | Count Error ( 2 s) | Total Uncert( 2 s) | MDC\|MDA, Action Lev | Rpt Unit, Lc | Yield CRDL(RL) | Rst/MDC, Rst/TotUcert | Analysis, Prep Date | Total Sa Size | Aliquot Size | Primary Detector |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Batch: 3122327 | E901.1 | | | Work Order: | FMVT01AA | | Report DB ID: | 9FMVT010 | | | | |
| ACTINIUM-228 | 1.44E+00 | | 3.8E-01 | 3.8E-01 | 2.15E-01 | pCi/g | | (6.7) | 5/23/03 11:04 a | | 260.6 | GER8$1 |
| | | | | | | | | (7.5) | | | g | |
| AG-108M | -1.52E-02 | U | 2.9E-02 | 2.9E-02 | 4.76E-02 | pCi/g | | -0.32 | 5/23/03 11:04 a | | 260.6 | GER8$1 |
| | | | | | | | 2.86E-01 | -(1.1) | | | g | |
| AMERICIUM-241 | 7.18E-03 | U | 8.7E-02 | 8.7E-02 | 1.34E-01 | pCi/g | | 0.05 | 5/23/03 11:04 a | | 260.6 | GER8$1 |
| | | | | | | | 1.03E+00 | 0.17 | | | g | |
| BISMUTH-212 | 2.37E+00 | U | 1.0E+00 | 1.0E+00 | 1.27E+00 | pCi/g | | (1.9) | 5/23/03 11:04 a | | 260.6 | GER8$1 |
| | | | | | | | | (4.6) | | | g | |
| BISMUTH-214 | 1.44E+00 | | 2.4E-01 | 2.4E-01 | 1.06E-01 | pCi/g | | (13.6) | 5/23/03 11:04 a | | 260.6 | GER8$1 |
| | | | | | | | | (11.8) | | | g | |
| COBALT-60 | 1.41E-02 | U | 3.7E-02 | 3.7E-02 | 7.07E-02 | pCi/g | | 0.2 | 5/23/03 11:04 a | | 260.6 | GER8$1 |
| | | | | | | | 1.50E-01 | 0.77 | | | g | |
| CESIUM-134 | 1.20E-01 | U | 7.5E-02 | 7.5E-02 | 9.72E-02 | pCi/g | | (1.2) | 5/23/03 11:04 a | | 260.6 | GER8$1 |
| | | | | | | | 1.90E-01 | (3.2) | | | g | |
| CESIUM-137 | 2.98E-02 | U | 4.3E-02 | 4.3E-02 | 7.96E-02 | pCi/g | | 0.37 | 5/23/03 11:04 a | | 260.6 | GER8$1 |
| | | | | | | | 3.20E-01 | (1.4) | | | g | |
| EUROPIUM-152 | -5.92E-02 | U | 9.2E-02 | 9.2E-02 | 1.52E-01 | pCi/g | | -0.39 | 5/23/03 11:04 a | | 260.6 | GER8$1 |
| | | | | | | | 4.04E-01 | -(1.3) | | | g | |
| EUROPIUM-154 | -2.62E-02 | U | 1.1E-01 | 1.1E-01 | 1.89E-01 | pCi/g | | -0.14 | 5/23/03 11:04 a | | 260.6 | GER8$1 |
| | | | | | | | 3.70E-01 | -0.49 | | | g | |

STL Richland
rptSTLRchSample
V4.03 A97

MDC|MDA,Lc - Detection, Decision Level based on instrument background or blank, adjusted by the sample Efficiency, Yield, and Volume.
J Qual - No U qualifier has been assigned and the result is below the Reporting Limit, RL (CRDL) or Report Value is Estimated.
U Qual - Analyzed for, but the result is less than the Mdc/Mda|Total Uncert or gamma scan software did not identify the nuclide.

# FORM I

## SAMPLE RESULTS

Date: 29-May-03

| | | | | | |
|---|---|---|---|---|---|
| Lab Name: | STL Richland | SDG: | 22862 | Collection Date: | 4/7/2003 1:35:00 PM |
| Lot-Sample No.: | J3D300240-12 | Report No. : | 22709 | Received Date: | 4/30/2003 11:10:00 AM |
| Client Sample ID: | 9526-0001-018 F | COC No. : | 2003-00107 | Matrix: | SOIL |

Ordered by Client Sample ID, Batch No.

| Parameter | Result | Qual | Count Error ( 2 s) | Total Uncert( 2 s) | MDC\|MDA, Action Lev | Rpt Unit, Lc | Yield CRDL(RL) | Rst/MDC, Rst/TotUcert | Analysis, Prep Date | Total Sa Size | Aliquot Size | Primary Detector |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| EUROPIUM-155 | 7.80E-02 | U | 1.0E-01 | 1.0E-01 | 1.76E-01 | pCi/g | | *0.44* | 5/23/03 11:04 a | | 260.6 | GER8$1 |
| | | | | | | | 1.57E+01 | *(1.6)* | | | g | |
| POTASSIUM-40 | 1.21E+01 | | 2.0E+00 | 2.0E+00 | 5.31E-01 | pCi/g | | *(22.8)* | 5/23/03 11:04 a | | 260.6 | GER8$1 |
| | | | | | | | | *(12.3)* | | | g | |
| MANGANESE-54 | 1.42E-02 | U | 3.6E-02 | 3.6E-02 | 6.69E-02 | pCi/g | | *0.21* | 5/23/03 11:04 a | | 260.6 | GER8$1 |
| | | | | | | | 6.96E-01 | *0.79* | | | g | |
| NIOBIUM-94 | -5.37E-03 | U | 3.3E-02 | 3.3E-02 | 5.82E-02 | pCi/g | | *-0.09* | 5/23/03 11:04 a | | 260.6 | GER8$1 |
| | | | | | | | 2.85E-01 | *-0.32* | | | g | |
| LEAD-212 | 1.57E+00 | | 2.8E-01 | 2.8E-01 | 9.56E-02 | pCi/g | | *(16.5)* | 5/23/03 11:04 a | | 260.6 | GER8$1 |
| | | | | | | | | *(11.3)* | | | g | |
| LEAD-214 | 1.44E+00 | | 2.7E-01 | 2.7E-01 | 1.22E-01 | pCi/g | | *(11.8)* | 5/23/03 11:04 a | | 260.6 | GER8$1 |
| | | | | | | | | *(10.9)* | | | g | |
| RADIUM-226 | 1.44E+00 | | 2.4E-01 | 2.4E-01 | 1.06E-01 | pCi/g | | *(13.6)* | 5/23/03 11:04 a | | 260.6 | GER8$1 |
| | | | | | | | | *(11.8)* | | | g | |
| THALLIUM-208 | 4.73E-01 | | 1.1E-01 | 1.1E-01 | 5.89E-02 | pCi/g | | *(8.)* | 5/23/03 11:04 a | | 260.6 | GER8$1 |
| | | | | | | | | *(8.8)* | | | g | |

No. of Results: 18 Comments:

STL Richland
rptSTLRchSample
V4.03 A97

MDC|MDA,Lc - Detection, Decision Level based on instrument background or blank, adjusted by the sample Efficiency, Yield, and Volume.
J Qual - No U qualifier has been assigned and the result is below the Reporting Limit, RL (CRDL) or Report Value is Estimated.
U Qual - Analyzed for, but the result is less than the Mdc/Mda|Total Uncert or gamma scan software did not identify the nuclide.

# FORM I

## SAMPLE RESULTS

Date: 29-May-03

| | | | | | |
|---|---|---|---|---|---|
| Lab Name: | STL Richland | SDG: | 22862 | Collection Date: | 4/7/2003 1:30:00 PM |
| Lot-Sample No.: | J3D300240-11 | Report No. : | 22709 | Received Date: | 4/30/2003 11:10:00 AM |
| Client Sample ID: | 9526-0001-019 F | COC No. : | 2003-00107 | Matrix: | SOIL |

Ordered by Client Sample ID, Batch No.

| Parameter | Result | Qual | Count Error ( 2 s) | Total Uncert( 2 s) | MDC\|MDA, Action Lev | Rpt Unit, Lc | Yield CRDL(RL) | Rst/MDC, Rst/TotUcert | Analysis, Prep Date | Total Sa Size | Aliquot Size | Primary Detector |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Batch: 3122327 | E901.1 | | | Work Order: | FMVTR1AA | | Report DB ID: | 9FMVTR10 | | | | |
| ACTINIUM-228 | 1.56E+00 | | 3.6E-01 | 3.6E-01 | 2.38E-01 | pCi/g | | (6.5) | 5/23/03 11:03 a | | 254.3 | GER7$1 |
| | | | | | | | | (8.6) | | | g | |
| AG-108M | 1.33E-02 | U | 3.4E-02 | 3.4E-02 | 6.14E-02 | pCi/g | | 0.22 | 5/23/03 11:03 a | | 254.3 | GER7$1 |
| | | | | | | | 2.86E-01 | 0.78 | | | g | |
| AMERICIUM-241 | 5.52E-02 | U | 1.4E-01 | 1.4E-01 | 2.49E-01 | pCi/g | | 0.22 | 5/23/03 11:03 a | | 254.3 | GER7$1 |
| | | | | | | | 1.03E+00 | 0.77 | | | g | |
| BISMUTH-212 | 2.16E+00 | U | 7.8E-01 | 7.8E-01 | 1.39E+00 | pCi/g | | (1.6) | 5/23/03 11:03 a | | 254.3 | GER7$1 |
| | | | | | | | | (5.5) | | | g | |
| BISMUTH-214 | 1.34E+00 | | 2.6E-01 | 2.6E-01 | 1.25E-01 | pCi/g | | (10.7) | 5/23/03 11:03 a | | 254.3 | GER7$1 |
| | | | | | | | | (10.4) | | | g | |
| COBALT-60 | -7.56E-05 | U | 3.8E-02 | 3.8E-02 | 7.04E-02 | pCi/g | | 0. | 5/23/03 11:03 a | | 254.3 | GER7$1 |
| | | | | | | | 1.50E-01 | 0. | | | g | |
| CESIUM-134 | 7.29E-02 | U | 6.4E-02 | 6.4E-02 | 1.04E-01 | pCi/g | | 0.7 | 5/23/03 11:03 a | | 254.3 | GER7$1 |
| | | | | | | | 1.90E-01 | (2.3) | | | g | |
| CESIUM-137 | 3.73E-02 | U | 4.5E-02 | 4.5E-02 | 8.48E-02 | pCi/g | | 0.44 | 5/23/03 11:03 a | | 254.3 | GER7$1 |
| | | | | | | | 3.20E-01 | (1.7) | | | g | |
| EUROPIUM-152 | -1.23E-02 | U | 1.1E-01 | 1.1E-01 | 1.88E-01 | pCi/g | | -0.07 | 5/23/03 11:03 a | | 254.3 | GER7$1 |
| | | | | | | | 4.04E-01 | -0.22 | | | g | |
| EUROPIUM-154 | 1.33E-02 | U | 1.2E-01 | 1.2E-01 | 2.18E-01 | pCi/g | | 0.06 | 5/23/03 11:03 a | | 254.3 | GER7$1 |
| | | | | | | | 3.70E-01 | 0.23 | | | g | |

STL Richland
rptSTLRchSample
V4.03 A97

MDC|MDA,Lc - Detection, Decision Level based on instrument background or blank, adjusted by the sample Efficiency, Yield, and Volume.
J Qual - No U qualifier has been assigned and the result is below the Reporting Limit, RL (CRDL) or Report Value is Estimated.
U Qual - Analyzed for, but the result is less than the Mdc/Mda|Total Uncert or gamma scan software did not identify the nuclide.

# FORM I

## SAMPLE RESULTS

Date: 29-May-03

| | | | | | |
|---|---|---|---|---|---|
| Lab Name: | STL Richland | SDG: | 22862 | Collection Date: | 4/7/2003 1:30:00 PM |
| Lot-Sample No.: | J3D300240-11 | Report No. : | 22709 | Received Date: | 4/30/2003 11:10:00 AM |
| Client Sample ID: | 9526-0001-019 F | COC No. : | 2003-00107 | Matrix: | SOIL |

Ordered by Client Sample ID, Batch No.

| Parameter | Result | Qual | Count Error ( 2 s) | Total Uncert( 2 s) | MDC\|MDA, Action Lev | Rpt Unit, Lc | Yield CRDL(RL) | Rst/MDC, Rst/TotUcert | Analysis, Prep Date | Total Sa Size | Aliquot Size | Primary Detector |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| EUROPIUM-155 | 4.96E-02 | U | 1.2E-01 | 1.2E-01 | 2.01E-01 | pCi/g | | *0.25* | 5/23/03 11:03 a | | 254.3 | GER7$1 |
| | | | | | | | 1.57E+01 | *0.85* | | | g | |
| POTASSIUM-40 | 1.27E+01 | | 2.1E+00 | 2.1E+00 | 6.08E-01 | pCi/g | | *(21.)* | 5/23/03 11:03 a | | 254.3 | GER7$1 |
| | | | | | | | | *(12.1)* | | | g | |
| MANGANESE-54 | -2.31E-02 | U | 4.9E-02 | 4.9E-02 | 8.42E-02 | pCi/g | | *-0.27* | 5/23/03 11:03 a | | 254.3 | GER7$1 |
| | | | | | | | 6.96E-01 | *-0.94* | | | g | |
| NIOBIUM-94 | -1.96E-02 | U | 3.3E-02 | 3.3E-02 | 5.64E-02 | pCi/g | | *-0.35* | 5/23/03 11:03 a | | 254.3 | GER7$1 |
| | | | | | | | 2.85E-01 | *-(1.2)* | | | g | |
| LEAD-212 | 1.57E+00 | | 2.8E-01 | 2.8E-01 | 1.08E-01 | pCi/g | | *(14.5)* | 5/23/03 11:03 a | | 254.3 | GER7$1 |
| | | | | | | | | *(11.4)* | | | g | |
| LEAD-214 | 1.47E+00 | | 2.8E-01 | 2.8E-01 | 1.36E-01 | pCi/g | | *(10.8)* | 5/23/03 11:03 a | | 254.3 | GER7$1 |
| | | | | | | | | *(10.5)* | | | g | |
| RADIUM-226 | 1.34E+00 | | 2.6E-01 | 2.6E-01 | 1.25E-01 | pCi/g | | *(10.7)* | 5/23/03 11:03 a | | 254.3 | GER7$1 |
| | | | | | | | | *(10.4)* | | | g | |
| THALLIUM-208 | 5.33E-01 | | 1.2E-01 | 1.2E-01 | 7.03E-02 | pCi/g | | *(7.6)* | 5/23/03 11:03 a | | 254.3 | GER7$1 |
| | | | | | | | | *(9.)* | | | g | |

No. of Results: 18 Comments:

STL Richland
rptSTLRchSample
V4.03 A97

MDC|MDA,Lc - Detection, Decision Level based on instrument background or blank, adjusted by the sample Efficiency, Yield, and Volume.
J Qual - No U qualifier has been assigned and the result is below the Reporting Limit, RL (CRDL) or Report Value is Estimated.
U Qual - Analyzed for, but the result is less than the Mdc/Mda|Total Uncert or gamma scan software did not identify the nuclide.

# FORM I

## SAMPLE RESULTS

Date: 29-May-03

| | | | | | |
|---|---|---|---|---|---|
| Lab Name: | STL Richland | SDG: | 22862 | Collection Date: | 4/7/2003 1:20:00 PM |
| Lot-Sample No.: | J3D300240-10 | Report No. : | 22709 | Received Date: | 4/30/2003 11:10:00 AM |
| Client Sample ID: | 9526-0001-020 F | COC No. : | 2003-00107 | Matrix: | SOIL |

Ordered by Client Sample ID, Batch No.

| Parameter | Result | Qual | Count Error ( 2 s) | Total Uncert( 2 s) | MDC\|MDA, Action Lev | Rpt Unit, Lc | Yield CRDL(RL) | Rst/MDC, Rst/TotUcert | Analysis, Prep Date | Total Sa Size | Aliquot Size | Primary Detector |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Batch: 3122327 | E901.1 | | | Work Order: | FMVTN1AA | | Report DB ID: | 9FMVTN10 | | | | |
| ACTINIUM-228 | 1.46E+00 | | 3.2E-01 | 3.2E-01 | 2.31E-01 | pCi/g | | (6.3) | 5/23/03 11:03 a | | 276.9 | GER6$1 |
| | | | | | | | | (9.1) | | | g | |
| AG-108M | -1.89E-02 | U | 3.2E-02 | 3.2E-02 | 5.33E-02 | pCi/g | | -0.35 | 5/23/03 11:03 a | | 276.9 | GER6$1 |
| | | | | | | | 2.86E-01 | -(1.2) | | | g | |
| AMERICIUM-241 | 1.65E-01 | U | 1.2E-01 | 1.2E-01 | 2.15E-01 | pCi/g | | 0.77 | 5/23/03 11:03 a | | 276.9 | GER6$1 |
| | | | | | | | 1.03E+00 | (2.8) | | | g | |
| BISMUTH-212 | 2.55E+00 | U | 9.0E-01 | 9.0E-01 | 1.37E+00 | pCi/g | | (1.9) | 5/23/03 11:03 a | | 276.9 | GER6$1 |
| | | | | | | | | (5.7) | | | g | |
| BISMUTH-214 | 1.41E+00 | | 2.6E-01 | 2.6E-01 | 1.26E-01 | pCi/g | | (11.2) | 5/23/03 11:03 a | | 276.9 | GER6$1 |
| | | | | | | | | (10.8) | | | g | |
| COBALT-60 | 2.50E-02 | U | 3.7E-02 | 3.7E-02 | 7.49E-02 | pCi/g | | 0.33 | 5/23/03 11:03 a | | 276.9 | GER6$1 |
| | | | | | | | 1.50E-01 | (1.3) | | | g | |
| CESIUM-134 | 1.15E-01 | U | 5.8E-02 | 5.8E-02 | 9.29E-02 | pCi/g | | (1.2) | 5/23/03 11:03 a | | 276.9 | GER6$1 |
| | | | | | | | 1.90E-01 | (4.) | | | g | |
| CESIUM-137 | 5.83E-01 | | 1.3E-01 | 1.3E-01 | 6.65E-02 | pCi/g | | (8.8) | 5/23/03 11:03 a | | 276.9 | GER6$1 |
| | | | | | | | 3.20E-01 | (9.3) | | | g | |
| EUROPIUM-152 | -3.05E-02 | U | 1.1E-01 | 1.1E-01 | 1.82E-01 | pCi/g | | -0.17 | 5/23/03 11:03 a | | 276.9 | GER6$1 |
| | | | | | | | 4.04E-01 | -0.58 | | | g | |
| EUROPIUM-154 | -4.55E-02 | U | 1.1E-01 | 1.1E-01 | 1.96E-01 | pCi/g | | -0.23 | 5/23/03 11:03 a | | 276.9 | GER6$1 |
| | | | | | | | 3.70E-01 | -0.8 | | | g | |

STL Richland
rptSTLRchSample
V4.03 A97

MDC|MDA,Lc - Detection, Decision Level based on instrument background or blank, adjusted by the sample Efficiency, Yield, and Volume.
J Qual - No U qualifier has been assigned and the result is below the Reporting Limit, RL (CRDL) or Report Value is Estimated.
U Qual - Analyzed for, but the result is less than the Mdc/Mda|Total Uncert or gamma scan software did not identify the nuclide.

# FORM I

## SAMPLE RESULTS

Date: 29-May-03

| | | | | | |
|---|---|---|---|---|---|
| Lab Name: | STL Richland | SDG: | 22862 | Collection Date: | 4/7/2003 1:20:00 PM |
| Lot-Sample No.: | J3D300240-10 | Report No. : | 22709 | Received Date: | 4/30/2003 11:10:00 AM |
| Client Sample ID: | 9526-0001-020 F | COC No. : | 2003-00107 | Matrix: | SOIL |

Ordered by Client Sample ID, Batch No.

| Parameter | Result | Qual | Count Error ( 2 s) | Total Uncert( 2 s) | MDC\|MDA, Action Lev | Rpt Unit, Lc | Yield CRDL(RL) | Rst/MDC, Rst/TotUcert | Analysis, Prep Date | Total Sa Size | Aliquot Size | Primary Detector |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| EUROPIUM-155 | 1.12E-01 | U | 1.0E-01 | 1.0E-01 | 1.80E-01 | pCi/g | | *0.62* | 5/23/03 11:03 a | | 276.9 | GER6$1 |
| | | | | | | | 1.57E+01 | *(2.2)* | | | g | |
| POTASSIUM-40 | 1.12E+01 | | 1.9E+00 | 1.9E+00 | 6.14E-01 | pCi/g | | *(18.3)* | 5/23/03 11:03 a | | 276.9 | GER6$1 |
| | | | | | | | | *(12.)* | | | g | |
| MANGANESE-54 | -1.18E-02 | U | 4.2E-02 | 4.2E-02 | 7.10E-02 | pCi/g | | *-0.17* | 5/23/03 11:03 a | | 276.9 | GER6$1 |
| | | | | | | | 6.96E-01 | *-0.57* | | | g | |
| NIOBIUM-94 | -3.21E-02 | U | 3.6E-02 | 3.6E-02 | 5.83E-02 | pCi/g | | *-0.55* | 5/23/03 11:03 a | | 276.9 | GER6$1 |
| | | | | | | | 2.85E-01 | *-(1.8)* | | | g | |
| LEAD-212 | 1.55E+00 | | 2.9E-01 | 2.9E-01 | 9.75E-02 | pCi/g | | *(15.9)* | 5/23/03 11:03 a | | 276.9 | GER6$1 |
| | | | | | | | | *(10.8)* | | | g | |
| LEAD-214 | 1.56E+00 | | 3.3E-01 | 3.3E-01 | 1.29E-01 | pCi/g | | *(12.)* | 5/23/03 11:03 a | | 276.9 | GER6$1 |
| | | | | | | | | *(9.5)* | | | g | |
| RADIUM-226 | 1.41E+00 | | 2.6E-01 | 2.6E-01 | 1.26E-01 | pCi/g | | *(11.2)* | 5/23/03 11:03 a | | 276.9 | GER6$1 |
| | | | | | | | | *(10.8)* | | | g | |
| THALLIUM-208 | 4.92E-01 | | 1.0E-01 | 1.0E-01 | 6.42E-02 | pCi/g | | *(7.7)* | 5/23/03 11:03 a | | 276.9 | GER6$1 |
| | | | | | | | | *(9.6)* | | | g | |

No. of Results: 18 Comments:

STL Richland
rptSTLRchSample
V4.03 A97

MDC|MDA,Lc - Detection, Decision Level based on instrument background or blank, adjusted by the sample Efficiency, Yield, and Volume.
J Qual - No U qualifier has been assigned and the result is below the Reporting Limit, RL (CRDL) or Report Value is Estimated.
U Qual - Analyzed for, but the result is less than the Mdc/Mda|Total Uncert or gamma scan software did not identify the nuclide.

# FORM I

## SAMPLE RESULTS

Date: 29-May-03

| | | | | | |
|---|---|---|---|---|---|
| Lab Name: | STL Richland | SDG: | 22862 | Collection Date: | 4/7/2003 1:45:00 PM |
| Lot-Sample No.: | J3D300240-13 | Report No. : | 22709 | Received Date: | 4/30/2003 11:10:00 AM |
| Client Sample ID: | 9526-0001-021 F | COC No. : | 2003-00107 | Matrix: | SOIL |

Ordered by Client Sample ID, Batch No.

| Parameter | Result | Qual | Count Error (2 s) | Total Uncert(2 s) | MDC\|MDA, Action Lev | Rpt Unit, Lc | Yield CRDL(RL) | Rst/MDC, Rst/TotUcert | Analysis, Prep Date | Total Sa Size | Aliquot Size | Primary Detector |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Batch: 3122327 | E901.1 | | | Work Order: FMVT31AA | | | Report DB ID: 9FMVT310 | | | | | |
| ACTINIUM-228 | 1.32E+00 | U | 3.5E-01 | 3.5E-01 | 5.52E-01 | pCi/g | | (2.4) | 5/23/03 12:51 p | | 226.4 | GER2S1 |
| | | | | | | | | (7.6) | | | g | |
| AG-108M | 1.18E-02 | U | 4.1E-02 | 4.1E-02 | 7.39E-02 | pCi/g | | 0.16 | 5/23/03 12:51 p | | 226.4 | GER2S1 |
| | | | | | | | 2.86E-01 | 0.57 | | | g | |
| AMERICIUM-241 | -3.94E-01 | U | 5.2E-01 | 5.2E-01 | 8.55E-01 | pCi/g | | -0.46 | 5/23/03 12:51 p | | 226.4 | GER2S1 |
| | | | | | | | 1.03E+00 | -(1.5) | | | g | |
| BISMUTH-212 | 2.42E+00 | U | 8.7E-01 | 8.7E-01 | 1.68E+00 | pCi/g | | (1.4) | 5/23/03 12:51 p | | 226.4 | GER2S1 |
| | | | | | | | | (5.6) | | | g | |
| BISMUTH-214 | 1.50E+00 | U | 2.7E-01 | 2.7E-01 | 3.72E-01 | pCi/g | | (4.) | 5/23/03 12:51 p | | 226.4 | GER2S1 |
| | | | | | | | | (11.1) | | | g | |
| COBALT-60 | 1.04E-03 | U | 4.5E-02 | 4.5E-02 | 8.30E-02 | pCi/g | | 0.01 | 5/23/03 12:51 p | | 226.4 | GER2S1 |
| | | | | | | | 1.50E-01 | 0.05 | | | g | |
| CESIUM-134 | 8.67E-02 | U | 5.7E-02 | 5.7E-02 | 1.11E-01 | pCi/g | | 0.78 | 5/23/03 12:51 p | | 226.4 | GER2S1 |
| | | | | | | | 1.90E-01 | (3.) | | | g | |
| CESIUM-137 | 6.60E-01 | | 1.2E-01 | 1.2E-01 | 9.45E-02 | pCi/g | | (7.) | 5/23/03 12:51 p | | 226.4 | GER2S1 |
| | | | | | | | 3.20E-01 | (10.6) | | | g | |
| EUROPIUM-152 | 1.22E-02 | U | 2.0E-01 | 2.0E-01 | 2.47E-01 | pCi/g | | 0.05 | 5/23/03 12:51 p | | 226.4 | GER2S1 |
| | | | | | | | 4.04E-01 | 0.12 | | | g | |
| EUROPIUM-154 | -1.78E-02 | U | 1.3E-01 | 1.3E-01 | 2.39E-01 | pCi/g | | -0.07 | 5/23/03 12:51 p | | 226.4 | GER2S1 |
| | | | | | | | 3.70E-01 | -0.26 | | | g | |

STL Richland
rptSTLRchSample
V4.03 A97

MDC|MDA,Lc - Detection, Decision Level based on instrument background or blank, adjusted by the sample Efficiency, Yield, and Volume.
J Qual - No U qualifier has been assigned and the result is below the Reporting Limit, RL (CRDL) or Report Value is Estimated.
U Qual - Analyzed for, but the result is less than the Mdc/Mda|Total Uncert or gamma scan software did not identify the nuclide.

# FORM I

## SAMPLE RESULTS

Date: 29-May-03

| | | | | | |
|---|---|---|---|---|---|
| Lab Name: | STL Richland | SDG: | 22862 | Collection Date: | 4/7/2003 1:45:00 PM |
| Lot-Sample No.: | J3D300240-13 | Report No. : | 22709 | Received Date: | 4/30/2003 11:10:00 AM |
| Client Sample ID: | 9526-0001-021 F | COC No. : | 2003-00107 | Matrix: | SOIL |

Ordered by Client Sample ID, Batch No.

| Parameter | Result | Qual | Count Error ( 2 s) | Total Uncert( 2 s) | MDC\|MDA, Action Lev | Rpt Unit, Lc | Yield CRDL(RL) | Rst/MDC, Rst/TotUcert | Analysis, Prep Date | Total Sa Size | Aliquot Size | Primary Detector |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| EUROPIUM-155 | -1.74E-01 | U | 2.0E-01 | 2.0E-01 | 3.30E-01 | pCi/g | | -0.53 | 5/23/03 12:51 p | | 226.4 | GER2$1 |
| | | | | | | | 1.57E+01 | -(1.7) | | | g | |
| POTASSIUM-40 | 1.03E+01 | | 1.9E+00 | 1.9E+00 | 7.39E-01 | pCi/g | | (13.9) | 5/23/03 12:51 p | | 226.4 | GER2$1 |
| | | | | | | | | (11.) | | | g | |
| MANGANESE-54 | 8.38E-03 | U | 5.0E-02 | 5.0E-02 | 9.03E-02 | pCi/g | | 0.09 | 5/23/03 12:51 p | | 226.4 | GER2$1 |
| | | | | | | | 6.96E-01 | 0.34 | | | g | |
| NIOBIUM-94 | 2.39E-02 | U | 4.1E-02 | 4.1E-02 | 7.89E-02 | pCi/g | | 0.3 | 5/23/03 12:51 p | | 226.4 | GER2$1 |
| | | | | | | | 2.85E-01 | (1.2) | | | g | |
| LEAD-212 | 1.72E+00 | | 3.6E-01 | 3.6E-01 | 1.41E-01 | pCi/g | | (12.2) | 5/23/03 12:51 p | | 226.4 | GER2$1 |
| | | | | | | | | (9.5) | | | g | |
| LEAD-214 | 1.34E+00 | | 3.0E-01 | 3.0E-01 | 1.77E-01 | pCi/g | | (7.6) | 5/23/03 12:51 p | | 226.4 | GER2$1 |
| | | | | | | | | (8.9) | | | g | |
| RADIUM-226 | 1.50E+00 | U | 2.7E-01 | 2.7E-01 | 3.72E-01 | pCi/g | | (4.) | 5/23/03 12:51 p | | 226.4 | GER2$1 |
| | | | | | | | | (11.1) | | | g | |
| THALLIUM-208 | 4.83E-01 | U | 1.1E-01 | 1.1E-01 | 1.74E-01 | pCi/g | | (2.8) | 5/23/03 12:51 p | | 226.4 | GER2$1 |
| | | | | | | | | (8.5) | | | g | |

No. of Results: 18 Comments:

STL Richland
rptSTLRchSample
V4.03 A97

MDC|MDA,Lc - Detection, Decision Level based on instrument background or blank, adjusted by the sample Efficiency, Yield, and Volume.
J Qual - No U qualifier has been assigned and the result is below the Reporting Limit, RL (CRDL) or Report Value is Estimated.
U Qual - Analyzed for, but the result is less than the Mdc/Mda|Total Uncert or gamma scan software did not identify the nuclide.

# FORM I

## SAMPLE RESULTS

Date: 29-May-03

| | | | | | |
|---|---|---|---|---|---|
| Lab Name: | STL Richland | SDG: | 22862 | Collection Date: | 4/7/2003 2:20:00 PM |
| Lot-Sample No.: | J3D300240-15 | Report No. : | 22709 | Received Date: | 4/30/2003 11:10:00 AM |
| Client Sample ID: | 9526-0001-022 F | COC No. : | 2003-00107 | Matrix: | SOIL |

Ordered by Client Sample ID, Batch No.

| Parameter | Result | Qual | Count Error ( 2 s) | Total Uncert( 2 s) | MDC\|MDA, Action Lev | Rpt Unit, Lc | Yield CRDL(RL) | Rst/MDC, Rst/TotUcert | Analysis, Prep Date | Total Sa Size | Aliquot Size | Primary Detector |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Batch: 3122327 | E901.1 | | | Work Order: | FMVT81AA | | Report DB ID: 9FMVT810 | | | | | |
| ACTINIUM-228 | 1.17E+00 | U | 3.4E-01 | 3.4E-01 | 5.05E-01 | pCi/g | | (2.3) | 5/23/03 02:40 p | | 265.4 | GER2$1 |
| | | | | | | | | (6.9) | | | g | |
| AG-108M | 2.73E-02 | U | 3.5E-02 | 3.5E-02 | 6.42E-02 | pCi/g | | 0.43 | 5/23/03 02:40 p | | 265.4 | GER2$1 |
| | | | | | | | 2.86E-01 | (1.6) | | | g | |
| AMERICIUM-241 | 5.38E-02 | U | 4.7E-01 | 4.7E-01 | 7.94E-01 | pCi/g | | 0.07 | 5/23/03 02:40 p | | 265.4 | GER2$1 |
| | | | | | | | 1.03E+00 | 0.23 | | | g | |
| BISMUTH-212 | 1.37E+00 | U | 6.4E-01 | 6.4E-01 | 1.25E+00 | pCi/g | | (1.1) | 5/23/03 02:40 p | | 265.4 | GER2$1 |
| | | | | | | | | (4.3) | | | g | |
| BISMUTH-214 | 1.34E+00 | U | 2.8E-01 | 2.8E-01 | 3.36E-01 | pCi/g | | (4.) | 5/23/03 02:40 p | | 265.4 | GER2$1 |
| | | | | | | | | (9.6) | | | g | |
| COBALT-60 | 3.03E-03 | U | 3.9E-02 | 3.9E-02 | 7.18E-02 | pCi/g | | 0.04 | 5/23/03 02:40 p | | 265.4 | GER2$1 |
| | | | | | | | 1.50E-01 | 0.16 | | | g | |
| CESIUM-134 | 2.59E-02 | U | 5.0E-02 | 5.0E-02 | 9.07E-02 | pCi/g | | 0.29 | 5/23/03 02:40 p | | 265.4 | GER2$1 |
| | | | | | | | 1.90E-01 | (1.) | | | g | |
| CESIUM-137 | 8.23E-01 | | 1.7E-01 | 1.7E-01 | 7.50E-02 | pCi/g | | (11.) | 5/23/03 02:40 p | | 265.4 | GER2$1 |
| | | | | | | | 3.20E-01 | (10.) | | | g | |
| EUROPIUM-152 | 9.94E-02 | U | 1.9E-01 | 1.9E-01 | 2.20E-01 | pCi/g | | 0.45 | 5/23/03 02:40 p | | 265.4 | GER2$1 |
| | | | | | | | 4.04E-01 | (1.) | | | g | |
| EUROPIUM-154 | -9.40E-02 | U | 1.3E-01 | 1.3E-01 | 2.11E-01 | pCi/g | | -0.45 | 5/23/03 02:40 p | | 265.4 | GER2$1 |
| | | | | | | | 3.70E-01 | -(1.5) | | | g | |

STL Richland
rptSTLRchSample
V4.03 A97

MDC|MDA,Lc - Detection, Decision Level based on instrument background or blank, adjusted by the sample Efficiency, Yield, and Volume.
J Qual - No U qualifier has been assigned and the result is below the Reporting Limit, RL (CRDL) or Report Value is Estimated.
U Qual - Analyzed for, but the result is less than the Mdc/Mda|Total Uncert or gamma scan software did not identify the nuclide.

# FORM I

## SAMPLE RESULTS

Date: 29-May-03

| | | | | | |
|---|---|---|---|---|---|
| Lab Name: | STL Richland | SDG: | 22862 | Collection Date: | 4/7/2003 2:20:00 PM |
| Lot-Sample No.: | J3D300240-15 | Report No. : | 22709 | Received Date: | 4/30/2003 11:10:00 AM |
| Client Sample ID: | 9526-0001-022 F | COC No. : | 2003-00107 | Matrix: | SOIL |

Ordered by Client Sample ID, Batch No.

| Parameter | Result | Qual | Count Error ( 2 s) | Total Uncert( 2 s) | MDC\|MDA, Action Lev | Rpt Unit, Lc | Yield CRDL(RL) | Rst/MDC, Rst/TotUcert | Analysis, Prep Date | Total Sa Size | Aliquot Size | Primary Detector |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| EUROPIUM-155 | -1.62E-01 | U | 1.8E-01 | 1.8E-01 | 2.90E-01 | pCi/g | | -0.56 | 5/23/03 02:40 p | | 265.4 | GER2$1 |
| | | | | | | | 1.57E+01 | -(1.8) | | | g | |
| POTASSIUM-40 | 9.98E+00 | | 1.8E+00 | 1.8E+00 | 6.52E-01 | pCi/g | | (15.3) | 5/23/03 02:40 p | | 265.4 | GER2$1 |
| | | | | | | | | (11.2) | | | g | |
| MANGANESE-54 | -2.74E-02 | U | 4.6E-02 | 4.6E-02 | 7.76E-02 | pCi/g | | -0.35 | 5/23/03 02:40 p | | 265.4 | GER2$1 |
| | | | | | | | 6.96E-01 | -(1.2) | | | g | |
| NIOBIUM-94 | 1.34E-02 | U | 3.6E-02 | 3.6E-02 | 6.75E-02 | pCi/g | | 0.2 | 5/23/03 02:40 p | | 265.4 | GER2$1 |
| | | | | | | | 2.85E-01 | 0.74 | | | g | |
| LEAD-212 | 1.21E+00 | | 2.6E-01 | 2.6E-01 | 1.29E-01 | pCi/g | | (9.4) | 5/23/03 02:40 p | | 265.4 | GER2$1 |
| | | | | | | | | (9.4) | | | g | |
| LEAD-214 | 1.62E+00 | | 3.0E-01 | 3.0E-01 | 1.47E-01 | pCi/g | | (11.) | 5/23/03 02:40 p | | 265.4 | GER2$1 |
| | | | | | | | | (10.6) | | | g | |
| RADIUM-226 | 1.34E+00 | U | 2.8E-01 | 2.8E-01 | 3.36E-01 | pCi/g | | (4.) | 5/23/03 02:40 p | | 265.4 | GER2$1 |
| | | | | | | | | (9.6) | | | g | |
| THALLIUM-208 | 4.22E-01 | U | 1.1E-01 | 1.1E-01 | 1.48E-01 | pCi/g | | (2.9) | 5/23/03 02:40 p | | 265.4 | GER2$1 |
| | | | | | | | | (7.7) | | | g | |

No. of Results: 18 Comments:

STL Richland
rptSTLRchSample
V4.03 A97

MDC|MDA,Lc - Detection, Decision Level based on instrument background or blank, adjusted by the sample Efficiency, Yield, and Volume.
J Qual - No U qualifier has been assigned and the result is below the Reporting Limit, RL (CRDL) or Report Value is Estimated.
U Qual - Analyzed for, but the result is less than the Mdc/Mda|Total Uncert or gamma scan software did not identify the nuclide.

# FORM I

## SAMPLE RESULTS

Date: 29-May-03

| | | | | | |
|---|---|---|---|---|---|
| Lab Name: | STL Richland | SDG: | 22862 | Collection Date: | 4/16/2003 1:48:00 PM |
| Lot-Sample No.: | J3D300240-23 | Report No. : | 22709 | Received Date: | 4/30/2003 11:10:00 AM |
| Client Sample ID: | 9526-0001-023 F | COC No. : | 2003-00109 | Matrix: | SOIL |

Ordered by Client Sample ID, Batch No.

| Parameter | Result | Qual | Count Error ( 2 s) | Total Uncert( 2 s) | MDC\|MDA, Action Lev | Rpt Unit, Lc | Yield CRDL(RL) | Rst/MDC, Rst/TotUcert | Analysis, Prep Date | Total Sa Size | Aliquot Size | Primary Detector |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Batch: 3122330 | E901.1 | | | Work Order: | FMVVT1AA | | Report DB ID: | 9FMVVT10 | | | | |
| ACTINIUM-228 | 1.65E+00 | U | 3.6E-01 | 3.6E-01 | 5.89E-01 | pCi/g | | (2.8) | 5/22/03 02:54 p | | 238.3 | GER2$1 |
| | | | | | | | | (9.2) | | | g | |
| AG-108M | -4.57E-03 | U | 4.0E-02 | 4.0E-02 | 6.85E-02 | pCi/g | | -0.07 | 5/22/03 02:54 p | | 238.3 | GER2$1 |
| | | | | | | | 2.86E-01 | -0.23 | | | g | |
| AMERICIUM-241 | -5.50E-01 | U | 5.2E-01 | 5.2E-01 | 8.23E-01 | pCi/g | | -0.67 | 5/22/03 02:54 p | | 238.3 | GER2$1 |
| | | | | | | | 1.03E+00 | -(2.1) | | | g | |
| BISMUTH-212 | 1.46E+00 | U | 7.5E-01 | 7.5E-01 | 1.44E+00 | pCi/g | | (1.) | 5/22/03 02:54 p | | 238.3 | GER2$1 |
| | | | | | | | | (3.9) | | | g | |
| BISMUTH-214 | 1.18E+00 | U | 2.7E-01 | 2.7E-01 | 3.52E-01 | pCi/g | | (3.3) | 5/22/03 02:54 p | | 238.3 | GER2$1 |
| | | | | | | | | (8.6) | | | g | |
| COBALT-60 | 1.90E-02 | U | 4.2E-02 | 4.2E-02 | 8.15E-02 | pCi/g | | 0.23 | 5/22/03 02:54 p | | 238.3 | GER2$1 |
| | | | | | | | 1.50E-01 | 0.91 | | | g | |
| CESIUM-134 | 8.77E-02 | U | 5.7E-02 | 5.7E-02 | 1.11E-01 | pCi/g | | 0.79 | 5/22/03 02:54 p | | 238.3 | GER2$1 |
| | | | | | | | 1.90E-01 | (3.1) | | | g | |
| CESIUM-137 | 4.93E-01 | | 1.2E-01 | 1.2E-01 | 9.06E-02 | pCi/g | | (5.4) | 5/22/03 02:54 p | | 238.3 | GER2$1 |
| | | | | | | | 3.20E-01 | (8.4) | | | g | |
| EUROPIUM-152 | -5.08E-02 | U | 2.0E-01 | 2.0E-01 | 2.43E-01 | pCi/g | | -0.21 | 5/22/03 02:54 p | | 238.3 | GER2$1 |
| | | | | | | | 4.04E-01 | -0.51 | | | g | |
| EUROPIUM-154 | -2.86E-02 | U | 1.4E-01 | 1.4E-01 | 2.47E-01 | pCi/g | | -0.12 | 5/22/03 02:54 p | | 238.3 | GER2$1 |
| | | | | | | | 3.70E-01 | -0.41 | | | g | |

STL Richland
rptSTLRchSample
V4.03 A97

MDC|MDA,Lc - Detection, Decision Level based on instrument background or blank, adjusted by the sample Efficiency, Yield, and Volume.
J Qual - No U qualifier has been assigned and the result is below the Reporting Limit, RL (CRDL) or Report Value is Estimated.
U Qual - Analyzed for, but the result is less than the Mdc/Mda|Total Uncert or gamma scan software did not identify the nuclide.

# FORM I

## SAMPLE RESULTS

Date: 29-May-03

| | | | | | |
|---|---|---|---|---|---|
| Lab Name: | STL Richland | SDG: | 22862 | Collection Date: | 4/16/2003 1:48:00 PM |
| Lot-Sample No.: | J3D300240-23 | Report No. : | 22709 | Received Date: | 4/30/2003 11:10:00 AM |
| Client Sample ID: | 9526-0001-023 F | COC No. : | 2003-00109 | Matrix: | SOIL |

Ordered by Client Sample ID, Batch No.

| Parameter | Result | Qual | Count Error ( 2 s) | Total Uncert( 2 s) | MDC\|MDA, Action Lev | Rpt Unit, Lc | Yield CRDL(RL) | Rst/MDC, Rst/TotUcert | Analysis, Prep Date | Total Sa Size | Aliquot Size | Primary Detector |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| EUROPIUM-155 | 1.39E-02 | U | 2.0E-01 | 2.0E-01 | 3.41E-01 | pCi/g | | *0.04* | 5/22/03 02:54 p | | 238.3 | GER2$1 |
| | | | | | | | 1.57E+01 | *0.14* | | | g | |
| POTASSIUM-40 | 1.10E+01 | | 2.0E+00 | 2.0E+00 | 6.52E-01 | pCi/g | | *(16.9)* | 5/22/03 02:54 p | | 238.3 | GER2$1 |
| | | | | | | | | *(11.2)* | | | g | |
| MANGANESE-54 | 1.78E-02 | U | 4.6E-02 | 4.6E-02 | 8.56E-02 | pCi/g | | *0.21* | 5/22/03 02:54 p | | 238.3 | GER2$1 |
| | | | | | | | 6.96E-01 | *0.77* | | | g | |
| NIOBIUM-94 | 8.49E-03 | U | 4.1E-02 | 4.1E-02 | 7.58E-02 | pCi/g | | *0.11* | 5/22/03 02:54 p | | 238.3 | GER2$1 |
| | | | | | | | 2.85E-01 | *0.41* | | | g | |
| LEAD-212 | 1.62E+00 | | 3.3E-01 | 3.3E-01 | 1.35E-01 | pCi/g | | *(12.)* | 5/22/03 02:54 p | | 238.3 | GER2$1 |
| | | | | | | | | *(9.8)* | | | g | |
| LEAD-214 | 1.43E+00 | | 2.8E-01 | 2.8E-01 | 1.62E-01 | pCi/g | | *(8.8)* | 5/22/03 02:54 p | | 238.3 | GER2$1 |
| | | | | | | | | *(10.2)* | | | g | |
| RADIUM-226 | 1.18E+00 | U | 2.7E-01 | 2.7E-01 | 3.52E-01 | pCi/g | | *(3.3)* | 5/22/03 02:54 p | | 238.3 | GER2$1 |
| | | | | | | | | *(8.6)* | | | g | |
| THALLIUM-208 | 5.42E-01 | | 1.3E-01 | 1.3E-01 | 8.43E-02 | pCi/g | | *(6.4)* | 5/22/03 02:54 p | | 238.3 | GER2$1 |
| | | | | | | | | *(8.5)* | | | g | |

No. of Results: 18 Comments:

STL Richland
rptSTLRchSample
V4.03 A97

MDC|MDA,Lc - Detection, Decision Level based on instrument background or blank, adjusted by the sample Efficiency, Yield, and Volume.
J Qual - No U qualifier has been assigned and the result is below the Reporting Limit, RL (CRDL) or Report Value is Estimated.
U Qual - Analyzed for, but the result is less than the Mdc/Mda|Total Uncert or gamma scan software did not identify the nuclide.

# FORM I

## SAMPLE RESULTS

Date: 29-May-03

| | | | | | |
|---|---|---|---|---|---|
| Lab Name: | STL Richland | SDG: | 22862 | Collection Date: | 4/16/2003 1:55:00 PM |
| Lot-Sample No.: | J3D300240-24 | Report No. : | 22709 | Received Date: | 4/30/2003 11:10:00 AM |
| Client Sample ID: | 9526-0001-024 F | COC No. : | 2003-00109 | Matrix: | SOIL |

Ordered by Client Sample ID, Batch No.

| Parameter | Result | Qual | Count Error ( 2 s) | Total Uncert( 2 s) | MDC\|MDA, Action Lev | Rpt Unit, Lc | Yield CRDL(RL) | Rst/MDC, Rst/TotUcert | Analysis, Prep Date | Total Sa Size | Aliquot Size | Primary Detector |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Batch: 3122330 | E901.1 | | | Work Order: | FMVVX1AA | | Report DB ID: | 9FMVVX10 | | | | |
| ACTINIUM-228 | 1.56E+00 | | 3.6E-01 | 3.6E-01 | 2.37E-01 | pCi/g | | (6.6) | 5/22/03 02:54 p | | 248.5 | GER5$1 |
| | | | | | | | | (8.7) | | | g | |
| AG-108M | 1.36E-02 | U | 3.5E-02 | 3.5E-02 | 6.26E-02 | pCi/g | | 0.22 | 5/22/03 02:54 p | | 248.5 | GER5$1 |
| | | | | | | | 2.86E-01 | 0.78 | | | g | |
| AMERICIUM-241 | 4.79E-02 | U | 8.3E-02 | 8.3E-02 | 1.39E-01 | pCi/g | | 0.34 | 5/22/03 02:54 p | | 248.5 | GER5$1 |
| | | | | | | | 1.03E+00 | (1.2) | | | g | |
| BISMUTH-212 | 1.91E+00 | U | 8.9E-01 | 8.9E-01 | 1.43E+00 | pCi/g | | (1.3) | 5/22/03 02:54 p | | 248.5 | GER5$1 |
| | | | | | | | | (4.3) | | | g | |
| BISMUTH-214 | 1.24E+00 | | 2.5E-01 | 2.5E-01 | 1.28E-01 | pCi/g | | (9.7) | 5/22/03 02:54 p | | 248.5 | GER5$1 |
| | | | | | | | | (10.) | | | g | |
| COBALT-60 | 2.07E-02 | U | 4.0E-02 | 4.0E-02 | 7.83E-02 | pCi/g | | 0.26 | 5/22/03 02:54 p | | 248.5 | GER5$1 |
| | | | | | | | 1.50E-01 | (1.) | | | g | |
| CESIUM-134 | 6.98E-02 | U | 5.0E-02 | 5.0E-02 | 9.92E-02 | pCi/g | | 0.7 | 5/22/03 02:54 p | | 248.5 | GER5$1 |
| | | | | | | | 1.90E-01 | (2.8) | | | g | |
| CESIUM-137 | 3.49E-01 | | 1.1E-01 | 1.1E-01 | 8.23E-02 | pCi/g | | (4.2) | 5/22/03 02:54 p | | 248.5 | GER5$1 |
| | | | | | | | 3.20E-01 | (6.5) | | | g | |
| EUROPIUM-152 | -1.83E-02 | U | 1.2E-01 | 1.2E-01 | 1.96E-01 | pCi/g | | -0.09 | 5/22/03 02:54 p | | 248.5 | GER5$1 |
| | | | | | | | 4.04E-01 | -0.31 | | | g | |
| EUROPIUM-154 | 4.00E-02 | U | 1.2E-01 | 1.2E-01 | 2.30E-01 | pCi/g | | 0.17 | 5/22/03 02:54 p | | 248.5 | GER5$1 |
| | | | | | | | 3.70E-01 | 0.66 | | | g | |

STL Richland
rptSTLRchSample
V4.03 A97

MDC|MDA,Lc - Detection, Decision Level based on instrument background or blank, adjusted by the sample Efficiency, Yield, and Volume.
J Qual - No U qualifier has been assigned and the result is below the Reporting Limit, RL (CRDL) or Report Value is Estimated.
U Qual - Analyzed for, but the result is less than the Mdc/Mda|Total Uncert or gamma scan software did not identify the nuclide.

# FORM I

## SAMPLE RESULTS

Date: 29-May-03

| | | | | | |
|---|---|---|---|---|---|
| Lab Name: | STL Richland | SDG: | 22862 | Collection Date: | 4/16/2003 1:55:00 PM |
| Lot-Sample No.: | J3D300240-24 | Report No. : | 22709 | Received Date: | 4/30/2003 11:10:00 AM |
| Client Sample ID: | 9526-0001-024 F | COC No. : | 2003-00109 | Matrix: | SOIL |

Ordered by Client Sample ID, Batch No.

| Parameter | Result | Qual | Count Error ( 2 s) | Total Uncert( 2 s) | MDC\|MDA, Action Lev | Rpt Unit, Lc | Yield CRDL(RL) | Rst/MDC, Rst/TotUcert | Analysis, Prep Date | Total Sa Size | Aliquot Size | Primary Detector |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| EUROPIUM-155 | 1.14E-01 | U | 1.1E-01 | 1.1E-01 | 1.88E-01 | pCi/g | 1.57E+01 | 0.61 (2.1) | 5/22/03 02:54 p | | 248.5 g | GER5$1 |
| POTASSIUM-40 | 1.10E+01 | | 1.9E+00 | 1.9E+00 | 5.22E-01 | pCi/g | | (21.1) (11.7) | 5/22/03 02:54 p | | 248.5 g | GER5$1 |
| MANGANESE-54 | -3.30E-02 | U | 4.2E-02 | 4.2E-02 | 6.99E-02 | pCi/g | 6.96E-01 | -0.47 -(1.6) | 5/22/03 02:54 p | | 248.5 g | GER5$1 |
| NIOBIUM-94 | -1.78E-02 | U | 3.7E-02 | 3.7E-02 | 6.35E-02 | pCi/g | 2.85E-01 | -0.28 -0.96 | 5/22/03 02:54 p | | 248.5 g | GER5$1 |
| LEAD-212 | 1.51E+00 | | 2.8E-01 | 2.8E-01 | 1.07E-01 | pCi/g | | (14.2) (10.8) | 5/22/03 02:54 p | | 248.5 g | GER5$1 |
| LEAD-214 | 1.53E+00 | | 2.8E-01 | 2.8E-01 | 1.42E-01 | pCi/g | | (10.8) (10.9) | 5/22/03 02:54 p | | 248.5 g | GER5$1 |
| RADIUM-226 | 1.24E+00 | | 2.5E-01 | 2.5E-01 | 1.28E-01 | pCi/g | | (9.7) (10.) | 5/22/03 02:54 p | | 248.5 g | GER5$1 |
| THALLIUM-208 | 4.91E-01 | | 1.1E-01 | 1.1E-01 | 7.07E-02 | pCi/g | | (6.9) (8.5) | 5/22/03 02:54 p | | 248.5 g | GER5$1 |

No. of Results: 18 Comments:

STL Richland
rptSTLRchSample
V4.03 A97

MDC|MDA,Lc - Detection, Decision Level based on instrument background or blank, adjusted by the sample Efficiency, Yield, and Volume.
J Qual - No U qualifier has been assigned and the result is below the Reporting Limit, RL (CRDL) or Report Value is Estimated.
U Qual - Analyzed for, but the result is less than the Mdc/Mda|Total Uncert or gamma scan software did not identify the nuclide.

# FORM I

## SAMPLE RESULTS

Date: 29-May-03

| | | | | | |
|---|---|---|---|---|---|
| Lab Name: | STL Richland | SDG: | 22862 | Collection Date: | 4/16/2003 2:06:00 PM |
| Lot-Sample No.: | J3D300240-25 | Report No.: | 22709 | Received Date: | 4/30/2003 11:10:00 AM |
| Client Sample ID: | 9526-0001-025 F | COC No.: | 2003-00109 | Matrix: | SOIL |

Ordered by Client Sample ID, Batch No.

| Parameter | Result | Qual | Count Error (2 s) | Total Uncert(2 s) | MDC\|MDA, Action Lev | Rpt Unit, Lc | Yield CRDL(RL) | Rst/MDC, Rst/TotUcert | Analysis, Prep Date | Total Sa Size | Aliquot Size | Primary Detector |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Batch: 3122330 | E901.1 | | | Work Order: | FMVV01AA | | Report DB ID: | 9FMVV010 | | | | |
| ACTINIUM-228 | 1.15E+00 | U | 3.4E-01 | 3.4E-01 | 5.47E-01 | pCi/g | | (2.1) | 5/22/03 04:50 p | | 258.5 | GER2$1 |
| | | | | | | | | (6.7) | | | g | |
| AG-108M | -9.19E-03 | U | 3.7E-02 | 3.7E-02 | 6.35E-02 | pCi/g | | -0.14 | 5/22/03 04:50 p | | 258.5 | GER2$1 |
| | | | | | | | 2.86E-01 | -0.49 | | | g | |
| AMERICIUM-241 | -4.80E-01 | U | 4.8E-01 | 4.8E-01 | 7.74E-01 | pCi/g | | -0.62 | 5/22/03 04:50 p | | 258.5 | GER2$1 |
| | | | | | | | 1.03E+00 | -(2.) | | | g | |
| BISMUTH-212 | 1.46E+00 | U | 7.7E-01 | 7.7E-01 | 1.45E+00 | pCi/g | | (1.) | 5/22/03 04:50 p | | 258.5 | GER2$1 |
| | | | | | | | | (3.8) | | | g | |
| BISMUTH-214 | 1.52E+00 | | 2.7E-01 | 2.7E-01 | 1.44E-01 | pCi/g | | (10.5) | 5/22/03 04:50 p | | 258.5 | GER2$1 |
| | | | | | | | | (11.1) | | | g | |
| COBALT-60 | 2.31E-02 | U | 4.3E-02 | 4.3E-02 | 8.38E-02 | pCi/g | | 0.28 | 5/22/03 04:50 p | | 258.5 | GER2$1 |
| | | | | | | | 1.50E-01 | (1.1) | | | g | |
| CESIUM-134 | 4.14E-02 | U | 4.7E-02 | 4.7E-02 | 9.03E-02 | pCi/g | | 0.46 | 5/22/03 04:50 p | | 258.5 | GER2$1 |
| | | | | | | | 1.90E-01 | (1.7) | | | g | |
| CESIUM-137 | 3.68E-01 | | 1.1E-01 | 1.1E-01 | 8.16E-02 | pCi/g | | (4.5) | 5/22/03 04:50 p | | 258.5 | GER2$1 |
| | | | | | | | 3.20E-01 | (6.6) | | | g | |
| EUROPIUM-152 | -3.86E-02 | U | 1.8E-01 | 1.8E-01 | 2.04E-01 | pCi/g | | -0.19 | 5/22/03 04:50 p | | 258.5 | GER2$1 |
| | | | | | | | 4.04E-01 | -0.44 | | | g | |
| EUROPIUM-154 | 8.74E-02 | U | 1.3E-01 | 1.3E-01 | 2.53E-01 | pCi/g | | 0.35 | 5/22/03 04:50 p | | 258.5 | GER2$1 |
| | | | | | | | 3.70E-01 | (1.3) | | | g | |

STL Richland
rptSTLRchSample
V4.03 A97

MDC|MDA,Lc - Detection, Decision Level based on instrument background or blank, adjusted by the sample Efficiency, Yield, and Volume.
J Qual - No U qualifier has been assigned and the result is below the Reporting Limit, RL (CRDL) or Report Value is Estimated.
U Qual - Analyzed for, but the result is less than the Mdc/Mda|Total Uncert or gamma scan software did not identify the nuclide.

# FORM I

## SAMPLE RESULTS

Date: 29-May-03

| | | | | | |
|---|---|---|---|---|---|
| Lab Name: | STL Richland | SDG: | 22862 | Collection Date: | 4/16/2003 2:06:00 PM |
| Lot-Sample No.: | J3D300240-25 | Report No. : | 22709 | Received Date: | 4/30/2003 11:10:00 AM |
| Client Sample ID: | 9526-0001-025 F | COC No. : | 2003-00109 | Matrix: | SOIL |

Ordered by Client Sample ID, Batch No.

| Parameter | Result | Qual | Count Error ( 2 s) | Total Uncert( 2 s) | MDC\|MDA, Action Lev | Rpt Unit, Lc | Yield CRDL(RL) | Rst/MDC, Rst/TotUcert | Analysis, Prep Date | Total Sa Size | Aliquot Size | Primary Detector |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| EUROPIUM-155 | 3.12E-02 | U | 1.8E-01 | 1.8E-01 | 3.19E-01 | pCi/g | | *0.1* | 5/22/03 04:50 p | | 258.5 | GER2$1 |
| | | | | | | | 1.57E+01 | *0.34* | | | g | |
| POTASSIUM-40 | 1.30E+01 | | 2.1E+00 | 2.1E+00 | 7.41E-01 | pCi/g | | *(17.5)* | 5/22/03 04:50 p | | 258.5 | GER2$1 |
| | | | | | | | | *(12.4)* | | | g | |
| MANGANESE-54 | -1.47E-02 | U | 4.8E-02 | 4.8E-02 | 8.32E-02 | pCi/g | | *-0.18* | 5/22/03 04:50 p | | 258.5 | GER2$1 |
| | | | | | | | 6.96E-01 | *-0.61* | | | g | |
| NIOBIUM-94 | 1.16E-03 | U | 3.8E-02 | 3.8E-02 | 6.89E-02 | pCi/g | | *0.02* | 5/22/03 04:50 p | | 258.5 | GER2$1 |
| | | | | | | | 2.85E-01 | *0.06* | | | g | |
| LEAD-212 | 1.43E+00 | | 2.9E-01 | 2.9E-01 | 1.29E-01 | pCi/g | | *(11.)* | 5/22/03 04:50 p | | 258.5 | GER2$1 |
| | | | | | | | | *(9.9)* | | | g | |
| LEAD-214 | 1.41E+00 | | 2.9E-01 | 2.9E-01 | 1.41E-01 | pCi/g | | *(10.)* | 5/22/03 04:50 p | | 258.5 | GER2$1 |
| | | | | | | | | *(9.7)* | | | g | |
| RADIUM-226 | 1.52E+00 | | 2.7E-01 | 2.7E-01 | 1.44E-01 | pCi/g | | *(10.5)* | 5/22/03 04:50 p | | 258.5 | GER2$1 |
| | | | | | | | | *(11.1)* | | | g | |
| THALLIUM-208 | 4.56E-01 | U | 1.2E-01 | 1.2E-01 | 1.62E-01 | pCi/g | | *(2.8)* | 5/22/03 04:50 p | | 258.5 | GER2$1 |
| | | | | | | | | *(7.7)* | | | g | |

No. of Results: 18 Comments:

STL Richland
rptSTLRchSample
V4.03 A97

MDC|MDA,Lc - Detection, Decision Level based on instrument background or blank, adjusted by the sample Efficiency, Yield, and Volume.
J Qual - No U qualifier has been assigned and the result is below the Reporting Limit, RL (CRDL) or Report Value is Estimated.
U Qual - Analyzed for, but the result is less than the Mdc/Mda|Total Uncert or gamma scan software did not identify the nuclide.

# FORM I

## SAMPLE RESULTS

Date: 29-May-03

| | | | | | |
|---|---|---|---|---|---|
| Lab Name: | STL Richland | SDG: | 22862 | Collection Date: | 4/16/2003 2:27:00 PM |
| Lot-Sample No.: | J3D300240-26 | Report No. : | 22709 | Received Date: | 4/30/2003 11:10:00 AM |
| Client Sample ID: | 9526-0001-026 F | COC No. : | 2003-00109 | Matrix: | SOIL |

Ordered by Client Sample ID, Batch No.

| Parameter | Result | Qual | Count Error ( 2 s) | Total Uncert( 2 s) | MDC\|MDA, Action Lev | Rpt Unit, Lc | Yield CRDL(RL) | Rst/MDC, Rst/TotUcert | Analysis, Prep Date | Total Sa Size | Aliquot Size | Primary Detector |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Batch: 3122330 | E901.1 | | | Work Order: | FMVV11AA | | Report DB ID: | 9FMVV110 | | | | |
| ACTINIUM-228 | 1.29E+00 | | 3.3E-01 | 3.3E-01 | 2.00E-01 | pCi/g | | (6.5) | 5/22/03 04:50 p | | 274.2 | GER5$1 |
| | | | | | | | | (7.7) | | | g | |
| AG-108M | 3.50E-02 | U | 3.2E-02 | 3.2E-02 | 5.95E-02 | pCi/g | | 0.59 | 5/22/03 04:50 p | | 274.2 | GER5$1 |
| | | | | | | | 2.86E-01 | (2.2) | | | g | |
| AMERICIUM-241 | 4.68E-02 | U | 8.4E-02 | 8.4E-02 | 1.29E-01 | pCi/g | | 0.36 | 5/22/03 04:50 p | | 274.2 | GER5$1 |
| | | | | | | | 1.03E+00 | (1.1) | | | g | |
| BISMUTH-212 | 1.28E+00 | U | 8.2E-01 | 8.2E-01 | 1.26E+00 | pCi/g | | (1.) | 5/22/03 04:50 p | | 274.2 | GER5$1 |
| | | | | | | | | (3.1) | | | g | |
| BISMUTH-214 | 1.32E+00 | | 2.6E-01 | 2.6E-01 | 1.27E-01 | pCi/g | | (10.5) | 5/22/03 04:50 p | | 274.2 | GER5$1 |
| | | | | | | | | (10.4) | | | g | |
| COBALT-60 | 9.99E-03 | U | 3.3E-02 | 3.3E-02 | 6.37E-02 | pCi/g | | 0.16 | 5/22/03 04:50 p | | 274.2 | GER5$1 |
| | | | | | | | 1.50E-01 | 0.61 | | | g | |
| CESIUM-134 | 5.80E-02 | U | 4.8E-02 | 4.8E-02 | 9.31E-02 | pCi/g | | 0.62 | 5/22/03 04:50 p | | 274.2 | GER5$1 |
| | | | | | | | 1.90E-01 | (2.4) | | | g | |
| CESIUM-137 | 2.69E-01 | J | 7.8E-02 | 7.8E-02 | 7.56E-02 | pCi/g | | (3.6) | 5/22/03 04:50 p | | 274.2 | GER5$1 |
| | | | | | | | 3.20E-01 | (6.9) | | | g | |
| EUROPIUM-152 | 9.48E-03 | U | 1.1E-01 | 1.1E-01 | 1.93E-01 | pCi/g | | 0.05 | 5/22/03 04:50 p | | 274.2 | GER5$1 |
| | | | | | | | 4.04E-01 | 0.17 | | | g | |
| EUROPIUM-154 | -1.46E-02 | U | 1.2E-01 | 1.2E-01 | 2.22E-01 | pCi/g | | -0.07 | 5/22/03 04:50 p | | 274.2 | GER5$1 |
| | | | | | | | 3.70E-01 | -0.24 | | | g | |

STL Richland
rptSTLRchSample
V4.03 A97

MDC|MDA,Lc - Detection, Decision Level based on instrument background or blank, adjusted by the sample Efficiency, Yield, and Volume.
J Qual - No U qualifier has been assigned and the result is below the Reporting Limit, RL (CRDL) or Report Value is Estimated.
U Qual - Analyzed for, but the result is less than the Mdc/Mda|Total Uncert or gamma scan software did not identify the nuclide.

# FORM I

## SAMPLE RESULTS

Date: 29-May-03

| | | | | | |
|---|---|---|---|---|---|
| Lab Name: | STL Richland | SDG: | 22862 | Collection Date: | 4/16/2003 2:27:00 PM |
| Lot-Sample No.: | J3D300240-26 | Report No. : | 22709 | Received Date: | 4/30/2003 11:10:00 AM |
| Client Sample ID: | 9526-0001-026 F | COC No. : | 2003-00109 | Matrix: | SOIL |

Ordered by Client Sample ID, Batch No.

| Parameter | Result | Qual | Count Error ( 2 s) | Total Uncert( 2 s) | MDC\|MDA, Action Lev | Rpt Unit, Lc | Yield CRDL(RL) | Rst/MDC, Rst/TotUcert | Analysis, Prep Date | Total Sa Size | Aliquot Size | Primary Detector |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| EUROPIUM-155 | 1.32E-01 | U | 1.0E-01 | 1.0E-01 | 1.79E-01 | pCi/g | | *0.74* | 5/22/03 04:50 p | | 274.2 | GER5$1 |
| | | | | | | | 1.57E+01 | *(2.6)* | | | g | |
| POTASSIUM-40 | 9.68E+00 | | 1.7E+00 | 1.7E+00 | 4.73E-01 | pCi/g | | *(20.5)* | 5/22/03 04:50 p | | 274.2 | GER5$1 |
| | | | | | | | | *(11.5)* | | | g | |
| MANGANESE-54 | -4.01E-03 | U | 4.0E-02 | 4.0E-02 | 7.19E-02 | pCi/g | | *-0.06* | 5/22/03 04:50 p | | 274.2 | GER5$1 |
| | | | | | | | 6.96E-01 | *-0.2* | | | g | |
| NIOBIUM-94 | -8.80E-03 | U | 3.5E-02 | 3.5E-02 | 6.19E-02 | pCi/g | | *-0.14* | 5/22/03 04:50 p | | 274.2 | GER5$1 |
| | | | | | | | 2.85E-01 | *-0.5* | | | g | |
| LEAD-212 | 1.48E+00 | | 2.7E-01 | 2.7E-01 | 9.54E-02 | pCi/g | | *(15.6)* | 5/22/03 04:50 p | | 274.2 | GER5$1 |
| | | | | | | | | *(10.9)* | | | g | |
| LEAD-214 | 1.53E+00 | | 2.8E-01 | 2.8E-01 | 1.22E-01 | pCi/g | | *(12.5)* | 5/22/03 04:50 p | | 274.2 | GER5$1 |
| | | | | | | | | *(11.)* | | | g | |
| RADIUM-226 | 1.32E+00 | | 2.6E-01 | 2.6E-01 | 1.27E-01 | pCi/g | | *(10.5)* | 5/22/03 04:50 p | | 274.2 | GER5$1 |
| | | | | | | | | *(10.4)* | | | g | |
| THALLIUM-208 | 4.56E-01 | | 1.1E-01 | 1.1E-01 | 6.33E-02 | pCi/g | | *(7.2)* | 5/22/03 04:50 p | | 274.2 | GER5$1 |
| | | | | | | | | *(8.)* | | | g | |

No. of Results: 18 Comments:

STL Richland
rptSTLRchSample
V4.03 A97

MDC|MDA,Lc - Detection, Decision Level based on instrument background or blank, adjusted by the sample Efficiency, Yield, and Volume.
J Qual - No U qualifier has been assigned and the result is below the Reporting Limit, RL (CRDL) or Report Value is Estimated.
U Qual - Analyzed for, but the result is less than the Mdc/Mda|Total Uncert or gamma scan software did not identify the nuclide.

# FORM I

## SAMPLE RESULTS

Date: 29-May-03

| | | | | | |
|---|---|---|---|---|---|
| Lab Name: | STL Richland | SDG: | 22862 | Collection Date: | 4/16/2003 2:25:00 PM |
| Lot-Sample No.: | J3D300240-27 | Report No. : | 22709 | Received Date: | 4/30/2003 11:10:00 AM |
| Client Sample ID: | 9526-0001-027 F | COC No. : | 2003-00109 | Matrix: | SOIL |

Ordered by Client Sample ID, Batch No.

| Parameter | Result | Qual | Count Error ( 2 s) | Total Uncert( 2 s) | MDC\|MDA, Action Lev | Rpt Unit, Lc | Yield CRDL(RL) | Rst/MDC, Rst/TotUcert | Analysis, Prep Date | Total Sa Size | Aliquot Size | Primary Detector |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Batch: 3122330 | E901.1 | | | Work Order: | FMVV21AA | | Report DB ID: 9FMVV210 | | | | | |
| ACTINIUM-228 | 1.18E+00 | | 3.1E-01 | 3.1E-01 | 2.31E-01 | pCi/g | | (5.1) | 5/22/03 06:35 p | | 272.4 | GER2$1 |
| | | | | | | | | (7.7) | | | g | |
| AG-108M | -2.93E-03 | U | 4.2E-02 | 4.2E-02 | 7.14E-02 | pCi/g | | -0.04 | 5/22/03 06:35 p | | 272.4 | GER2$1 |
| | | | | | | | 2.86E-01 | -0.14 | | | g | |
| AMERICIUM-241 | 6.25E-02 | U | 4.6E-01 | 4.6E-01 | 7.83E-01 | pCi/g | | 0.08 | 5/22/03 06:35 p | | 272.4 | GER2$1 |
| | | | | | | | 1.03E+00 | 0.27 | | | g | |
| BISMUTH-212 | 1.57E+00 | U | 6.9E-01 | 6.9E-01 | 1.33E+00 | pCi/g | | (1.2) | 5/22/03 06:35 p | | 272.4 | GER2$1 |
| | | | | | | | | (4.6) | | | g | |
| BISMUTH-214 | 1.11E+00 | U | 2.2E-01 | 2.2E-01 | 3.02E-01 | pCi/g | | (3.7) | 5/22/03 06:35 p | | 272.4 | GER2$1 |
| | | | | | | | | (10.1) | | | g | |
| COBALT-60 | 1.63E-02 | U | 4.0E-02 | 4.0E-02 | 7.60E-02 | pCi/g | | 0.21 | 5/22/03 06:35 p | | 272.4 | GER2$1 |
| | | | | | | | 1.50E-01 | 0.82 | | | g | |
| CESIUM-134 | 5.22E-02 | U | 4.9E-02 | 4.9E-02 | 9.33E-02 | pCi/g | | 0.56 | 5/22/03 06:35 p | | 272.4 | GER2$1 |
| | | | | | | | 1.90E-01 | (2.1) | | | g | |
| CESIUM-137 | 1.61E+00 | | 2.3E-01 | 2.3E-01 | 8.09E-02 | pCi/g | | (19.9) | 5/22/03 06:35 p | | 272.4 | GER2$1 |
| | | | | | | | 3.20E-01 | (13.9) | | | g | |
| EUROPIUM-152 | -7.11E-02 | U | 2.0E-01 | 2.0E-01 | 2.23E-01 | pCi/g | | -0.32 | 5/22/03 06:35 p | | 272.4 | GER2$1 |
| | | | | | | | 4.04E-01 | -0.73 | | | g | |
| EUROPIUM-154 | -5.33E-02 | U | 1.2E-01 | 1.2E-01 | 2.07E-01 | pCi/g | | -0.26 | 5/22/03 06:35 p | | 272.4 | GER2$1 |
| | | | | | | | 3.70E-01 | -0.89 | | | g | |

STL Richland
rptSTLRchSample
V4.03 A97

MDC|MDA,Lc - Detection, Decision Level based on instrument background or blank, adjusted by the sample Efficiency, Yield, and Volume.
J Qual - No U qualifier has been assigned and the result is below the Reporting Limit, RL (CRDL) or Report Value is Estimated.
U Qual - Analyzed for, but the result is less than the Mdc/Mda|Total Uncert or gamma scan software did not identify the nuclide.

# FORM I

## SAMPLE RESULTS

Date: 29-May-03

| | | | | | |
|---|---|---|---|---|---|
| Lab Name: | STL Richland | SDG: | 22862 | Collection Date: | 4/16/2003 2:25:00 PM |
| Lot-Sample No.: | J3D300240-27 | Report No. : | 22709 | Received Date: | 4/30/2003 11:10:00 AM |
| Client Sample ID: | 9526-0001-027 F | COC No. : | 2003-00109 | Matrix: | SOIL |

Ordered by Client Sample ID, Batch No.

| Parameter | Result | Qual | Count Error ( 2 s) | Total Uncert( 2 s) | MDC\|MDA, Action Lev | Rpt Unit, Lc | Yield CRDL(RL) | Rst/MDC, Rst/TotUcert | Analysis, Prep Date | Total Sa Size | Aliquot Size | Primary Detector |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| EUROPIUM-155 | -6.55E-02 | U | 1.8E-01 | 1.8E-01 | 2.99E-01 | pCi/g | | -0.22 | 5/22/03 06:35 p | | 272.4 | GER2$1 |
| | | | | | | | 1.57E+01 | -0.74 | | | g | |
| POTASSIUM-40 | 1.04E+01 | | 1.7E+00 | 1.7E+00 | 6.29E-01 | pCi/g | | (16.4) | 5/22/03 06:35 p | | 272.4 | GER2$1 |
| | | | | | | | | (12.) | | | g | |
| MANGANESE-54 | -1.12E-02 | U | 4.2E-02 | 4.2E-02 | 7.38E-02 | pCi/g | | -0.15 | 5/22/03 06:35 p | | 272.4 | GER2$1 |
| | | | | | | | 6.96E-01 | -0.53 | | | g | |
| NIOBIUM-94 | 1.44E-02 | U | 3.7E-02 | 3.7E-02 | 6.86E-02 | pCi/g | | 0.21 | 5/22/03 06:35 p | | 272.4 | GER2$1 |
| | | | | | | | 2.85E-01 | 0.78 | | | g | |
| LEAD-212 | 1.10E+00 | | 2.4E-01 | 2.4E-01 | 1.26E-01 | pCi/g | | (8.7) | 5/22/03 06:35 p | | 272.4 | GER2$1 |
| | | | | | | | | (9.2) | | | g | |
| LEAD-214 | 1.20E+00 | | 2.4E-01 | 2.4E-01 | 1.55E-01 | pCi/g | | (7.7) | 5/22/03 06:35 p | | 272.4 | GER2$1 |
| | | | | | | | | (9.8) | | | g | |
| RADIUM-226 | 1.11E+00 | | 2.2E-01 | 2.2E-01 | 1.35E-01 | pCi/g | | (8.2) | 5/22/03 06:35 p | | 272.4 | GER2$1 |
| | | | | | | | | (10.1) | | | g | |
| THALLIUM-208 | 4.40E-01 | | 1.1E-01 | 1.1E-01 | 6.67E-02 | pCi/g | | (6.6) | 5/22/03 06:35 p | | 272.4 | GER2$1 |
| | | | | | | | | (8.1) | | | g | |

No. of Results: 18 Comments:

STL Richland
rptSTLRchSample
V4.03 A97

MDC|MDA,Lc - Detection, Decision Level based on instrument background or blank, adjusted by the sample Efficiency, Yield, and Volume.
J Qual - No U qualifier has been assigned and the result is below the Reporting Limit, RL (CRDL) or Report Value is Estimated.
U Qual - Analyzed for, but the result is less than the Mdc/Mda|Total Uncert or gamma scan software did not identify the nuclide.

# FORM I

## SAMPLE RESULTS

Date: 29-May-03

| | | | | | |
|---|---|---|---|---|---|
| Lab Name: | STL Richland | SDG: | 22862 | Collection Date: | 4/16/2003 2:45:00 PM |
| Lot-Sample No.: | J3D300240-28 | Report No. : | 22709 | Received Date: | 4/30/2003 11:10:00 AM |
| Client Sample ID: | 9526-0001-028 F | COC No. : | 2003-00109 | Matrix: | SOIL |

Ordered by Client Sample ID, Batch No.

| Parameter | Result | Qual | Count Error ( 2 s) | Total Uncert( 2 s) | MDC\|MDA, Action Lev | Rpt Unit, Lc | Yield CRDL(RL) | Rst/MDC, Rst/TotUcert | Analysis, Prep Date | Total Sa Size | Aliquot Size | Primary Detector |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Batch: 3122330 | E901.1 | | | Work Order: | FMVV31AA | | Report DB ID: | 9FMVV310 | | | | |
| ACTINIUM-228 | 1.42E+00 | | 3.4E-01 | 3.4E-01 | 2.61E-01 | pCi/g | | (5.4) | 5/22/03 06:37 p | | 246.2 | GER5$1 |
| | | | | | | | | (8.2) | | | g | |
| AG-108M | -1.81E-02 | U | 3.3E-02 | 3.3E-02 | 5.46E-02 | pCi/g | | -0.33 | 5/22/03 06:37 p | | 246.2 | GER5$1 |
| | | | | | | | 2.86E-01 | -(1.1) | | | g | |
| AMERICIUM-241 | 6.20E-02 | U | 9.0E-02 | 9.0E-02 | 1.39E-01 | pCi/g | | 0.45 | 5/22/03 06:37 p | | 246.2 | GER5$1 |
| | | | | | | | 1.03E+00 | (1.4) | | | g | |
| BISMUTH-212 | 2.18E+00 | U | 9.8E-01 | 9.8E-01 | 1.50E+00 | pCi/g | | (1.5) | 5/22/03 06:37 p | | 246.2 | GER5$1 |
| | | | | | | | | (4.5) | | | g | |
| BISMUTH-214 | 1.40E+00 | | 2.6E-01 | 2.6E-01 | 1.36E-01 | pCi/g | | (10.3) | 5/22/03 06:37 p | | 246.2 | GER5$1 |
| | | | | | | | | (10.7) | | | g | |
| COBALT-60 | -3.05E-02 | U | 4.5E-02 | 4.5E-02 | 7.54E-02 | pCi/g | | -0.4 | 5/22/03 06:37 p | | 246.2 | GER5$1 |
| | | | | | | | 1.50E-01 | -(1.3) | | | g | |
| CESIUM-134 | 7.98E-02 | U | 5.2E-02 | 5.2E-02 | 1.03E-01 | pCi/g | | 0.77 | 5/22/03 06:37 p | | 246.2 | GER5$1 |
| | | | | | | | 1.90E-01 | (3.1) | | | g | |
| CESIUM-137 | 4.51E-01 | | 1.1E-01 | 1.1E-01 | 7.55E-02 | pCi/g | | (6.) | 5/22/03 06:37 p | | 246.2 | GER5$1 |
| | | | | | | | 3.20E-01 | (8.2) | | | g | |
| EUROPIUM-152 | -6.69E-02 | U | 1.1E-01 | 1.1E-01 | 1.88E-01 | pCi/g | | -0.36 | 5/22/03 06:37 p | | 246.2 | GER5$1 |
| | | | | | | | 4.04E-01 | -(1.2) | | | g | |
| EUROPIUM-154 | -1.61E-02 | U | 1.2E-01 | 1.2E-01 | 2.22E-01 | pCi/g | | -0.07 | 5/22/03 06:37 p | | 246.2 | GER5$1 |
| | | | | | | | 3.70E-01 | -0.26 | | | g | |

STL Richland
rptSTLRchSample
V4.03 A97

MDC|MDA,Lc - Detection, Decision Level based on instrument background or blank, adjusted by the sample Efficiency, Yield, and Volume.
J Qual - No U qualifier has been assigned and the result is below the Reporting Limit, RL (CRDL) or Report Value is Estimated.
U Qual - Analyzed for, but the result is less than the Mdc/Mda|Total Uncert or gamma scan software did not identify the nuclide.

# FORM I

## SAMPLE RESULTS

Date: 29-May-03

| | | | | | |
|---|---|---|---|---|---|
| Lab Name: | STL Richland | SDG: | 22862 | Collection Date: | 4/16/2003 2:45:00 PM |
| Lot-Sample No.: | J3D300240-28 | Report No. : | 22709 | Received Date: | 4/30/2003 11:10:00 AM |
| Client Sample ID: | 9526-0001-028 F | COC No. : | 2003-00109 | Matrix: | SOIL |

Ordered by Client Sample ID, Batch No.

| Parameter | Result | Qual | Count Error ( 2 s) | Total Uncert( 2 s) | MDC\|MDA, Action Lev | Rpt Unit, Lc | Yield CRDL(RL) | Rst/MDC, Rst/TotUcert | Analysis, Prep Date | Total Sa Size | Aliquot Size | Primary Detector |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| EUROPIUM-155 | 2.09E-01 | U | 1.1E-01 | 1.1E-01 | 2.01E-01 | pCi/g | | (1.) | 5/22/03 06:37 p | | 246.2 | GER5$1 |
| | | | | | | | 1.57E+01 | (3.6) | | | g | |
| POTASSIUM-40 | 1.20E+01 | | 2.0E+00 | 2.0E+00 | 4.71E-01 | pCi/g | | (25.5) | 5/22/03 06:37 p | | 246.2 | GER5$1 |
| | | | | | | | | (12.1) | | | g | |
| MANGANESE-54 | 1.40E-02 | U | 4.2E-02 | 4.2E-02 | 7.89E-02 | pCi/g | | 0.18 | 5/22/03 06:37 p | | 246.2 | GER5$1 |
| | | | | | | | 6.96E-01 | 0.66 | | | g | |
| NIOBIUM-94 | 2.65E-02 | U | 3.9E-02 | 3.9E-02 | 7.51E-02 | pCi/g | | 0.35 | 5/22/03 06:37 p | | 246.2 | GER5$1 |
| | | | | | | | 2.85E-01 | (1.4) | | | g | |
| LEAD-212 | 1.35E+00 | | 2.6E-01 | 2.6E-01 | 1.11E-01 | pCi/g | | (12.2) | 5/22/03 06:37 p | | 246.2 | GER5$1 |
| | | | | | | | | (10.5) | | | g | |
| LEAD-214 | 1.54E+00 | | 3.2E-01 | 3.2E-01 | 1.43E-01 | pCi/g | | (10.8) | 5/22/03 06:37 p | | 246.2 | GER5$1 |
| | | | | | | | | (9.7) | | | g | |
| RADIUM-226 | 1.40E+00 | | 2.6E-01 | 2.6E-01 | 1.36E-01 | pCi/g | | (10.3) | 5/22/03 06:37 p | | 246.2 | GER5$1 |
| | | | | | | | | (10.7) | | | g | |
| THALLIUM-208 | 4.48E-01 | U | 1.1E-01 | 1.1E-01 | 1.56E-01 | pCi/g | | (2.9) | 5/22/03 06:37 p | | 246.2 | GER5$1 |
| | | | | | | | | (7.8) | | | g | |

No. of Results: 18 Comments:

STL Richland
rptSTLRchSample
V4.03 A97

MDC|MDA,Lc - Detection, Decision Level based on instrument background or blank, adjusted by the sample Efficiency, Yield, and Volume.
J Qual - No U qualifier has been assigned and the result is below the Reporting Limit, RL (CRDL) or Report Value is Estimated.
U Qual - Analyzed for, but the result is less than the Mdc/Mda|Total Uncert or gamma scan software did not identify the nuclide.

# FORM I

## SAMPLE RESULTS

Date: 29-May-03

| | | | | | |
|---|---|---|---|---|---|
| Lab Name: | STL Richland | SDG: | 22862 | Collection Date: | 4/24/2003 10:35:00 AM |
| Lot-Sample No.: | J3D300240-1 | Report No. : | 22709 | Received Date: | 4/30/2003 11:10:00 AM |
| Client Sample ID: | 9526-0002-025 F | COC No. : | 2003-00106 | Matrix: | SOIL |

Ordered by Client Sample ID, Batch No.

| Parameter | Result | Qual | Count Error ( 2 s) | Total Uncert( 2 s) | MDC\|MDA, Action Lev | Rpt Unit, Lc | Yield CRDL(RL) | Rst/MDC, Rst/TotUcert | Analysis, Prep Date | Total Sa Size | Aliquot Size | Primary Detector |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Batch: 3122327 | E901.1 | | | Work Order: | FMVRV1AA | | Report DB ID: 9FMVRV10 | | | | | |
| ACTINIUM-228 | 1.15E+00 | | 2.9E-01 | 2.9E-01 | 2.04E-01 | pCi/g | | (5.6) | 5/23/03 07:26 a | | 360.5 | GER2$1 |
| | | | | | | | | (7.9) | | | g | |
| AG-108M | 8.30E-04 | U | 3.0E-02 | 3.0E-02 | 5.32E-02 | pCi/g | | 0.02 | 5/23/03 07:26 a | | 360.5 | GER2$1 |
| | | | | | | | 2.86E-01 | 0.05 | | | g | |
| AMERICIUM-241 | 1.47E-03 | U | 3.8E-01 | 3.8E-01 | 6.37E-01 | pCi/g | | 0. | 5/23/03 07:26 a | | 360.5 | GER2$1 |
| | | | | | | | 1.03E+00 | 0.01 | | | g | |
| BISMUTH-212 | 1.67E+00 | U | 6.1E-01 | 6.1E-01 | 1.15E+00 | pCi/g | | (1.5) | 5/23/03 07:26 a | | 360.5 | GER2$1 |
| | | | | | | | | (5.5) | | | g | |
| BISMUTH-214 | 1.24E+00 | | 2.2E-01 | 2.2E-01 | 1.19E-01 | pCi/g | | (10.4) | 5/23/03 07:26 a | | 360.5 | GER2$1 |
| | | | | | | | | (11.5) | | | g | |
| COBALT-60 | -1.28E-02 | U | 3.2E-02 | 3.2E-02 | 5.55E-02 | pCi/g | | -0.23 | 5/23/03 07:26 a | | 360.5 | GER2$1 |
| | | | | | | | 1.50E-01 | -0.79 | | | g | |
| CESIUM-134 | 5.93E-02 | U | 4.0E-02 | 4.0E-02 | 7.59E-02 | pCi/g | | 0.78 | 5/23/03 07:26 a | | 360.5 | GER2$1 |
| | | | | | | | 1.90E-01 | (3.) | | | g | |
| CESIUM-137 | 5.28E-01 | | 9.8E-02 | 9.8E-02 | 6.32E-02 | pCi/g | | (8.3) | 5/23/03 07:26 a | | 360.5 | GER2$1 |
| | | | | | | | 3.20E-01 | (10.7) | | | g | |
| EUROPIUM-152 | 6.10E-02 | U | 1.3E-01 | 1.3E-01 | 1.78E-01 | pCi/g | | 0.34 | 5/23/03 07:26 a | | 360.5 | GER2$1 |
| | | | | | | | 4.04E-01 | 0.91 | | | g | |
| EUROPIUM-154 | -4.74E-02 | U | 1.1E-01 | 1.1E-01 | 1.81E-01 | pCi/g | | -0.26 | 5/23/03 07:26 a | | 360.5 | GER2$1 |
| | | | | | | | 3.70E-01 | -0.88 | | | g | |

STL Richland
rptSTLRchSample
V4.03 A97

MDC|MDA,Lc - Detection, Decision Level based on instrument background or blank, adjusted by the sample Efficiency, Yield, and Volume.
J Qual - No U qualifier has been assigned and the result is below the Reporting Limit, RL (CRDL) or Report Value is Estimated.
U Qual - Analyzed for, but the result is less than the Mdc/Mda|Total Uncert or gamma scan software did not identify the nuclide.

# FORM I

## SAMPLE RESULTS

Date: 29-May-03

| | | | | | |
|---|---|---|---|---|---|
| Lab Name: | STL Richland | SDG: | 22862 | Collection Date: | 4/24/2003 10:35:00 AM |
| Lot-Sample No.: | J3D300240-1 | Report No. : | 22709 | Received Date: | 4/30/2003 11:10:00 AM |
| Client Sample ID: | 9526-0002-025 F | COC No. : | 2003-00106 | Matrix: | SOIL |

Ordered by Client Sample ID, Batch No.

| Parameter | Result | Qual | Count Error ( 2 s) | Total Uncert( 2 s) | MDC\|MDA, Action Lev | Rpt Unit, Lc | Yield CRDL(RL) | Rst/MDC, Rst/TotUcert | Analysis, Prep Date | Total Sa Size | Aliquot Size | Primary Detector |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| EUROPIUM-155 | 3.92E-02 | U | 1.5E-01 | 1.5E-01 | 2.57E-01 | pCi/g | | *0.15* | 5/23/03 07:26 a | | 360.5 | GER2$1 |
| | | | | | | | 1.57E+01 | *0.51* | | | g | |
| POTASSIUM-40 | 1.29E+01 | | 1.9E+00 | 1.9E+00 | 5.20E-01 | pCi/g | | *(24.8)* | 5/23/03 07:26 a | | 360.5 | GER2$1 |
| | | | | | | | | *(13.3)* | | | g | |
| MANGANESE-54 | -1.84E-02 | U | 3.7E-02 | 3.7E-02 | 6.25E-02 | pCi/g | | *-0.29* | 5/23/03 07:26 a | | 360.5 | GER2$1 |
| | | | | | | | 6.96E-01 | *-1.* | | | g | |
| NIOBIUM-94 | 7.78E-03 | U | 2.8E-02 | 2.8E-02 | 5.09E-02 | pCi/g | | *0.15* | 5/23/03 07:26 a | | 360.5 | GER2$1 |
| | | | | | | | 2.85E-01 | *0.56* | | | g | |
| LEAD-212 | 1.14E+00 | | 2.3E-01 | 2.3E-01 | 9.75E-02 | pCi/g | | *(11.7)* | 5/23/03 07:26 a | | 360.5 | GER2$1 |
| | | | | | | | | *(9.8)* | | | g | |
| LEAD-214 | 1.42E+00 | | 2.5E-01 | 2.5E-01 | 1.25E-01 | pCi/g | | *(11.4)* | 5/23/03 07:26 a | | 360.5 | GER2$1 |
| | | | | | | | | *(11.5)* | | | g | |
| RADIUM-226 | 1.24E+00 | | 2.2E-01 | 2.2E-01 | 1.19E-01 | pCi/g | | *(10.4)* | 5/23/03 07:26 a | | 360.5 | GER2$1 |
| | | | | | | | | *(11.5)* | | | g | |
| THALLIUM-208 | 4.05E-01 | | 9.5E-02 | 9.5E-02 | 6.04E-02 | pCi/g | | *(6.7)* | 5/23/03 07:26 a | | 360.5 | GER2$1 |
| | | | | | | | | *(8.5)* | | | g | |

No. of Results: 18 Comments:

STL Richland
rptSTLRchSample
V4.03 A97

MDC|MDA,Lc - Detection, Decision Level based on instrument background or blank, adjusted by the sample Efficiency, Yield, and Volume.
J Qual - No U qualifier has been assigned and the result is below the Reporting Limit, RL (CRDL) or Report Value is Estimated.
U Qual - Analyzed for, but the result is less than the Mdc/Mda|Total Uncert or gamma scan software did not identify the nuclide.

# FORM I

## SAMPLE RESULTS

Date: 29-May-03

| | | | | | |
|---|---|---|---|---|---|
| Lab Name: | STL Richland | SDG: | 22862 | Collection Date: | 4/24/2003 10:32:00 AM |
| Lot-Sample No.: | J3D300240-2 | Report No. : | 22709 | Received Date: | 4/30/2003 11:10:00 AM |
| Client Sample ID: | 9526-0002-026 F | COC No. : | 2003-00106 | Matrix: | SOIL |

Ordered by Client Sample ID, Batch No.

| Parameter | Result | Qual | Count Error ( 2 s) | Total Uncert( 2 s) | MDC\|MDA, Action Lev | Rpt Unit, Lc | Yield CRDL(RL) | Rst/MDC, Rst/TotUcert | Analysis, Prep Date | Total Sa Size | Aliquot Size | Primary Detector |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Batch: 3122327 | E901.1 | | | Work Order: | FMVR21AA | | Report DB ID: | 9FMVR210 | | | | |
| ACTINIUM-228 | 1.30E+00 | U | 3.7E-01 | 3.7E-01 | 5.53E-01 | pCi/g | | (2.4) | 5/23/03 07:29 a | | 252.8 | GER5$1 |
| | | | | | | | | (7.1) | | | g | |
| AG-108M | 6.95E-03 | U | 3.6E-02 | 3.6E-02 | 6.40E-02 | pCi/g | | 0.11 | 5/23/03 07:29 a | | 252.8 | GER5$1 |
| | | | | | | | 2.86E-01 | 0.38 | | | g | |
| AMERICIUM-241 | 1.19E-01 | U | 9.1E-02 | 9.1E-02 | 1.47E-01 | pCi/g | | 0.81 | 5/23/03 07:29 a | | 252.8 | GER5$1 |
| | | | | | | | 1.03E+00 | (2.6) | | | g | |
| BISMUTH-212 | 1.94E+00 | U | 7.3E-01 | 7.3E-01 | 1.44E+00 | pCi/g | | (1.3) | 5/23/03 07:29 a | | 252.8 | GER5$1 |
| | | | | | | | | (5.3) | | | g | |
| BISMUTH-214 | 1.88E+00 | | 3.2E-01 | 3.2E-01 | 1.35E-01 | pCi/g | | (13.9) | 5/23/03 07:29 a | | 252.8 | GER5$1 |
| | | | | | | | | (11.9) | | | g | |
| COBALT-60 | 5.35E-03 | U | 4.2E-02 | 4.2E-02 | 7.91E-02 | pCi/g | | 0.07 | 5/23/03 07:29 a | | 252.8 | GER5$1 |
| | | | | | | | 1.50E-01 | 0.25 | | | g | |
| CESIUM-134 | 9.05E-02 | U | 5.2E-02 | 5.2E-02 | 1.03E-01 | pCi/g | | 0.88 | 5/23/03 07:29 a | | 252.8 | GER5$1 |
| | | | | | | | 1.90E-01 | (3.5) | | | g | |
| CESIUM-137 | 9.80E-01 | | 1.7E-01 | 1.7E-01 | 9.16E-02 | pCi/g | | (10.7) | 5/23/03 07:29 a | | 252.8 | GER5$1 |
| | | | | | | | 3.20E-01 | (11.6) | | | g | |
| EUROPIUM-152 | -1.01E-01 | U | 1.2E-01 | 1.2E-01 | 1.96E-01 | pCi/g | | -0.51 | 5/23/03 07:29 a | | 252.8 | GER5$1 |
| | | | | | | | 4.04E-01 | -(1.7) | | | g | |
| EUROPIUM-154 | -1.11E-02 | U | 1.1E-01 | 1.1E-01 | 2.05E-01 | pCi/g | | -0.05 | 5/23/03 07:29 a | | 252.8 | GER5$1 |
| | | | | | | | 3.70E-01 | -0.2 | | | g | |

STL Richland
rptSTLRchSample
V4.03 A97

MDC|MDA,Lc - Detection, Decision Level based on instrument background or blank, adjusted by the sample Efficiency, Yield, and Volume.
J Qual - No U qualifier has been assigned and the result is below the Reporting Limit, RL (CRDL) or Report Value is Estimated.
U Qual - Analyzed for, but the result is less than the Mdc/Mda|Total Uncert or gamma scan software did not identify the nuclide.

# FORM I

## SAMPLE RESULTS

Date: 29-May-03

| | | | | | |
|---|---|---|---|---|---|
| Lab Name: | STL Richland | SDG: | 22862 | Collection Date: | 4/24/2003 10:32:00 AM |
| Lot-Sample No.: | J3D300240-2 | Report No. : | 22709 | Received Date: | 4/30/2003 11:10:00 AM |
| Client Sample ID: | 9526-0002-026 F | COC No. : | 2003-00106 | Matrix: | SOIL |

Ordered by Client Sample ID, Batch No.

| Parameter | Result | Qual | Count Error ( 2 s) | Total Uncert( 2 s) | MDC\|MDA, Action Lev | Rpt Unit, Lc | Yield CRDL(RL) | Rst/MDC, Rst/TotUcert | Analysis, Prep Date | Total Sa Size | Aliquot Size | Primary Detector |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| EUROPIUM-155 | 1.12E-01 | U | 1.1E-01 | 1.1E-01 | 1.90E-01 | pCi/g | 1.57E+01 | 0.59 (2.1) | 5/23/03 07:29 a | | 252.8 g | GER5$1 |
| POTASSIUM-40 | 1.27E+01 | | 2.1E+00 | 2.1E+00 | 5.09E-01 | pCi/g | | (24.9) (12.3) | 5/23/03 07:29 a | | 252.8 g | GER5$1 |
| MANGANESE-54 | 3.34E-02 | U | 4.7E-02 | 4.7E-02 | 8.67E-02 | pCi/g | 6.96E-01 | 0.39 (1.4) | 5/23/03 07:29 a | | 252.8 g | GER5$1 |
| NIOBIUM-94 | -6.64E-03 | U | 3.7E-02 | 3.7E-02 | 6.62E-02 | pCi/g | 2.85E-01 | -0.1 -0.36 | 5/23/03 07:29 a | | 252.8 g | GER5$1 |
| LEAD-212 | 1.41E+00 | | 2.7E-01 | 2.7E-01 | 1.11E-01 | pCi/g | | (12.7) (10.4) | 5/23/03 07:29 a | | 252.8 g | GER5$1 |
| LEAD-214 | 2.34E+00 | | 4.0E-01 | 4.0E-01 | 1.50E-01 | pCi/g | | (15.6) (11.8) | 5/23/03 07:29 a | | 252.8 g | GER5$1 |
| RADIUM-226 | 1.88E+00 | | 3.2E-01 | 3.2E-01 | 1.35E-01 | pCi/g | | (13.9) (11.9) | 5/23/03 07:29 a | | 252.8 g | GER5$1 |
| THALLIUM-208 | 4.83E-01 | | 1.1E-01 | 1.1E-01 | 7.10E-02 | pCi/g | | (6.8) (8.6) | 5/23/03 07:29 a | | 252.8 g | GER5$1 |

No. of Results: 18 Comments:

STL Richland
rptSTLRchSample
V4.03 A97

MDC|MDA,Lc - Detection, Decision Level based on instrument background or blank, adjusted by the sample Efficiency, Yield, and Volume.
J Qual - No U qualifier has been assigned and the result is below the Reporting Limit, RL (CRDL) or Report Value is Estimated.
U Qual - Analyzed for, but the result is less than the Mdc/Mda|Total Uncert or gamma scan software did not identify the nuclide.

# FORM I

## SAMPLE RESULTS

Date: 29-May-03

| | | | | | |
|---|---|---|---|---|---|
| Lab Name: | STL Richland | SDG: | 22862 | Collection Date: | 4/24/2003 10:33:00 AM |
| Lot-Sample No.: | J3D300240-3 | Report No. : | 22709 | Received Date: | 4/30/2003 11:10:00 AM |
| Client Sample ID: | 9526-0002-027 F | COC No. : | 2003-00106 | Matrix: | SOIL |

Ordered by Client Sample ID, Batch No.

| Parameter | Result | Qual | Count Error ( 2 s) | Total Uncert( 2 s) | MDC\|MDA, Action Lev | Rpt Unit, Lc | Yield CRDL(RL) | Rst/MDC, Rst/TotUcert | Analysis, Prep Date | Total Sa Size | Aliquot Size | Primary Detector |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Batch: 3122327 | E901.1 | | | Work Order: | FMVR31AA | | Report DB ID: | 9FMVR310 | | | | |
| ACTINIUM-228 | 1.46E+00 | | 3.5E-01 | 3.5E-01 | 2.90E-01 | pCi/g | | (5.) | 5/23/03 09:15 a | | 229.7 | GER2$1 |
| | | | | | | | | (8.4) | | | g | |
| AG-108M | -2.49E-02 | U | 4.3E-02 | 4.3E-02 | 7.27E-02 | pCi/g | | -0.34 | 5/23/03 09:15 a | | 229.7 | GER2$1 |
| | | | | | | | 2.86E-01 | -(1.2) | | | g | |
| AMERICIUM-241 | -2.91E-01 | U | 5.1E-01 | 5.1E-01 | 8.42E-01 | pCi/g | | -0.35 | 5/23/03 09:15 a | | 229.7 | GER2$1 |
| | | | | | | | 1.03E+00 | -(1.1) | | | g | |
| BISMUTH-212 | 1.25E+00 | U | 7.6E-01 | 7.6E-01 | 1.45E+00 | pCi/g | | 0.86 | 5/23/03 09:15 a | | 229.7 | GER2$1 |
| | | | | | | | | (3.3) | | | g | |
| BISMUTH-214 | 1.66E+00 | U | 3.1E-01 | 3.1E-01 | 3.94E-01 | pCi/g | | (4.2) | 5/23/03 09:15 a | | 229.7 | GER2$1 |
| | | | | | | | | (10.8) | | | g | |
| COBALT-60 | 1.97E-03 | U | 4.5E-02 | 4.5E-02 | 8.18E-02 | pCi/g | | 0.02 | 5/23/03 09:15 a | | 229.7 | GER2$1 |
| | | | | | | | 1.50E-01 | 0.09 | | | g | |
| CESIUM-134 | 3.55E-02 | U | 5.3E-02 | 5.3E-02 | 9.80E-02 | pCi/g | | 0.36 | 5/23/03 09:15 a | | 229.7 | GER2$1 |
| | | | | | | | 1.90E-01 | (1.3) | | | g | |
| CESIUM-137 | 6.98E-01 | | 1.4E-01 | 1.4E-01 | 1.13E-01 | pCi/g | | (6.2) | 5/23/03 09:15 a | | 229.7 | GER2$1 |
| | | | | | | | 3.20E-01 | (10.3) | | | g | |
| EUROPIUM-152 | 6.77E-03 | U | 2.1E-01 | 2.1E-01 | 2.42E-01 | pCi/g | | 0.03 | 5/23/03 09:15 a | | 229.7 | GER2$1 |
| | | | | | | | 4.04E-01 | 0.06 | | | g | |
| EUROPIUM-154 | -3.70E-02 | U | 1.3E-01 | 1.3E-01 | 2.22E-01 | pCi/g | | -0.17 | 5/23/03 09:15 a | | 229.7 | GER2$1 |
| | | | | | | | 3.70E-01 | -0.58 | | | g | |

STL Richland
rptSTLRchSample
V4.03 A97

MDC|MDA,Lc - Detection, Decision Level based on instrument background or blank, adjusted by the sample Efficiency, Yield, and Volume.
J Qual - No U qualifier has been assigned and the result is below the Reporting Limit, RL (CRDL) or Report Value is Estimated.
U Qual - Analyzed for, but the result is less than the Mdc/Mda|Total Uncert or gamma scan software did not identify the nuclide.

# FORM I

## SAMPLE RESULTS

Date: 29-May-03

| | | | | | |
|---|---|---|---|---|---|
| Lab Name: | STL Richland | SDG: | 22862 | Collection Date: | 4/24/2003 10:33:00 AM |
| Lot-Sample No.: | J3D300240-3 | Report No. : | 22709 | Received Date: | 4/30/2003 11:10:00 AM |
| Client Sample ID: | 9526-0002-027 F | COC No. : | 2003-00106 | Matrix: | SOIL |

Ordered by Client Sample ID, Batch No.

| Parameter | Result | Qual | Count Error ( 2 s) | Total Uncert( 2 s) | MDC\|MDA, Action Lev | Rpt Unit, Lc | Yield CRDL(RL) | Rst/MDC, Rst/TotUcert | Analysis, Prep Date | Total Sa Size | Aliquot Size | Primary Detector |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| EUROPIUM-155 | 1.96E-01 | U | 2.0E-01 | 2.0E-01 | 3.50E-01 | pCi/g | 1.57E+01 | 0.56 (1.9) | 5/23/03 09:15 a | | 229.7 g | GER2$1 |
| POTASSIUM-40 | 1.03E+01 | | 1.8E+00 | 1.8E+00 | 7.19E-01 | pCi/g | | (14.4) (11.2) | 5/23/03 09:15 a | | 229.7 g | GER2$1 |
| MANGANESE-54 | -1.03E-02 | U | 4.8E-02 | 4.8E-02 | 8.49E-02 | pCi/g | 6.96E-01 | -0.12 -0.43 | 5/23/03 09:15 a | | 229.7 g | GER2$1 |
| NIOBIUM-94 | 1.21E-02 | U | 4.1E-02 | 4.1E-02 | 7.68E-02 | pCi/g | 2.85E-01 | 0.16 0.58 | 5/23/03 09:15 a | | 229.7 g | GER2$1 |
| LEAD-212 | 9.30E-01 | | 2.5E-01 | 2.5E-01 | 2.07E-01 | pCi/g | | (4.5) (7.3) | 5/23/03 09:15 a | | 229.7 g | GER2$1 |
| LEAD-214 | 1.98E+00 | | 3.7E-01 | 3.7E-01 | 1.75E-01 | pCi/g | | (11.3) (10.8) | 5/23/03 09:15 a | | 229.7 g | GER2$1 |
| RADIUM-226 | 1.66E+00 | U | 3.1E-01 | 3.1E-01 | 3.94E-01 | pCi/g | | (4.2) (10.8) | 5/23/03 09:15 a | | 229.7 g | GER2$1 |
| THALLIUM-208 | 3.75E-01 | U | 1.3E-01 | 1.3E-01 | 1.61E-01 | pCi/g | | (2.3) (6.) | 5/23/03 09:15 a | | 229.7 g | GER2$1 |

No. of Results: 18 Comments:

STL Richland
rptSTLRchSample
V4.03 A97

MDC|MDA,Lc - Detection, Decision Level based on instrument background or blank, adjusted by the sample Efficiency, Yield, and Volume.
J Qual - No U qualifier has been assigned and the result is below the Reporting Limit, RL (CRDL) or Report Value is Estimated.
U Qual - Analyzed for, but the result is less than the Mdc/Mda|Total Uncert or gamma scan software did not identify the nuclide.

# FORM I

## SAMPLE RESULTS

Date: 29-May-03

| | | | | | |
|---|---|---|---|---|---|
| Lab Name: | STL Richland | SDG: | 22862 | Collection Date: | 4/24/2003 10:40:00 AM |
| Lot-Sample No.: | J3D300240-4 | Report No. : | 22709 | Received Date: | 4/30/2003 11:10:00 AM |
| Client Sample ID: | 9526-0002-028 F | COC No. : | 2003-00106 | Matrix: | SOIL |

Ordered by Client Sample ID, Batch No.

| Parameter | Result | Qual | Count Error ( 2 s) | Total Uncert( 2 s) | MDC\|MDA, Action Lev | Rpt Unit, Lc | Yield CRDL(RL) | Rst/MDC, Rst/TotUcert | Analysis, Prep Date | Total Sa Size | Aliquot Size | Primary Detector |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Batch: 3122327 | E901.1 | | | Work Order: | FMVR61AA | | Report DB ID: 9FMVR610 | | | | | |
| ACTINIUM-228 | 1.44E+00 | | 3.1E-01 | 3.1E-01 | 2.22E-01 | pCi/g | | (6.5) | 5/23/03 09:18 a | | 252.1 | GER5$1 |
| | | | | | | | | (9.2) | | | g | |
| AG-108M | -7.93E-03 | U | 3.5E-02 | 3.5E-02 | 6.08E-02 | pCi/g | | -0.13 | 5/23/03 09:18 a | | 252.1 | GER5$1 |
| | | | | | | | 2.86E-01 | -0.45 | | | g | |
| AMERICIUM-241 | 1.84E-02 | U | 8.5E-02 | 8.5E-02 | 1.40E-01 | pCi/g | | 0.13 | 5/23/03 09:18 a | | 252.1 | GER5$1 |
| | | | | | | | 1.03E+00 | 0.43 | | | g | |
| BISMUTH-212 | 1.25E+00 | U | 6.7E-01 | 6.7E-01 | 1.30E+00 | pCi/g | | 0.96 | 5/23/03 09:18 a | | 252.1 | GER5$1 |
| | | | | | | | | (3.8) | | | g | |
| BISMUTH-214 | 1.29E+00 | U | 2.7E-01 | 2.7E-01 | 3.65E-01 | pCi/g | | (3.5) | 5/23/03 09:18 a | | 252.1 | GER5$1 |
| | | | | | | | | (9.6) | | | g | |
| COBALT-60 | 1.82E-02 | U | 4.3E-02 | 4.3E-02 | 8.24E-02 | pCi/g | | 0.22 | 5/23/03 09:18 a | | 252.1 | GER5$1 |
| | | | | | | | 1.50E-01 | 0.85 | | | g | |
| CESIUM-134 | 8.53E-02 | U | 4.9E-02 | 4.9E-02 | 9.80E-02 | pCi/g | | 0.87 | 5/23/03 09:18 a | | 252.1 | GER5$1 |
| | | | | | | | 1.90E-01 | (3.5) | | | g | |
| CESIUM-137 | 7.10E-01 | | 1.3E-01 | 1.3E-01 | 7.76E-02 | pCi/g | | (9.1) | 5/23/03 09:18 a | | 252.1 | GER5$1 |
| | | | | | | | 3.20E-01 | (10.9) | | | g | |
| EUROPIUM-152 | -3.18E-02 | U | 1.2E-01 | 1.2E-01 | 1.96E-01 | pCi/g | | -0.16 | 5/23/03 09:18 a | | 252.1 | GER5$1 |
| | | | | | | | 4.04E-01 | -0.53 | | | g | |
| EUROPIUM-154 | -8.24E-02 | U | 1.3E-01 | 1.3E-01 | 2.17E-01 | pCi/g | | -0.38 | 5/23/03 09:18 a | | 252.1 | GER5$1 |
| | | | | | | | 3.70E-01 | -(1.3) | | | g | |

STL Richland
rptSTLRchSample
V4.03 A97

MDC|MDA,Lc - Detection, Decision Level based on instrument background or blank, adjusted by the sample Efficiency, Yield, and Volume.
J Qual - No U qualifier has been assigned and the result is below the Reporting Limit, RL (CRDL) or Report Value is Estimated.
U Qual - Analyzed for, but the result is less than the Mdc/Mda|Total Uncert or gamma scan software did not identify the nuclide.

# FORM I

## SAMPLE RESULTS

Date: 29-May-03

| | | | | | |
|---|---|---|---|---|---|
| Lab Name: | STL Richland | SDG: | 22862 | Collection Date: | 4/24/2003 10:40:00 AM |
| Lot-Sample No.: | J3D300240-4 | Report No. : | 22709 | Received Date: | 4/30/2003 11:10:00 AM |
| Client Sample ID: | 9526-0002-028 F | COC No. : | 2003-00106 | Matrix: | SOIL |

Ordered by Client Sample ID, Batch No.

| Parameter | Result | Qual | Count Error ( 2 s) | Total Uncert( 2 s) | MDC\|MDA, Action Lev | Rpt Unit, Lc | Yield CRDL(RL) | Rst/MDC, Rst/TotUcert | Analysis, Prep Date | Total Sa Size | Aliquot Size | Primary Detector |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| EUROPIUM-155 | 1.14E-01 | U | 1.0E-01 | 1.0E-01 | 1.82E-01 | pCi/g | | *0.63* | 5/23/03 09:18 a | | 252.1 | GER5$1 |
| | | | | | | | 1.57E+01 | *(2.2)* | | | g | |
| POTASSIUM-40 | 9.73E+00 | | 1.8E+00 | 1.8E+00 | 6.11E-01 | pCi/g | | *(15.9)* | 5/23/03 09:18 a | | 252.1 | GER5$1 |
| | | | | | | | | *(10.9)* | | | g | |
| MANGANESE-54 | 1.70E-02 | U | 4.4E-02 | 4.4E-02 | 7.98E-02 | pCi/g | | *0.21* | 5/23/03 09:18 a | | 252.1 | GER5$1 |
| | | | | | | | 6.96E-01 | *0.78* | | | g | |
| NIOBIUM-94 | -1.17E-02 | U | 3.2E-02 | 3.2E-02 | 5.66E-02 | pCi/g | | *-0.21* | 5/23/03 09:18 a | | 252.1 | GER5$1 |
| | | | | | | | 2.85E-01 | *-0.73* | | | g | |
| LEAD-212 | 1.26E+00 | | 2.4E-01 | 2.4E-01 | 1.13E-01 | pCi/g | | *(11.1)* | 5/23/03 09:18 a | | 252.1 | GER5$1 |
| | | | | | | | | *(10.4)* | | | g | |
| LEAD-214 | 1.81E+00 | | 3.2E-01 | 3.2E-01 | 1.31E-01 | pCi/g | | *(13.9)* | 5/23/03 09:18 a | | 252.1 | GER5$1 |
| | | | | | | | | *(11.2)* | | | g | |
| RADIUM-226 | 1.29E+00 | | 2.7E-01 | 2.7E-01 | 1.31E-01 | pCi/g | | *(9.8)* | 5/23/03 09:18 a | | 252.1 | GER5$1 |
| | | | | | | | | *(9.6)* | | | g | |
| THALLIUM-208 | 3.98E-01 | | 9.6E-02 | 9.6E-02 | 7.75E-02 | pCi/g | | *(5.1)* | 5/23/03 09:18 a | | 252.1 | GER5$1 |
| | | | | | | | | *(8.3)* | | | g | |

No. of Results: 18 Comments:

STL Richland
rptSTLRchSample
V4.03 A97

MDC|MDA,Lc - Detection, Decision Level based on instrument background or blank, adjusted by the sample Efficiency, Yield, and Volume.
J Qual - No U qualifier has been assigned and the result is below the Reporting Limit, RL (CRDL) or Report Value is Estimated.
U Qual - Analyzed for, but the result is less than the Mdc/Mda|Total Uncert or gamma scan software did not identify the nuclide.

# FORM I

## SAMPLE RESULTS

Date: 29-May-03

| | | | | | |
|---|---|---|---|---|---|
| Lab Name: | STL Richland | SDG: | 22862 | Collection Date: | 4/24/2003 10:53:00 AM |
| Lot-Sample No.: | J3D300240-5 | Report No. : | 22709 | Received Date: | 4/30/2003 11:10:00 AM |
| Client Sample ID: | 9526-0002-029 F | COC No. : | 2003-00106 | Matrix: | SOIL |

Ordered by Client Sample ID, Batch No.

| Parameter | Result | Qual | Count Error ( 2 s) | Total Uncert( 2 s) | MDC\|MDA, Action Lev | Rpt Unit, Lc | Yield CRDL(RL) | Rst/MDC, Rst/TotUcert | Analysis, Prep Date | Total Sa Size | Aliquot Size | Primary Detector |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Batch: 3122327 | E901.1 | | | Work Order: | FMVR71AA | | Report DB ID: | 9FMVR710 | | | | |
| ACTINIUM-228 | 1.05E+00 | | 2.6E-01 | 2.6E-01 | 2.03E-01 | pCi/g | | (5.2) | 5/23/03 09:17 a | | 308.5 | GER6$1 |
| | | | | | | | | (8.) | | | g | |
| AG-108M | 8.13E-03 | U | 2.6E-02 | 2.6E-02 | 4.62E-02 | pCi/g | | 0.18 | 5/23/03 09:17 a | | 308.5 | GER6$1 |
| | | | | | | | 2.86E-01 | 0.63 | | | g | |
| AMERICIUM-241 | -4.59E-02 | U | 9.9E-02 | 9.9E-02 | 1.68E-01 | pCi/g | | -0.27 | 5/23/03 09:17 a | | 308.5 | GER6$1 |
| | | | | | | | 1.03E+00 | -0.93 | | | g | |
| BISMUTH-212 | 1.24E+00 | U | 7.1E-01 | 7.1E-01 | 1.06E+00 | pCi/g | | (1.2) | 5/23/03 09:17 a | | 308.5 | GER6$1 |
| | | | | | | | | (3.5) | | | g | |
| BISMUTH-214 | 1.08E+00 | U | 2.0E-01 | 2.0E-01 | 2.76E-01 | pCi/g | | (3.9) | 5/23/03 09:17 a | | 308.5 | GER6$1 |
| | | | | | | | | (10.8) | | | g | |
| COBALT-60 | -3.68E-05 | U | 3.3E-02 | 3.3E-02 | 6.20E-02 | pCi/g | | 0. | 5/23/03 09:17 a | | 308.5 | GER6$1 |
| | | | | | | | 1.50E-01 | 0. | | | g | |
| CESIUM-134 | 4.52E-02 | U | 4.4E-02 | 4.4E-02 | 8.24E-02 | pCi/g | | 0.55 | 5/23/03 09:17 a | | 308.5 | GER6$1 |
| | | | | | | | 1.90E-01 | (2.1) | | | g | |
| CESIUM-137 | 7.02E-01 | | 1.2E-01 | 1.2E-01 | 6.26E-02 | pCi/g | | (11.2) | 5/23/03 09:17 a | | 308.5 | GER6$1 |
| | | | | | | | 3.20E-01 | (11.3) | | | g | |
| EUROPIUM-152 | 2.61E-02 | U | 8.9E-02 | 8.9E-02 | 1.58E-01 | pCi/g | | 0.17 | 5/23/03 09:17 a | | 308.5 | GER6$1 |
| | | | | | | | 4.04E-01 | 0.59 | | | g | |
| EUROPIUM-154 | -4.34E-02 | U | 1.0E-01 | 1.0E-01 | 1.74E-01 | pCi/g | | -0.25 | 5/23/03 09:17 a | | 308.5 | GER6$1 |
| | | | | | | | 3.70E-01 | -0.85 | | | g | |

STL Richland
rptSTLRchSample
V4.03 A97

MDC|MDA,Lc - Detection, Decision Level based on instrument background or blank, adjusted by the sample Efficiency, Yield, and Volume.
J Qual - No U qualifier has been assigned and the result is below the Reporting Limit, RL (CRDL) or Report Value is Estimated.
U Qual - Analyzed for, but the result is less than the Mdc/Mda|Total Uncert or gamma scan software did not identify the nuclide.

STL RICHLAND

# FORM I

## SAMPLE RESULTS

Date: 29-May-03

| | | | | | |
|---|---|---|---|---|---|
| Lab Name: | STL Richland | SDG: | 22862 | Collection Date: | 4/24/2003 10:53:00 AM |
| Lot-Sample No.: | J3D300240-5 | Report No. : | 22709 | Received Date: | 4/30/2003 11:10:00 AM |
| Client Sample ID: | 9526-0002-029 F | COC No. : | 2003-00106 | Matrix: | SOIL |

Ordered by Client Sample ID, Batch No.

| Parameter | Result | Qual | Count Error ( 2 s) | Total Uncert( 2 s) | MDC\|MDA, Action Lev | Rpt Unit, Lc | Yield CRDL(RL) | Rst/MDC, Rst/TotUcert | Analysis, Prep Date | Total Sa Size | Aliquot Size | Primary Detector |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| EUROPIUM-155 | 4.48E-02 | U | 8.5E-02 | 8.5E-02 | 1.46E-01 | pCi/g | | *0.31* | 5/23/03 09:17 a | | 308.5 | GER6$1 |
| | | | | | | | 1.57E+01 | *(1.1)* | | | g | |
| POTASSIUM-40 | 8.70E+00 | | 1.6E+00 | 1.6E+00 | 5.26E-01 | pCi/g | | *(16.5)* | 5/23/03 09:17 a | | 308.5 | GER6$1 |
| | | | | | | | | *(11.1)* | | | g | |
| MANGANESE-54 | 2.54E-02 | U | 3.4E-02 | 3.4E-02 | 6.42E-02 | pCi/g | | *0.4* | 5/23/03 09:17 a | | 308.5 | GER6$1 |
| | | | | | | | 6.96E-01 | *(1.5)* | | | g | |
| NIOBIUM-94 | -2.80E-02 | U | 3.2E-02 | 3.2E-02 | 5.32E-02 | pCi/g | | *-0.53* | 5/23/03 09:17 a | | 308.5 | GER6$1 |
| | | | | | | | 2.85E-01 | *-(1.7)* | | | g | |
| LEAD-212 | 9.96E-01 | | 1.9E-01 | 1.9E-01 | 8.45E-02 | pCi/g | | *(11.8)* | 5/23/03 09:17 a | | 308.5 | GER6$1 |
| | | | | | | | | *(10.4)* | | | g | |
| LEAD-214 | 1.13E+00 | | 2.5E-01 | 2.5E-01 | 1.07E-01 | pCi/g | | *(10.5)* | 5/23/03 09:17 a | | 308.5 | GER6$1 |
| | | | | | | | | *(9.2)* | | | g | |
| RADIUM-226 | 1.08E+00 | | 2.0E-01 | 2.0E-01 | 1.09E-01 | pCi/g | | *(10.)* | 5/23/03 09:17 a | | 308.5 | GER6$1 |
| | | | | | | | | *(10.8)* | | | g | |
| THALLIUM-208 | 3.70E-01 | | 8.8E-02 | 8.8E-02 | 5.04E-02 | pCi/g | | *(7.3)* | 5/23/03 09:17 a | | 308.5 | GER6$1 |
| | | | | | | | | *(8.4)* | | | g | |

No. of Results: 18 Comments:

STL Richland
rptSTLRchSample
V4.03 A97

MDC|MDA,Lc - Detection, Decision Level based on instrument background or blank, adjusted by the sample Efficiency, Yield, and Volume.
J Qual - No U qualifier has been assigned and the result is below the Reporting Limit, RL (CRDL) or Report Value is Estimated.
U Qual - Analyzed for, but the result is less than the Mdc/Mda|Total Uncert or gamma scan software did not identify the nuclide.

# FORM II

Date: 29-May-03

## DUPLICATE RESULTS

| | | | | | |
|---|---|---|---|---|---|
| Lab Name: | STL Richland | SDG: | 22862 | Collection Date: | 4/10/2003 9:55:00 AM |
| Lot-Sample No.: | J3D300240-18 | Report No. : | 22709 | Received Date: | 4/30/2003 11:10:00 AM |
| Client Sample ID: | 9526-0001-015 F DUP | COC No. : | 2003-00108 | Matrix: | SOIL |

| Parameter | Result, Orig Rst | Qual | Count Error ( 2 s) | Total Uncert( 2 s) | MDC\|MDA, Action Lev | Rpt Unit, CRDL | Yield | Rst/MDC, Rst/TotUcert | Analysis, Prep Date | Total Sa Size | Aliquot Size | Primary Detector |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Batch: 3122330 E901.1 | | | | Work Order: FMVVD1AC | | Report DB ID: FMVVD1CR | | | Orig Sa DB ID: 9FMVVD10 | | | |
| ACTINIUM-228 | 9.42E-01 | | 3.0E-01 | 3.0E-01 | 2.36E-01 | pCi/g | | (4.) | 5/22/03 10:26 a | | 265.8 | GER4$1 |
| | 1.14E+00 | | RER2 0.9 | | | | | (6.2) | | | g | |
| AG-108M | 1.63E-02 | U | 3.2E-02 | 3.2E-02 | 5.74E-02 | pCi/g | | 0.28 | 5/22/03 10:26 a | | 265.8 | GER4$1 |
| | -6.40E-03 | U | RER2 0.9 | | | 2.86E-01 | | (1.) | | | g | |
| AMERICIUM-241 | -5.46E-02 | U | 2.3E-01 | 2.3E-01 | 3.84E-01 | pCi/g | | -0.14 | 5/22/03 10:26 a | | 265.8 | GER4$1 |
| | -2.63E-01 | U | RER2 0.8 | | | 1.03E+00 | | -0.47 | | | g | |
| BISMUTH-212 | 7.60E-01 | U | 5.6E-01 | 5.6E-01 | 1.10E+00 | pCi/g | | 0.69 | 5/22/03 10:26 a | | 265.8 | GER4$1 |
| | 1.57E+00 | U | RER2 1.8 | | | | | (2.7) | | | g | |
| BISMUTH-214 | 1.20E+00 | | 2.1E-01 | 2.1E-01 | 1.17E-01 | pCi/g | | (10.2) | 5/22/03 10:26 a | | 265.8 | GER4$1 |
| | 1.22E+00 | | RER2 0.1 | | | | | (11.3) | | | g | |
| COBALT-60 | 4.97E-03 | U | 4.0E-02 | 4.0E-02 | 7.49E-02 | pCi/g | | 0.07 | 5/22/03 10:26 a | | 265.8 | GER4$1 |
| | -1.42E-02 | U | RER2 0.6 | | | 1.50E-01 | | 0.25 | | | g | |
| CESIUM-134 | 8.28E-02 | U | 4.8E-02 | 4.8E-02 | 9.64E-02 | pCi/g | | 0.86 | 5/22/03 10:26 a | | 265.8 | GER4$1 |
| | -1.20E-03 | U | RER2 2.5 | | | 1.90E-01 | | (3.4) | | | g | |
| CESIUM-137 | 7.25E-01 | | 1.5E-01 | 1.5E-01 | 7.08E-02 | pCi/g | | (10.2) | 5/22/03 10:26 a | | 265.8 | GER4$1 |
| | 8.05E-01 | | RER2 0.8 | | | 3.20E-01 | | (9.5) | | | g | |
| EUROPIUM-152 | -2.32E-03 | U | 1.1E-01 | 1.1E-01 | 1.71E-01 | pCi/g | | -0.01 | 5/22/03 10:26 a | | 265.8 | GER4$1 |
| | 8.19E-02 | U | RER2 0.8 | | | 4.04E-01 | | -0.04 | | | g | |
| EUROPIUM-154 | 6.90E-03 | U | 1.1E-01 | 1.1E-01 | 1.98E-01 | pCi/g | | 0.03 | 5/22/03 10:26 a | | 265.8 | GER4$1 |
| | -3.55E-02 | U | RER2 0.5 | | | 3.70E-01 | | 0.13 | | | g | |
| EUROPIUM-155 | 5.05E-02 | U | 1.1E-01 | 1.1E-01 | 1.93E-01 | pCi/g | | 0.26 | 5/22/03 10:26 a | | 265.8 | GER4$1 |
| | 8.09E-02 | U | RER2 0.3 | | | 1.57E+01 | | 0.93 | | | g | |

STL Richland
rptSTLRchDupV4.0 3 A97

RER2 - Replicate Error Ratio = (S-D)/[sqrt(sq(TPUs)+sq(TPUd))] as defined by ICPT BOA.
MDC|MDA,Lc - Detection, Decision Level based on instrument background or blank, adjusted by the sample Efficiency, Yield, and Volume.
U Qual - Analyzed for, but the result is less than the Mdc/Mda|Total Uncert or gamma scan software did not identify the nuclide.

# FORM II

Date: 29-May-03

## DUPLICATE RESULTS

| | | | | | |
|---|---|---|---|---|---|
| Lab Name: | STL Richland | SDG: | 22862 | Collection Date: | 4/10/2003 9:55:00 AM |
| Lot-Sample No.: | J3D300240-18 | Report No. : | 22709 | Received Date: | 4/30/2003 11:10:00 AM |
| Client Sample ID: | 9526-0001-015 F DUP | COC No. : | 2003-00108 | Matrix: | SOIL |

| Parameter | Result, Orig Rst | Qual | Count Error ( 2 s) | Total Uncert( 2 s) | MDC\|MDA, Action Lev | Rpt Unit, CRDL | Yield | Rst/MDC, Rst/TotUcert | Analysis, Prep Date | Total Sa Size | Aliquot Size | Primary Detector |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| POTASSIUM-40 | 9.54E+00 | | 1.7E+00 | 1.7E+00 | 4.55E-01 | pCi/g | | (20.9) | 5/22/03 10:26 a | | 265.8 | GER4$1 |
| | 9.53E+00 | | RER2 0.0 | | | | | (11.) | | | g | |
| MANGANESE-54 | -1.74E-02 | U | 3.9E-02 | 3.9E-02 | 6.67E-02 | pCi/g | | -0.26 | 5/22/03 10:26 a | | 265.8 | GER4$1 |
| | 1.41E-02 | U | RER2 1.0 | | | 6.96E-01 | | -0.89 | | | g | |
| NIOBIUM-94 | -1.82E-02 | U | 3.4E-02 | 3.4E-02 | 5.68E-02 | pCi/g | | -0.32 | 5/22/03 10:26 a | | 265.8 | GER4$1 |
| | -1.96E-02 | U | RER2 0.1 | | | 2.85E-01 | | -(1.1) | | | g | |
| LEAD-212 | 1.25E+00 | | 2.3E-01 | 2.3E-01 | 9.23E-02 | pCi/g | | (13.5) | 5/22/03 10:26 a | | 265.8 | GER4$1 |
| | 1.17E+00 | | RER2 0.5 | | | | | (10.8) | | | g | |
| LEAD-214 | 1.28E+00 | | 2.5E-01 | 2.5E-01 | 1.27E-01 | pCi/g | | (10.1) | 5/22/03 10:26 a | | 265.8 | GER4$1 |
| | 1.22E+00 | | RER2 0.3 | | | | | (10.3) | | | g | |
| RADIUM-226 | 1.20E+00 | | 2.1E-01 | 2.1E-01 | 1.17E-01 | pCi/g | | (10.2) | 5/22/03 10:26 a | | 265.8 | GER4$1 |
| | 1.22E+00 | | RER2 0.1 | | | | | (11.3) | | | g | |
| THALLIUM-208 | 4.34E-01 | U | 1.1E-01 | 1.1E-01 | 1.45E-01 | pCi/g | | (3.) | 5/22/03 10:26 a | | 265.8 | GER4$1 |
| | 4.27E-01 | U | RER2 0.1 | | | | | (8.) | | | g | |

No. of Results: 18 Comments:

STL Richland
rptSTLRchDupV4.0
3 A97

RER2 - Replicate Error Ratio = (S-D)/[sqrt(sq(TPUs)+sq(TPUd))] as defined by ICPT BOA.
MDC|MDA,Lc - Detection, Decision Level based on instrument background or blank, adjusted by the sample Efficiency, Yield, and Volume.
U Qual - Analyzed for, but the result is less than the Mdc/Mda|Total Uncert or gamma scan software did not identify the nuclide.

# FORM II

Date: 29-May-03

## DUPLICATE RESULTS

| | | | | | |
|---|---|---|---|---|---|
| Lab Name: | STL Richland | SDG: | 22862 | Collection Date: | 4/24/2003 10:35:00 AM |
| Lot-Sample No.: | J3D300240-1 | Report No. : | 22709 | Received Date: | 4/30/2003 11:10:00 AM |
| Client Sample ID: | 9526-0002-025 F DUP | COC No. : | 2003-00106 | Matrix: | SOIL |

| Parameter | Result, Orig Rst | Qual | Count Error ( 2 s) | Total Uncert( 2 s) | MDC\|MDA, Action Lev | Rpt Unit, CRDL | Yield | Rst/MDC, Rst/TotUcert | Analysis, Prep Date | Total Sa Size | Aliquot Size | Primary Detector |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Batch: 3122327 | E901.1 | | | Work Order: | FMVRV1AC | Report DB ID: | FMVRV1CR | | Orig Sa DB ID: 9FMVRV10 | | | |
| ACTINIUM-228 | 1.21E+00 | | 2.5E-01 | 2.5E-01 | 1.78E-01 | pCi/g | | (6.8) | 5/23/03 07:27 a | | 359.2 | GER8$1 |
| | 1.15E+00 | | RER2 0.3 | | | | | (9.7) | | | g | |
| AG-108M | 2.57E-02 | U | 2.6E-02 | 2.6E-02 | 4.73E-02 | pCi/g | | 0.54 | 5/23/03 07:27 a | | 359.2 | GER8$1 |
| | 8.30E-04 | U | RER2 1.2 | | | 2.86E-01 | | (2.) | | | g | |
| AMERICIUM-241 | 1.72E-02 | U | 7.5E-02 | 7.5E-02 | 1.07E-01 | pCi/g | | 0.16 | 5/23/03 07:27 a | | 359.2 | GER8$1 |
| | 1.47E-03 | U | RER2 0.1 | | | 1.03E+00 | | 0.46 | | | g | |
| BISMUTH-212 | 1.62E+00 | U | 7.0E-01 | 7.0E-01 | 1.01E+00 | pCi/g | | (1.6) | 5/23/03 07:27 a | | 359.2 | GER8$1 |
| | 1.67E+00 | U | RER2 0.1 | | | | | (4.6) | | | g | |
| BISMUTH-214 | 1.30E+00 | | 2.2E-01 | 2.2E-01 | 9.28E-02 | pCi/g | | (14.) | 5/23/03 07:27 a | | 359.2 | GER8$1 |
| | 1.24E+00 | | RER2 0.4 | | | | | (12.) | | | g | |
| COBALT-60 | -3.59E-02 | U | 3.0E-02 | 3.0E-02 | 4.44E-02 | pCi/g | | -0.81 | 5/23/03 07:27 a | | 359.2 | GER8$1 |
| | -1.28E-02 | U | RER2 1.1 | | | 1.50E-01 | | -(2.4) | | | g | |
| CESIUM-134 | 4.03E-02 | U | 3.6E-02 | 3.6E-02 | 6.79E-02 | pCi/g | | 0.59 | 5/23/03 07:27 a | | 359.2 | GER8$1 |
| | 5.93E-02 | U | RER2 0.7 | | | 1.90E-01 | | (2.2) | | | g | |
| CESIUM-137 | 5.06E-01 | | 9.7E-02 | 9.7E-02 | 5.47E-02 | pCi/g | | (9.3) | 5/23/03 07:27 a | | 359.2 | GER8$1 |
| | 5.28E-01 | | RER2 0.3 | | | 3.20E-01 | | (10.4) | | | g | |
| EUROPIUM-152 | -2.51E-02 | U | 7.7E-02 | 7.7E-02 | 1.31E-01 | pCi/g | | -0.19 | 5/23/03 07:27 a | | 359.2 | GER8$1 |
| | 6.10E-02 | U | RER2 1.1 | | | 4.04E-01 | | -0.65 | | | g | |
| EUROPIUM-154 | -7.84E-02 | U | 9.1E-02 | 9.1E-02 | 1.45E-01 | pCi/g | | -0.54 | 5/23/03 07:27 a | | 359.2 | GER8$1 |
| | -4.74E-02 | U | RER2 0.4 | | | 3.70E-01 | | -(1.7) | | | g | |
| EUROPIUM-155 | 6.29E-02 | U | 8.4E-02 | 8.4E-02 | 1.46E-01 | pCi/g | | 0.43 | 5/23/03 07:27 a | | 359.2 | GER8$1 |
| | 3.92E-02 | U | RER2 0.3 | | | 1.57E+01 | | (1.5) | | | g | |

STL Richland RER2 - Replicate Error Ratio = (S-D)/[sqrt(sq(TPUs)+sq(TPUd))] as defined by ICPT BOA.

rptSTLRchDupV4.0 3 A97 MDC|MDA,Lc - Detection, Decision Level based on instrument background or blank, adjusted by the sample Efficiency, Yield, and Volume.

U Qual - Analyzed for, but the result is less than the Mdc/Mda|Total Uncert or gamma scan software did not identify the nuclide.

# FORM II

Date: 29-May-03

## DUPLICATE RESULTS

| | | | | | |
|---|---|---|---|---|---|
| Lab Name: | STL Richland | SDG: | 22862 | Collection Date: | 4/24/2003 10:35:00 AM |
| Lot-Sample No.: | J3D300240-1 | Report No. : | 22709 | Received Date: | 4/30/2003 11:10:00 AM |
| Client Sample ID: | 9526-0002-025 F DUP | COC No. : | 2003-00106 | Matrix: | SOIL |

| Parameter | Result, Orig Rst | Qual | Count Error ( 2 s) | Total Uncert( 2 s) | MDC\|MDA, Action Lev | Rpt Unit, CRDL | Yield | Rst/MDC, Rst/TotUcert | Analysis, Prep Date | Total Sa Size | Aliquot Size | Primary Detector |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| POTASSIUM-40 | 1.25E+01 | | 1.8E+00 | 1.8E+00 | 4.10E-01 | pCi/g | | (30.5) | 5/23/03 07:27 a | | 359.2 | GER8$1 |
| | 1.29E+01 | | RER2 0.3 | | | | | (13.6) | | | g | |
| MANGANESE-54 | -1.65E-02 | U | 3.1E-02 | 3.1E-02 | 5.17E-02 | pCi/g | | -0.32 | 5/23/03 07:27 a | | 359.2 | GER8$1 |
| | -1.84E-02 | U | RER2 0.1 | | | 6.96E-01 | | -(1.1) | | | g | |
| NIOBIUM-94 | -3.34E-03 | U | 2.7E-02 | 2.7E-02 | 4.71E-02 | pCi/g | | -0.07 | 5/23/03 07:27 a | | 359.2 | GER8$1 |
| | 7.78E-03 | U | RER2 0.6 | | | 2.85E-01 | | -0.25 | | | g | |
| LEAD-212 | 1.12E+00 | | 2.0E-01 | 2.0E-01 | 7.75E-02 | pCi/g | | (14.5) | 5/23/03 07:27 a | | 359.2 | GER8$1 |
| | 1.14E+00 | | RER2 0.1 | | | | | (11.1) | | | g | |
| LEAD-214 | 1.39E+00 | | 2.3E-01 | 2.3E-01 | 9.45E-02 | pCi/g | | (14.7) | 5/23/03 07:27 a | | 359.2 | GER8$1 |
| | 1.42E+00 | | RER2 0.2 | | | | | (12.) | | | g | |
| RADIUM-226 | 1.30E+00 | | 2.2E-01 | 2.2E-01 | 9.28E-02 | pCi/g | | (14.) | 5/23/03 07:27 a | | 359.2 | GER8$1 |
| | 1.24E+00 | | RER2 0.4 | | | | | (12.) | | | g | |
| THALLIUM-208 | 3.38E-01 | | 8.5E-02 | 8.5E-02 | 4.95E-02 | pCi/g | | (6.8) | 5/23/03 07:27 a | | 359.2 | GER8$1 |
| | 4.05E-01 | | RER2 1.0 | | | | | (8.) | | | g | |

No. of Results: 18 Comments:

STL Richland
rptSTLRchDupV4.0
3 A97

RER2 - Replicate Error Ratio = (S-D)/[sqrt(sq(TPUs)+sq(TPUd))] as defined by ICPT BOA.
MDC|MDA,Lc - Detection, Decision Level based on instrument background or blank, adjusted by the sample Efficiency, Yield, and Volume.
U Qual - Analyzed for, but the result is less than the Mdc/Mda|Total Uncert or gamma scan software did not identify the nuclide.

# FORM II
## BLANK RESULTS

Date: 29-May-03

Lab Name: STL Richland
Matrix: SOIL

SDG: 22862
Report No.: 22709

| Parameter | Result | Qual | Count Error (2 s) | Total Uncert(2 s) | MDC\|MDA, Lc | Rpt Unit, CRDL | Yield | Rst/MDC, Rst/TotUcert | Analysis, Prep Date | Total Sa Size | Aliquot Size | Primary Detector |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Batch: 3122327 | E901.1 | | | Work Order: | FM2FF1AA | | Report DB ID: | FM2FF1AB | | | | |
| ACTINIUM-228 | -6.54E-03 | U | 1.1E-01 | 1.1E-01 | 2.04E-01 | pCi/g | | -0.03<br>-0.12 | 5/23/03 04:25 p | | 200.0<br>g | GER2$1 |
| AG-108M | -2.98E-02 | U | 2.6E-02 | 2.6E-02 | 4.08E-02 | pCi/g | | -0.73<br>-(2.3) | 5/23/03 04:25 p | | 200.0<br>g | GER2$1 |
| AMERICIUM-241 | -7.18E-02 | U | 3.2E-01 | 3.2E-01 | 5.49E-01 | pCi/g | | -0.13<br>-0.45 | 5/23/03 04:25 p | | 200.0<br>g | GER2$1 |
| BISMUTH-212 | 5.49E-02 | U | 4.7E-01 | 4.7E-01 | 8.68E-01 | pCi/g | | 0.06<br>0.24 | 5/23/03 04:25 p | | 200.0<br>g | GER2$1 |
| BISMUTH-214 | 4.35E-02 | U | 6.8E-02 | 6.8E-02 | 1.31E-01 | pCi/g | | 0.33<br>(1.3) | 5/23/03 04:25 p | | 200.0<br>g | GER2$1 |
| COBALT-60 | 4.45E-02 | U | 3.6E-02 | 3.6E-02 | 8.24E-02 | pCi/g | | 0.54<br>(2.5) | 5/23/03 04:25 p | | 200.0<br>g | GER2$1 |
| CESIUM-134 | -2.02E-02 | U | 3.7E-02 | 3.7E-02 | 6.19E-02 | 1.52E-01<br>pCi/g | | -0.33<br>-(1.1) | 5/23/03 04:25 p | | 200.0<br>g | GER2$1 |
| CESIUM-137 | 9.84E-03 | U | 3.6E-02 | 3.6E-02 | 6.81E-02 | 1.87E-01<br>pCi/g | | 0.14<br>0.54 | 5/23/03 04:25 p | | 200.0<br>g | GER2$1 |
| EUROPIUM-152 | -4.90E-02 | U | 8.6E-02 | 8.6E-02 | 1.43E-01 | 3.16E-01<br>pCi/g | | -0.34<br>-(1.1) | 5/23/03 04:25 p | | 200.0<br>g | GER2$1 |
| EUROPIUM-154 | 5.01E-02 | U | 6.9E-02 | 6.9E-02 | 1.62E-01 | 4.04E-01<br>pCi/g | | 0.31<br>(1.5) | 5/23/03 04:25 p | | 200.0<br>g | GER2$1 |
| EUROPIUM-155 | 1.05E-02 | U | 1.1E-01 | 1.1E-01 | 1.94E-01 | 3.72E-01<br>pCi/g | | 0.05<br>0.19 | 5/23/03 04:25 p | | 200.0<br>g | GER2$1 |
| POTASSIUM-40 | -5.16E-01 | U | 6.5E-01 | 6.5E-01 | 1.41E+00 | 1.57E+01<br>pCi/g | | -0.36<br>-(1.6) | 5/23/03 04:25 p | | 200.0<br>g | GER2$1 |

STL Richland
rptSTLRchBlank
V4.03 A97

MDC|MDA,Lc - Detection, Decision Level based on instrument background or blank, adjusted by the sample Efficiency, Yield, and Volume.
U Qual - Analyzed for, but the result is less than the Mdc/Mda|Total Uncert or gamma scan software did not identify the nuclide.

STL RICHLAND

# FORM II

## BLANK RESULTS

Date: 29-May-03

Lab Name: STL Richland

Matrix: SOIL

SDG: 22862

Report No.: 22709

| Parameter | Result | Qual | Count Error ( 2 s) | Total Uncert( 2 s) | MDC\|MDA, Lc | Rpt Unit, CRDL | Yield | Rst/MDC, Rst/TotUcert | Analysis, Prep Date | Total Sa Size | Aliquot Size | Primary Detector |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MANGANESE-54 | -2.64E-02 | U | 3.5E-02 | 3.5E-02 | 5.75E-02 | pCi/g | | -0.46 | 5/23/03 04:25 p | | 200.0 | GER2$1 |
| | | | | | | 6.96E-01 | | -(1.5) | | | g | |
| NIOBIUM-94 | -7.77E-03 | U | 3.4E-02 | 3.4E-02 | 6.23E-02 | pCi/g | | -0.12 | 5/23/03 04:25 p | | 200.0 | GER2$1 |
| | | | | | | 2.85E-01 | | -0.45 | | | g | |
| LEAD-212 | 5.48E-02 | U | 6.0E-02 | 6.0E-02 | 1.11E-01 | pCi/g | | 0.49 | 5/23/03 04:25 p | | 200.0 | GER2$1 |
| | | | | | | | | (1.8) | | | g | |
| LEAD-214 | 2.07E-02 | U | 7.0E-02 | 7.0E-02 | 1.26E-01 | pCi/g | | 0.16 | 5/23/03 04:25 p | | 200.0 | GER2$1 |
| | | | | | | | | 0.59 | | | g | |
| RADIUM-226 | 4.34E-02 | U | 6.8E-02 | 6.8E-02 | 1.31E-01 | pCi/g | | 0.33 | 5/23/03 04:25 p | | 200.0 | GER2$1 |
| | | | | | | | | (1.3) | | | g | |
| THALLIUM-208 | 1.67E-02 | U | 4.4E-02 | 4.4E-02 | 8.53E-02 | pCi/g | | 0.2 | 5/23/03 04:25 p | | 200.0 | GER2$1 |
| | | | | | | | | 0.76 | | | g | |
| Batch: 3122330 | E901.1 | | | Work Order: | FM2FK1AA | | Report DB ID: | FM2FK1AB | | | | |
| ACTINIUM-228 | -1.54E-01 | U | 1.2E-01 | 1.2E-01 | 1.97E-01 | pCi/g | | -0.78 | 5/23/03 07:30 a | | 200.0 | GER6$1 |
| | | | | | | | | -(2.5) | | | g | |
| AG-108M | -7.13E-03 | U | 2.8E-02 | 2.8E-02 | 4.78E-02 | pCi/g | | -0.15 | 5/23/03 07:30 a | | 200.0 | GER6$1 |
| | | | | | | | | -0.52 | | | g | |
| AMERICIUM-241 | 7.44E-03 | U | 6.5E-02 | 6.5E-02 | 1.19E-01 | pCi/g | | 0.06 | 5/23/03 07:30 a | | 200.0 | GER6$1 |
| | | | | | | | | 0.23 | | | g | |
| BISMUTH-212 | 3.44E-01 | U | 4.0E-01 | 4.0E-01 | 8.33E-01 | pCi/g | | 0.41 | 5/23/03 07:30 a | | 200.0 | GER6$1 |
| | | | | | | | | (1.7) | | | g | |
| BISMUTH-214 | -1.22E-02 | U | 7.0E-02 | 7.0E-02 | 1.28E-01 | pCi/g | | -0.1 | 5/23/03 07:30 a | | 200.0 | GER6$1 |
| | | | | | | | | -0.35 | | | g | |
| COBALT-60 | 2.36E-02 | U | 2.6E-02 | 2.6E-02 | 6.27E-02 | pCi/g | | 0.38 | 5/23/03 07:30 a | | 200.0 | GER6$1 |
| | | | | | | 1.52E-01 | | (1.8) | | | g | |

STL Richland
rptSTLRchBlank
V4.03 A97

MDC|MDA,Lc - Detection, Decision Level based on instrument background or blank, adjusted by the sample Efficiency, Yield, and Volume.
U Qual - Analyzed for, but the result is less than the Mdc/Mda|Total Uncert or gamma scan software did not identify the nuclide.

# FORM II

## BLANK RESULTS

Date: 29-May-03

Lab Name: STL Richland

Matrix: SOIL

SDG: 22862

Report No.: 22709

| Parameter | Result | Qual | Count Error ( 2 s) | Total Uncert( 2 s) | MDC\|MDA, Lc | Rpt Unit, CRDL | Yield | Rst/MDC, Rst/TotUcert | Analysis, Prep Date | Total Sa Size | Aliquot Size | Primary Detector |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CESIUM-134 | -1.27E-02 | U | 3.4E-02 | 3.4E-02 | 5.97E-02 | pCi/g | | -0.21 | 5/23/03 07:30 a | | 200.0 | GER6$1 |
| | | | | | | 1.87E-01 | | -0.74 | | | g | |
| CESIUM-137 | -2.32E-03 | U | 2.9E-02 | 2.9E-02 | 5.33E-02 | pCi/g | | -0.04 | 5/23/03 07:30 a | | 200.0 | GER6$1 |
| | | | | | | 3.16E-01 | | -0.16 | | | g | |
| EUROPIUM-152 | -2.23E-02 | U | 7.6E-02 | 7.6E-02 | 1.35E-01 | pCi/g | | -0.17 | 5/23/03 07:30 a | | 200.0 | GER6$1 |
| | | | | | | 4.04E-01 | | -0.58 | | | g | |
| EUROPIUM-154 | 1.38E-02 | U | 9.1E-02 | 9.1E-02 | 1.80E-01 | pCi/g | | 0.08 | 5/23/03 07:30 a | | 200.0 | GER6$1 |
| | | | | | | 3.72E-01 | | 0.31 | | | g | |
| EUROPIUM-155 | 5.57E-03 | U | 5.5E-02 | 5.5E-02 | 9.85E-02 | pCi/g | | 0.06 | 5/23/03 07:30 a | | 200.0 | GER6$1 |
| | | | | | | 1.57E+01 | | 0.2 | | | g | |
| POTASSIUM-40 | -9.06E-01 | U | 7.0E-01 | 7.0E-01 | 1.53E+00 | pCi/g | | -0.59 | 5/23/03 07:30 a | | 200.0 | GER6$1 |
| | | | | | | | | -(2.6) | | | g | |
| MANGANESE-54 | -1.79E-02 | U | 2.9E-02 | 2.9E-02 | 4.76E-02 | pCi/g | | -0.38 | 5/23/03 07:30 a | | 200.0 | GER6$1 |
| | | | | | | 6.96E-01 | | -(1.2) | | | g | |
| NIOBIUM-94 | -1.08E-03 | U | 2.2E-02 | 2.2E-02 | 4.30E-02 | pCi/g | | -0.03 | 5/23/03 07:30 a | | 200.0 | GER6$1 |
| | | | | | | 2.85E-01 | | -0.1 | | | g | |
| LEAD-212 | -4.32E-02 | U | 4.9E-02 | 4.9E-02 | 7.99E-02 | pCi/g | | -0.54 | 5/23/03 07:30 a | | 200.0 | GER6$1 |
| | | | | | | | | -(1.8) | | | g | |
| LEAD-214 | -2.90E-03 | U | 5.9E-02 | 5.9E-02 | 9.99E-02 | pCi/g | | -0.03 | 5/23/03 07:30 a | | 200.0 | GER6$1 |
| | | | | | | | | -0.1 | | | g | |
| RADIUM-226 | -1.17E-02 | U | 7.0E-02 | 7.0E-02 | 1.28E-01 | pCi/g | | -0.09 | 5/23/03 07:30 a | | 200.0 | GER6$1 |
| | | | | | | | | -0.33 | | | g | |
| THALLIUM-208 | -1.08E-02 | U | 3.2E-02 | 3.2E-02 | 5.77E-02 | pCi/g | | -0.19 | 5/23/03 07:30 a | | 200.0 | GER6$1 |
| | | | | | | | | -0.68 | | | g | |

STL Richland
rptSTLRchBlank
V4.03 A97

MDC|MDA,Lc - Detection, Decision Level based on instrument background or blank, adjusted by the sample Efficiency, Yield, and Volume.
U Qual - Analyzed for, but the result is less than the Mdc/Mda|Total Uncert or gamma scan software did not identify the nuclide.

# FORM II

## LCS RESULTS

Date: 29-May-03

Lab Name: STL Richland

Matrix: SOIL

SDG: 22862

Report No. : 22709

| Parameter | Result | Qual | Count Error ( 2 s) | Total Uncert(2 s) | MDC\|MDA | Report Unit | Yield | Expected | Expected Uncert | Recovery, Bias | Analysis, Prep Date | Aliquot Size | Primary Detector |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Batch: 3122327 | E901.1 | | | Work Order: | FM2FF1AC | | Report DB ID: | FM2FF1CS | | | | | |
| CESIUM-137 | 1.10E+00 | | 1.8E-01 | 1.8E-01 | 7.32E-02 | pCi/g | | 1.01E+00 | 3.5E-02 | 109% | 5/23/03 06:12 p | 200.1 | GER2$1 |
| | | | | | | | Rec Limits: | 70 | 130 | 0.1 | | g | |
| Batch: 3122330 | E901.1 | | | Work Order: | FM2FK1AC | | Report DB ID: | FM2FK1CS | | | | | |
| CESIUM-137 | 1.12E+00 | | 1.8E-01 | 1.8E-01 | 5.68E-02 | pCi/g | | 1.00E+00 | 3.5E-02 | 112% | 5/23/03 07:30 a | 200.0 | GER7$1 |
| | | | | | | | Rec Limits: | 70 | 130 | 0.1 | | g | |

No. of Results: 2 Comments:

STL Richland Bias - (Result/Expected)-1 as defined by ANSI N13.30.

rptSTLRchLcs
V4.03 A97

# Attachment 2b
# Hard-to-Detect Data
# (47 Pages)

# CASE NARRATIVE

CASE NARRATIVE
For
CONNECTICUT YANKEE
Project: Soils
PO# 002332
Work Order: 113505
SDG: MSR#04-1562

June 18, 2004

**Laboratory Identification:**
General Engineering Laboratories, LLC

**Mailing Address:**
P.O. Box 30712
Charleston, South Carolina 29417

**Express Mail Delivery and Shipping Address:**
2040 Savage Road
Charleston, South Carolina 29407

**Telephone Number:**
(843) 556-8171

**Summary:**

**Sample receipt**

The samples for the Soil Project for work order 113505 arrived at General Engineering Laboratories, LLC, (GEL) in Charleston, South Carolina May 21, 2004 for environmental analysis. All sample containers arrived without any visible signs of tampering or breakage. The chain of custody contained the proper documentation and signatures.

The laboratory received the following samples:

| | |
|---|---|
| 113505001 | 9526-0002-015F |
| 113505002 | 9526-0002-016F |
| 113505003 | 9526-0002-017F |
| 113505004 | 9526-0001-010SP |
| 113505005 | 9526-0001-002F |
| 113505006 | 9526-0001-002SP |
| 113505007 | 9526-0001-009SP |


GENERAL ENGINEERING LABORATORIES, LLC
*a Member of THE GEL GROUP, INC.*
P.O. Box 30712 • Charleston, SC 29417 • 2040 Savage Road (29407)
Phone (843) 556-8171 • Fax (843) 766-1178 • www.gel.com

**Items of Note:**

There are not items to note.

**Case Narrative:**

Sample analyses were conducted using methodology as outlined in General Engineering Laboratories (GEL) Standard Operating Procedures. Any technical or administrative problems during analysis, data review, and reduction are listed below by analytical parameter.

**Analytical Request:**

Seven soil samples were analyzed for FSSGAM. Of the seven, five were analyzed for Sr-90 and two were analyzed for H-3.

**Internal Chain of Custody:**

Custody was maintained for all of these samples.

**Data Package:**

The enclosed data package contains the following sections: Case Narrative, Chain of Custody, Cooler Receipt Checklist, Laboratory Certifications, and Radiochemistry.

I certify that this data package is in compliance with the SOW, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hard copy data package has been authorized by the Laboratory Manager or a designee, as verified by the following signature.

Sarah Kozlik
Project Manager



GENERAL ENGINEERING LABORATORIES, LLC
*a Member of THE GEL GROUP, INC.*
P.O. Box 30712 • Charleston, SC 29417 • 2040 Savage Road (29407)
Phone (843) 556-8171 • Fax (843) 766-1178 • www.gel.com

# CHAIN OF CUSTODY

# Chain of Custody Form

No. 2004-00080

**Connecticut Yankee Atomic Power Company**
362 Injun Hollow Road, East Hampton, CT 06424
860-267-2556

113505%

Project Name: Haddam Neck Decommissioning

Contact Name & Phone:
Jack McCarthy 860-267-2556 Ext. 3024

Analytical Lab (Name, City, State
General Engineering Laboratories
2040 Savage Road
Charleston, SC 29407 ( 843-556-8171 )
Sarah Kozlik

Priority: ☒ 30 D. ☐ 15 D. ☐ 7 D.
Other:

Lab Use Only
Comments:

| Sample Designation | Date | Time | Media Code | Sample Type Code | Container Size-&Type Code | FSSGAM | FSS ALL | FSSHTD | FSSTRU | Sr-90 | | Comment, Preservation | Lab Sample ID |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 9526-0002-015F | 5/11/04 | 1430 | TS | G | BP | X | | | | X | | | |
| 9526-0002-016F | 5/11/04 | 1448 | TS | G | BP | X | | | | X | | | |
| 9526-0002-017F | 5/11/04 | 1440 | TS | G | BP | X | | | | X | | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |

NOTES: PO #: 002332 MSR #: 04-1562 ☒ LTP QA ☐ Radwaste QA ☐ Non QA

Samples Shipped Via:
☒ Fed Ex
☐ UPS
☐ Hand
☐ Other ____
7926 4447 1396
Bill of Lading #

Internal Container Temp. 12 Deg. C.
Custody Sealed? Yes No
Custody Seal Intact? Yes No

| | |
|---|---|
| 1) Relinquished By [signature] Date/Time 5/20/04 / 0910 | 2) Received By [signature] Date/Time 5-21-04 1000 |
| 3) Relinquished By Date/Time | 4) Received By Date/Time |
| 5) Relinquished By Date/Time | 6) Received By Date/Time |

Page 2 of 2

# Chain of Custody Form

No. 2004-00067

**Connecticut Yankee Atomic Power Company**
362 Injun Hollow Road, East Hampton, CT 06424
860-267-2556

113505%

Project Name: Haddam Neck Decommissioning

Contact Name & Phone:
Jack McCarthy 860-267-2556 Ext. 3024

Analytical Lab (Name, City, State
General Engineering Laboratories
2040 Savage Road
Charleston, SC 29407 ( 843-556-8171 )
Sarah Kozlik

Priority: ☒ 30 D. ☐ 15 D. ☐ 7 D.
Other:

Lab Use Only
Comments:

| | Sample Designation | Date | Time | Media Code | Sample Type Code | Container Size-&Type Code | FSSGAM | FSS ALL | FSSHTD | FSSTRU | Sr-90 | H-3 | Comment, Preservation | Lab Sample ID |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 006 | 9526-0001-002SP | 3/3/04 | 15:10 | TS | G | BP | X | | | | | X | TRITIUM | |
| 007 | 9526-0001-009SP | 3/3/04 | 15:03 | TS | G | BP | X | | | | | X | TRITIUM | |
| 004 | 9526-0001-010SP | 3/3/04 | 15:20 | TS | G | BP | X | | | | X | | STRONTIUM 90 | |

NOTES: PO #: 002332 MSR #: 04-1562 ☒ LTP QA ☐ Radwaste QA ☐ Non QA

Samples Shipped Via:
☒ Fed Ex
☐ UPS
☐ Hand
☐ Other ____
7926 4447 1396
Bill of Lading #

Internal Container Temp.: 22 Deg. C
Custody Sealed? Y N
Custody Seal Intact? Y N

| | |
|---|---|
| 1) Relinquished By: John J. McGoohan — Date/Time: 5/20/04 / 0910 | 2) Received By: [signature] — Date/Time: 5-21-04 1000 |
| 3) Relinquished By — Date/Time | 4) Received By — Date/Time |
| 5) Relinquished By — Date/Time | 6) Received By — Date/Time |

# Chain of Custody Form

**Connecticut Yankee Atomic Power Company**
362 Injun Hollow Road, East Hampton, CT 06424
860-267-2556

No. 2004-00079

113505%

Project Name: Haddam Neck Decommissioning

Contact Name & Phone:
Jack McCarthy 860-267-2556 Ext. 3024

Analytical Lab (Name, City, State
General Engineering Laboratories
2040 Savage Road
Charleston, SC 29407 ( 843-556-8171 )
Sarah Kozlik

Priority: ☒ 30 D. ☐ 15 D. ☐ 7 D.
Other:

Lab Use Only
Comments

| Sample Designation | Date | Time | Media Code | Sample Type Code | Container Size-&Type Code | FSSGAM | FSS ALL | FSSHTD | FSSTRU | Sr-90 | | Comment, Preservation | Lab Sample ID |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 9526-0001-002F | 5/11/04 | 1419 | TS | G | BP | X | | | | X | | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |

NOTES: PO #: 002332 MSR #: 04-1562 ☒ LTP QA ☐ Radwaste QA ☐ Non QA

Samples Shipped Via:
☒ Fed Ex
☐ UPS
☐ Hand
☐ Other ____
7926 4447 1396
Bill of Lading #

Internal Container Temp: 22 Deg. C
Custody Sealed? Y ☑ N ☐
Custody Seal Intact? Y ☑ N ☐

| | |
|---|---|
| 1) Relinquished By: John J. DeGoster Date/Time 5/20/04 / 0910 | 2) Received By: Mike Sandor Date/Time 5-21-04 1000 |
| 3) Relinquished By Date/Time | 4) Received By Date/Time |
| 5) Relinquished By Date/Time | 6) Received By Date/Time |

# COOLER RECEIPT CHECKLIST

Figure 1. Sample Check-in List

Date/Time Received: 5-21-04 1000

SDG#: MSR# 04-1562

Work Order Number: 113505

Shipping Container ID: FED EX 7926 4447 1346 Chain of Custody # 2004-00067, 00079 + 00080

1. Custody Seals on shipping container intact? Yes [ ] No [ ] NA ✓
2. Custody Seals dated and signed? Yes [ ] No [ ] NA ✓
3. Chain-of-Custody record present? Yes [ ] No [✓]
4. Cooler temperature 2d C
5. Vermiculite/packing materials is: Wet [ ] Dry [ ] NA ✓
6. Number of samples in shipping container: 7
7. Sample holding times exceeded? Yes [ ] No [✓]

8. Samples have:

| | |
|---|---|
| ____tape | ____hazard labels |
| ✓ custody seals | ____appropriate sample labels |

9. Samples are:

| | |
|---|---|
| ✓ in good condition | ____leaking |
| ____broken | ____have air bubbles |

10. Were any anomalies identified in sample receipt? Yes [ ] No [✓]
11. Description of anomalies (include sample numbers): _____

Sample Custodian/Laboratory: Mike Hamler GCL Date: 5-21-04

Telephoned to: _____ On _____ By _____

# RADIOLOGICAL ANALYSIS

Radiochemistry Case Narrative
Connecticut Yankee Atomic Power Co. (YANK)
SDG MSR#04-1562

**Method/Analysis Information**

| | |
|---|---|
| **Product:** | **Gammaspec, Gamma, Solid-FSS GAM & ALL FSS** |
| Analytical Method: | EML HASL 300, 4.5.2.3 |
| Prep Method: | Dry Soil Prep |
| Analytical Batch Number: | 335653 |
| Prep Batch Number: | 335544 |

| Sample ID | Client ID |
|---|---|
| 113505001 | 9526-0002-015F |
| 113505002 | 9526-0002-016F |
| 113505003 | 9526-0002-017F |
| 113505004 | 9526-0001-010SP |
| 113505005 | 9526-0001-002F |
| 113505006 | 9526-0001-002SP |
| 113505007 | 9526-0001-009SP |
| 1200644523 | Method Blank (MB) |
| 1200644525 | Laboratory Control Sample (LCS) |
| 1200644524 | 113505001(9526-0002-015F) Sample Duplicate (DUP) |

**SOP Reference**
Procedure for preparation, analysis and reporting of analytical data are controlled by General Engineering Laboratories, LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-RAD-A-013 REV# 10.

**Calibration Information:**

**Calibration Information**
All initial and continuing calibration requirements have been met.

**Standards Information**
Standard solution(s) for these analyses are NIST traceable and used before the expiration date(s).

**Sample Geometry**
All counting sources were prepared in the same geometry as the calibration standards.

**Quality Control (QC) Information:**

**Blank Information**
The blank volume is representative of the sample volume in this batch.

**Designated QC**
The following sample was used for QC: 113505001 (9526-0002-015F).

**QC Information**
All of the QC samples met the required acceptance limits.

**Technical Information:**

**Holding Time**
All sample procedures for this sample set were performed within the required holding time.

**Preparation Information**
All preparation criteria have been met for these analyses.

**Sample Re-prep/Re-analysis**
None of the samples in this sample set required reprep or reanalysis.

**Miscellaneous Information:**

**NCR Documentation**
Nonconformance reports are generated to document any procedural anomalies that may deviate from referenced SOP or contractual documents. An NCR was not generated for this SDG.

**Qualifier information**

| Qualifier | Reason | Analyte | Sample |
|---|---|---|---|
| UI | Data rejected due to interference. | Europium-155 | 113505002 |
| | | | 113505003 |
| | | | 113505004 |
| | | Manganese-54 | 1200644524 |
| UI | Data rejected due to low abundance. | Cesium-134 | 113505001 |
| | | | 113505002 |
| | | | 113505003 |
| | | | 113505004 |
| | | | 113505005 |
| | | | 113505007 |
| | | | 1200644524 |
| | | Europium-155 | 1200644524 |
| | | Manganese-54 | 113505004 |

**Method/Analysis Information**

| | |
|---|---|
| **Product:** | **GFPC, Sr90, solid-ALL FSS** |
| Analytical Method: | EPA 905.0 Modified |
| Prep Method: | Ash Soil Prep |
| Dry Soil Prep GL-RAD-A-021 Method: | Dry Soil Prep |
| Analytical Batch Number: | 335956 |
| Prep Batch Number: | 335545 |
| Dry Soil Prep GL-RAD-A-021 Batch Number: | 335544 |

| Sample ID | Client ID |
|---|---|
| 113505001 | 9526-0002-015F |
| 113505002 | 9526-0002-016F |
| 113505003 | 9526-0002-017F |
| 113505004 | 9526-0001-010SP |
| 113505005 | 9526-0001-002F |
| 1200631487 | Method Blank (MB) |
| 1200631490 | Laboratory Control Sample (LCS) |
| 1200631488 | 113282019(9535-0001-002F) Sample Duplicate (DUP) |
| 1200631489 | 113282019(9535-0001-002F) Matrix Spike (MS) |

**SOP Reference**

Procedure for preparation, analysis and reporting of analytical data are controlled by General Engineering Laboratories, LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-RAD-A-004 REV# 8.

**Calibration Information:**

**Calibration Information**
All initial and continuing calibration requirements have been met.

**Standards Information**
Standard solution(s) for these analyses are NIST traceable and used before the expiration date(s).

**Sample Geometry**
All counting sources were prepared in the same geometry as the calibration standards.

**Quality Control (QC) Information:**

**Blank Information**
The blank volume is representative of the sample volume in this batch.

**Designated QC**
The following sample was used for QC: 113282019 (9535-0001-002F).

**QC Information**
All of the QC samples met the required acceptance limits.

**Technical Information:**

**Holding Time**
All sample procedures for this sample set were performed within the required holding time.

**Preparation Information**
All preparation criteria have been met for these analyses.

**Sample Re-prep/Re-analysis**
None of the samples in this sample set required reprep or reanalysis.

**Chemical Recoveries**
All chemical recoveries meet the required acceptance limits for this sample set.

**Miscellaneous Information:**

**NCR Documentation**
Nonconformance reports are generated to document any procedural anomalies that may deviate from referenced SOP or contractual documents. An NCR was not generated for this SDG.

**Additional Comments**
Samples 113505001 (9526-0002-015F), 113505002 (9526-0002-016F), 113505003 (9526-0002-017F), 113505005 (9526-0001-002F), 1200631487 (MB) and 1200631488 (9535-0001-002F) were verified by recounting at least five days from the initial count date.

**Qualifier Information**
Manual qualifiers were not required.

**Method/Analysis Information**

| | |
|---|---|
| **Product:** | **LSC, Tritium Dist, Solid-HTD2,ALL FSS** |
| Analytical Method: | EPA 906.0 Modified |
| Analytical Batch Number: | 339628 |

| **Sample ID** | **Client ID** |
|---|---|
| 113505006 | 9526-0001-002SP |
| 113505007 | 9526-0001-009SP |
| 1200640251 | Method Blank (MB) |
| 1200640254 | Laboratory Control Sample (LCS) |
| 1200640252 | 113282019(9535-0001-002F) Sample Duplicate (DUP) |
| 1200640253 | 113282019(9535-0001-002F) Matrix Spike (MS) |

**SOP Reference**
Procedure for preparation, analysis and reporting of analytical data are controlled by General Engineering Laboratories, LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-RAD-A-002 REV# 9.

**Calibration Information:**

**Calibration Information**
All initial and continuing calibration requirements have been met.

**Standards Information**
Standard solution(s) for these analyses are NIST traceable and used before the expiration date(s).

**Sample Geometry**
All counting sources were prepared in the same geometry as the calibration standards.

**Quality Control (QC) Information:**

**Blank Information**
The blank volume is representative of the sample volume in this batch.

**Designated QC**
The following sample was used for QC: 113282019 (9535-0001-002F).

**QC Information**
All of the QC samples met the required acceptance limits.

**Technical Information:**

**Holding Time**
All sample procedures for this sample set were performed within the required holding time.

**Preparation Information**
All preparation criteria have been met for these analyses.

**Sample Re-prep/Re-analysis**
None of the samples in this sample set required reprep or reanalysis.

**Miscellaneous Information:**

**NCR Documentation**

Nonconformance reports are generated to document any procedural anomalies that may deviate from referenced SOP or contractual documents. An NCR was not generated for this SDG.

**Qualifier information**
Manual qualifiers were not required.

**Certification Statement**
Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless otherwise noted in the analytical case narrative.

**Review Validation:**
GEL requires all analytical data to be verified by a qualified data validator. In addition, all data designated for CLP or CLP-like packaging will receive a third level validation upon completion of the data package.
**The following data validator verified the information presented in this case narrative:**

Reviewer: Jacqueline G. Chaney 6/18/04

# SAMPLE DATA SUMMARY

# GENERAL ENGINEERING LABORATORIES, LLC

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

## Certificate of Analysis

Company : Connecticut Yankee Atomic Power
Address : Haddam Neck Plant
362 Injun Hollow Road
East Hampton, Connecticut 06424
Contact: Mr. Pete Hollenbeck
Project: Soils PO# 002332

Report Date: June 18, 2004



| | | | |
|---|---|---|---|
| Client Sample ID: | 9526-0002-015F | Project: | YANK00504 |
| Sample ID: | 113505001 | Client ID: | YANK001 |
| Matrix: | Soil | Vol. Recv.: | |
| Collect Date: | 11-MAY-04 | | |
| Receive Date: | 22-MAY-04 | | |
| Collector: | Client | | |
| Moisture: | 33.9% | | |

| Parameter | Qualifier | Result | Uncertainty | LC | TPU | MDA | Units | DF | Analyst | Date | Time | Batch | Mtd. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Rad Gamma Spec Analysis** | | | | | | | | | | | | | |
| *Gammaspec, Gamma, Solid-FSS GAM & ALL FSS* | | | | | | | | | | | | | |
| Actinium-228 | | 1.43 | +/-0.308 | 0.0853 | +/-0.302 | 0.177 | pCi/g | | SRB | 06/13/04 | 2148 | 335653 | 1 |
| Americium-241 | U | 0.0411 | +/-0.0394 | 0.0303 | +/-0.0386 | 0.0615 | pCi/g | | | | | | |
| Bismuth-212 | | 1.24 | +/-0.588 | 0.180 | +/-0.577 | 0.373 | pCi/g | | | | | | |
| Bismuth-214 | | 1.23 | +/-0.180 | 0.0439 | +/-0.177 | 0.0904 | pCi/g | | | | | | |
| Cesium-134 | U<br>UI | 0.00 | +/-0.0396 | 0.0305 | +/-0.0388 | 0.0628 | pCi/g | | | | | | |
| Cesium-137 | | 1.28 | +/-0.137 | 0.0246 | +/-0.135 | 0.0508 | pCi/g | | | | | | |
| Cobalt-60 | U | 0.042 | +/-0.0303 | 0.0261 | +/-0.0297 | 0.0546 | pCi/g | | | | | | |
| Europium-152 | U | 0.00894 | +/-0.0666 | 0.0551 | +/-0.0653 | 0.113 | pCi/g | | | | | | |
| Europium-154 | U | -0.0278 | +/-0.0895 | 0.0698 | +/-0.0878 | 0.146 | pCi/g | | | | | | |
| Europium-155 | U | 0.0494 | +/-0.0945 | 0.0477 | +/-0.0926 | 0.0972 | pCi/g | | | | | | |
| Lead-212 | | 1.54 | +/-0.163 | 0.0333 | +/-0.160 | 0.0678 | pCi/g | | | | | | |
| Lead-214 | | 1.40 | +/-0.176 | 0.0396 | +/-0.172 | 0.0812 | pCi/g | | | | | | |
| Manganese-54 | U | 0.0318 | +/-0.0337 | 0.025 | +/-0.0331 | 0.0518 | pCi/g | | | | | | |
| Niobium-94 | U | 0.00497 | +/-0.0299 | 0.0207 | +/-0.0293 | 0.0428 | pCi/g | | | | | | |
| Potassium-40 | | 19.1 | +/-1.65 | 0.215 | +/-1.61 | 0.455 | pCi/g | | | | | | |
| Radium-226 | | 1.23 | +/-0.180 | 0.0439 | +/-0.177 | 0.0904 | pCi/g | | | | | | |
| Silver-108m | U | -0.0214 | +/-0.0246 | 0.0194 | +/-0.0241 | 0.0399 | pCi/g | | | | | | |
| Thallium-208 | | 0.413 | +/-0.0782 | 0.0231 | +/-0.0766 | 0.0477 | pCi/g | | | | | | |
| **Rad Gas Flow Proportional Counting** | | | | | | | | | | | | | |
| *GFPC, Sr90, solid-ALL FSS* | | | | | | | | | | | | | |
| Strontium-90 | | 0.035 | +/-0.0165 | 0.0134 | +/-0.0182 | 0.029 | pCi/g | | HOB1 | 06/03/04 | 1844 | 335956 | 2 |

**The following Prep Methods were performed**

| Method | Description | Analyst | Date | Time | Prep Batch |
|---|---|---|---|---|---|
| Ash Soil Prep | Ash Soil Prep, GL-RAD-A-021B | MJM1 | 05/25/04 | 1337 | 335545 |
| Dry Soil Prep | Dry Soil Prep GL-RAD-A-021 | AWB | 05/24/04 | 1702 | 335544 |

**The following Analytical Methods were performed**

| Method | Description |
|---|---|
| 1 | EML HASL 300, 4.5.2.3 |
| 2 | EPA 905.0 Modified |

**GENERAL ENGINEERING LABORATORIES, LLC**
2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

# Certificate of Analysis

Company: Connecticut Yankee Atomic Power
Address: Haddam Neck Plant
362 Injun Hollow Road
East Hampton, Connecticut 06424
Contact: Mr. Pete Hollenbeck
Project: Soils PO# 002332

Report Date: June 18, 2004



Client Sample ID: 9526-0002-015F
Sample ID: 113505001

Project: YANK00504
Client ID: YANK001
Vol. Recv.:

| Parameter | Qualifier | Result | Uncertainty | LC | TPU | MDA | Units | DF | AnalystDate | Time | Batch Mtd. |
|---|---|---|---|---|---|---|---|---|---|---|---|

| Surrogate/Tracer recovery | Test | Recovery% | Acceptable Limits |
|---|---|---|---|
| Carrier/Tracer Recovery | GFPC, Sr90, solid-ALL FSS | 100 | (25%-125%) |

Notes:
The Qualifiers in this report are defined as follows :

B Target analyte was detected in the sample as well as the associated blank.
BD Flag for results below the MDC or a flag for low tracer recovery.
E Concentration of the target analyte exceeds the instrument calibration range.
H Analytical holding time exceeded.
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
U Indicates the target analyte was analyzed for but not detected above the detection limit.
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier-please see case narrative, data summary package or contact your project manager for details.
h Sample preparation or preservation holding time exceeded.
The above sample is reported on a dry weight basis.
This data report has been prepared and reviewed in accordance with General Engineering Laboratories, LLC standard operating procedures. Please direct any questions to your Project Manager, Sarah Kozlik.

Reviewed by

# GENERAL ENGINEERING LABORATORIES, LLC

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

## Certificate of Analysis

Company: Connecticut Yankee Atomic Power
Address: Haddam Neck Plant
362 Injun Hollow Road
East Hampton, Connecticut 06424
Contact: Mr. Pete Hollenbeck
Project: Soils PO# 002332

Report Date: June 18, 2004



| | | | |
|---|---|---|---|
| Client Sample ID: | 9526-0002-016F | Project: | YANK00504 |
| Sample ID: | 113505002 | Client ID: | YANK001 |
| Matrix: | Soil | Vol. Recv.: | |
| Collect Date: | 11-MAY-04 | | |
| Receive Date: | 22-MAY-04 | | |
| Collector: | Client | | |
| Moisture: | 32% | | |

| Parameter | Qualifier | Result | Uncertainty | LC | TPU | MDA | Units | DF | Analyst | Date | Time | Batch | Mtd. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Rad Gamma Spec Analysis** | | | | | | | | | | | | | |
| *Gammaspec, Gamma, Solid-FSS GAM & ALL FSS* | | | | | | | | | | | | | |
| Actinium-228 | | 1.03 | +/-0.180 | 0.0463 | +/-0.177 | 0.098 | pCi/g | | SRB | 06/13/04 | 2148 | 335653 | 1 |
| Americium-241 | U | 0.0385 | +/-0.121 | 0.0943 | +/-0.118 | 0.193 | pCi/g | | | | | | |
| Bismuth-212 | | 0.643 | +/-0.243 | 0.101 | +/-0.238 | 0.212 | pCi/g | | | | | | |
| Bismuth-214 | | 0.865 | +/-0.104 | 0.027 | +/-0.102 | 0.0561 | pCi/g | | | | | | |
| Cesium-134 | U | 0.00 | +/-0.028 | 0.0182 | +/-0.0275 | 0.0379 | pCi/g | | | | | | |
| | UI | | | | | | | | | | | | |
| Cesium-137 | | 1.38 | +/-0.107 | 0.0156 | +/-0.105 | 0.0324 | pCi/g | | | | | | |
| Cobalt-60 | U | 0.0286 | +/-0.0185 | 0.017 | +/-0.0181 | 0.036 | pCi/g | | | | | | |
| Europium-152 | U | -0.0382 | +/-0.050 | 0.0383 | +/-0.049 | 0.0791 | pCi/g | | | | | | |
| Europium-154 | U | 0.00831 | +/-0.0503 | 0.0421 | +/-0.0493 | 0.0899 | pCi/g | | | | | | |
| Europium-155 | U | 0.00 | +/-0.0819 | 0.0422 | +/-0.0802 | 0.0864 | pCi/g | | | | | | |
| | UI | | | | | | | | | | | | |
| Lead-212 | | 1.05 | +/-0.110 | 0.0238 | +/-0.107 | 0.0488 | pCi/g | | | | | | |
| Lead-214 | | 0.991 | +/-0.128 | 0.0287 | +/-0.126 | 0.0591 | pCi/g | | | | | | |
| Manganese-54 | U | 0.00397 | +/-0.0267 | 0.0145 | +/-0.0261 | 0.0305 | pCi/g | | | | | | |
| Niobium-94 | U | 0.0142 | +/-0.0154 | 0.0132 | +/-0.0151 | 0.0275 | pCi/g | | | | | | |
| Potassium-40 | | 9.78 | +/-1.05 | 0.132 | +/-1.02 | 0.285 | pCi/g | | | | | | |
| Radium-226 | | 0.865 | +/-0.104 | 0.027 | +/-0.102 | 0.0561 | pCi/g | | | | | | |
| Silver-108m | U | 0.00866 | +/-0.0168 | 0.0144 | +/-0.0165 | 0.0297 | pCi/g | | | | | | |
| Thallium-208 | | 0.348 | +/-0.0516 | 0.0134 | +/-0.0506 | 0.028 | pCi/g | | | | | | |
| **Rad Gas Flow Proportional Counting** | | | | | | | | | | | | | |
| *GFPC, Sr90, solid-ALL FSS* | | | | | | | | | | | | | |
| Strontium-90 | | 0.0467 | +/-0.0177 | 0.0143 | +/-0.0201 | 0.0305 | pCi/g | | HOB1 | 06/03/04 | 1844 | 335956 | 2 |

**The following Prep Methods were performed**

| Method | Description | Analyst | Date | Time | Prep Batch |
|---|---|---|---|---|---|
| Ash Soil Prep | Ash Soil Prep, GL-RAD-A-021B | MJM1 | 05/25/04 | 1337 | 335545 |
| Dry Soil Prep | Dry Soil Prep GL-RAD-A-021 | AWB | 05/24/04 | 1702 | 335544 |

**The following Analytical Methods were performed**

| Method | Description |
|---|---|
| 1 | EML HASL 300, 4.5.2.3 |
| 2 | EPA 905.0 Modified |

**GENERAL ENGINEERING LABORATORIES, LLC**
2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

# Certificate of Analysis

Company : Connecticut Yankee Atomic Power
Address : Haddam Neck Plant
362 Injun Hollow Road
East Hampton, Connecticut 06424
Contact: Mr. Pete Hollenbeck
Project: Soils PO# 002332

Report Date: June 18, 2004



Client Sample ID: 9526-0002-016F
Sample ID: 113505002

Project: YANK00504
Client ID: YANK001
Vol. Recv.:

| Parameter | Qualifier | Result | Uncertainty | LC | TPU | MDA | Units | DF | AnalystDate | Time | Batch Mtd. |
|---|---|---|---|---|---|---|---|---|---|---|---|

| Surrogate/Tracer recovery | Test | Recovery% | Acceptable Limits |
|---|---|---|---|
| Carrier/Tracer Recovery | GFPC, Sr90, solid-ALL FSS | 107 | (25%-125%) |

Notes:
The Qualifiers in this report are defined as follows :

B Target analyte was detected in the sample as well as the associated blank.
BD Flag for results below the MDC or a flag for low tracer recovery.
E Concentration of the target analyte exceeds the instrument calibration range.
H Analytical holding time exceeded.
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
U Indicates the target analyte was analyzed for but not detected above the detection limit.
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier-please see case narrative, data summary package or contact your project manager for details.
h Sample preparation or preservation holding time exceeded.

The above sample is reported on a dry weight basis.
This data report has been prepared and reviewed in accordance with General Engineering Laboratories, LLC standard operating procedures. Please direct any questions to your Project Manager, Sarah Kozlik.

Reviewed by

# GENERAL ENGINEERING LABORATORIES, LLC

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

## Certificate of Analysis

Company: Connecticut Yankee Atomic Power
Address: Haddam Neck Plant
362 Injun Hollow Road
East Hampton, Connecticut 06424
Contact: Mr. Pete Hollenbeck
Project: Soils PO# 002332

Report Date: June 18, 2004



| | | | |
|---|---|---|---|
| Client Sample ID: | 9526-0002-017F | Project: | YANK00504 |
| Sample ID: | 113505003 | Client ID: | YANK001 |
| Matrix: | Soil | Vol. Recv.: | |
| Collect Date: | 11-MAY-04 | | |
| Receive Date: | 22-MAY-04 | | |
| Collector: | Client | | |
| Moisture: | 31.4% | | |

| Parameter | Qualifier | Result | Uncertainty | LC | TPU | MDA | Units | DF | Analyst | Date | Time | Batch | Mtd. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Rad Gamma Spec Analysis** | | | | | | | | | | | | | |
| *Gammaspec, Gamma, Solid-FSS GAM & ALL FSS* | | | | | | | | | | | | | |
| Actinium-228 | | 1.85 | +/-0.312 | 0.0696 | +/-0.306 | 0.147 | pCi/g | | SRB | 06/13/04 | 2149 | 335653 | 1 |
| Americium-241 | U | 0.0184 | +/-0.0474 | 0.0269 | +/-0.0465 | 0.0548 | pCi/g | | | | | | |
| Bismuth-212 | | 1.22 | +/-0.425 | 0.153 | +/-0.416 | 0.321 | pCi/g | | | | | | |
| Bismuth-214 | | 1.09 | +/-0.148 | 0.0365 | +/-0.145 | 0.0762 | pCi/g | | | | | | |
| Cesium-134 | U | 0.00 | +/-0.0747 | 0.0308 | +/-0.0732 | 0.0638 | pCi/g | | | | | | |
| | U1 | | | | | | | | | | | | |
| Cesium-137 | | 1.20 | +/-0.126 | 0.0225 | +/-0.124 | 0.0468 | pCi/g | | | | | | |
| Cobalt-60 | U | 0.00918 | +/-0.027 | 0.0229 | +/-0.0264 | 0.0489 | pCi/g | | | | | | |
| Europium-152 | U | -0.0116 | +/-0.058 | 0.0466 | +/-0.0569 | 0.0964 | pCi/g | | | | | | |
| Europium-154 | U | -0.00192 | +/-0.077 | 0.064 | +/-0.0755 | 0.136 | pCi/g | | | | | | |
| Europium-155 | U | 0.00 | +/-0.0781 | 0.0402 | +/-0.0765 | 0.0823 | pCi/g | | | | | | |
| | U1 | | | | | | | | | | | | |
| Lead-212 | | 1.78 | +/-0.168 | 0.0285 | +/-0.164 | 0.0584 | pCi/g | | | | | | |
| Lead-214 | | 1.21 | +/-0.147 | 0.0357 | +/-0.144 | 0.0736 | pCi/g | | | | | | |
| Manganese-54 | U | 0.0303 | +/-0.0329 | 0.0227 | +/-0.0323 | 0.0475 | pCi/g | | | | | | |
| Niobium-94 | U | -0.00243 | +/-0.0227 | 0.0186 | +/-0.0222 | 0.0389 | pCi/g | | | | | | |
| Potassium-40 | | 15.2 | +/-1.34 | 0.192 | +/-1.31 | 0.413 | pCi/g | | | | | | |
| Radium-226 | | 1.09 | +/-0.148 | 0.0365 | +/-0.145 | 0.0762 | pCi/g | | | | | | |
| Silver-108m | U | -0.00229 | +/-0.0226 | 0.0179 | +/-0.0222 | 0.0371 | pCi/g | | | | | | |
| Thallium-208 | | 0.559 | +/-0.0843 | 0.0204 | +/-0.0827 | 0.0425 | pCi/g | | | | | | |
| **Rad Gas Flow Proportional Counting** | | | | | | | | | | | | | |
| *GFPC, Sr90, solid-ALL FSS* | | | | | | | | | | | | | |
| Strontium-90 | | 0.0716 | +/-0.0196 | 0.0135 | +/-0.0255 | 0.0292 | pCi/g | | HOB1 | 06/03/04 | 1844 | 335956 | 2 |

**The following Prep Methods were performed**

| Method | Description | Analyst | Date | Time | Prep Batch |
|---|---|---|---|---|---|
| Ash Soil Prep | Ash Soil Prep, GL-RAD-A-021B | MJM1 | 05/25/04 | 1337 | 335545 |
| Dry Soil Prep | Dry Soil Prep GL-RAD-A-021 | AWB | 05/24/04 | 1702 | 335544 |

**The following Analytical Methods were performed**

| Method | Description |
|---|---|
| 1 | EML HASL 300, 4.5.2.3 |
| 2 | EPA 905.0 Modified |

# GENERAL ENGINEERING LABORATORIES, LLC

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

## Certificate of Analysis

Company : Connecticut Yankee Atomic Power
Address : Haddam Neck Plant
362 Injun Hollow Road
East Hampton, Connecticut 06424
Contact: Mr. Pete Hollenbeck
Project: Soils PO# 002332

Report Date: June 18, 2004



Client Sample ID: 9526-0002-017F
Sample ID: 113505003

Project: YANK00504
Client ID: YANK001
Vol. Recv.:

| Parameter | Qualifier | Result | Uncertainty | LC | TPU | MDA | Units | DF | AnalystDate | Time | Batch Mtd. |
|---|---|---|---|---|---|---|---|---|---|---|---|

| Surrogate/Tracer recovery | Test | Recovery% | Acceptable Limits |
|---|---|---|---|
| Carrier/Tracer Recovery | GFPC, Sr90, solid-ALL FSS | 98 | (25%-125%) |

Notes:
The Qualifiers in this report are defined as follows :

B Target analyte was detected in the sample as well as the associated blank.
BD Flag for results below the MDC or a flag for low tracer recovery.
E Concentration of the target analyte exceeds the instrument calibration range.
H Analytical holding time exceeded.
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
U Indicates the target analyte was analyzed for but not detected above the detection limit.
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier-please see case narrative, data summary package or contact your project manager for details.
h Sample preparation or preservation holding time exceeded.

The above sample is reported on a dry weight basis.
This data report has been prepared and reviewed in accordance with General Engineering Laboratories, LLC standard operating procedures. Please direct any questions to your Project Manager, Sarah Kozlik.

Reviewed by

# GENERAL ENGINEERING LABORATORIES, LLC

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

## Certificate of Analysis

Company: Connecticut Yankee Atomic Power
Address: Haddam Neck Plant
362 Injun Hollow Road
East Hampton, Connecticut 06424
Contact: Mr. Pete Hollenbeck
Project: Soils PO# 002332

Report Date: June 18, 2004



| | | | |
|---|---|---|---|
| Client Sample ID: | 9526-0001-010SP | Project: | YANK00504 |
| Sample ID: | 113505004 | Client ID: | YANK001 |
| Matrix: | Soil | Vol. Recv.: | |
| Collect Date: | 03-MAR-04 | | |
| Receive Date: | 22-MAY-04 | | |
| Collector: | Client | | |
| Moisture: | 32.9% | | |

| Parameter | Qualifier | Result | Uncertainty | LC | TPU | MDA | Units | DF | Analyst | Date | Time | Batch | Mtd. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Rad Gamma Spec Analysis** | | | | | | | | | | | | | |
| *Gammaspec, Gamma, Solid-FSS GAM & ALL FSS* | | | | | | | | | | | | | |
| Actinium-228 | | 1.45 | +/-0.232 | 0.049 | +/-0.227 | 0.103 | pCi/g | | SRB | 06/13/04 | 2149 | 335653 | 1 |
| Americium-241 | U | -0.0208 | +/-0.0766 | 0.0553 | +/-0.075 | 0.113 | pCi/g | | | | | | |
| Bismuth-212 | | 0.857 | +/-0.277 | 0.111 | +/-0.272 | 0.232 | pCi/g | | | | | | |
| Bismuth-214 | | 1.23 | +/-0.134 | 0.0253 | +/-0.132 | 0.0525 | pCi/g | | | | | | |
| Cesium-134 | U | 0.00 | +/-0.0382 | 0.0197 | +/-0.0374 | 0.0409 | pCi/g | | | | | | |
| | UI | | | | | | | | | | | | |
| Cesium-137 | | 0.635 | +/-0.0629 | 0.0165 | +/-0.0617 | 0.0342 | pCi/g | | | | | | |
| Cobalt-60 | U | 0.0106 | +/-0.0191 | 0.0161 | +/-0.0188 | 0.0342 | pCi/g | | | | | | |
| Europium-152 | U | -0.018 | +/-0.0445 | 0.0347 | +/-0.0436 | 0.0715 | pCi/g | | | | | | |
| Europium-154 | U | -0.0137 | +/-0.0578 | 0.0462 | +/-0.0566 | 0.0973 | pCi/g | | | | | | |
| Europium-155 | U | 0.00 | +/-0.0775 | 0.0367 | +/-0.0759 | 0.0749 | pCi/g | | | | | | |
| | UI | | | | | | | | | | | | |
| Lead-212 | | 1.53 | +/-0.132 | 0.0211 | +/-0.129 | 0.0431 | pCi/g | | | | | | |
| Lead-214 | | 1.40 | +/-0.146 | 0.0248 | +/-0.143 | 0.0511 | pCi/g | | | | | | |
| Manganese-54 | U | 0.00 | +/-0.0368 | 0.0183 | +/-0.0361 | 0.038 | pCi/g | | | | | | |
| | UI | | | | | | | | | | | | |
| Niobium-94 | U | -0.00344 | +/-0.0159 | 0.0127 | +/-0.0156 | 0.0265 | pCi/g | | | | | | |
| Potassium-40 | | 12.9 | +/-1.12 | 0.127 | +/-1.10 | 0.272 | pCi/g | | | | | | |
| Radium-226 | | 1.23 | +/-0.134 | 0.0253 | +/-0.132 | 0.0525 | pCi/g | | | | | | |
| Silver-108m | U | 0.0034 | +/-0.0148 | 0.0125 | +/-0.0145 | 0.0259 | pCi/g | | | | | | |
| Thallium-208 | | 0.460 | +/-0.0616 | 0.0148 | +/-0.0603 | 0.0306 | pCi/g | | | | | | |
| **Rad Gas Flow Proportional Counting** | | | | | | | | | | | | | |
| *GFPC, Sr90, solid-ALL FSS* | | | | | | | | | | | | | |
| Strontium-90 | U | 0.0231 | +/-0.0155 | 0.0137 | +/-0.0163 | 0.0294 | pCi/g | | HOB1 | 06/03/04 | 1844 | 335956 | 2 |

**The following Prep Methods were performed**

| Method | Description | Analyst | Date | Time | Prep Batch |
|---|---|---|---|---|---|
| Ash Soil Prep | Ash Soil Prep, GL-RAD-A-021B | MJM1 | 05/25/04 | 1337 | 335545 |
| Dry Soil Prep | Dry Soil Prep GL-RAD-A-021 | AWB | 05/24/04 | 1702 | 335544 |

**The following Analytical Methods were performed**

| Method | Description |
|---|---|
| 1 | EML HASL 300, 4.5.2.3 |
| 2 | EPA 905.0 Modified |

# GENERAL ENGINEERING LABORATORIES, LLC

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

## Certificate of Analysis

Company : Connecticut Yankee Atomic Power
Address : Haddam Neck Plant
362 Injun Hollow Road
East Hampton, Connecticut 06424
Contact: Mr. Pete Hollenbeck
Project: Soils PO# 002332

Report Date: June 18, 2004



Client Sample ID: 9526-0001-010SP
Sample ID: 113505004

Project: YANK00504
Client ID: YANK001
Vol. Recv.:

| Parameter | Qualifier | Result | Uncertainty | LC | TPU | MDA | Units | DF | AnalystDate | Time | Batch Mtd. |
|---|---|---|---|---|---|---|---|---|---|---|---|

| Surrogate/Tracer recovery | Test | Recovery% | Acceptable Limits |
|---|---|---|---|
| Carrier/Tracer Recovery | GFPC, Sr90, solid-ALL FSS | 103 | (25%-125%) |

Notes:
The Qualifiers in this report are defined as follows :

B Target analyte was detected in the sample as well as the associated blank.
BD Flag for results below the MDC or a flag for low tracer recovery.
E Concentration of the target analyte exceeds the instrument calibration range.
H Analytical holding time exceeded.
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
U Indicates the target analyte was analyzed for but not detected above the detection limit.
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier-please see case narrative, data summary package or contact your project manager for details.
h Sample preparation or preservation holding time exceeded.

The above sample is reported on a dry weight basis.
This data report has been prepared and reviewed in accordance with General Engineering Laboratories, LLC standard operating procedures. Please direct any questions to your Project Manager, Sarah Kozlik.

Reviewed by

# GENERAL ENGINEERING LABORATORIES, LLC

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

## Certificate of Analysis

Company: Connecticut Yankee Atomic Power
Address: Haddam Neck Plant
362 Injun Hollow Road
East Hampton, Connecticut 06424
Contact: Mr. Pete Hollenbeck
Project: Soils PO# 002332

Report Date: June 18, 2004



| | | | |
|---|---|---|---|
| Client Sample ID: | 9526-0001-002F | Project: | YANK00504 |
| Sample ID: | 113505005 | Client ID: | YANK001 |
| Matrix: | Soil | Vol. Recv.: | |
| Collect Date: | 11-MAY-04 | | |
| Receive Date: | 22-MAY-04 | | |
| Collector: | Client | | |
| Moisture: | 26.8% | | |

| Parameter | Qualifier | Result | Uncertainty | LC | TPU | MDA | Units | DF | Analyst | Date | Time | Batch | Mtd. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Rad Gamma Spec Analysis** | | | | | | | | | | | | | |
| *Gammaspec, Gamma, Solid-FSS GAM & ALL FSS* | | | | | | | | | | | | | |
| Actinium-228 | | 1.14 | +/-0.195 | 0.0422 | +/-0.191 | 0.0886 | pCi/g | | SRB | 06/13/04 | 2150 | 335653 | 1 |
| Americium-241 | U | 0.0409 | +/-0.0818 | 0.0716 | +/-0.0801 | 0.146 | pCi/g | | | | | | |
| Bismuth-212 | | 0.634 | +/-0.188 | 0.0968 | +/-0.184 | 0.202 | pCi/g | | | | | | |
| Bismuth-214 | | 0.836 | +/-0.0985 | 0.0211 | +/-0.0965 | 0.044 | pCi/g | | | | | | |
| Cesium-134 | U | 0.00 | +/-0.0305 | 0.0165 | +/-0.0299 | 0.0341 | pCi/g | | | | | | |
| | UI | | | | | | | | | | | | |
| Cesium-137 | | 0.409 | +/-0.0508 | 0.0121 | +/-0.0498 | 0.0253 | pCi/g | | | | | | |
| Cobalt-60 | U | -0.000118 | +/-0.0151 | 0.0124 | +/-0.0148 | 0.0264 | pCi/g | | | | | | |
| Europium-152 | U | -0.0163 | +/-0.0423 | 0.0313 | +/-0.0415 | 0.0645 | pCi/g | | | | | | |
| Europium-154 | U | -0.00446 | +/-0.0446 | 0.0364 | +/-0.0437 | 0.0773 | pCi/g | | | | | | |
| Europium-155 | U | 0.0119 | +/-0.0542 | 0.0354 | +/-0.0531 | 0.0722 | pCi/g | | | | | | |
| Lead-212 | | 1.18 | +/-0.114 | 0.0179 | +/-0.112 | 0.0368 | pCi/g | | | | | | |
| Lead-214 | | 1.01 | +/-0.120 | 0.022 | +/-0.118 | 0.0453 | pCi/g | | | | | | |
| Manganese-54 | U | -0.000631 | +/-0.0178 | 0.0124 | +/-0.0174 | 0.026 | pCi/g | | | | | | |
| Niobium-94 | U | -0.000245 | +/-0.0133 | 0.0108 | +/-0.013 | 0.0225 | pCi/g | | | | | | |
| Potassium-40 | | 10.6 | +/-0.984 | 0.102 | +/-0.964 | 0.220 | pCi/g | | | | | | |
| Radium-226 | | 0.836 | +/-0.0985 | 0.0211 | +/-0.0965 | 0.044 | pCi/g | | | | | | |
| Silver-108m | U | -0.00175 | +/-0.0128 | 0.0108 | +/-0.0126 | 0.0223 | pCi/g | | | | | | |
| Thallium-208 | | 0.374 | +/-0.0432 | 0.0119 | +/-0.0424 | 0.0248 | pCi/g | | | | | | |
| **Rad Gas Flow Proportional Counting** | | | | | | | | | | | | | |
| *GFPC, Sr90, solid-ALL FSS* | | | | | | | | | | | | | |
| Strontium-90 | | 0.0847 | +/-0.0186 | 0.012 | +/-0.0258 | 0.0257 | pCi/g | | HOB1 | 06/03/04 | 1844 | 335956 | 2 |

**The following Prep Methods were performed**

| Method | Description | Analyst | Date | Time | Prep Batch |
|---|---|---|---|---|---|
| Ash Soil Prep | Ash Soil Prep, GL-RAD-A-021B | MJM1 | 05/25/04 | 1337 | 335545 |
| Dry Soil Prep | Dry Soil Prep GL-RAD-A-021 | AWB | 05/24/04 | 1702 | 335544 |

**The following Analytical Methods were performed**

| Method | Description |
|---|---|
| 1 | EML HASL 300, 4.5.2.3 |
| 2 | EPA 905.0 Modified |

**GENERAL ENGINEERING LABORATORIES, LLC**
2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

# Certificate of Analysis

Company : Connecticut Yankee Atomic Power
Address : Haddam Neck Plant
362 Injun Hollow Road
East Hampton, Connecticut 06424
Contact: Mr. Pete Hollenbeck
Project: Soils PO# 002332

Report Date: June 18, 2004



Client Sample ID: 9526-0001-002F
Sample ID: 113505005

Project: YANK00504
Client ID: YANK001
Vol. Recv.:

| Parameter | Qualifier | Result | Uncertainty | LC | TPU | MDA | Units | DF | AnalystDate | Time | Batch Mtd. |
|---|---|---|---|---|---|---|---|---|---|---|---|

| Surrogate/Tracer recovery | Test | Recovery% | Acceptable Limits |
|---|---|---|---|
| Carrier/Tracer Recovery | GFPC, Sr90, solid-ALL FSS | 106 | (25%-125%) |

Notes:
The Qualifiers in this report are defined as follows :

B Target analyte was detected in the sample as well as the associated blank.
BD Flag for results below the MDC or a flag for low tracer recovery.
E Concentration of the target analyte exceeds the instrument calibration range.
H Analytical holding time exceeded.
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
U Indicates the target analyte was analyzed for but not detected above the detection limit.
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier-please see case narrative, data summary package or contact your project manager for details.
h Sample preparation or preservation holding time exceeded.

The above sample is reported on a dry weight basis.
This data report has been prepared and reviewed in accordance with General Engineering Laboratories, LLC standard operating procedures. Please direct any questions to your Project Manager, Sarah Kozlik.

Reviewed by

# GENERAL ENGINEERING LABORATORIES, LLC

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

## Certificate of Analysis

Company : Connecticut Yankee Atomic Power
Address : Haddam Neck Plant
362 Injun Hollow Road
East Hampton, Connecticut 06424
Contact: Mr. Pete Hollenbeck
Project: Soils PO# 002332

Report Date: June 18, 2004



| | | | |
|---|---|---|---|
| Client Sample ID: | 9526-0001-002SP | Project: | YANK00504 |
| Sample ID: | 113505006 | Client ID: | YANK001 |
| Matrix: | Soil | Vol. Recv.: | |
| Collect Date: | 03-MAR-04 | | |
| Receive Date: | 22-MAY-04 | | |
| Collector: | Client | | |
| Moisture: | 36.1% | | |

| Parameter | Qualifier | Result | Uncertainty | LC | TPU | MDA | Units | DF | Analyst | Date | Time | Batch | Mtd. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Rad Gamma Spec Analysis** | | | | | | | | | | | | | |
| *Gammaspec, Gamma, Solid-FSS GAM & ALL FSS* | | | | | | | | | | | | | |
| Actinium-228 | | 1.01 | +/-0.205 | 0.0491 | +/-0.200 | 0.104 | pCi/g | | SRB | 06/13/04 | 2150 | 335653 | 1 |
| Americium-241 | U | 0.00856 | +/-0.0811 | 0.0619 | +/-0.0795 | 0.127 | pCi/g | | | | | | |
| Bismuth-212 | | 0.767 | +/-0.263 | 0.101 | +/-0.258 | 0.214 | pCi/g | | | | | | |
| Bismuth-214 | | 0.849 | +/-0.113 | 0.0278 | +/-0.111 | 0.0582 | pCi/g | | | | | | |
| Cesium-134 | U | 0.0399 | +/-0.0321 | 0.0202 | +/-0.0314 | 0.0423 | pCi/g | | | | | | |
| Cesium-137 | | 1.22 | +/-0.0979 | 0.0157 | +/-0.096 | 0.0329 | pCi/g | | | | | | |
| Cobalt-60 | U | 0.0205 | +/-0.0197 | 0.0163 | +/-0.0193 | 0.035 | pCi/g | | | | | | |
| Europium-152 | U | -0.0336 | +/-0.0539 | 0.0409 | +/-0.0528 | 0.0847 | pCi/g | | | | | | |
| Europium-154 | U | -0.0481 | +/-0.0587 | 0.0444 | +/-0.0576 | 0.0955 | pCi/g | | | | | | |
| Europium-155 | U | 0.051 | +/-0.0504 | 0.0428 | +/-0.0494 | 0.0876 | pCi/g | | | | | | |
| Lead-212 | | 1.14 | +/-0.120 | 0.0249 | +/-0.118 | 0.0511 | pCi/g | | | | | | |
| Lead-214 | | 0.871 | +/-0.116 | 0.0314 | +/-0.114 | 0.0648 | pCi/g | | | | | | |
| Manganese-54 | U | 0.0282 | +/-0.0213 | 0.0149 | +/-0.0208 | 0.0317 | pCi/g | | | | | | |
| Niobium-94 | U | 0.00226 | +/-0.0164 | 0.0133 | +/-0.016 | 0.0279 | pCi/g | | | | | | |
| Potassium-40 | | 8.91 | +/-0.956 | 0.134 | +/-0.937 | 0.293 | pCi/g | | | | | | |
| Radium-226 | | 0.849 | +/-0.113 | 0.0278 | +/-0.111 | 0.0582 | pCi/g | | | | | | |
| Silver-108m | U | 0.00589 | +/-0.0174 | 0.0146 | +/-0.017 | 0.0303 | pCi/g | | | | | | |
| Thallium-208 | | 0.304 | +/-0.0554 | 0.015 | +/-0.0543 | 0.0315 | pCi/g | | | | | | |
| **Rad Liquid Scintillation Analysis** | | | | | | | | | | | | | |
| *LSC, Tritium Dist, Solid-HTD2,ALL FSS* | | | | | | | | | | | | | |
| Tritium | U | -1.58 | +/-4.39 | 3.80 | +/-4.39 | 7.60 | pCi/g | | JLB1 | 06/11/04 | 2343 | 339628 | 2 |

**The following Prep Methods were performed**

| Method | Description | Analyst | Date | Time | Prep Batch |
|---|---|---|---|---|---|
| Dry Soil Prep | Dry Soil Prep GL-RAD-A-021 | AWB | 05/24/04 | 1702 | 335544 |

**The following Analytical Methods were performed**

| Method | Description |
|---|---|
| 1 | EML HASL 300, 4.5.2.3 |
| 2 | EPA 906.0 Modified |

Notes:
The Qualifiers in this report are defined as follows :

# GENERAL ENGINEERING LABORATORIES, LLC

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

## Certificate of Analysis

Company : Connecticut Yankee Atomic Power
Address : Haddam Neck Plant
362 Injun Hollow Road
East Hampton, Connecticut 06424
Contact: Mr. Pete Hollenbeck
Project: Soils PO# 002332

Report Date: June 18, 2004



Client Sample ID: 9526-0001-002SP
Sample ID: 113505006

Project: YANK00504
Client ID: YANK001
Vol. Recv.:

| Parameter | Qualifier | Result | Uncertainty | LC | TPU | MDA | Units | DF | AnalystDate | Time | Batch Mtd. |
|---|---|---|---|---|---|---|---|---|---|---|---|

B Target analyte was detected in the sample as well as the associated blank.
BD Flag for results below the MDC or a flag for low tracer recovery.
E Concentration of the target analyte exceeds the instrument calibration range.
H Analytical holding time exceeded.
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
U Indicates the target analyte was analyzed for but not detected above the detection limit.
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier-please see case narrative, data summary package or contact your project manager for details.
h Sample preparation or preservation holding time exceeded.

The above sample is reported on a dry weight basis.

This data report has been prepared and reviewed in accordance with General Engineering Laboratories, LLC standard operating procedures. Please direct any questions to your Project Manager, Sarah Kozlik.

Reviewed by

# GENERAL ENGINEERING LABORATORIES, LLC

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

## Certificate of Analysis

Company : Connecticut Yankee Atomic Power
Address : Haddam Neck Plant
362 Injun Hollow Road
East Hampton, Connecticut 06424
Contact: Mr. Pete Hollenbeck
Project: Soils PO# 002332

Report Date: June 18, 2004



| | | | |
|---|---|---|---|
| Client Sample ID: | 9526-0001-009SP | Project: | YANK00504 |
| Sample ID: | 113505007 | Client ID: | YANK001 |
| Matrix: | Soil | Vol. Recv.: | |
| Collect Date: | 03-MAR-04 | | |
| Receive Date: | 22-MAY-04 | | |
| Collector: | Client | | |
| Moisture: | 16.9% | | |

| Parameter | Qualifier | Result | Uncertainty | LC | TPU | MDA | Units | DF | Analyst | Date | Time | Batch | Mtd. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Rad Gamma Spec Analysis** | | | | | | | | | | | | | |
| *Gammaspec, Gamma, Solid-FSS GAM & ALL FSS* | | | | | | | | | | | | | |
| Actinium-228 | | 0.778 | +/-0.157 | 0.0431 | +/-0.154 | 0.0908 | pCi/g | | SRB | 06/13/04 | 2151 | 335653 | 1 |
| Americium-241 | U | 0.061 | +/-0.0574 | 0.0523 | +/-0.0563 | 0.107 | pCi/g | | | | | | |
| Bismuth-212 | | 0.648 | +/-0.213 | 0.0938 | +/-0.208 | 0.197 | pCi/g | | | | | | |
| Bismuth-214 | | 0.525 | +/-0.0851 | 0.023 | +/-0.0834 | 0.0479 | pCi/g | | | | | | |
| Cesium-134 | U<br>UI | 0.00 | +/-0.0249 | 0.017 | +/-0.0244 | 0.0354 | pCi/g | | | | | | |
| Cesium-137 | | 0.211 | +/-0.0436 | 0.0128 | +/-0.0427 | 0.0266 | pCi/g | | | | | | |
| Cobalt-60 | U | 0.00758 | +/-0.0151 | 0.0128 | +/-0.0148 | 0.0275 | pCi/g | | | | | | |
| Europium-152 | U | -0.0445 | +/-0.0368 | 0.0301 | +/-0.0361 | 0.0623 | pCi/g | | | | | | |
| Europium-154 | U | -0.0265 | +/-0.0478 | 0.0373 | +/-0.0468 | 0.0794 | pCi/g | | | | | | |
| Europium-155 | U | 0.0355 | +/-0.053 | 0.0333 | +/-0.052 | 0.0682 | pCi/g | | | | | | |
| Lead-212 | | 0.828 | +/-0.0783 | 0.0187 | +/-0.0767 | 0.0384 | pCi/g | | | | | | |
| Lead-214 | | 0.626 | +/-0.0824 | 0.0219 | +/-0.0808 | 0.0453 | pCi/g | | | | | | |
| Manganese-54 | U | 0.0156 | +/-0.0183 | 0.0162 | +/-0.018 | 0.0338 | pCi/g | | | | | | |
| Niobium-94 | U | 0.00311 | +/-0.0137 | 0.0113 | +/-0.0134 | 0.0236 | pCi/g | | | | | | |
| Potassium-40 | | 11.4 | +/-0.949 | 0.110 | +/-0.930 | 0.237 | pCi/g | | | | | | |
| Radium-226 | | 0.525 | +/-0.0851 | 0.023 | +/-0.0834 | 0.0479 | pCi/g | | | | | | |
| Silver-108m | U | -0.00114 | +/-0.0126 | 0.0106 | +/-0.0123 | 0.022 | pCi/g | | | | | | |
| Thallium-208 | | 0.274 | +/-0.0404 | 0.0128 | +/-0.0396 | 0.0267 | pCi/g | | | | | | |
| **Rad Liquid Scintillation Analysis** | | | | | | | | | | | | | |
| *LSC, Tritium Dist, Solid-HTD2,ALL FSS* | | | | | | | | | | | | | |
| Tritium | U | -3.52 | +/-3.04 | 2.81 | +/-3.06 | 5.63 | pCi/g | | JLB1 | 06/12/04 | 0016 | 339628 | 2 |

**The following Prep Methods were performed**

| Method | Description | Analyst | Date | Time | Prep Batch |
|---|---|---|---|---|---|
| Dry Soil Prep | Dry Soil Prep GL-RAD-A-021 | AWB | 05/24/04 | 1702 | 335544 |

**The following Analytical Methods were performed**

| Method | Description |
|---|---|
| 1 | EML HASL 300, 4.5.2.3 |
| 2 | EPA 906.0 Modified |

# GENERAL ENGINEERING LABORATORIES, LLC

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

## Certificate of Analysis

Company: Connecticut Yankee Atomic Power
Address: Haddam Neck Plant
362 Injun Hollow Road
East Hampton, Connecticut 06424
Contact: Mr. Pete Hollenbeck
Project: Soils PO# 002332

Report Date: June 18, 2004



Client Sample ID: 9526-0001-009SP
Sample ID: 113505007

Project: YANK00504
Client ID: YANK001
Vol. Recv.:

| Parameter | Qualifier | Result | Uncertainty | LC | TPU | MDA | Units | DF | AnalystDate | Time | Batch Mtd. |
|---|---|---|---|---|---|---|---|---|---|---|---|

Notes:
The Qualifiers in this report are defined as follows:

B Target analyte was detected in the sample as well as the associated blank.
BD Flag for results below the MDC or a flag for low tracer recovery.
E Concentration of the target analyte exceeds the instrument calibration range.
H Analytical holding time exceeded.
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
U Indicates the target analyte was analyzed for but not detected above the detection limit.
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier-please see case narrative, data summary package or contact your project manager for details.
h Sample preparation or preservation holding time exceeded.

The above sample is reported on a dry weight basis.
This data report has been prepared and reviewed in accordance with General Engineering Laboratories, LLC standard operating procedures. Please direct any questions to your Project Manager, Sarah Kozlik.

Reviewed by

# QUALITY CONTROL DATA

# QC Summary

Report Date: June 18, 2004
Page 1 of 5

Client : Connecticut Yankee Atomic Power
Haddam Neck Plant
362 Injun Hollow Road
East Hampton, Connecticut
Contact: Mr. Pete Hollenbeck

Workorder: 113505

| Parmname | NOM | Sample | Qual | QC | Units | RPD% | REC% | Range | Anlst | Date Time |
|---|---|---|---|---|---|---|---|---|---|---|
| **Rad Gamma Spec** | | | | | | | | | | |
| Batch 335653 | | | | | | | | | | |
| QC1200644524 113505001 DUP | | | | | | | | | | |
| Actinium-228 | | 1.43 | | 1.47 | pCi/g | 3 | | (0% - 100%) | SRB | 06/15/04 14:32 |
| | Uncert: | +/-0.308 | | +/-0.265 | | | | | | |
| | TPU: | +/-0.302 | | +/-0.259 | | | | | | |
| Americium-241 | U | 0.0411 | U | 0.00219 | pCi/g | 180 | | (0% - 100%) | | |
| | Uncert: | +/-0.0394 | | +/-0.159 | | | | | | |
| | TPU: | +/-0.0386 | | +/-0.156 | | | | | | |
| Bismuth-212 | | 1.24 | | 0.879 | pCi/g | 34 | | (0% - 100%) | | |
| | Uncert: | +/-0.588 | | +/-0.317 | | | | | | |
| | TPU: | +/-0.577 | | +/-0.310 | | | | | | |
| Bismuth-214 | | 1.23 | | 1.23 | pCi/g | 0 | | (0% - 20%) | | |
| | Uncert: | +/-0.180 | | +/-0.146 | | | | | | |
| | TPU: | +/-0.177 | | +/-0.143 | | | | | | |
| Cesium-134 | UUI | 0.00 | UUI | 0.00 | pCi/g | 7 | | (0% - 100%) | | |
| | Uncert: | +/-0.0396 | | +/-0.0384 | | | | | | |
| | TPU: | +/-0.0388 | | +/-0.0376 | | | | | | |
| Cesium-137 | | 1.28 | | 1.22 | pCi/g | 5 | | (0% - 100%) | | |
| | Uncert: | +/-0.137 | | +/-0.0988 | | | | | | |
| | TPU: | +/-0.135 | | +/-0.0969 | | | | | | |
| Cobalt-60 | U | 0.042 | U | 0.0142 | pCi/g | 99 | | (0% - 100%) | | |
| | Uncert: | +/-0.0303 | | +/-0.0234 | | | | | | |
| | TPU: | +/-0.0297 | | +/-0.0229 | | | | | | |
| Europium-152 | U | 0.00894 | U | 0.0015 | pCi/g | 142 | | (0% - 100%) | | |
| | Uncert: | +/-0.0666 | | +/-0.0586 | | | | | | |
| | TPU: | +/-0.0653 | | +/-0.0574 | | | | | | |
| Europium-154 | U | -0.0278 | U | -0.0571 | pCi/g | N/A | | (0% - 100%) | | |
| | Uncert: | +/-0.0895 | | +/-0.0705 | | | | | | |
| | TPU: | +/-0.0878 | | +/-0.0691 | | | | | | |
| Europium-155 | U | 0.0494 | UUI | 0.00 | pCi/g | 76 | | (0% - 100%) | | |
| | Uncert: | +/-0.0945 | | +/-0.0941 | | | | | | |
| | TPU: | +/-0.0926 | | +/-0.0922 | | | | | | |
| Lead-212 | | 1.54 | | 1.52 | pCi/g | 2 | | (0% - 20%) | | |
| | Uncert: | +/-0.163 | | +/-0.152 | | | | | | |
| | TPU: | +/-0.160 | | +/-0.149 | | | | | | |
| Lead-214 | | 1.40 | | 1.45 | pCi/g | 3 | | (0% - 20%) | | |
| | Uncert: | +/-0.176 | | +/-0.163 | | | | | | |
| | TPU: | +/-0.172 | | +/-0.160 | | | | | | |
| Manganese-54 | U | 0.0318 | UUI | 0.00 | pCi/g | 20 | | (0% - 100%) | | |
| | Uncert: | +/-0.0337 | | +/-0.0305 | | | | | | |
| | TPU: | +/-0.0331 | | +/-0.0299 | | | | | | |
| Niobium-94 | U | 0.00497 | U | 0.0167 | pCi/g | 108 | | (0% - 100%) | | |
| | Uncert: | +/-0.0299 | | +/-0.020 | | | | | | |
| | TPU: | +/-0.0293 | | +/-0.0196 | | | | | | |

# QC Summary

Workorder: 113505



| Parmname | NOM | Sample | Qual | QC | Units | RPD% | REC% | Range | Anlst | Date Time |
|---|---|---|---|---|---|---|---|---|---|---|
| **Rad Gamma Spec** | | | | | | | | | | |
| Batch 335653 | | | | | | | | | | |
| Potassium-40 | | 19.1 | | 18.5 | pCi/g | 3 | | (0% - 20%) | | |
| | Uncert: | +/-1.65 | | +/-1.77 | | | | | | |
| | TPU: | +/-1.61 | | +/-1.74 | | | | | | |
| Radium-226 | | 1.23 | | 1.23 | pCi/g | 0 | | (0% - 100%) | | |
| | Uncert: | +/-0.180 | | +/-0.146 | | | | | | |
| | TPU: | +/-0.177 | | +/-0.143 | | | | | | |
| Silver-108m | U | -0.0214 | U | -0.00709 | pCi/g | N/A | | (0% - 100%) | | |
| | Uncert: | +/-0.0246 | | +/-0.0195 | | | | | | |
| | TPU: | +/-0.0241 | | +/-0.0191 | | | | | | |
| Thallium-208 | | 0.413 | | 0.459 | pCi/g | 11 | | (0% - 20%) | | |
| | Uncert: | +/-0.0782 | | +/-0.0599 | | | | | | |
| | TPU: | +/-0.0766 | | +/-0.0587 | | | | | | |
| QC1200644525 LCS | | | | | | | | | | |
| Actinium-228 | | | U | 0.248 | pCi/g | | | | | 06/15/04 14:33 |
| | Uncert: | | | +/-0.748 | | | | | | |
| | TPU: | | | +/-0.733 | | | | | | |
| Americium-241 | 23.4 | | | 24.0 | pCi/g | | 103 | (75%-125%) | | |
| | Uncert: | | | +/-1.88 | | | | | | |
| | TPU: | | | +/-1.84 | | | | | | |
| Bismuth-212 | | | U | 0.660 | pCi/g | | | | | |
| | Uncert: | | | +/-1.15 | | | | | | |
| | TPU: | | | +/-1.13 | | | | | | |
| Bismuth-214 | | | U | 0.0224 | pCi/g | | | | | |
| | Uncert: | | | +/-0.256 | | | | | | |
| | TPU: | | | +/-0.251 | | | | | | |
| Cesium-134 | | | U | -0.0908 | pCi/g | | | | | |
| | Uncert: | | | +/-0.161 | | | | | | |
| | TPU: | | | +/-0.158 | | | | | | |
| Cesium-137 | 9.25 | | | 9.93 | pCi/g | | 107 | (75%-125%) | | |
| | Uncert: | | | +/-0.991 | | | | | | |
| | TPU: | | | +/-0.971 | | | | | | |
| Cobalt-60 | 14.4 | | | 14.7 | pCi/g | | 102 | (75%-125%) | | |
| | Uncert: | | | +/-1.10 | | | | | | |
| | TPU: | | | +/-1.08 | | | | | | |
| Europium-152 | | | U | 0.354 | pCi/g | | | | | |
| | Uncert: | | | +/-0.312 | | | | | | |
| | TPU: | | | +/-0.306 | | | | | | |
| Europium-154 | | | U | -0.189 | pCi/g | | | | | |
| | Uncert: | | | +/-0.353 | | | | | | |
| | TPU: | | | +/-0.346 | | | | | | |
| Europium-155 | | | U | 0.0659 | pCi/g | | | | | |
| | Uncert: | | | +/-0.306 | | | | | | |
| | TPU: | | | +/-0.300 | | | | | | |
| Lead-212 | | | U | 0.0243 | pCi/g | | | | | |
| | Uncert: | | | +/-0.165 | | | | | | |
| | TPU: | | | +/-0.161 | | | | | | |
| Lead-214 | | | U | 0.202 | pCi/g | | | | | |
| | Uncert: | | | +/-0.390 | | | | | | |

# QC Summary

**Workorder:** 113505



| Parmname | NOM | Sample | Qual | QC | Units | RPD% | REC% | Range | Anlst | Date Time |
|---|---|---|---|---|---|---|---|---|---|---|
| **Rad Gamma Spec** | | | | | | | | | | |
| Batch 335653 | | | | | | | | | | |
| | TPU: | | | +/-0.382 | | | | | | |
| Manganese-54 | | | U | 0.145 | pCi/g | | | | | |
| | Uncert: | | | +/-0.161 | | | | | | |
| | TPU: | | | +/-0.158 | | | | | | |
| Niobium-94 | | | U | 0.0126 | pCi/g | | | | | |
| | Uncert: | | | +/-0.143 | | | | | | |
| | TPU: | | | +/-0.141 | | | | | | |
| Potassium-40 | | | U | -0.363 | pCi/g | | | | | |
| | Uncert: | | | +/-1.39 | | | | | | |
| | TPU: | | | +/-1.36 | | | | | | |
| Radium-226 | | | U | 0.0224 | pCi/g | | | (75%-125%) | | |
| | Uncert: | | | +/-0.256 | | | | | | |
| | TPU: | | | +/-0.251 | | | | | | |
| Silver-108m | | | U | -0.00571 | pCi/g | | | | | |
| | Uncert: | | | +/-0.123 | | | | | | |
| | TPU: | | | +/-0.121 | | | | | | |
| Thallium-208 | | | U | -0.0574 | pCi/g | | | | | |
| | Uncert: | | | +/-0.149 | | | | | | |
| | TPU: | | | +/-0.146 | | | | | | |
| QC1200644523 MB | | | | | | | | | | |
| Actinium-228 | | | U | 0.0236 | pCi/g | | | | | 06/15/04 14:32 |
| | Uncert: | | | +/-0.146 | | | | | | |
| | TPU: | | | +/-0.143 | | | | | | |
| Americium-241 | | | U | 0.0184 | pCi/g | | | | | |
| | Uncert: | | | +/-0.032 | | | | | | |
| | TPU: | | | +/-0.0313 | | | | | | |
| Bismuth-212 | | | U | 0.123 | pCi/g | | | | | |
| | Uncert: | | | +/-0.220 | | | | | | |
| | TPU: | | | +/-0.216 | | | | | | |
| Bismuth-214 | | | U | 0.0379 | pCi/g | | | | | |
| | Uncert: | | | +/-0.054 | | | | | | |
| | TPU: | | | +/-0.0529 | | | | | | |
| Cesium-134 | | | U | -0.00701 | pCi/g | | | | | |
| | Uncert: | | | +/-0.0319 | | | | | | |
| | TPU: | | | +/-0.0313 | | | | | | |
| Cesium-137 | | | U | -0.0332 | pCi/g | | | | | |
| | Uncert: | | | +/-0.0284 | | | | | | |
| | TPU: | | | +/-0.0278 | | | | | | |
| Cobalt-60 | | | U | 0.00364 | pCi/g | | | | | |
| | Uncert: | | | +/-0.0296 | | | | | | |
| | TPU: | | | +/-0.029 | | | | | | |
| Europium-152 | | | U | 0.00471 | pCi/g | | | | | |
| | Uncert: | | | +/-0.0625 | | | | | | |
| | TPU: | | | +/-0.0613 | | | | | | |
| Europium-154 | | | U | -0.0175 | pCi/g | | | | | |
| | Uncert: | | | +/-0.0843 | | | | | | |
| | TPU: | | | +/-0.0826 | | | | | | |
| Europium-155 | | | U | 0.0337 | pCi/g | | | | | |

# QC Summary

Workorder: 113505



| Parmname | NOM | Sample | Qual | QC | Units | RPD% | REC% | Range | Anlst | Date Time |
|---|---|---|---|---|---|---|---|---|---|---|
| **Rad Gamma Spec** | | | | | | | | | | |
| Batch 335653 | | | | | | | | | | |
| | Uncert: | | | +/-0.0499 | | | | | | |
| | TPU: | | | +/-0.0489 | | | | | | |
| Lead-212 | | | U | 0.0301 | pCi/g | | | | | |
| | Uncert: | | | +/-0.0626 | | | | | | |
| | TPU: | | | +/-0.0614 | | | | | | |
| Lead-214 | | | U | 0.0668 | pCi/g | | | | | |
| | Uncert: | | | +/-0.079 | | | | | | |
| | TPU: | | | +/-0.0774 | | | | | | |
| Manganese-54 | | | U | 0.00885 | pCi/g | | | | | |
| | Uncert: | | | +/-0.0268 | | | | | | |
| | TPU: | | | +/-0.0263 | | | | | | |
| Niobium-94 | | | U | -0.0027 | pCi/g | | | | | |
| | Uncert: | | | +/-0.0255 | | | | | | |
| | TPU: | | | +/-0.025 | | | | | | |
| Potassium-40 | | | U | 0.219 | pCi/g | | | | | |
| | Uncert: | | | +/-0.280 | | | | | | |
| | TPU: | | | +/-0.274 | | | | | | |
| Radium-226 | | | U | 0.0379 | pCi/g | | | | | |
| | Uncert: | | | +/-0.054 | | | | | | |
| | TPU: | | | +/-0.0529 | | | | | | |
| Silver-108m | | | U | -0.0062 | pCi/g | | | | | |
| | Uncert: | | | +/-0.0226 | | | | | | |
| | TPU: | | | +/-0.0222 | | | | | | |
| Thallium-208 | | | U | 0.0157 | pCi/g | | | | | |
| | Uncert: | | | +/-0.0513 | | | | | | |
| | TPU: | | | +/-0.0502 | | | | | | |
| **Rad Gas Flow** | | | | | | | | | | |
| Batch 335956 | | | | | | | | | | |
| QC1200631488 113282019 DUP | | | | | | | | | | |
| Strontium-90 | U | 0.00426 | | 0.0433 | pCi/g | 0 | | (0% - 100%) | HOB1 | 06/03/04 19:12 |
| | Uncert: | +/-0.0179 | | +/-0.0167 | | | | | | |
| | TPU: | +/-0.0179 | | +/-0.019 | | | | | | |
| QC1200631490 LCS | | | | | | | | | | |
| Strontium-90 | 2.64 | | | 2.42 | pCi/g | | 92 | (75%-125%) | | 06/03/04 17:42 |
| | Uncert: | | | +/-0.126 | | | | | | |
| | TPU: | | | +/-0.539 | | | | | | |
| QC1200631487 MB | | | | | | | | | | |
| Strontium-90 | | | | 0.0485 | pCi/g | | | | | 06/03/04 19:12 |
| | Uncert: | | | +/-0.0152 | | | | | | |
| | TPU: | | | +/-0.0187 | | | | | | |
| QC1200631489 113282019 MS | | | | | | | | | | |
| Strontium-90 | 5.94 U | 0.00426 | | 5.26 | pCi/g | | 89 | (75%-125%) | | 06/03/04 17:42 |
| | Uncert: | +/-0.0179 | | +/-0.276 | | | | | | |
| | TPU: | +/-0.0179 | | +/-1.14 | | | | | | |
| **Rad Liquid Scintillation** | | | | | | | | | | |
| Batch 339628 | | | | | | | | | | |
| QC1200640252 113282019 DUP | | | | | | | | | | |
| Tritium | U | -3.19 | U | -1.94 | pCi/g | N/A | | (0% - 100%) | JLB1 | 06/12/04 01:21 |

# QC Summary

Workorder: 113505



| Parmname | NOM | Sample | Qual | QC | Units | RPD% | REC% | Range | Anlst | Date Time |
|---|---|---|---|---|---|---|---|---|---|---|
| **Rad Liquid Scintillation** | | | | | | | | | | |
| Batch 339628 | | | | | | | | | | |
| | Uncert: | +/-4.96 | | +/-3.23 | | | | | | |
| | TPU: | +/-4.97 | | +/-3.23 | | | | | | |
| QC1200640254 LCS | | | | | | | | | | |
| Tritium | 57.7 | | | 57.9 | pCi/g | | 100 | (75%-125%) | | 06/12/04 02:26 |
| | Uncert: | | | +/-6.54 | | | | | | |
| | TPU: | | | +/-8.14 | | | | | | |
| QC1200640251 MB | | | | | | | | | | |
| Tritium | | | U | -2.26 | pCi/g | | | | | 06/12/04 00:48 |
| | Uncert: | | | +/-3.03 | | | | | | |
| | TPU: | | | +/-3.03 | | | | | | |
| QC1200640253 113282019 MS | | | | | | | | | | |
| Tritium | 80.9 U | -3.19 | | 70.7 | pCi/g | | 87 | (75%-125%) | | 06/12/04 01:54 |
| | Uncert: | +/-4.96 | | +/-8.79 | | | | | | |
| | TPU: | +/-4.97 | | +/-10.6 | | | | | | |

Notes:
The Qualifiers in this report are defined as follows:

- B Target analyte was detected in the sample as well as the associated blank.
- BD Flag for results below the MDC or a flag for low tracer recovery.
- E Concentration of the target analyte exceeds the instrument calibration range.
- H Analytical holding time exceeded.
- J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
- U Indicates the target analyte was analyzed for but not detected above the detection limit.
- UI Uncertain identification for gamma spectroscopy.
- X Lab-specific qualifier-please see case narrative, data summary package or contact your project manager for details.
- h Sample preparation or preservation holding time exceeded.

N/A indicates that spike recovery limits do not apply when sample concentration exceeds spike conc. by a factor of 4 or more.
** Indicates analyte is a surrogate compound.
^ The Relative Percent Difference (RPD) obtained from the sample duplicate (DUP) is evaluated against the acceptence criteria when the sample is greater than five times (5X) the contract required detection limit (RL). In cases where either the sample or duplicate value is less than 5X the RL, a control limit of +/- the RL is used to evaluate the DUP result.
For PS, PSD, and SDILT results, the values listed are the measured amounts, not final concentrations.

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

Analytical Data Package Prepared For

# Connecticut Yankee

Radiochemical Analysis By

## STL Richland

*2800 G.W. Way, Richland Wa, 99352, (509)-375-3131.*

Assigned Laboratory Code: STLR

*Data Package Contains _____ Pages*

Report No.: 25071

| SDG No. | Order No. | Client Sample ID (List Order) | Lot-Sa No. | Work Order | Report DB ID | Batch No. |
|---|---|---|---|---|---|---|
| 25067 | | 9526-0001-002F(FMVMG) | J4A290294-1 | F8RH71AK | 9F8RH710 | 4033497 |
| | | 9526-0001-002F(FMVMG) | J4A290294-1 | F8RH71AD | 9F8RH710 | 4033500 |
| | | 9526-0001-002F(FMVMG) | J4A290294-1 | F8RH71AA | 9F8RH710 | 4033502 |
| | | 9526-0001-002F(FMVMG) | J4A290294-1 | F8RH71AC | 9F8RH710 | 4033505 |
| | | 9526-0001-002F(FMVMG) | J4A290294-1 | F8RH71AE | 9F8RH710 | 4033507 |
| | | 9526-0001-002F(FMVMG) | J4A290294-1 | F8RH71AH | 9F8RH710 | 4033508 |
| | | 9526-0001-002F(FMVMG) | J4A290294-1 | F8RH71AN | 9F8RH710 | 4037319 |
| | | 9526-0001-002F(FMVMG) | J4A290294-1 | F8RH72AG | 9F8RH720 | 4051400 |
| | | 9526-0001-010F(FMVWN) | J4A290294-2 | F8RH81AK | 9F8RH810 | 4033497 |
| | | 9526-0001-010F(FMVWN) | J4A290294-2 | F8RH81AD | 9F8RH810 | 4033500 |
| | | 9526-0001-010F(FMVWN) | J4A290294-2 | F8RH81AA | 9F8RH810 | 4033502 |
| | | 9526-0001-010F(FMVWN) | J4A290294-2 | F8RH81AC | 9F8RH810 | 4033505 |
| | | 9526-0001-010F(FMVWN) | J4A290294-2 | F8RH81AE | 9F8RH810 | 4033507 |
| | | 9526-0001-010F(FMVWN) | J4A290294-2 | F8RH81AH | 9F8RH810 | 4033508 |
| | | 9526-0001-010F(FMVWN) | J4A290294-2 | F8RH81AP | 9F8RH810 | 4037319 |
| | | 9526-0001-010F(FMVWN) | J4A290294-2 | F8RH82AG | 9F8RH820 | 4051400 |
| | | 9526-0002-015F(FMV2W) | J4A290294-3 | F8RH91AK | 9F8RH910 | 4033497 |
| | | 9526-0002-015F(FMV2W) | J4A290294-3 | F8RH91AD | 9F8RH910 | 4033500 |
| | | 9526-0002-015F(FMV2W) | J4A290294-3 | F8RH91AA | 9F8RH910 | 4033502 |
| | | 9526-0002-015F(FMV2W) | J4A290294-3 | F8RH91AC | 9F8RH910 | 4033505 |
| | | 9526-0002-015F(FMV2W) | J4A290294-3 | F8RH91AE | 9F8RH910 | 4033507 |
| | | 9526-0002-015F(FMV2W) | J4A290294-3 | F8RH91AH | 9F8RH910 | 4033508 |
| | | 9526-0002-015F(FMV2W) | J4A290294-3 | F8RH91AP | 9F8RH910 | 4037319 |
| | | 9526-0002-015F(FMV2W) | J4A290294-3 | F8RH92AG | 9F8RH920 | 4051400 |
| | | 9526-0002-017F(FMV3C) | J4A290294-4 | F8RJA1AK | 9F8RJA10 | 4033497 |
| | | 9526-0002-017F(FMV3C) | J4A290294-4 | F8RJA1AD | 9F8RJA10 | 4033500 |

## Report No.: 25071

| SDG No. | Order No. | Client Sample ID (List Order) | Lot-Sa No. | Work Order | Report DB ID | Batch No. |
|---|---|---|---|---|---|---|
| 25067 | | 9526-0002-017F(FMV3C) | J4A290294-4 | F8RJA1AA | 9F8RJA10 | 4033502 |
| | | 9526-0002-017F(FMV3C) | J4A290294-4 | F8RJA1AC | 9F8RJA10 | 4033505 |
| | | 9526-0002-017F(FMV3C) | J4A290294-4 | F8RJA1AE | 9F8RJA10 | 4033507 |
| | | 9526-0002-017F(FMV3C) | J4A290294-4 | F8RJA1AH | 9F8RJA10 | 4033508 |
| | | 9526-0002-017F(FMV3C) | J4A290294-4 | F8RJA1AN | 9F8RJA10 | 4037319 |
| | | 9526-0002-017F(FMV3C) | J4A290294-4 | F8RJA2AG | 9F8RJA20 | 4051400 |

SEVERN TRENT STL

STL Richland
2800 George Washington Way
Richland, WA 99352

Tel: 509 375 3131 Fax: 509 375 5590
www.stl-inc.com

# Certificate of Analysis

Connecticut Yankee Atomic Power
362 Injun Hollow Road
East Hampton, CT 06424

February 27, 2004

Attention: Pete Hollenbeck

| | | |
|---|---|---|
| Date Received in Lab | : | January 29, 2004 |
| Sample Type | : | Four (4) Soils |
| SDG Number | : | 25067 |
| Project Name/Number | : | Haddam Neck Decommissioning |
| COC Number | : | E-mail request |

## CASE NARRATIVE

### I. Introduction

On January 29, 2004, a request to analyze four soil samples was received at the STL Richland (STLR) laboratory. Upon receipt, the samples were assigned the STLR identification numbers as described on the cover page of the Analytical Data Package report form. The samples were assigned to Lot Number J4A290294.

### II. Sample Receipt

The samples were received in good condition and no anomalies were noted during check-in.

### III. Analytical Results/Methodology

The analytical results for this report are presented by laboratory sample ID. Each set of data includes sample identification information, analytical results and the appropriate associated statistical errors.

The requested analysis was:

**Alpha Spectroscopy**
Americium-241 by method RICH-RC-5080
Curium-243/244 by method RICH-RC-5080
Plutonium-238, -239/240 by method RICH-RC-5010
**Gas Proportional Counting**
Strontium-90 by method RICH-RC-5006

**Liquid Scintillation Counting**
Carbon-14 by method RICH-RC-5022
Iron-55 by method RICH-RC-5074
Nickel-63 by method RICH-RC-5069
Plutonium-241 by method RICH-RC-5010
Technetium-99 by method RICH-RC-5078
Tritium by method RICH-RC-5037

## IV. Quality Control

The analytical result for each analysis performed includes a minimum of one laboratory control sample (LCS), and one reagent blank sample analysis. Any exceptions have been noted in the "Comments" section.

QC and sample results are reported in the same units.

## V. Comments

**Alpha Spectroscopy**
Americium-241 by method RICH-RC-5080:
The LCS, batch blank, sample, and sample duplicate results are within acceptance limits.

Curium-243/244 by method RICH-RC-5080:
The LCS, batch blank, sample, and sample duplicate results are within acceptance limits.

Plutonium-238, -239/240 by method RICH-RC-5010:
The LCS, batch blank, sample, and sample duplicate results are within acceptance limits.

**Gas Proportional Counting**
Strontium-90 by method RICH-RC-5006:
The MDA for all samples did not meet the CRDL. The technician aliquoted the improper amounts in order to meet the CRDL but the sample results are greater than the MDA therefore the data is accepted. The non-conformance has been noted and the technician has been made aware of the error. Except as noted, the LCS, batch blank, sample, and sample duplicate results are within acceptance limits.

**Liquid Scintillation Counting**
Carbon-14 by method RICH-RC-5022:
Sample 9526-0001-010F MDA does not meet the CRDL due to a small aliquot taken because of a high radiation screen. Except as noted, the LCS, batch blank, sample, and sample duplicate results are within acceptance limits.

Iron-55 by method RICH-RC-5074:
The LCS, batch blank, sample, and sample duplicate results are within acceptance limits.

Nickel-63 by method RICH-RC-5069:
The entire batch was reanalyzed due to low tracer recoveries during the original analysis. The LCS, batch blank, sample, and sample duplicate results are within acceptance limits after the reanalysis.

Plutonium-241 by method RICH-RC-5010:
The LCS recovery was slightly lower than acceptance limits at 69% but all of the samples are far below the CRDL. An LCS adjustment would still keep the sample results below the CRDL therefore the data is accepted. Except as noted, the LCS, batch blank, sample, and sample duplicate results are within acceptance limits.

Technetium-99 by method RICH-RC-5078:
The LCS, batch blank, sample, and sample duplicate results are within acceptance limits.

Tritium by method RICH-RC-5037:
Due to the fact that these samples were previously dried in order to analyze for Gamma the H-3 analysis is unable to be run.

I certify that this Certificate of Analysis is in compliance with the SOW, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hard copy data package has been authorized by the Laboratory Manager, or a designee as verified by the following signature.

Reviewed and approved:

Theresa H. Kallsen

Theresa H. Kallsen
Project Management Assistant

## Drinking Water Method Cross References

| | DRINKING WATER ASTM METHOD CROSS REFERENCES | |
|---|---|---|
| | | |
| **Referenced Method** | **Isotope(s)** | **STL Richland's SOP number** |
| EPA 901.1 | Cs-134, I-131 | RICH-RC-5017 |
| EPA 900.0 | Alpha & Beta | RICH-RC-5014 |
| EPA 903.1 | Ra-226 | RICH-RC-5005 |
| EPA 904.0 | Ra-228 | RICH-RC-5005 |
| EPA 905.0 | Sr89/90 | RICH-RC-5006 |
| ASTM D2460 | Total Radium | RICH-RC-5027 |
| Standard Method 7500-U-C & ASTM D5174 | Uranium | RICH-RC-5058 |
| EPA 906.0 | Tritium | RICH-RC-5007 |
| | | |
| | | |
| | | |
| | | |
| NOTE: | | |
| The Gross Alpha LCS is prepared with Am-241 (unless otherwise specified in the case narrative) | | |
| The Gross Beta LCS is prepared with Sr/Y-90 (unless otherwise specified in the case narrative) | | |

## Uncertainty Estimation

STL Richland has adopted the internationally accepted approach to estimating uncertainties described in "NIST Technical Note 1297, 1994 Edition". The approach, "Law of Propagation of Errors", involves the identification of all variables in an analytical method which are used to derive a result. These variables are related to the analytical result (R) by some functional relationship, R = constants * f(x,y,z,...). The components (x,y,z) are evaluated to determine their contribution to the overall method uncertainty. The individual component uncertainties ($u_i$) are then combined using a statistical model that provides the most probable overall uncertainty value. All component uncertainties are categorized as type A, evaluated by statistical methods, or type B, evaluated by other means. Uncertainties not included in the components, such as sample homogeneity, are combined with the component uncertainty as the square root of the sum-of-the-squares of the individual uncertainties. The uncertainty associated with the derived result is the combined uncertainty ($u_c$) multiplied by the coverage factor (1,2, or 3).

When three or more sample replicates are used to derive the analytical result, the type A uncertainty is the standard deviation of the mean value (S/vn), where S is the standard deviation of the derived results. The type B uncertainties are all other random or non-random components that are not included in the standard deviation.

The derivation of the general "Law of Propagation of Errors" equations and specific example are available on request.

## Report Definitions

| | |
|---|---|
| Action Lev | An agreed upon activity level used to trigger some action when the final result is greater than or equal to the Action Level. Often the Action Level is related to the Decision Limit. |
| Batch | The QC preparation batch number that relates laboratory samples to QC samples that were prepared and analyzed together. |
| Bias | Defined by the equation (Result/Expected)-1 as defined by ANSI N13.30. |
| COC No | Chain of Custody Number assigned by the Client or STL Richland. |
| Count Error (#s) | Poisson counting statistics of the gross sample count and background. The uncertainty is absolute and in the same units as the result. For Liquid Scintillation Counting (LSC) the batch blank count is the background. |
| Total Uncert (#s) *$u_c$ - Combined Uncertainty.* | All known uncertainties associated with the preparation and analysis of the sample are propagated to give a measure of the uncertainty associated with the result, *$u_c$ the combined uncertainty.* The uncertainty is absolute and in the same units as the result. |
| (#s), Coverage Factor | The coverage factor defines the width of the confidence interval, 1, 2 or 3 standard deviations. |
| CRDL (RL) | Contractual Required Detection Limit as defined in the Client's Statement Of Work or STL Richland "default" nominal detection limit. Often referred to the reporting level (RL) |
| Lc | Decision Level based on instrument background or blank, adjusted by the Efficiency, Chemical Yield, and Volume associated with the sample. The Type I error probability is approximately 5%. Lc=(1.645 * Sqrt(2*(BkgrndCnt/BkgrndCntMin)/SCntMin)) * (ConvFct/(Eff*Yld*Abn*Vol) * IngrFct). For LSC methods the batch blank is used as a measure of the background variability. Lc cannot be calculated when the background count is zero. |
| Lot-Sample No | The number assigned by the LIMS software to track samples received on the same day for a given client. The sample number is a sequential number assigned to each sample in the Lot. |
| MDC\|MDA | Detection Level based on instrument background or blank, adjusted by the Efficiency, Chemical Yield, and Volume with a Type I and II error probability of approximately 5%. MDC = (4.65 * Sqrt((BkgrndCnt/BkgrndCntMin)/SCntMin) + 2.71/SCntMin) * (ConvFct/(Eff * Yld * Abn * Vol) * IngrFct). For LSC methods the batch blank is used as a measure of the background variability. |
| Primary Detector | The instrument identifier associated with the analysis of the sample aliquot. |
| Ratio U-234/U-238 | The U-234 result divided by the U-238 result. The U-234/U-238 ratio for natural uranium in NIST SRM 4321C is 1.038. |
| Rst/MDC | Ratio of the Result to the MDC. A value greater than 1 may indicate activity above background at a high level of confidence. Caution should be used when applying this factor and it should be used in concert with the qualifiers associated with the result. |
| Rst/TotUcert | Ratio of the Result to the Total Uncertainty. If the uncertainty has a coverage factor of 2 a value greater than 1 may indicate activity above background at approximately the 95% level of confidence assuming a two-sided confidence interval. Caution should be used when applying this factor and it should be used in concert with the qualifiers associated with the result. |
| Report DB No | Sample Identifier used by the report system. The number is based upon the first five digits of the Work Order Number. |
| RER | The equation Replicate Error Ratio = (S-D)/[sqrt($TPUs^2$ + $TPUd^2$)] as defined by ICPT BOA where S is the original sample result, D is the result of the duplicate, TPUs is the total uncertainty of the original sample and TPUd is the total uncertainty of the duplicate sample. |
| SDG | Sample Delivery Group Number assigned by the Client or assigned by STL Richland upon sample receipt. |
| Sum Rpt Alpha Spec Rst(s) | The sum of the reported alpha spec results for tests derived from the same sample excluding duplicate result where the results are in the same units. |
| Work Order | The LIMS software assign test specific identifier. |
| Yield | The recovery of the tracer added to the sample such as Pu-242 used to trace a Pu-239/40 method. |

# Sample Results Summary

Date: 28-Feb-04

## STL Richland STLR

Ordered by Method, Batch No., Client Sample ID.

Report No. : 25071

SDG No: 25067

| Batch | Client Id Work Order | Parameter | Result +- Uncertainty ( 2s) | Qual | Units | Yield | MDC or MDA | CRDL | RER2 |
|---|---|---|---|---|---|---|---|---|---|
| 4033508 FBXZ | | | | | | | | | |
| | 9526-0001-002F(FMVMG) | | | | | | | | |
| | F8RH71AH | FE-55 | 1.46E+01 +- 7.07E+00 | U | pCi/g | 89% | 1.92E+01 | 1.10E+03 | |
| | 9526-0001-010F(FMVWN) | | | | | | | | |
| | F8RH81AH | FE-55 | 4.34E+01 +- 2.92E+01 | U | pCi/g | 113% | 4.96E+01 | 1.10E+03 | |
| | 9526-0002-015F(FMV2W) | | | | | | | | |
| | F8RH91AH | FE-55 | 3.56E+01 +- 2.38E+01 | U | pCi/g | 97% | 4.39E+01 | 1.10E+03 | |
| | 9526-0002-017F(FMV3C) | | | | | | | | |
| | F8RJA1AH | FE-55 | 6.30E+01 +- 3.94E+01 | J | pCi/g | 58% | 5.49E+01 | 1.10E+03 | |
| | 9526-0002-017F(FMV3C) DUP | | | | | | | | |
| | F8RJA1AM | FE-55 | 3.30E+01 +- 2.26E+01 | U | pCi/g | 94% | 3.49E+01 | 1.10E+03 | |
| 4033507 CMUD | | | | | | | | | |
| | 9526-0001-002F(FMVMG) | | | | | | | | |
| | F8RH71AE | SR-90 | 2.94E-01 +- 1.32E-01 | | pCi/g | 66% | 2.16E-01 | 6.00E-02 | |
| | 9526-0001-010F(FMVWN) | | | | | | | | |
| | F8RH81AE | SR-90 | 3.28E+00 +- 1.92E+00 | | pCi/g | 73% | 2.59E+00 | 6.00E-02 | |
| | 9526-0002-015F(FMV2W) | | | | | | | | |
| | F8RH91AE | SR-90 | 3.61E-01 +- 1.67E-01 | | pCi/g | 47% | 2.72E-01 | 6.00E-02 | |
| | 9526-0002-015F(FMV2W) DUP | | | | | | | | |
| | F8RH91AN | SR-90 | 2.98E-01 +- 1.51E-01 | | pCi/g | 52% | 2.54E-01 | 6.00E-02 | |
| | 9526-0002-017F(FMV3C) | | | | | | | | |
| | F8RJA1AE | SR-90 | 3.16E-01 +- 1.63E-01 | | pCi/g | 51% | 2.83E-01 | 6.00E-02 | |
| 4033500 RICHRC5010 | | | | | | | | | |
| | 9526-0001-002F(FMVMG) | | | | | | | | |
| | F8RH71AD | PU-238 | 0.00E+00 +- 1.24E-02 | U | pCi/g | 88% | 1.37E-02 | 1.18E+00 | |
| | | PU239/40 | 2.52E-02 +- 2.29E-02 | J | pCi/g | 88% | 1.36E-02 | 1.07E+00 | |
| | 9526-0001-010F(FMVWN) | | | | | | | | |
| | F8RH81AD | PU-238 | 0.00E+00 +- 2.12E-01 | U | pCi/g | 51% | 2.35E-01 | 1.18E+00 | |
| | | PU239/40 | 0.00E+00 +- 2.11E-01 | U | pCi/g | 51% | 2.33E-01 | 1.07E+00 | |
| | 9526-0001-010F(FMVWN) DUP | | | | | | | | |
| | F8RH81AR | PU-238 | 0.00E+00 +- 3.50E-01 | U | pCi/g | 39% | 3.87E-01 | 1.18E+00 | |
| | | PU239/40 | 2.55E-01 +- 4.08E-01 | U | pCi/g | 39% | 6.79E-01 | 1.07E+00 | |
| | 9526-0002-015F(FMV2W) | | | | | | | | |
| | F8RH91AD | PU-238 | 0.00E+00 +- 2.77E-02 | U | pCi/g | 59% | 3.07E-02 | 1.18E+00 | |
| | | PU239/40 | 0.00E+00 +- 2.75E-02 | U | pCi/g | 59% | 3.05E-02 | 1.07E+00 | |
| | 9526-0002-017F(FMV3C) | | | | | | | | |
| | F8RJA1AD | PU-238 | 2.48E-02 +- 3.53E-02 | U | pCi/g | 52% | 3.36E-02 | 1.18E+00 | |
| | | PU239/40 | 9.84E-02 +- 7.16E-02 | J | pCi/g | 52% | 3.33E-02 | 1.07E+00 | |
| 4033497 RICHRC5080 | | | | | | | | | |
| | 9526-0001-002F(FMVMG) | | | | | | | | |



RER2 - Replicate Error Ratio = (S-D)/[sqrt(sq(TPUs)+sq(TPUd))] as defined by ICPT BOA.

J Qual - No U|< qualifier has been assigned and the result is below the Reporting Limit, RL (CRDL) or Report Value is Estimated.

U Qual - Analyzed for, but the result is less than the Mdc/Mda|Total Uncert or gamma scan software did not identify the nuclide.

# Sample Results Summary

## STL Richland STLR

Ordered by Method, Batch No., Client Sample ID.

Date: 28-Feb-04

Report No. : 25071

SDG No: 25067

| Batch | Client Id Work Order | Parameter | Result +- Uncertainty ( 2s) | Qual | Units | Yield | MDC or MDA | CRDL | RER2 |
|---|---|---|---|---|---|---|---|---|---|
| 4033497 RICHRC5080 | | | | | | | | | |
| 9526-0001-002F(FMVMG) | | | | | | | | | |
| | F8RH71AK | AM-241 | 2.21E-02 +- 2.58E-02 | J | pCi/g | 74% | 1.99E-02 | 1.03E+00 | |
| | | CM-242 | 0.00E+00 +- 6.81E-02 | U | pCi/g | 74% | 7.53E-02 | | |
| | | CM-243/244 | 0.00E+00 +- 1.86E-02 | U | pCi/g | 74% | 2.06E-02 | 1.16E+00 | |
| 9526-0001-002F(FMVMG) DUP | | | | | | | | | |
| | F8RH71AL | AM-241 | 2.69E-02 +- 2.73E-02 | J | pCi/g | 75% | 1.82E-02 | 1.03E+00 | |
| | | CM-242 | 0.00E+00 +- 6.22E-02 | U | pCi/g | 75% | 6.88E-02 | | |
| | | CM-243/244 | 0.00E+00 +- 1.70E-02 | U | pCi/g | 75% | 1.88E-02 | 1.16E+00 | |
| 9526-0001-010F(FMVWN) | | | | | | | | | |
| | F8RH81AK | AM-241 | 1.27E-01 +- 2.11E-01 | U | pCi/g | 83% | 3.39E-01 | 1.03E+00 | |
| | | CM-242 | 0.00E+00 +- 6.54E-01 | U | pCi/g | 83% | 7.24E-01 | | |
| | | CM-243/244 | 0.00E+00 +- 1.79E-01 | U | pCi/g | 83% | 1.98E-01 | 1.16E+00 | |
| 9526-0002-015F(FMV2W) | | | | | | | | | |
| | F8RH91AK | AM-241 | 3.87E-02 +- 3.94E-02 | J | pCi/g | 89% | 2.62E-02 | 1.03E+00 | |
| | | CM-242 | 3.65E-02 +- 7.34E-02 | U | pCi/g | 89% | 9.90E-02 | | |
| | | CM-243/244 | 9.98E-03 +- 2.00E-02 | U | pCi/g | 89% | 2.70E-02 | 1.16E+00 | |
| 9526-0002-017F(FMV3C) | | | | | | | | | |
| | F8RJA1AK | AM-241 | 3.18E-02 +- 3.73E-02 | J | pCi/g | 74% | 2.88E-02 | 1.03E+00 | |
| | | CM-242 | 0.00E+00 +- 9.82E-02 | U | pCi/g | 74% | 1.09E-01 | | |
| | | CM-243/244 | 0.00E+00 +- 2.68E-02 | U | pCi/g | 74% | 2.97E-02 | 1.16E+00 | |
| 4033502 RICHRC5022 | | | | | | | | | |
| 9526-0001-002F(FMVMG) | | | | | | | | | |
| | F8RH71AA | C-14 | 2.32E-02 +- 7.53E-02 | U | pCi/g | 100% | 1.38E-01 | 2.26E-01 | |
| 9526-0001-010F(FMVWN) | | | | | | | | | |
| | F8RH81AA | C-14 | 6.35E-02 +- 3.74E-01 | U | pCi/g | 100% | 6.88E-01 | 2.26E-01 | |
| 9526-0002-015F(FMV2W) | | | | | | | | | |
| | F8RH91AA | C-14 | 3.13E-02 +- 7.56E-02 | U | pCi/g | 100% | 1.38E-01 | 2.26E-01 | |
| 9526-0002-015F(FMV2W) DUP | | | | | | | | | |
| | F8RH91AL | C-14 | -3.47E-02 +- 7.40E-02 | U | pCi/g | 100% | 1.38E-01 | 2.26E-01 | |
| 9526-0002-017F(FMV3C) | | | | | | | | | |
| | F8RJA1AA | C-14 | 6.84E-02 +- 7.66E-02 | U | pCi/g | 100% | 1.38E-01 | 2.26E-01 | |
| 4033505 RICHRC5078 | | | | | | | | | |
| 9526-0001-002F(FMVMG) | | | | | | | | | |
| | F8RH71AC | TC-99 | 5.66E-02 +- 1.58E-01 | U | pCi/g | 100% | 2.66E-01 | 5.04E-01 | |
| 9526-0001-002F(FMVMG) DUP | | | | | | | | | |
| | F8RH71AM | TC-99 | 1.46E-01 +- 1.52E-01 | U | pCi/g | 100% | 2.47E-01 | 5.04E-01 | |
| 9526-0001-010F(FMVWN) | | | | | | | | | |
| | F8RH81AC | TC-99 | 1.25E-01 +- 1.62E-01 | U | pCi/g | 100% | 2.67E-01 | 5.04E-01 | |
| 9526-0002-015F(FMV2W) | | | | | | | | | |



RER2 - Replicate Error Ratio = (S-D)/[sqrt(sq(TPUs)+sq(TPUd))] as defined by ICPT BOA.

J Qual - No U|< qualifier has been assigned and the result is below the Reporting Limit, RL (CRDL) or Report Value is Estimated.
U Qual - Analyzed for, but the result is less than the Mdc/Mda|Total Uncert or gamma scan software did not identify the nuclide.

# Sample Results Summary

## STL Richland STLR

Ordered by Method, Batch No., Client Sample ID.

Date: 28-Feb-04

Report No. : 25071

SDG No: 25067

| Batch | Client Id Work Order | Parameter | Result +- Uncertainty ( 2s) | Qual | Units | Yield | MDC or MDA | CRDL | RER2 |
|---|---|---|---|---|---|---|---|---|---|
| 4033505 | RICHRC5078 | | | | | | | | |
| | 9526-0002-015F(FMV2W) | | | | | | | | |
| | F8RH91AC | TC-99 | 1.72E-01 +- 1.65E-01 | U | pCi/g | 100% | 2.67E-01 | 5.04E-01 | |
| | 9526-0002-017F(FMV3C) | | | | | | | | |
| | F8RJA1AC | TC-99 | -2.22E-02 +- 1.45E-01 | U | pCi/g | 100% | 2.51E-01 | 5.04E-01 | |
| 4037319 | RICHRC5010 | | | | | | | | |
| | 9526-0001-002F(FMVMG) | | | | | | | | |
| | F8RH71AN | PU-241 | 2.87E-01 +- 5.90E-01 | U | pCi/g | 88% | 1.15E+00 | 3.48E+01 | |
| | 9526-0001-010F(FMVWN) | | | | | | | | |
| | F8RH81AP | PU-241 | 1.26E+01 +- 1.50E+01 | U | pCi/g | 51% | 2.73E+01 | 3.48E+01 | |
| | 9526-0001-010F(FMVWN) DUP | | | | | | | | |
| | F8RH81AQ | PU-241 | -8.04E+00 +- 1.71E+01 | U | pCi/g | 39% | 3.49E+01 | 3.48E+01 | |
| | 9526-0002-015F(FMV2W) | | | | | | | | |
| | F8RH91AP | PU-241 | 1.85E+00 +- 1.87E+00 | U | pCi/g | 59% | 3.52E+00 | 3.48E+01 | |
| | 9526-0002-017F(FMV3C) | | | | | | | | |
| | F8RJA1AN | PU-241 | 8.88E-01 +- 1.97E+00 | U | pCi/g | 52% | 3.85E+00 | 3.48E+01 | |
| 4051400 | RICHRC5069 | | | | | | | | |
| | 9526-0001-002F(FMVMG) | | | | | | | | |
| | F8RH72AG | NI-63 | 5.37E+00 +- 4.38E+00 | U | pCi/g | 88% | 8.26E+00 | 2.89E+01 | |
| | 9526-0001-010F(FMVWN) | | | | | | | | |
| | F8RH82AG | NI-63 | 2.60E+00 +- 5.94E+00 | U | pCi/g | 96% | 8.67E+00 | 2.89E+01 | |
| | 9526-0002-015F(FMV2W) | | | | | | | | |
| | F8RH92AG | NI-63 | 3.86E+00 +- 3.69E+00 | U | pCi/g | 94% | 5.29E+00 | 2.89E+01 | |
| | 9526-0002-017F(FMV3C) | | | | | | | | |
| | F8RJA2AG | NI-63 | 3.17E-01 +- 3.35E+00 | U | pCi/g | 98% | 5.44E+00 | 2.89E+01 | |
| | 9526-0002-017F(FMV3C) DUP | | | | | | | | |
| | F8RJA2AL | NI-63 | 1.69E+00 +- 3.62E+00 | U | pCi/g | 96% | 6.39E+00 | 2.89E+01 | |

No. of Results: 55

STL Richland

rptSTLRchSaSummary2 V4.07 A97

RER2 - Replicate Error Ratio = (S-D)/[sqrt(sq(TPUs)+sq(TPUd))] as defined by ICPT BOA.

U Qual - Analyzed for, but the result is less than the Mdc/Mda|Total Uncert or gamma scan software did not identify the nuclide.

# QC Results Summary
## STL Richland STLR
Ordered by Method, Batch No, QC Type,.

Date: 28-Feb-04

Report No. : 25071

SDG No.: 25067

| Batch Work Order | Parameter | Result +- Uncertainty ( 2s) | Qual | Units | Yield | Recovery | Bias | MDC\|MDA |
|---|---|---|---|---|---|---|---|---|
| FBXZ | | | | | | | | |
| 4033508 BLANK QC | | | | | | | | |
| F8XN91AA | FE-55 | 1.25E+01 +- 5.76E+00 | J | pCi/g | 86% | | | 1.18E+01 |
| 4033508 LCS | | | | | | | | |
| F8XN91AC | FE-55 | 6.68E+01 +- 1.41E+01 | J | pCi/g | 89% | 100% | 0.0 | 1.41E+01 |
| CMJD | | | | | | | | |
| 4033507 BLANK QC | | | | | | | | |
| F8XN81AA | SR-90 | 1.66E-01 +- 1.05E-01 | U | pCi/g | 77% | | | 1.92E-01 |
| 4033507 LCS | | | | | | | | |
| F8XN81AC | SR-90 | 2.82E+00 +- 4.88E-01 | | pCi/g | 74% | 122% | 0.2 | 1.86E-01 |
| RICHRC5010 | | | | | | | | |
| 4033500 BLANK QC | | | | | | | | |
| F9PAR1AA | PU-238 | 0.00E+00 +- 1.90E-02 | U | pCi/g | 54% | | | 2.10E-02 |
| | PU239/40 | -1.54E-03 +- 3.09E-03 | U | pCi/g | 54% | | | 3.69E-02 |
| 4033500 LCS | | | | | | | | |
| F9PAR1AC | PU239/40 | 4.66E-01 +- 1.21E-01 | J | pCi/g | 69% | 101% | 0.0 | 1.30E-02 |
| RICHRC5080 | | | | | | | | |
| 4033497 BLANK QC | | | | | | | | |
| F8XNK1AA | AM-241 | 5.75E-03 +- 1.16E-02 | U | pCi/g | 83% | | | 1.56E-02 |
| | CM-242 | 0.00E+00 +- 5.32E-02 | U | pCi/g | 83% | | | 5.89E-02 |
| | CM-243/244 | 0.00E+00 +- 1.45E-02 | U | pCi/g | 83% | | | 1.61E-02 |
| 4033497 LCS | | | | | | | | |
| F8XNK1AC | AM-241 | 4.33E+00 +- 8.01E-01 | | pCi/g | 108% | 95% | 0.0 | 1.22E-02 |
| RICHRC5022 | | | | | | | | |
| 4033502 BLANK QC | | | | | | | | |
| F8XNV1AA | C-14 | -4.80E-02 +- 7.38E-02 | U | pCi/g | 100% | | | 1.39E-01 |
| 4033502 LCS | | | | | | | | |
| F8XNV1AC | C-14 | 6.97E+00 +- 2.83E-01 | | pCi/g | 100% | 96% | 0.0 | 1.39E-01 |
| RICHRC5078 | | | | | | | | |
| 4033505 MATRIX SPIKE | | | | | | | | |
| F8RH81AN | TC-99 | 2.31E+01 +- 1.53E+00 | | pCi/g | 100% | 90% | -0.1 | 2.51E-01 |
| 4033505 BLANK QC | | | | | | | | |
| F8XN41AA | TC-99 | 1.64E-02 +- 1.56E-01 | U | pCi/g | 100% | | | 2.66E-01 |
| 4033505 LCS | | | | | | | | |
| F8XN41AC | TC-99 | 1.26E+01 +- 9.02E-01 | J | pCi/g | 100% | 93% | -0.1 | 2.65E-01 |
| RICHRC5010 | | | | | | | | |
| 4037319 BLANK QC | | | | | | | | |
| F87LH1AA | PU-241 | 8.87E-01 +- 1.01E+00 | U | pCi/g | 54% | | | 1.93E+00 |
| 4037319 LCS | | | | | | | | |
| F87LH1AC | PU-241 | 1.48E+01 +- 1.78E+00 | J | pCi/g | 69% | 63% | -0.4 | 1.50E+00 |
| RICHRC5069 | | | | | | | | |
| 4051400 BLANK QC | | | | | | | | |
| F9X1H1AA | NI-63 | 2.68E-01 +- 3.24E+00 | U | pCi/g | 100% | | | 5.00E+00 |
| 4051400 LCS | | | | | | | | |

STL Richland
rptSTLRchQcSummary V4.07 A97

Bias - (Result/Expected)-1 as defined by ANSI N13.30.
J Qual - No U|< qualifier has been assigned and the result is below the Reporting Limit, RL (CRDL) or Report Value is Estimated.
U Qual - Analyzed for, but the result is less than the Mdc/Mda|Total Uncert or gamma scan software did not identify the nuclide.

# QC Results Summary
## STL Richland STLR

Ordered by Method, Batch No, QC Type,.

Date: 28-Feb-04

Report No. : 25071

SDG No.: 25067

| Batch Work Order | Parameter | Result +- Uncertainty ( 2s) | Qual | Units | Yield | Recovery | Bias | MDC\|MDA |
|---|---|---|---|---|---|---|---|---|
| F9X1H1AC | NI-63 | 3.65E+02 +- 5.75E+01 | | pCi/g | 97% | 72% | -0.3 | 6.00E+00 |

No. of Results: 20

STL Richland Bias - (Result/Expected)-1 as defined by ANSI N13.30.

rptSTLRchQcSum
mary V4.07 A97

# FORM I

## SAMPLE RESULTS

Date: 28-Feb-04

| | | | | | |
|---|---|---|---|---|---|
| Lab Name: | STL Richland | SDG: | 25067 | Collection Date: | 4/10/2003 |
| Lot-Sample No.: | J4A290294-1 | Report No. : | 25071 | Received Date: | 1/29/2004 3:00:00 PM |
| Client Sample ID: | 9526-0001-002F(FMVMG) | COC No. : | | Matrix: | SOIL |

Ordered by Client Sample ID, Batch I

| Parameter | Result | Qual | Count Error ( 2 s) | Total Uncert( 2 s) | MDC\|MDA, Action Lev | Rpt Unit, Lc | Yield CRDL(RL) | Rst/MDC, Rst/TotUcert | Analysis, Prep Date | Total Sa Size | Aliquot Size | Prin Dcte |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Batch: 4033497 | RICHRC5080 | | | Work Order: F8RH71AK | | | Report DB ID: 9F8RH710 | | | | | |
| AM-241 | 2.21E-02 | J | 2.55E-02 | 2.58E-02 | 1.99E-02 | pCi/g | 74% | *(1.1)* | 2/16/04 09:16 p | | 2.0 | ALF |
| | | | | | | | 1.03E+00 | *(1.7)* | | | G | |
| CM-242 | 0.00E+00 | U | 0.00E+00 | 6.81E-02 | 7.53E-02 | pCi/g | 74% | *0.* | 2/16/04 09:16 p | | 2.0 | ALF |
| | | | | | | | | *0.* | | | G | |
| CM-243/244 | 0.00E+00 | U | 0.00E+00 | 1.86E-02 | 2.06E-02 | pCi/g | 74% | *0.* | 2/16/04 09:16 p | | 2.0 | ALF |
| | | | | | | | 1.16E+00 | *0.* | | | G | |
| Batch: 4033500 | RICHRC5010 | | | Work Order: F8RH71AD | | | Report DB ID: 9F8RH710 | | | | | |
| PU-238 | 0.00E+00 | U | 0.00E+00 | 1.24E-02 | 1.37E-02 | pCi/g | 88% | *0.* | 2/12/04 05:37 p | | 2.04 | ALF |
| | | | | | | | 1.18E+00 | *0.* | | | G | |
| PU239/40 | 2.52E-02 | J | 2.25E-02 | 2.29E-02 | 1.36E-02 | pCi/g | 88% | *(1.8)* | 2/12/04 05:37 p | | 2.04 | ALF |
| | | | | | | | 1.07E+00 | *(2.2)* | | | G | |
| Batch: 4033502 | RICHRC5022 | | | Work Order: F8RH71AA | | | Report DB ID: 9F8RH710 | | | | | |
| C-14 | 2.32E-02 | U | 5.87E-02 | 7.53E-02 | 1.38E-01 | pCi/g | 100% | *0.17* | 2/13/04 01:50 p | | 5.013 | LS |
| | | | | | | 6.77E-02 | 2.26E-01 | *0.62* | | | G | |
| Batch: 4033505 | RICHRC5078 | | | Work Order: F8RH71AC | | | Report DB ID: 9F8RH710 | | | | | |
| TC-99 | 5.66E-02 | U | 1.10E-01 | 1.58E-01 | 2.66E-01 | pCi/g | 100% | *0.21* | 2/27/04 10:16 a | | 5.0 | LS |
| | | | | | | 1.28E-01 | 5.04E-01 | *0.72* | | | G | |
| Batch: 4033507 | CMUD | | | Work Order: F8RH71AE | | | Report DB ID: 9F8RH710 | | | | | |
| SR-90 | 2.94E-01 | | 1.22E-01 | 1.32E-01 | 2.16E-01 | pCi/g | 66% | *(1.4)* | 2/25/04 09:00 a | | 2.03 | GP |
| | | | | | | 9.73E-02 | 6.00E-02 | *(4.5)* | | | G | |

STL Richland
rptSTLRchSample
V4.07 A97

MDC|MDA,Lc - Detection, Decision Level based on instrument background or blank, adjusted by the sample Efficiency, Yield, and Volume.
J Qual - No U|< qualifier has been assigned and the result is below the Reporting Limit, RL (CRDL) or Report Value is Estimated.
U Qual - Analyzed for, but the result is less than the Mdc/Mda|Total Uncert or gamma scan software did not identify the nuclide.

# FORM I

Date: 28-Feb-04

## SAMPLE RESULTS

| | | | | | |
|---|---|---|---|---|---|
| Lab Name: | STL Richland | SDG: | 25067 | Collection Date: | 4/10/2003 |
| Lot-Sample No.: | J4A290294-1 | Report No. : | 25071 | Received Date: | 1/29/2004 3:00:00 PM |
| Client Sample ID: | 9526-0001-002F(FMVMG) | COC No. : | | Matrix: | SOIL |

Ordered by Client Sample ID, Batch I

| Parameter | Result | Qual | Count Error ( 2 s) | Total Uncert( 2 s) | MDC\|MDA, Action Lev | Rpt Unit, Lc | Yield CRDL(RL) | Rst/MDC, Rst/TotUcert | Analysis, Prep Date | Total Sa Size | Aliquot Size | Prin Dete |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Batch: 4033508 | FBXZ | | | Work Order: | F8RH71AH | | Report DB ID: 9F8RH710 | | | | | |
| FE-55 | 1.46E+01 | U | | 7.07E+00 | 1.92E+01 | pCi/g | 89% | *0.76* | 2/19/04 02:46 p | | 0.2502 | LS |
| | | | | | | 9.16E+00 | 1.10E+03 | *(4.1)* | | | G | |
| Batch: 4037319 | RICHRC5010 | | | Work Order: | F8RH71AN | | Report DB ID: 9F8RH710 | | | | | |
| PU-241 | 2.87E-01 | U | 4.80E-01 | 5.90E-01 | 1.15E+00 | pCi/g | 88% | *0.25* | 2/17/04 11:10 p | | 2.04 | LS |
| | | | | | | 5.39E-01 | 3.48E+01 | *0.97* | | | G | |
| Batch: 4051400 | RICHRC5069 | | | Work Order: | F8RH72AG | | Report DB ID: 9F8RH720 | | | | | |
| NI-63 | 5.37E+00 | U | 2.86E+00 | 4.38E+00 | 8.26E+00 | pCi/g | 88% | *0.65* | 2/26/04 02:21 p | | 0.2504 | LS |
| | | | | | | 4.00E+00 | 2.89E+01 | *(2.5)* | | | G | |

No. of Results: 11 Comments:



MDC|MDA,Lc - Detection, Decision Level based on instrument background or blank, adjusted by the sample Efficiency, Yield, and Volume.
J Qual - No U|< qualifier has been assigned and the result is below the Reporting Limit, RL (CRDL) or Report Value is Estimated.
U Qual - Analyzed for, but the result is less than the Mdc/Mda|Total Uncert or gamma scan software did not identify the nuclide.

# FORM I

Date: 28-Feb-04

## SAMPLE RESULTS

| | | | | | |
|---|---|---|---|---|---|
| Lab Name: | STL Richland | SDG: | 25067 | Collection Date: | 4/10/2003 |
| Lot-Sample No.: | J4A290294-2 | Report No. : | 25071 | Received Date: | 1/29/2004 3:00:00 PM |
| Client Sample ID: | 9526-0001-010F(FMVWN) | COC No. : | | Matrix: | SOIL |

Ordered by Client Sample ID, Batch I

| Parameter | Result | Qual | Count Error ( 2 s) | Total Uncert( 2 s) | MDC\|MDA, Action Lev | Rpt Unit, Lc | Yield CRDL(RL) | Rst/MDC, Rst/TotUcert | Analysis, Prep Date | Total Sa Size | Aliquot Size | Prin Dete |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Batch: 4033497 | RICHRC5080 | | | Work Order: F8RH81AK | | | Report DB ID: 9F8RH810 | | | | | |
| AM-241 | 1.27E-01 | U | 2.02E-01 | 2.11E-01 | 3.39E-01 | pCi/g | 83% | *0.38* | 2/16/04 09:16 p | | 0.1502 | ALF |
| | | | | | | 7.36E-02 | 1.03E+00 | *(1.2)* | | | G | |
| CM-242 | 0.00E+00 | U | 0.00E+00 | 6.54E-01 | 7.24E-01 | pCi/g | 83% | *0.* | 2/16/04 09:16 p | | 0.1502 | ALI |
| | | | | | | | | *0.* | | | G | |
| CM-243/244 | 0.00E+00 | U | 0.00E+00 | 1.79E-01 | 1.98E-01 | pCi/g | 83% | *0.* | 2/16/04 09:16 p | | 0.1502 | ALI |
| | | | | | | | 1.16E+00 | *0.* | | | G | |
| Batch: 4033500 | RICHRC5010 | | | Work Order: F8RH81AD | | | Report DB ID: 9F8RH810 | | | | | |
| PU-238 | 0.00E+00 | U | 0.00E+00 | 2.12E-01 | 2.35E-01 | pCi/g | 51% | *0.* | 2/12/04 05:40 p | | 0.15 | ALI |
| | | | | | | | 1.18E+00 | *0.* | | | G | |
| PU239/40 | 0.00E+00 | U | 0.00E+00 | 2.11E-01 | 2.33E-01 | pCi/g | 51% | *0.* | 2/12/04 05:40 p | | 0.15 | ALI |
| | | | | | | | 1.07E+00 | *0.* | | | G | |
| Batch: 4033502 | RICHRC5022 | | | Work Order: F8RH81AA | | | Report DB ID: 9F8RH810 | | | | | |
| C-14 | 6.35E-02 | U | 2.92E-01 | 3.74E-01 | 6.88E-01 | pCi/g | 100% | *0.09* | 2/13/04 05:13 p | | 1.006 | LS |
| | | | | | | 3.37E-01 | 2.26E-01 | *0.34* | | | G | |
| Batch: 4033505 | RICHRC5078 | | | Work Order: F8RH81AC | | | Report DB ID: 9F8RH810 | | | | | |
| TC-99 | 1.25E-01 | U | 1.13E-01 | 1.62E-01 | 2.67E-01 | pCi/g | 100% | *0.47* | 2/27/04 12:21 p | | 5.0 | LS |
| | | | | | | 1.28E-01 | 5.04E-01 | *(1.5)* | | | G | |
| Batch: 4033507 | CMUD | | | Work Order: F8RH81AE | | | Report DB ID: 9F8RH810 | | | | | |
| SR-90 | 3.28E+00 | | 1.42E+00 | 1.92E+00 | 2.59E+00 | pCi/g | 73% | *(1.3)* | 2/25/04 09:00 a | | 0.1507 | GF |
| | | | | | | 1.16E+00 | 6.00E-02 | *(3.4)* | | | G | |

STL Richland
rptSTLRchSample
V4.07 A97

MDC|MDA,Lc - Detection, Decision Level based on instrument background or blank, adjusted by the sample Efficiency, Yield, and Volume.
J Qual - No U|< qualifier has been assigned and the result is below the Reporting Limit, RL (CRDL) or Report Value is Estimated.
U Qual - Analyzed for, but the result is less than the Mdc/Mda|Total Uncert or gamma scan software did not identify the nuclide.

# FORM I

## SAMPLE RESULTS

Date: 28-Feb-04

| | | | | | |
|---|---|---|---|---|---|
| Lab Name: | STL Richland | SDG: | 25067 | Collection Date: | 4/10/2003 |
| Lot-Sample No.: | J4A290294-2 | Report No. : | 25071 | Received Date: | 1/29/2004 3:00:00 PM |
| Client Sample ID: | 9526-0001-010F(FMVWN) | COC No. : | | Matrix: | SOIL |

Ordered by Client Sample ID, Batch I

| Parameter | Result | Qual | Count Error ( 2 s) | Total Uncert( 2 s) | MDC\|MDA, Action Lev | Rpt Unit, Lc | Yield CRDL(RL) | Rst/MDC, Rst/TotUcert | Analysis, Prep Date | Total Sa Size | Aliquot Size | Prim Dete |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Batch: 4033508 | FBXZ | | | Work Order: | F8RH81AH | | Report DB ID: 9F8RH810 | | | | | |
| FE-55 | 4.34E+01 | U | | 2.92E+01 | 4.96E+01 | pCi/g | 113% | *0.87* | 2/19/04 02:46 p | | 0.0759 | LS |
| | | | | | | 2.36E+01 | 1.10E+03 | *(3.)* | | | G | |
| Batch: 4037319 | RICHRC5010 | | | Work Order: | F8RH81AP | | Report DB ID: 9F8RH810 | | | | | |
| PU-241 | 1.26E+01 | U | 1.16E+01 | 1.50E+01 | 2.73E+01 | pCi/g | 51% | *0.46* | 2/17/04 11:10 p | | 0.15 | LS |
| | | | | | | 1.28E+01 | 3.48E+01 | *(1.7)* | | | G | |
| Batch: 4051400 | RICHRC5069 | | | Work Order: | F8RH82AG | | Report DB ID: 9F8RH820 | | | | | |
| NI-63 | 2.60E+00 | U | 3.46E+00 | 5.94E+00 | 8.67E+00 | pCi/g | 96% | *0.3* | 2/26/04 04:03 p | | 0.1511 | LS |
| | | | | | | 4.20E+00 | 2.89E+01 | *0.88* | | | G | |

No. of Results: 11 Comments:

STL Richland
rptSTLRchSample
V4.07 A97

MDC|MDA,Lc - Detection, Decision Level based on instrument background or blank, adjusted by the sample Efficiency, Yield, and Volume.
J Qual - No U|< qualifier has been assigned and the result is below the Reporting Limit, RL (CRDL) or Report Value is Estimated.
U Qual - Analyzed for, but the result is less than the Mdc/Mda|Total Uncert or gamma scan software did not identify the nuclide.

# FORM II

Date: 28-Feb-04

## DUPLICATE RESULTS

| | | | | | |
|---|---|---|---|---|---|
| Lab Name: | STL Richland | SDG: | 25067 | Collection Date: | 4/10/2003 |
| Lot-Sample No.: | J4A290294-1 | Report No. : | 25071 | Received Date: | 1/29/2004 3:00:00 PM |
| Client Sample ID: | 9526-0001-002F(FMVMG) DUP | COC No. : | | Matrix: | SOIL |

| Parameter | Result, Orig Rst | Qual | Count Error ( 2 s) | Total Uncert( 2 s) | MDC\|MDA, Action Lev | Rpt Unit, CRDL | Yield | Rst/MDC, Rst/TotUcert | Analysis, Prep Date | Total Sa Size | Aliquot Size | Primar Detect |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Batch: 4033497 | RICHRC5080 | | | Work Order: F8RH71AL | | Report DB ID: F8RH71LR | | | Orig Sa DB ID: 9F8RH710 | | | |
| AM-241 | 2.69E-02 | J | 2.69E-02 | 2.73E-02 | 1.82E-02 | pCi/g | 75% | (1.5) | 2/16/04 09:16 p | | 2.01 | ALP12 |
| | 2.21E-02 | J | RER2 0.3 | | | 1.03E+00 | | (2.) | | | G | |
| CM-242 | 0.00E+00 | U | 0.00E+00 | 6.22E-02 | 6.88E-02 | pCi/g | 75% | 0. | 2/16/04 09:16 p | | 2.01 | ALP12 |
| | 0.00E+00 | U | RER2 0.0 | | | | | 0. | | | G | |
| CM-243/244 | 0.00E+00 | U | 0.00E+00 | 1.70E-02 | 1.88E-02 | pCi/g | 75% | 0. | 2/16/04 09:16 p | | 2.01 | ALP12 |
| | 0.00E+00 | U | RER2 0.0 | | | 1.16E+00 | | 0. | | | G | |
| | | | | | | | | | Alpha Spec Result Sum = 2.7E-02 | | | |
| Batch: 4033505 | RICHRC5078 | | | Work Order: F8RH71AM | | Report DB ID: F8RH71MR | | | Orig Sa DB ID: 9F8RH710 | | | |
| TC-99 | 1.46E-01 | U | 1.06E-01 | 1.52E-01 | 2.47E-01 | pCi/g | 100% | 0.59 | 2/27/04 11:19 a | | 5.4 | LSC4 |
| | 5.66E-02 | U | RER2 0.8 | | | 5.04E-01 | | (1.9) | | | G | |
| | | | | | | | | | Alpha Spec Result Sum = 2.7E-02 | | | |

No. of Results: 4 Comments:

STL Richland
rptSTLRchDupV4.0 7 A97

RER2 - Replicate Error Ratio = (S-D)/[sqrt(sq(TPUs)+sq(TPUd))] as defined by ICPT BOA.
MDC|MDA,Lc - Detection, Decision Level based on instrument background or blank, adjusted by the sample Efficiency, Yield, and Volume.
J Qual - No U|< qualifier has been assigned and the result is below the Reporting Limit, RL (CRDL) or Report Value is Estimated.
U Qual - Analyzed for, but the result is less than the Mdc/Mda|Total Uncert or gamma scan software did not identify the nuclide.

# FORM II

Date: 28-Feb-04

## DUPLICATE RESULTS

| | | | | | |
|---|---|---|---|---|---|
| Lab Name: | STL Richland | SDG: | 25067 | Collection Date: | 4/10/2003 |
| Lot-Sample No.: | J4A290294-2 | Report No. : | 25071 | Received Date: | 1/29/2004 3:00:00 PM |
| Client Sample ID: | 9526-0001-010F(FMVWN) DUP | COC No. : | | Matrix: | SOIL |

| Parameter | Result, Orig Rst | Qual | Count Error ( 2 s) | Total Uncert( 2 s) | MDC\|MDA, Action Lev | Rpt Unit, CRDL | Yield | Rst/MDC, Rst/TotUcert | Analysis, Prep Date | Total Sa Size | Aliquot Size | Primary Detecto |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Batch: 4033500 | RICHRC5010 | | | Work Order: F8RH81AR | | Report DB ID: F8RH81RR | | | Orig Sa DB ID: 9F8RH810 | | | |
| PU-238 | 0.00E+00 | U | 0.00E+00 | 3.50E-01 | 3.87E-01 | pCi/g | 39% | 0. | 2/12/04 05:40 p | | 0.1504 | ALP13 |
| | 0.00E+00 | U | RER2 0.0 | | | 1.18E+00 | | 0. | | | G | |
| PU239/40 | 2.55E-01 | U | 4.05E-01 | 4.08E-01 | 6.79E-01 | pCi/g | 39% | 0.38 | 2/12/04 05:40 p | | 0.1504 | ALP13 |
| | 0.00E+00 | U | RER2 1.1 | | | 1.07E+00 | | (1.3) | | | G | |
| | | | | | | | | | Alpha Spec Result Sum = 2.6E-01 | | | |
| Batch: 4037319 | RICHRC5010 | | | Work Order: F8RH81AQ | | Report DB ID: F8RH81QR | | | Orig Sa DB ID: 9F8RH810 | | | |
| PU-241 | -8.04E+00 | U | 1.37E+01 | 1.71E+01 | 3.49E+01 | pCi/g | 39% | -0.23 | 2/17/04 11:10 p | | 0.1504 | LSC7 |
| | 1.26E+01 | U | RER2 1.8 | | | 3.48E+01 | | -0.94 | | | G | |
| | | | | | | | | | Alpha Spec Result Sum = 2.6E-01 | | | |

No. of Results: 3 Comments:

22

STL Richland
rptSTLRchDupV4.0
7 A97

RER2 - Replicate Error Ratio = (S-D)/[sqrt(sq(TPUs)+sq(TPUd))] as defined by ICPT BOA.
MDC|MDA,Lc - Detection, Decision Level based on instrument background or blank, adjusted by the sample Efficiency, Yield, and Volume.
U Qual - Analyzed for, but the result is less than the Mdc/Mda|Total Uncert or gamma scan software did not identify the nuclide.

# FORM II

## BLANK RESULTS

Date: 28-Feb-04

Lab Name: STL Richland
Matrix: SOIL

SDG: 25067
Report No. : 25071

| Parameter | Result | Qual | Count Error ( 2 s) | Total Uncert( 2 s) | MDC\|MDA, Lc | Rpt Unit, CRDL | Yield | Rst/MDC, Rst/TotUcert | Analysis, Prep Date | Total Sa Size | Aliquot Size | Primary Detector |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Batch: 4033502 | RICHRC5022 | | | Work Order: | F8XNV1AA | | Report DB ID: | F8XNV1AB | | | | |
| C-14 | -4.80E-02 | U | 5.79E-02 | 7.38E-02 | 1.39E-01 | pCi/g | 100% | -0.34 | 2/13/04 07:05 a | | 5.0 | LSC6 |
| | | | | | 6.82E-02 | 2.26E-01 | | -(1.3) | | | G | |
| Batch: 4051400 | RICHRC5069 | | | Work Order: | F9X1H1AA | | Report DB ID: | F9X1H1AB | | | | |
| NI-63 | 2.68E-01 | U | 1.96E+00 | 3.24E+00 | 5.00E+00 | pCi/g | 100% | 0.05 | 2/26/04 10:53 p | | 0.25 | LSC3 |
| | | | | | 2.42E+00 | 2.89E+01 | | 0.17 | | | G | |
| Batch: 4033500 | RICHRC5010 | | | Work Order: | F9PAR1AA | | Report DB ID: | F9PAR1AB | | | | |
| PU-238 | 0.00E+00 | U | 0.00E+00 | 1.90E-02 | 2.10E-02 | pCi/g | 54% | 0. | 2/12/04 11:05 p | | 2.0 | ALP13 |
| | | | | | | 1.18E+00 | | 0. | | | G | |
| PU239/40 | -1.54E-03 | U | 3.08E-03 | 3.09E-03 | 3.69E-02 | pCi/g | 54% | -0.04 | 2/12/04 11:05 p | | 2.0 | ALP13 |
| | | | | | 8.01E-03 | 1.07E+00 | | -1. | | | G | |
| Batch: 4033497 | RICHRC5080 | | | Work Order: | F8XNK1AA | | Report DB ID: | F8XNK1AB | | | | |
| AM-241 | 5.75E-03 | U | 1.15E-02 | 1.16E-02 | 1.56E-02 | pCi/g | 83% | 0.37 | 2/16/04 09:18 p | | 2.0 | ALP13 |
| | | | | | | 1.03E+00 | | 1. | | | G | |
| CM-242 | 0.00E+00 | U | 0.00E+00 | 5.32E-02 | 5.89E-02 | pCi/g | 83% | 0. | 2/16/04 09:18 p | | 2.0 | ALP13 |
| | | | | | | | | 0. | | | G | |
| CM-243/244 | 0.00E+00 | U | 0.00E+00 | 1.45E-02 | 1.61E-02 | pCi/g | 83% | 0. | 2/16/04 09:18 p | | 2.0 | ALP13 |
| | | | | | | 1.16E+00 | | 0. | | | G | |
| Batch: 4037319 | RICHRC5010 | | | Work Order: | F87LH1AA | | Report DB ID: | F87LH1AB | | | | |
| PU-241 | 8.87E-01 | U | 8.23E-01 | 1.01E+00 | 1.93E+00 | pCi/g | 54% | 0.46 | 2/17/04 11:10 p | | 2.0 | LSC7 |
| | | | | | 9.04E-01 | 3.48E+01 | | (1.8) | | | G | |
| Batch: 4033505 | RICHRC5078 | | | Work Order: | F8XN41AA | | Report DB ID: | F8XN41AB | | | | |

STL Richland
rptSTLRchBlank
V4.07 A97

MDC|MDA,Lc - Detection, Decision Level based on Instrument background or blank, adjusted by the sample Efficiency, Yield, and Volume.
U Qual - Analyzed for, but the result is less than the Mdc/Mda|Total Uncert or gamma scan software did not identify the nuclide.

# FORM II

Date: 28-Feb-04

## BLANK RESULTS

Lab Name: STL Richland
Matrix: SOIL

SDG: 25067
Report No. : 25071

| Parameter | Result | Qual | Count Error ( 2 s) | Total Uncert( 2 s) | MDC\|MDA, Lc | Rpt Unit, CRDL | Yield | Rst/MDC, Rst/TotUcert | Analysis, Prep Date | Total Sa Size | Aliquot Size | Primary Detector |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TC-99 | 1.64E-02 | U | 1.09E-01 | 1.56E-01 | 2.66E-01 | pCi/g | 100% | 0.06 | 2/27/04 04:30 p | | 5.0 | LSC4 |
| | | | | | 1.28E-01 | 2.00E+01 | | 0.21 | | | G | |
| Batch: 4033507 | CMUD | | | Work Order: | F8XN81AA | | Report DB ID: | F8XN81AB | | | | |
| SR-90 | 1.66E-01 | U | 9.94E-02 | 1.05E-01 | 1.92E-01 | pCi/g | 77% | 0.86 | 2/25/04 09:00 a | | 2.0 | GPC4C |
| | | | | | 8.65E-02 | 6.00E-02 | | (3.2) | | | G | |
| Batch: 4033508 | FBXZ | | | Work Order: | F8XN91AA | | Report DB ID: | F8XN91AB | | | | |
| FE-55 | 1.25E+01 | J | | 5.76E+00 | 1.18E+01 | pCi/g | 86% | (1.1) | 2/19/04 02:46 p | | 0.25 | LSC7 |
| | | | | | 5.62E+00 | 1.10E+03 | | (4.3) | | | G | |

No. of Results: 11 Comments:

STL Richland
rptSTLRchBlank
V4.07 A97

MDC|MDA,Lc - Detection, Decision Level based on instrument background or blank, adjusted by the sample Efficiency, Yield, and Volume.
J Qual - No U|< qualifier has been assigned and the result is below the Reporting Limit, RL (CRDL) or Report Value is Estimated.
U Qual - Analyzed for, but the result is less than the Mdc/Mda|Total Uncert or gamma scan software did not identify the nuclide.

# FORM II

Date: 28-Feb-04

## LCS RESULTS

Lab Name: STL Richland

SDG: 25067

Matrix: SOIL

Report No. : 25071

| Parameter | Result | Qual | Count Error ( 2 s) | Total Uncert( 2 s) | MDC\|MDA | Report Unit | Yield | Expected | Expected Uncert | Recovery, Bias | Analysis, Prep Date | Aliquot Size | Primar Detectc |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Batch: 4033502 | RICHRC5022 | | | Work Order: | F8XNV1AC | | Report DB ID: | F8XNV1CS | | | | | |
| C-14 | 6.97E+00 | | 1.30E-01 | 2.83E-01 | 1.39E-01 | pCi/g | 100% | 7.25E+00 | 2.34E-01 | 96% | 2/13/04 10:28 a | 5.0 | LSC |
| | | | | | | | Rec Limits: | 70 | 130 | 0.0 | | G | |
| Batch: 4051400 | RICHRC5069 | | | Work Order: | F9X1H1AC | | Report DB ID: | F9X1H1CS | | | | | |
| NI-63 | 3.65E+02 | | 7.37E+00 | 5.75E+01 | 6.00E+00 | pCi/g | 97% | 5.07E+02 | 1.70E+01 | 72% | 2/27/04 12:36 a | 0.25 | LSC: |
| | | | | | | | Rec Limits: | 70 | 130 | -0.3 | | G | |
| Batch: 4033500 | RICHRC5010 | | | Work Order: | F9PAR1AC | | Report DB ID: | F9PAR1CS | | | | | |
| PU239/40 | 4.66E-01 | | 9.47E-02 | 1.21E-01 | 1.30E-02 | pCi/g | 69% | 4.61E-01 | 2.33E-02 | 101% | 2/12/04 11:05 p | 2.0 | ALP1: |
| | | | | | | | Rec Limits: | 70 | 130 | 0.0 | | G | |
| Batch: 4033497 | RICHRC5080 | | | Work Order: | F8XNK1AC | | Report DB ID: | F8XNK1CS | | | | | |
| AM-241 | 4.33E+00 | | 2.79E-01 | 8.01E-01 | 1.22E-02 | pCi/g | 108% | 4.55E+00 | 1.53E-01 | 95% | 2/16/04 09:18 p | 2.0 | ALP1: |
| | | | | | | | Rec Limits: | 70 | 130 | 0.0 | | G | |
| Batch: 4037319 | RICHRC5010 | | | Work Order: | F87LH1AC | | Report DB ID: | F87LH1CS | | | | | |
| PU-241 | 1.48E+01 | | 1.17E+00 | 1.78E+00 | 1.50E+00 | pCi/g | 69% | 2.35E+01 | 1.06E+00 | 63% | 2/17/04 11:10 p | 2.0 | LSC |
| | | | | | | | Rec Limits: | 70 | 130 | -0.4 | | G | |
| Batch: 4033505 | RICHRC5078 | | | Work Order: | F8XN41AC | | Report DB ID: | F8XN41CS | | | | | |
| TC-99 | 1.26E+01 | | 3.27E-01 | 9.02E-01 | 2.65E-01 | pCi/g | 100% | 1.36E+01 | 3.05E-01 | 93% | 2/27/04 05:32 p | 5.0 | LSC |
| | | | | | | | Rec Limits: | 70 | 130 | -0.1 | | G | |
| Batch: 4033507 | CMUD | | | Work Order: | F8XN81AC | | Report DB ID: | F8XN81CS | | | | | |
| SR-90 | 2.82E+00 | | 2.59E-01 | 4.88E-01 | 1.86E-01 | pCi/g | 74% | 2.32E+00 | 2.82E-02 | 122% | 2/25/04 09:00 a | 2.0 | GPC |
| | | | | | | | Rec Limits: | 70 | 130 | 0.2 | | G | |
| Batch: 4033508 | FBXZ | | | Work Order: | F8XN91AC | | Report DB ID: | F8XN91CS | | | | | |

STL Richland Bias = (Result/Expected)-1 as defined by ANSI N13.30.

rptSTLRchLcs
V4.07 A97

# FORM II

## LCS RESULTS

Date: 28-Feb-04

Lab Name: STL Richland

Matrix: SOIL

SDG: 25067

Report No. : 25071

| Parameter | Result | Qual | Count Error ( 2 s) | Total Uncert( 2 s) | MDC\|MDA | Report Unit | Yield | Expected | Expected Uncert | Recovery, Bias | Analysis, Prep Date | Aliquot Size | Primary Detecto |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| FE-55 | 6.68E+01 | | | 1.41E+01 | 1.41E+01 | pCi/g | 89% | 6.65E+01 | 3.54E+00 | 100% | 2/19/04 02:46 p | 0.25 | LSC7 |
| | | | | | | | Rec Limits: | 70 | 130 | 0.0 | | G | |

No. of Results: 8 Comments:

STL Richland Bias - (Result/Expected)-1 as defined by ANSI N13.30.

rptSTLRchLcs
V4.07 A97

# FORM II

Date: 28-Feb-04

## MATRIX SPIKE RESULTS

Lab Name: STL Richland SDG: 25067

Lot-Sample No.: J4A290294-2 Report No. : 25071 Matrix: SOIL

| Parameter | SpikeResult, Orig Rst | Qual | Count Error (2 s) | Total Uncert(2 s) | MDC\|MDA | Rpt Unit, CRDL | Yield | Rec-overy | Exp-ected | Exp Uncert | Analysis, Prep Date | Aliquot Size | Prima Detect |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Batch: 4033505 | RICHRC5078 | | | Work Order: F8RH81AN | | | Report DB ID: F8RH81NW | | | | Orig Sa DB ID: 9F8RH810 | | |
| TC-99 | 2.31E+01 | | 4.19E-01 | 1.53E+00 | 2.51E-01 | pCi/g | 100% | 89.89% | 2.56E+01 | 5.77E-01 | 2/27/04 01:23 p | 5.3 | LSC |
| | 1.25E-01 | RER2 | | | | | | | | | | G | |

No. of Results: 1 Comments:

STL Richland RER - Replicate Error Ratio = (S-D)/[sqrt(sq(TPUs)+sq(TPUd))] as defined by ICPT BOA.

rptSTLRchMs Bias - (Result/Expected)-1 as defined by ANSI N13.30.

V4.07 A97

Analytical Data Package Prepared For

# Connecticut Yankee

Radiochemical Analysis By

## STL Richland

*2800 G.W. Way, Richland Wa, 99352, (509)-375-3131.*

Assigned Laboratory Code: STLR

*Data Package Contains* 12 *Pages*

Report No.: 25265

| SDG No. | Order No. | Client Sample ID (List Order) | Lot-Sa No. | Work Order | Report DB ID | Batch No. |
|---|---|---|---|---|---|---|
| 25340 | | 9526-0001-010F (FMVWN,F8RH8) | J4C040114-1 | GAK2T1AA | 9GAK2T10 | 4065202 |

SEVERN TRENT STL

STL Richland
2800 George Washington Way
Richland, WA 99352

Tel: 509 375 3131 Fax: 509 375 5590
www.stl-inc.com

# Certificate of Analysis

March 26, 2004

Connecticut Yankee Atomic Power
362 Injun Hollow Road
East Hampton, CT 06424

Attention: Pete Hollenbeck

| | | |
|---|---|---|
| Date Received in Lab | : | March 4, 2004 |
| Sample Type | : | One (1) Soil |
| SDG Number | : | 25340 |
| Project Name/Number | : | Haddam Neck Decommissioning |
| COC Number | : | E-mail request |

## CASE NARRATIVE

### I. Introduction

On March 4, 2004, a request to reanalyze one soil sample was received at the STL Richland (STLR) laboratory. Upon receipt, the sample was assigned a STLR identification number as described on the cover page of the Analytical Data Package report form. The sample was assigned to Lot Number J4C040114.

### II. Sample Receipt

The sample was received in good condition and no anomalies were noted during check-in.

### III. Analytical Results/Methodology

The analytical results for this report are presented by laboratory sample ID. Each set of data includes sample identification information, analytical results and the appropriate associated statistical errors.

The requested analysis was:

**Gas Proportional Counting**
Strontium-90 by method RICH-RC-5006

## IV. Quality Control

The analytical result for each analysis performed includes a minimum of one laboratory control sample (LCS), and one reagent blank sample analysis. Any exceptions have been noted in the "Comments" section.

QC and sample results are reported in the same units.

## V. Comments

**Gas Proportional Counting**
Strontium-90 by method RICH-RC-5006:
The MDA for all samples did not meet the CRDL. Per client approval, a smaller aliquot (2g) was used for analysis. Except as noted, the LCS, batch blank, sample, and sample duplicate results are within acceptance limits.

I certify that this Certificate of Analysis is in compliance with the SOW, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hard copy data package has been authorized by the Laboratory Manager, or a designee as verified by the following signature.

Reviewed and approved:

for

Theresa H. Kallsen
Project Management Assistant

## Drinking Water Method Cross References

| | DRINKING WATER ASTM METHOD CROSS REFERENCES | |
|---|---|---|
| | | |
| **Referenced Method** | **Isotope(s)** | **STL Richland's SOP number** |
| EPA 901.1 | Cs-134, I-131 | RICH-RC-5017 |
| EPA 900.0 | Alpha & Beta | RICH-RC-5014 |
| EPA 903.1 | Ra-226 | RICH-RC-5005 |
| EPA 904.0 | Ra-228 | RICH-RC-5005 |
| EPA 905.0 | Sr89/90 | RICH-RC-5006 |
| ASTM D2460 | Total Radium | RICH-RC-5027 |
| Standard Method 7500-U-C & ASTM D5174 | Uranium | RICH-RC-5058 |
| EPA 906.0 | Tritium | RICH-RC-5007 |
| | | |
| | | |
| | | |
| | | |
| NOTE: | | |
| The Gross Alpha LCS is prepared with Am-241 (unless otherwise specified in the case narrative) | | |
| The Gross Beta LCS is prepared with Sr/Y-90 (unless otherwise specified in the case narrative) | | |

## Uncertainty Estimation

STL Richland has adopted the internationally accepted approach to estimating uncertainties described in "NIST Technical Note 1297, 1994 Edition". The approach, "Law of Propagation of Errors", involves the identification of all variables in an analytical method which are used to derive a result. These variables are related to the analytical result (R) by some functional relationship, R = constants * f(x,y,z,...). The components (x,y,z) are evaluated to determine their contribution to the overall method uncertainty. The individual component uncertainties ($u_i$) are then combined using a statistical model that provides the most probable overall uncertainty value. All component uncertainties are categorized as type A, evaluated by statistical methods, or type B, evaluated by other means. Uncertainties not included in the components, such as sample homogeneity, are combined with the component uncertainty as the square root of the sum-of-the-squares of the individual uncertainties. The uncertainty associated with the derived result is the combined uncertainty ($u_c$) multiplied by the coverage factor (1,2, or 3).

When three or more sample replicates are used to derive the analytical result, the type A uncertainty is the standard deviation of the mean value (S/vn), where S is the standard deviation of the derived results. The type B uncertainties are all other random or non-random components that are not included in the standard deviation.

The derivation of the general "Law of Propagation of Errors" equations and specific example are available on request.

## Report Definitions

| | |
|---|---|
| **Action Lev** | An agreed upon activity level used to trigger some action when the final result is greater than or equal to the Action Level. Often the Action Level is related to the Decision Limit. |
| **Batch** | The QC preparation batch number that relates laboratory samples to QC samples that were prepared and analyzed together. |
| **Bias** | Defined by the equation (Result/Expected)-1 as defined by ANSI N13.30. |
| **COC No** | Chain of Custody Number assigned by the Client or STL Richland. |
| **Count Error (#s)** | Poisson counting statistics of the gross sample count and background. The uncertainty is absolute and in the same units as the result. For Liquid Scintillation Counting (LSC) the batch blank count is the background. |
| **Total Uncert (#s)** *$u_c$_Combined Uncertainty.* | All known uncertainties associated with the preparation and analysis of the sample are propagated to give a measure of the uncertainty associated with the result, *$u_c$ the combined uncertainty.* The uncertainty is absolute and in the same units as the result. |
| **(#s), Coverage Factor** | The coverage factor defines the width of the confidence interval, 1, 2 or 3 standard deviations. |
| **CRDL (RL)** | Contractual Required Detection Limit as defined in the Client's Statement Of Work or STL Richland "default" nominal detection limit. Often referred to the reporting level (RL) |
| **Lc** | Decision Level based on instrument background or blank, adjusted by the Efficiency, Chemical Yield, and Volume associated with the sample. The Type I error probability is approximately 5%. Lc=(1.645 * Sqrt(2*(BkgrndCnt/BkgrndCntMin)/SCntMin)) * (ConvFct/(Eff*Yld*Abn*Vol) * IngrFct). For LSC methods the batch blank is used as a measure of the background variability. Lc cannot be calculated when the background count is zero. |
| **Lot-Sample No** | The number assigned by the LIMS software to track samples received on the same day for a given client. The sample number is a sequential number assigned to each sample in the Lot. |
| **MDC\|MDA** | Detection Level based on instrument background or blank, adjusted by the Efficiency, Chemical Yield, and Volume with a Type I and II error probability of approximately 5%. MDC = (4.65 * Sqrt((BkgrndCnt/BkgrndCntMin)/SCntMin) + 2.71/SCntMin) * (ConvFct/(Eff * Yld * Abn * Vol) * IngrFct). For LSC methods the batch blank is used as a measure of the background variability. |
| **Primary Detector** | The instrument identifier associated with the analysis of the sample aliquot. |
| **Ratio U-234/U-238** | The U-234 result divided by the U-238 result. The U-234/U-238 ratio for natural uranium in NIST SRM 4321C is 1.038. |
| **Rst/MDC** | Ratio of the Result to the MDC. A value greater than 1 may indicate activity above background at a high level of confidence. Caution should be used when applying this factor and it should be used in concert with the qualifiers associated with the result. |
| **Rst/TotUcert** | Ratio of the Result to the Total Uncertainty. If the uncertainty has a coverage factor of 2 a value greater than 1 may indicate activity above background at approximately the 95% level of confidence assuming a two-sided confidence interval. Caution should be used when applying this factor and it should be used in concert with the qualifiers associated with the result. |
| **Report DB No** | Sample Identifier used by the report system. The number is based upon the first five digits of the Work Order Number. |
| **RER** | The equation Replicate Error Ratio = (S-D)/[sqrt($TPUs^2$ + $TPUd^2$)] as defined by ICPT BOA where S is the original sample result, D is the result of the duplicate, TPUs is the total uncertainty of the original sample and TPUd is the total uncertainty of the duplicate sample. |
| **SDG** | Sample Delivery Group Number assigned by the Client or assigned by STL Richland upon sample receipt. |
| **Sum Rpt Alpha Spec Rst(s)** | The sum of the reported alpha spec results for tests derived from the same sample excluding duplicate result where the results are in the same units. |
| **Work Order** | The LIMS software assign test specific identifier. |
| **Yield** | The recovery of the tracer added to the sample such as Pu-242 used to trace a Pu-239/40 method. |

# Sample Results Summary

Date: 26-Mar-04

## STL Richland STLR

Ordered by Method, Batch No., Client Sample ID.

Report No. : 25265

SDG No: 25340

| Batch | Client Id Work Order | Parameter | Result +- Uncertainty ( 2s) | Qual | Units | Yield | MDC or MDA | CRDL | RER2 |
|---|---|---|---|---|---|---|---|---|---|
| 4065202 | CMUD | | | | | | | | |
| | 9526-0001-010F (FMVWN,F8RH8) | | | | | | | | |
| | GAK2T1AA | SR-90 | 1.03E-01 +- 8.65E-02 | U | pCi/g | 59% | 1.56E-01 | 6.00E-02 | |
| | 9526-0001-010F (FMVWN,F8RH8) D | | | | | | | | |
| | GAK2T1AC | SR-90 | 1.09E-01 +- 8.32E-02 | U | pCi/g | 63% | 1.49E-01 | 6.00E-02 | |

No. of Results: 2

STL Richland

rptSTLRchSaSummary2 V4.07 A97

RER2 - Replicate Error Ratio = (S-D)/[sqrt(sq(TPUs)+sq(TPUd))] as defined by ICPT BOA.

U Qual - Analyzed for, but the result is less than the Mdc/Mda/Total Uncert or gamma scan software did not identify the nuclide.

# QC Results Summary

## STL Richland STLR

Ordered by Method, Batch No, QC Type,.

Date: 26-Mar-04

Report No. : 25265

SDG No.: 25340

| Batch Work Order | Parameter | Result +- Uncertainty ( 2s) | Qual | Units | Yield | Recovery | Bias | MDC\|MDA |
|---|---|---|---|---|---|---|---|---|
| CMUD | | | | | | | | |
| 4065202 BLANK QC | | | | | | | | |
| GANHL1AA | SR-90 | 3.05E-01 +- 1.03E-01 | | pCi/g | 66% | | | 1.46E-01 |
| 4065202 LCS | | | | | | | | |
| GANHL1AC | SR-90 | 2.59E+00 +- 4.30E-01 | | pCi/g | 57% | 111% | 0.1 | 1.75E-01 |

No. of Results: 2

STL Richland Bias - (Result/Expected)-1 as defined by ANSI N13.30.

rptSTLRchQcSum
mary V4.07 A97

# FORM I

## SAMPLE RESULTS

Date: 26-Mar-04

| | | | | | |
|---|---|---|---|---|---|
| Lab Name: | STL Richland | SDG: | 25340 | Collection Date: | 4/10/2003 |
| Lot-Sample No.: | J4C040114-1 | Report No. : | 25265 | Received Date: | 3/3/2004 4:00:00 PM |
| Client Sample ID: | 9526-0001-010F (FMVWN,F8RH8) | COC No. : | | Matrix: | SOIL |

Ordered by Client Sample ID; Batch No.

| Parameter | Result | Qual | Count Error ( 2 s) | Total Uncert( 2 s) | MDC\|MDA, Action Lev | Rpt Unit, Lc | Yield CRDL(RL) | Rst/MDC, Rst/TotUcert | Analysis, Prep Date | Total Sa Size | Aliquot Size | Primary Detector |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Batch: 4065202 | CMUD | | | Work Order: | GAK2T1AA | | Report DB ID: | 9GAK2T10 | | | | |
| SR-90 | 1.03E-01 | U | 8.65E-02 | 8.65E-02 | 1.56E-01 | pCi/g | 59% | *0.66* | 3/24/04 08:53 a | | 1.99 | GPC4A |
| | | | | | | 7.18E-02 | 6.00E-02 | *(2.4)* | | | G | |

No. of Results: 1 Comments:

8

STL Richland
rptSTLRchSample
V4.07 A97

MDC|MDA,Lc - Detection, Decision Level based on instrument background or blank, adjusted by the sample Efficiency, Yield, and Volume.
U Qual - Analyzed for, but the result is less than the Mdc/Mda|Total Uncert or gamma scan software did not identify the nuclide.

# FORM II

Date: 26-Mar-04

## DUPLICATE RESULTS

| | | | | | |
|---|---|---|---|---|---|
| Lab Name: | STL Richland | SDG: | 25340 | Collection Date: | 4/10/2003 |
| Lot-Sample No.: | J4C040114-1 | Report No. : | 25265 | Received Date: | 3/3/2004 4:00:00 PM |
| Client Sample ID: | 9526-0001-010F (FMVWN,F8RH8) D | COC No. : | | Matrix: | SOIL |

| Parameter | Result, Orig Rst | Qual | Count Error ( 2 s) | Total Uncert( 2 s) | MDC\|MDA, Action Lev | Rpt Unit, CRDL | Yield | Rst/MDC, Rst/TotUcert | Analysis, Prep Date | Total Sa Size | Aliquot Size | Primary Detector |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Batch: 4065202 | CMUD | | | Work Order: | GAK2T1AC | Report DB ID: | GAK2T1CR | | Orig Sa DB ID: | 9GAK2T10 | | |
| SR-90 | 1.09E-01 | U | 8.07E-02 | 8.32E-02 | 1.49E-01 | pCi/g | 63% | 0.73 | 3/24/04 08:53 a | | 1.99 | GPC4B |
| | 1.03E-01 | U | RER2 0.1 | | | 6.00E-02 | | (2.6) | | | G | |

No. of Results: 1 Comments:

9

STL Richland
rptSTLRchDupV4.0
7 A97

RER2 - Replicate Error Ratio = (S-D)/[sqrt(sq(TPUs)+sq(TPUd))] as defined by ICPT BOA.
MDC|MDA,Lc - Detection, Decision Level based on instrument background or blank, adjusted by the sample Efficiency, Yield, and Volume.
U Qual - Analyzed for, but the result is less than the Mdc/Mda|Total Uncert or gamma scan software did not identify the nuclide.

# FORM II

## BLANK RESULTS

Date: 26-Mar-04

Lab Name: STL Richland

Matrix: SOIL

SDG: 25340

Report No.: 25265

| Parameter | Result | Qual | Count Error ( 2 s) | Total Uncert( 2 s) | MDC\|MDA, Lc | Rpt Unit, CRDL | Yield | Rst/MDC, Rst/TotUcert | Analysis, Prep Date | Total Sa Size | Aliquot Size | Primary Detector |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Batch: 4065202 | CMUD | | | Work Order: | GANHL1AA | | Report DB ID: | GANHL1AB | | | | |
| SR-90 | 3.05E-01 | | 9.16E-02 | 1.03E-01 | 1.46E-01 | pCi/g | 66% | (2.1) | 3/24/04 08:53 a | | 2.0 | GPC4C |
| | | | | | 6.73E-02 | 6.00E-02 | | (5.9) | | | G | |

No. of Results: 1 Comments:

10

STL Richland MDC|MDA,Lc - Detection, Decision Level based on instrument background or blank, adjusted by the sample Efficiency, Yield, and Volume.

rptSTLRchBlank
V4.07 A97

# FORM II

## LCS RESULTS

Date: 26-Mar-04

Lab Name: STL Richland

Matrix: SOIL

SDG: 25340

Report No. : 25265

| Parameter | Result | Qual | Count Error ( 2 s) | Total Uncert( 2 s) | MDC\|MDA | Report Unit | Yield | Expected | Expected Uncert | Recovery, Bias | Analysis, Prep Date | Aliquot Size | Primary Detector |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Batch: 4065202 | CMUD | | | Work Order: | GANHL1AC | | Report DB ID: | GANHL1CS | | | | | |
| SR-90 | 2.59E+00 | | 2.05E-01 | 4.30E-01 | 1.75E-01 | pCi/g | 57% | 2.33E+00 | 2.83E-02 | 111% | 3/24/04 08:53 a | 2.0 | GPC4D |
| | | | | | | | Rec Limits: | 70 | 130 | 0.1 | | G | |

No. of Results: 1 Comments:

11

STL Richland Bias = (Result/Expected)-1 as defined by ANSI N13.30.

rptSTLRchLcs
V4.07 A97

PSL249

Severn Trent Laboratories, Inc
RAD NON-ACTINIDE WORKSHEET

Run Date: 01/29/2004
Time: 17:12:39
User Id.:
REVIEW DATE/BY: _____
WORK ORDER: F8RH8-1-AE_____

CLIENT CODE: 563680
PROJECT MANAGER: Theresa Kallsen
SITE: Connecticut Yankee
AMT. REC"D: 1 BAG
SAMPLE ID: 9526-0001-010F(FMVWN) FGAK2T
QC PACKAGE: Report
QC PROGRAM: STANDARD TEST SET JA 3-4-04
ANALYSIS CODE: XX-A-CM-UD-01 RSR85910
(41)SOLID, Sr85/90 by GPC-1, Sr-85

QUOTE #: 55733
LAB NUMBER: J4A290294-002
STORAGE LOC: J4A290294

SAMPLING DATE: 4/10/03
SAMPLING TIME:
RECEIVING DATE: 1/29/04

P

SAMPLE COMMENTS:
SOIL

ANALYSIS EXP. DATE: 10/07/03

ANALYTICAL DUE DATE: 2/26/04N
RAD LEVEL:

ANALYSIS COMMENTS:

* * * * * * * * * * * * PREPARATION/SEPERATION/ANALYSIS/DATA * * * * * * * * * * * * * * * *

METHOD: Sr-85 by NaI and Sr-90 by GPC 10 day ingrowth LIST: 0 Special Li
MATRIX:SOLID CLIENT MATRIX: SOIL QC BATCH: _____

PREP/SEP: Sr-90 PrpRC5013, SepRC5006(5071) SEP1

INITIAL: _____ TRACER: _____ DATE/BY: _____ _____
FINAL: _____ SPIKE: _____ TIME: _____
FILTER: Y/N BALANCE#: _____ TRACER YIELD: _____
PH: <2/ADJUST GEOMETRY: _____ BALANCE#: _____
DATE/BY: _____ _____ PIPET#: _____
COCKTAIL ADD DATE: _____ COMMENTS: _____
COMMENTS: _____

SEP 2
DATE/BY: _____ _____
TIME: _____
PPT WT: _____ BALANCE#: _____
DISH SZ: 1/1.5/2
COMMENTS: _____

INSTRUMENT ID: _____
DATE/BY: _____ _____
COUNT TIME: _____
DIL FACTOR: _____
CALIB DATE: _____
COMMENTS: _____

* * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *

% MOIST: _____ DRY WT: ? DECAY CORRECT: Y BLANK SUB: None
CALL IN: _____ UNCERT: Both SIGMA: 2 COUNT TIME: _____
UNITS: pCi/g

| | CRDL | RESULT | UNCERT | MDC |
|---|---|---|---|---|
| Strontium 90 | 6.00E-02 | _____ | _____ | _____ |
| **TRACER YIELD** | | | | |
| Strontium 85 | ( 20.00 - 115.00 ) | _____ | | |
| Sr Tracer | ( 20.00 - 115.00 ) | _____ | | |

J4C040114
25340
Due 3-24

# Attachment 2c
# Sample and Scan Area Data
# (5 Pages)

# Survey Release Record Scan Area Results
# Survey Unit 9526-0001

9526-0001 SCAN AREA # 1 REPORT

| Survey Location | Background (cpm)* | Action Level (cpm) | Reading (gross cpm) | Log Date | Log Time | E-600 S/N | Probe S/N |
|---|---|---|---|---|---|---|---|
| 9526-01-001-BC-0002 | - | 0 | 10700 | 4/15/2003 | 8:22:00 | 1109 | 109 |
| 9526-01-001-BC-0003 | - | 0 | 10800 | 4/15/2003 | 9:30:00 | 1109 | 109 |
| 9526-01-001-SC-0001 | 10700 | 12176 | 11100 | 4/15/2003 | 8:31:00 | 1109 | 109 |
| 9526-01-001-SC-0002 | 10700 | 12176 | 12100 | 4/15/2003 | 8:39:00 | 1109 | 109 |
| 9526-01-001-SC-0003 | 10700 | 12176 | 11700 | 4/15/2003 | 8:44:00 | 1109 | 109 |
| 9526-01-001-SC-0004 | 10700 | 12176 | 11300 | 4/15/2003 | 8:50:00 | 1109 | 109 |
| 9526-01-001-SC-0005 | 10700 | 12176 | 11200 | 4/15/2003 | 8:56:00 | 1109 | 109 |
| 9526-01-001-SC-0006 | 10700 | 12176 | 10400 | 4/15/2003 | 9:02:00 | 1109 | 109 |
| 9526-01-001-SC-0007 | 10700 | 12176 | 11700 | 4/15/2003 | 9:07:00 | 1109 | 109 |
| 9526-01-001-SC-0008 | 10700 | 12176 | 10600 | 4/15/2003 | 9:10:00 | 1109 | 109 |
| 9526-01-001-SC-0009 | 10700 | 12176 | 11400 | 4/15/2003 | 9:14:00 | 1109 | 109 |
| 9526-01-001-SC-0010 | 10700 | 12176 | 11100 | 4/15/2003 | 9:19:00 | 1109 | 109 |
| 9526-01-001-SC-0011 | 10700 | 12176 | 11200 | 4/15/2003 | 9:24:00 | 1109 | 109 |
| 9526-01-001-SC-0012 | 10700 | 12176 | 10300 | 4/15/2003 | 9:29:00 | 1109 | 109 |
| 9526-01-001-SC-0013 | 10800 | 12283 | 11000 | 4/15/2003 | 9:35:00 | 1109 | 109 |
| 9526-01-001-SC-0014 | 10800 | 12283 | 11000 | 4/15/2003 | 9:39:00 | 1109 | 109 |
| 9526-01-001-SC-0015 | 10800 | 12283 | 10900 | 4/15/2003 | 9:42:00 | 1109 | 109 |
| 9526-01-001-SC-0016 | 10800 | 12283 | 11000 | 4/15/2003 | 9:46:00 | 1109 | 109 |
| 9526-01-001-SC-0017 | 10800 | 12283 | 11300 | 4/15/2003 | 9:50:00 | 1109 | 109 |
| 9526-01-001-SC-0018 | 10800 | 12283 | 10500 | 4/15/2003 | 9:54:00 | 1109 | 109 |
| 9526-01-001-SC-0019 | 10800 | 12283 | 11000 | 4/15/2003 | 13:26:00 | 1109 | 109 |
| 9526-01-001-SC-0020 | 10800 | 12283 | 9990 | 4/15/2003 | 13:30:00 | 1109 | 109 |
| 9526-01-001-SC-0021 | 10800 | 12283 | 11100 | 4/15/2003 | 13:33:00 | 1109 | 109 |
| 9526-01-001-SC-0022 | 10800 | 12283 | 10600 | 4/15/2003 | 13:36:00 | 1109 | 109 |
| 9526-01-001-SC-0023 | 10800 | 12283 | 10400 | 4/15/2003 | 13:39:00 | 1109 | 109 |
| 9526-01-001-SC-0024 | 10800 | 12283 | 10500 | 4/15/2003 | 13:42:00 | 1109 | 109 |
| 9526-01-001-SC-0025 | 10800 | 12283 | 11100 | 4/15/2003 | 13:45:00 | 1109 | 109 |

# Survey Release Record Scan Area Results
# Survey Unit 9526-0001

9526-0001 SCAN AREA # 2 REPORT

| Survey Location | Background (cpm) | Action Level (cpm) | Reading (gross cpm) | Log Date | Log Time | E-600 S/N | Probe S/N |
|---|---|---|---|---|---|---|---|
| 9526-01-002-BC-0001 | - | 0 | 10500 | 4/14/2003 | 13:27:00 | 1106 | 106 |
| 9526-01-002-BC-0002 | - | 0 | 12700 | 4/14/2003 | 13:51:00 | 1106 | 106 |
| 9526-01-002-ER-0001 | 10500 | 11962 | 12500 | 4/14/2003 | 13:41:00 | 1106 | 106 |
| 9526-01-002-ER-0002 | 10500 | 11962 | 12200 | 4/14/2003 | 13:43:00 | 1106 | 106 |
| 9526-01-002-ER-0003 | 10500 | 11962 | 12800 | 4/14/2003 | 13:44:00 | 1106 | 106 |
| 9526-01-002-ER-0004 | 10500 | 11962 | 12700 | 4/14/2003 | 13:48:00 | 1106 | 106 |
| 9526-01-002-SC-0001 | 10500 | 11962 | 9330 | 4/14/2003 | 13:30:00 | 1106 | 106 |
| 9526-01-002-SC-0002 | 10500 | 11962 | 11300 | 4/14/2003 | 13:32:00 | 1106 | 106 |
| 9526-01-002-SC-0003 | 10500 | 11962 | 11100 | 4/14/2003 | 13:33:00 | 1106 | 106 |
| 9526-01-002-SC-0004 | 10500 | 11962 | 11100 | 4/14/2003 | 13:35:00 | 1106 | 106 |
| 9526-01-002-SC-0005 | 10500 | 11962 | 11100 | 4/14/2003 | 13:36:00 | 1106 | 106 |
| 9526-01-002-SC-0006 | 10500 | 11962 | 11400 | 4/14/2003 | 13:39:00 | 1106 | 106 |
| 9526-01-002-SC-0007 | 10500 | 11962 | 10500 | 4/14/2003 | 13:46:00 | 1106 | 106 |
| 9526-01-002-SC-0008 | 12700 | 14308 | 12100 | 4/14/2003 | 13:57:00 | 1106 | 106 |
| 9526-01-002-SC-0009 | 12700 | 14308 | 11000 | 4/14/2003 | 13:59:00 | 1106 | 106 |

9526-0001 SCAN AREA # 3 REPORT

| Survey Location | Background (cpm) | Action Level (cpm) | Reading (gross cpm) | Log Date | Log Time | E-600 S/N | Probe S/N |
|---|---|---|---|---|---|---|---|
| 9526-01-003-BC-0001 | - | 0 | 10800 | 4/14/2003 | 12:09:00 | 1106 | 106 |
| 9526-01-003-BC-0002 | - | 0 | 10800 | 4/14/2003 | 12:32:00 | 1106 | 106 |
| 9526-01-003-BC-0003 | - | 0 | 10400 | 4/14/2003 | 12:45:00 | 1106 | 106 |
| 9526-01-003-ER-0001 | 10800 | 12283 | 13400 | 4/14/2003 | 12:21:00 | 1106 | 106 |
| 9526-01-003-SC-0001 | 10800 | 12283 | 11400 | 4/14/2003 | 12:13:00 | 1106 | 106 |
| 9526-01-003-SC-0002 | 10800 | 12283 | 10100 | 4/14/2003 | 12:15:00 | 1106 | 106 |
| 9526-01-003-SC-0003 | 10800 | 12283 | 9940 | 4/14/2003 | 12:16:00 | 1106 | 106 |
| 9526-01-003-SC-0004 | 10800 | 12283 | 9970 | 4/14/2003 | 12:18:00 | 1106 | 106 |
| 9526-01-003-SC-0005 | 10800 | 12283 | 9910 | 4/14/2003 | 12:20:00 | 1106 | 106 |
| 9526-01-003-SC-0006 | 10800 | 12283 | 10700 | 4/14/2003 | 12:22:00 | 1106 | 106 |
| 9526-01-003-SC-0007 | 10800 | 12283 | 11300 | 4/14/2003 | 12:24:00 | 1106 | 106 |
| 9526-01-003-SC-0008 | 10800 | 12283 | 10900 | 4/14/2003 | 12:25:00 | 1106 | 106 |
| 9526-01-003-SC-0009 | 10800 | 12283 | 11500 | 4/14/2003 | 12:27:00 | 1106 | 106 |
| 9526-01-003-SC-0010 | 10800 | 12283 | 11300 | 4/14/2003 | 12:28:00 | 1106 | 106 |
| 9526-01-003-SC-0011 | 10800 | 12283 | 10900 | 4/14/2003 | 12:34:00 | 1106 | 106 |
| 9526-01-003-SC-0012 | 10800 | 12283 | 10300 | 4/14/2003 | 12:36:00 | 1106 | 106 |
| 9526-01-003-SC-0013 | 10800 | 12283 | 11300 | 4/14/2003 | 12:37:00 | 1106 | 106 |
| 9526-01-003-SC-0014 | 10800 | 12283 | 9570 | 4/14/2003 | 12:39:00 | 1106 | 106 |
| 9526-01-003-SC-0015 | 10800 | 12283 | 11400 | 4/14/2003 | 12:40:00 | 1106 | 106 |
| 9526-01-003-SC-0016 | 10400 | 11855 | 10000 | 4/14/2003 | 12:47:00 | 1106 | 106 |
| 9526-01-003-SC-0017 | 10400 | 11855 | 11200 | 4/14/2003 | 12:48:00 | 1106 | 106 |
| 9526-01-003-SC-0018 | 10400 | 11855 | 9880 | 4/14/2003 | 12:50:00 | 1106 | 106 |
| 9526-01-003-SC-0019 | 10400 | 11855 | 9440 | 4/14/2003 | 12:51:00 | 1106 | 106 |
| 9526-01-003-SC-0020 | 10400 | 11855 | 11000 | 4/14/2003 | 12:53:00 | 1106 | 106 |
| 9526-01-003-SC-0021 | 10400 | 11855 | 10500 | 4/14/2003 | 12:55:00 | 1106 | 106 |
| 9526-01-003-SC-0022 | 10400 | 11855 | 10400 | 4/14/2003 | 12:56:00 | 1106 | 106 |

# Survey Release Record Scan Area Results
# Survey Unit 9526-0001

9526-0001 SCAN AREA # 4 REPORT

| Survey Location | Background (cpm) | Action Level (cpm) | Reading (gross cpm) | Log Date | Log Time | E-600 S/N | Probe S/N |
|---|---|---|---|---|---|---|---|
| 9526-01-004-BC-0001 | - | 0 | 12300 | 4/14/2003 | 13:01:00 | 1106 | 106 |
| 9526-01-004-ER-0001 | 12300 | 13883 | 16800 | 4/14/2003 | 13:05:00 | 1106 | 106 |
| 9526-01-004-SC-0001 | 12300 | 13883 | 10900 | 4/14/2003 | 13:10:00 | 1106 | 106 |
| 9526-01-004-SC-0002 | 12300 | 13883 | 12700 | 4/14/2003 | 13:13:00 | 1106 | 106 |
| 9526-01-004-SC-0003 | 12300 | 13883 | 13400 | 4/14/2003 | 13:12:00 | 1106 | 106 |
| 9526-01-004-SC-0004 | 12300 | 13883 | 12400 | 4/14/2003 | 13:14:00 | 1106 | 106 |
| 9526-01-004-SC-0005 | 12300 | 13883 | 12900 | 4/14/2003 | 13:16:00 | 1106 | 106 |
| 9526-01-004-SC-0006 | 12300 | 13883 | 10400 | 4/14/2003 | 13:17:00 | 1106 | 106 |

9526-0001 SCAN AREA # 5 REPORT

| Survey Location | Background (cpm) | Action Level (cpm) | Reading (gross cpm) | Log Date | Log Time | E-600 S/N | Probe S/N |
|---|---|---|---|---|---|---|---|
| 9526-01-005-BC-0001 | - | 0 | 9600 | 4/15/2003 | 14:16:00 | 1109 | 109 |
| 9526-01-005-BC-0002 | - | 0 | 10500 | 4/15/2003 | 14:25:00 | 1109 | 109 |
| 9526-01-005-BC-0003 | - | 0 | 9830 | 4/15/2003 | 14:30:00 | 1109 | 109 |
| 9526-01-005-ER-0001 | 9830 | 11245 | 12400 | 4/15/2003 | 14:37:00 | 1109 | 109 |
| 9526-01-005-SC-0001 | 9600 | 10998 | 9360 | 4/15/2003 | 14:18:00 | 1109 | 109 |
| 9526-01-005-SC-0002 | 9600 | 10998 | 10100 | 4/15/2003 | 14:21:00 | 1109 | 109 |
| 9526-01-005-SC-0003 | 9600 | 10998 | 10800 | 4/15/2003 | 14:24:00 | 1109 | 109 |
| 9526-01-005-SC-0004 | 10500 | 11962 | 10000 | 4/15/2003 | 14:28:00 | 1109 | 109 |
| 9526-01-005-SC-0005 | 10500 | 11962 | 10300 | 4/15/2003 | 14:29:00 | 1109 | 109 |
| 9526-01-005-SC-0006 | 9830 | 11245 | 10900 | 4/15/2003 | 14:33:00 | 1109 | 109 |
| 9526-01-005-SC-0007 | 9830 | 11245 | 10900 | 4/15/2003 | 14:35:00 | 1109 | 109 |
| 9526-01-005-SC-0008 | 9830 | 11245 | 10100 | 4/15/2003 | 14:39:00 | 1109 | 109 |
| 9526-01-005-SC-0009 | 9830 | 11245 | 9510 | 4/15/2003 | 14:41:00 | 1109 | 109 |

# Survey Release Record Scan Area Results
# Survey Unit 9526-0001

SAMPLE LOCATION SCANS 9526-0001 4/7/2003

| Survey Location | Background (cpm) | Action Level (cpm) | Reading (gross cpm) | Log Date | *See note Log Time | E-600 S/N | Probe S/N |
|---|---|---|---|---|---|---|---|
| 9526-01-004-BL-0001 | - | 0 | 11100 | 4/7/2003 | 9:53:00 | 1109 | 109 |
| 9526-01-004-SL-0001 | 11100 | 12604 | 10600 | 4/7/2003 | 9:56:00 | 1109 | 109 |
| 9526-01-008-BL-0001 | - | 0 | 10100 | 4/7/2003 | 9:41:00 | 1109 | 109 |
| 9526-01-008-BL-0001 | - | 0 | 10700 | 4/7/2003 | 9:42:00 | 1109 | 109 |
| 9526-01-008-SL-0001 | 10700 | 12176 | 10800 | 4/7/2003 | 9:45:00 | 1109 | 109 |
| 9526-01-009-BL-0001 | - | 0 | 10100 | 4/7/2003 | 9:47:00 | 1109 | 109 |
| 9526-01-009-SL-0001 | 10100 | 11534 | 10100 | 4/7/2003 | 9:51:00 | 1109 | 109 |
| 9526-01-012-BL-0001 | - | 0 | 12500 | 4/7/2003 | 13:09:00 | 1109 | 109 |
| 9526-01-012-SL-0001 | 12500 | 14096 | 13000 | 4/7/2003 | 13:13:00 | 1109 | 109 |
| 9526-01-014-BL-0001 | - | 0 | 10500 | 4/7/2003 | 9:33:00 | 1109 | 109 |
| 9526-01-014-SL-0001 | 10500 | 11962 | 10500 | 4/7/2003 | 9:37:00 | 1109 | 109 |
| 9526-01-018-BL-0001 | - | 0 | 10900 | 4/7/2003 | 12:31:00 | 1109 | 109 |
| 9526-01-018-SL-0001 | 10900 | 12390 | 10200 | 4/7/2003 | 12:35:00 | 1109 | 109 |
| 9526-01-019-BL-0001 | - | 0 | 10400 | 4/7/2003 | 12:25:00 | 1109 | 109 |
| 9526-01-019-SL-0001 | 10400 | 11855 | 10600 | 4/7/2003 | 12:30:00 | 1109 | 109 |
| 9526-01-020-BL-0001 | - | 0 | 10500 | 4/7/2003 | 12:18:00 | 1109 | 109 |
| 9526-01-020-SL-0001 | 10500 | 11962 | 11000 | 4/7/2003 | 12:23:00 | 1109 | 109 |
| 9526-01-021-BL-0001 | - | 0 | 10900 | 4/7/2003 | 12:39:00 | 1109 | 109 |
| 9526-01-021-SL-0001 | 10900 | 12390 | 11400 | 4/7/2003 | 12:46:00 | 1109 | 109 |
| 9526-01-022-BL-0001 | - | 0 | 10600 | 4/7/2003 | 13:16:00 | 1109 | 109 |
| 9526-01-022-SL-0001 | 10600 | 12069 | 10400 | 4/7/2003 | 13:21:00 | 1109 | 109 |

SAMPLE LOCATION SCANS 9526-0001 4/10/2000

| Survey Location | Background (cpm) | Action Level (cpm) | Reading (gross cpm) | Log Date | *See Note Log Time | E-600 S/N | Probe S/N |
|---|---|---|---|---|---|---|---|
| 9526-01-001-BL-0001 | - | 0 | 14500 | 4/10/2003 | 9:45:00 | 1109 | 109 |
| 9526-01-001-SL-0001 | 14500 | 16219 | 14400 | 4/10/2003 | 9:47:00 | 1109 | 109 |
| 9526-01-002-BL-0001 | - | 0 | 11600 | 4/10/2003 | 9:39:00 | 1109 | 109 |
| 9526-01-002-SL-0001 | 11600 | 13137 | 11000 | 4/10/2003 | 9:41:00 | 1109 | 109 |
| 9526-01-003-BL-0001 | - | 0 | 9690 | 4/10/2003 | 8:56:00 | 1109 | 109 |
| 9526-01-003-SL-0001 | 9690 | 11095 | 9960 | 4/10/2003 | 8:59:00 | 1109 | 109 |
| 9526-01-004-BL-0001 | - | 0 | 11100 | 4/7/2003 | 9:53:00 | 1109 | 109 |
| 9526-01-004-SL-0001 | 11100 | 12604 | 10600 | 4/7/2003 | 9:56:00 | 1109 | 109 |
| 9526-01-005-BL-0001 | - | 0 | 11700 | 4/10/2003 | 9:49:00 | 1109 | 109 |
| 9526-01-005-SL-0001 | 11700 | 13244 | 11100 | 4/10/2003 | 9:51:00 | 1109 | 109 |
| 9526-01-006-BL-0001 | - | 0 | 14400 | 4/10/2003 | 9:28:00 | 1109 | 109 |
| 9526-01-006-SL-0001 | 14400 | 16113 | 13800 | 4/10/2003 | 9:30:00 | 1109 | 109 |
| 9526-01-007-BL-0001 | - | 0 | 9250 | 4/10/2003 | 9:00:00 | 1109 | 109 |
| 9526-01-007-SL-0001 | 9250 | 10623 | 8360 | 4/10/2003 | 9:03:00 | 1109 | 109 |
| 9526-01-008-BL-0001 | - | 0 | 10700 | 4/7/2003 | 9:42:00 | 1109 | 109 |
| 9526-01-008-SL-0001 | 10700 | 12176 | 10800 | 4/7/2003 | 9:45:00 | 1109 | 109 |
| 9526-01-009-BL-0001 | - | 0 | 10100 | 4/7/2003 | 9:47:00 | 1109 | 109 |
| 9526-01-009-SL-0001 | 10100 | 11534 | 10100 | 4/7/2003 | 9:51:00 | 1109 | 109 |
| 9526-01-010-BL-0001 | - | 0 | 14000 | 4/10/2003 | 9:22:00 | 1109 | 109 |
| 9526-01-010-SL-0001 | 14000 | 15689 | 14100 | 4/10/2003 | 9:24:00 | 1109 | 109 |
| 9526-01-011-BL-0001 | - | 0 | 10300 | 4/10/2003 | 9:08:00 | 1109 | 109 |
| 9526-01-011-SL-0001 | 10300 | 11748 | 10000 | 4/10/2003 | 9:10:00 | 1109 | 109 |
| 9526-01-012-BL-0001 | - | 0 | 12500 | 4/7/2003 | 13:09:00 | 1109 | 109 |

# Survey Release Record Scan Area Results
## Survey Unit 9526-0001

| Survey Location | Background (cpm) | Action Level (cpm) | Reading (gross cpm) | Log Date | *See Note Log Time | E-600 S/N | Probe S/N |
|---|---|---|---|---|---|---|---|
| 9526-01-012-SL-0001 | 12500 | 14096 | 13000 | 4/7/2003 | 13:13:00 | 1109 | 109 |
| 9526-01-013-BL-0001 | - | 0 | 13100 | 4/10/2003 | 9:15:00 | 1109 | 109 |
| 9526-01-013-SL-0001 | 13100 | 14733 | 13100 | 4/10/2003 | 9:18:00 | 1109 | 109 |
| 9526-01-014-BL-0001 | - | 0 | 10500 | 4/7/2003 | 9:33:00 | 1109 | 109 |
| 9526-01-014-SL-0001 | 10500 | 11962 | 10500 | 4/7/2003 | 9:37:00 | 1109 | 109 |
| 9526-01-015-BL-0001 | - | 0 | 10800 | 4/10/2003 | 8:36:00 | 1109 | 109 |
| 9526-01-015-SL-0001 | 10800 | 12283 | 10600 | 4/10/2003 | 8:38:00 | 1109 | 109 |
| 9526-01-016-BL-0001 | - | 0 | 8860 | 4/10/2003 | 8:29:00 | 1109 | 109 |
| 9526-01-016-SL-0001 | 8860 | 10203 | 10300 | 4/10/2003 | 8:34:00 | 1109 | 109 |
| 9526-01-017-BL-0001 | - | 0 | 13000 | 4/10/2003 | 8:40:00 | 1109 | 109 |
| 9526-01-017-SL-0001 | 13000 | 14627 | 11900 | 4/10/2003 | 8:44:00 | 1109 | 109 |
| 9526-01-018-BL-0001 | - | 0 | 10900 | 4/7/2003 | 12:31:00 | 1109 | 109 |
| 9526-01-018-SL-0001 | 10900 | 12390 | 10200 | 4/7/2003 | 12:35:00 | 1109 | 109 |
| 9526-01-019-BL-0001 | - | 0 | 10400 | 4/7/2003 | 12:25:00 | 1109 | 109 |
| 9526-01-019-SL-0001 | 10400 | 11855 | 10600 | 4/7/2003 | 12:30:00 | 1109 | 109 |
| 9526-01-020-BL-0001 | - | 0 | 10500 | 4/7/2003 | 12:18:00 | 1109 | 109 |
| 9526-01-020-SL-0001 | 10500 | 11962 | 11000 | 4/7/2003 | 12:23:00 | 1109 | 109 |
| 9526-01-021-BL-0001 | - | 0 | 10900 | 4/7/2003 | 12:39:00 | 1109 | 109 |
| 9526-01-021-SL-0001 | 10900 | 12390 | 11400 | 4/7/2003 | 12:46:00 | 1109 | 109 |
| 9526-01-022-BL-0001 | - | 0 | 10600 | 4/7/2003 | 13:16:00 | 1109 | 109 |
| 9526-01-022-SL-0001 | 10600 | 12069 | 10400 | 4/7/2003 | 13:21:00 | 1109 | 109 |

# Attachment 2d
# Split Sample Assessment Forms
# (2 Pages)

# Split Sample Assessment Form

| Survey Area#: 9526 | Survey Unit #: 0001 | Survey Unit name: Northeast Mountainside Area |
|---|---|---|

| Sample Plan or WPIR#: 24265-000-GEN-0000-00119-000 | SML#: 9526-0001-001F & FS |
|---|---|

Sample Description: Comparison of survey gamma spectroscopy results between two split samples from the same sample location.

| STANDARD | | | | | COMPARISON | | | |
|---|---|---|---|---|---|---|---|---|
| Radionuclide | Activity Value | Standard Error | Resolution | Agreement Range | Activity Value | Standard Error | Comparison Ratio | Acceptable (Y/N) |
| Cs-137 | 2.49 | 0.19 | 13 | 0.6-1.66 | 2.46 | 0.164 | 0.98 | Y |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

Comments/Corrective Actions: N/A

Table is provided to show acceptance criteria used to assess split samples.

| Resolution | Agreement Range |
|---|---|
| 4 - 7 | 0.5 - 2.0 |
| 8 - 15 | 0.6 - 1.66 |
| 16 - 50 | 0.75 - 1.33 |
| 51 - 200 | 0.80 - 1.25 |
| >200 | 0.85 - 1.18 |

| Performed By: | Date 1.5.05 | Reviewed By: | Date: 2/17/05 |
|---|---|---|---|

**WPIR – Work Plan and Inspection Record**
**SML – Sample Measurement Location designation**

# Split Sample Assessment Form

| Survey Area#: 9526 | Survey Unit #: 0001 | Survey Unit name: Northeast Mountainside Area |
|---|---|---|

| Sample Plan or WPIR#: 24265-000-GEN-0000-00119-000 | SML#: 9526-0001-006F & FS |
|---|---|

Sample Description: Comparison of survey gamma spectroscopy results between two split samples from the same sample location.

| STANDARD | | | | | COMPARISON | | | |
|---|---|---|---|---|---|---|---|---|
| Radionuclide | Activity Value | Standard Error | Resolution | Agreement Range | Activity Value | Standard Error | Comparison Ratio | Acceptable (Y/N) |
| Cs-137 | 2.06 | 0.14 | 15 | 0.6-1.66 | 2.05 | 0.134 | 0.99 | Y |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

Comments/Corrective Actions: N/A

Table is provided to show acceptance criteria used to assess split samples.

| Resolution | Agreement Range |
|---|---|
| 4 - 7 | 0.5 - 2.0 |
| 8 - 15 | 0.6 - 1.66 |
| 16 - 50 | 0.75 - 1.33 |
| 51 - 200 | 0.80 - 1.25 |
| >200 | 0.85 - 1.18 |

| Performed By: | Date 1.5.05 | Reviewed By: | Date: 2/17/05 |
|---|---|---|---|

**WPIR – Work Plan and Inspection Record**
**SML – Sample Measurement Location designation**

# Attachment 2e
# Preliminary Data Review Form
# (1 Page)

# PRELIMINARY DATA REVIEW FORM

Survey Plan No. : FSSP 9526-0001
WP&IR No. : 24265-000-GEN-0000-00119-000
Survey Unit : 9526-0001
Survey Unit Name : Northeast Mountain Side
Classification : 2
Survey Media : Soil
Type of Survey : Final Status Survey
Type of Measurement : Radionuclide Specific
Number of Measurements : 17

BASIC STATISTICAL QUANTITIES

| | Cs-137 | Co-60 |
|---|---|---|
| RANGE Minimum Value : | 2.91E-01 | -2.91E-02 |
| Maximum Value : | 1.87E+00 | 2.98E-02 |
| Mean : | 9.23E-01 | 2.05E-03 |
| Median : | 8.60E-01 | 3.84E-03 |
| Standard Deviation : | 5.15E-01 | 1.56E-02 |

| | RADIONUCLIDE CONCENTRATION (pCi/g) | | | |
|---|---|---|---|---|
| NUMBER | Cs-137 | ID? | Co-60 | ID? |
| 9526-0001-001F | 1.10E+00 | Y | 8.60E-03 | N |
| 9526-0001-002F | 1.87E+00 | Y | -2.91E-02 | N |
| 9526-0001-003F | 9.34E-01 | Y | -3.09E-03 | N |
| 9526-0001-004F | 3.64E-01 | Y | 2.98E-02 | N |
| 9526-0001-005F | 4.44E-01 | Y | 1.35E-02 | N |
| 9526-0001-006F | 5.09E-01 | Y | 9.99E-03 | N |
| 9526-0001-007F | 1.19E+00 | Y | 2.46E-03 | N |
| 9526-0001-008F | 7.35E-01 | Y | -2.53E-02 | N |
| 9526-0001-009F | 2.91E-01 | Y | 1.58E-02 | N |
| 9526-0001-010F | 1.75E+00 | Y | 3.84E-03 | N |
| 9526-0001-011F | 4.15E-01 | Y | -1.24E-02 | N |
| 9526-0001-012F | 1.23E+00 | Y | 1.47E-02 | N |
| 9526-0001-013F | 1.78E+00 | Y | 1.08E-03 | N |
| 9526-0001-014F | 3.80E-01 | Y | 1.26E-02 | N |
| 9526-0001-015F | 8.05E-01 | Y | -1.42E-02 | N |
| 9526-0001-016F | 1.03E+00 | Y | -6.23E-03 | N |
| 9526-0001-017F | 8.60E-01 | Y | 1.28E-02 | N |

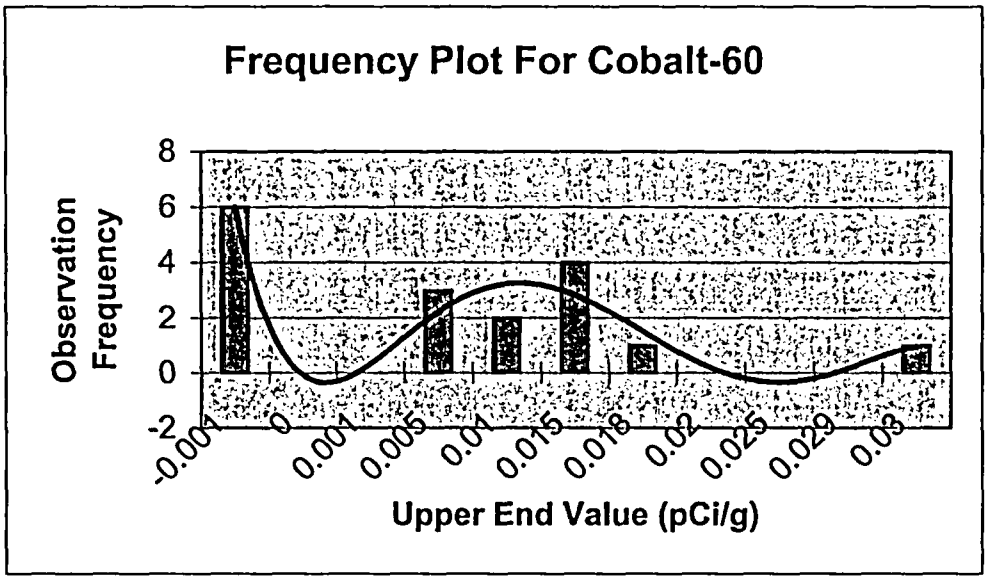
1.5.05
Submitted by/Date

2/17/05
Reviewed by/Date

# Attachment 2f
# Graphical Representation of Data
# (4 Pages)

HISTOGRAM PRESENTATION OF
Co-60 DATA

Survey Unit: 9526-0001
Survey Unit Name: Northeast Mountain Side



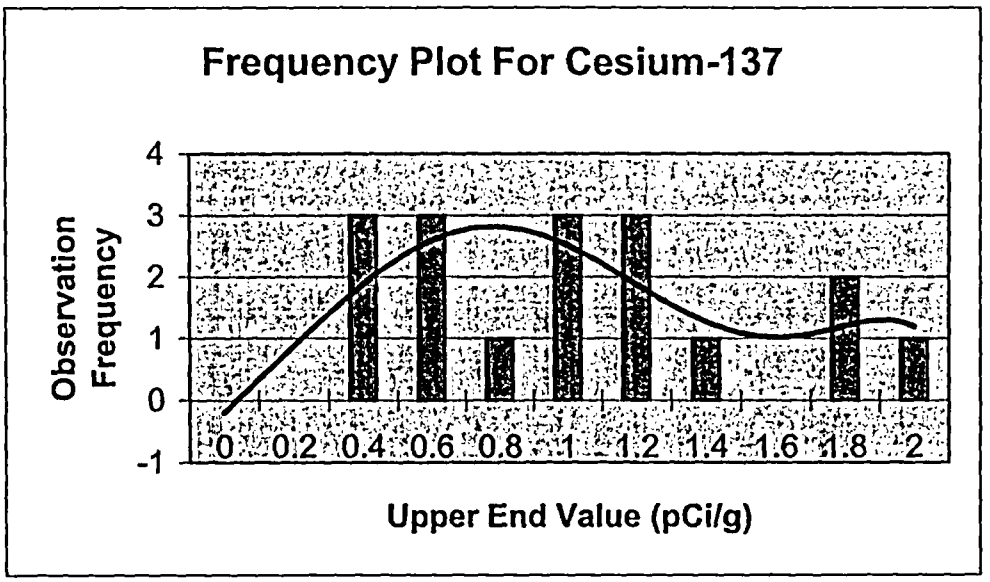

| Upper End Value | Observation Frequency | Observation Frequency |
|---|---|---|
| -0.001 | 6 | 35% |
| 0 | 0 | 0% |
| 0.001 | 0 | 0% |
| 0.005 | 3 | 18% |
| 0.01 | 2 | 12% |
| 0.015 | 4 | 24% |
| 0.0175 | 1 | 6% |
| 0.02 | 0 | 0% |
| 0.025 | 0 | 0% |
| 0.029 | 0 | 0% |
| 0.03 | 1 | 6% |
| Total = | 17 | 100% |

Submitted by/Date

2/17/05
Reviewed by/Date

HISTOGRAM PRESENTATION OF
Cs-137 DATA

Survey Unit: 9526-0001
Survey Unit Name: Northeast Mountain Side

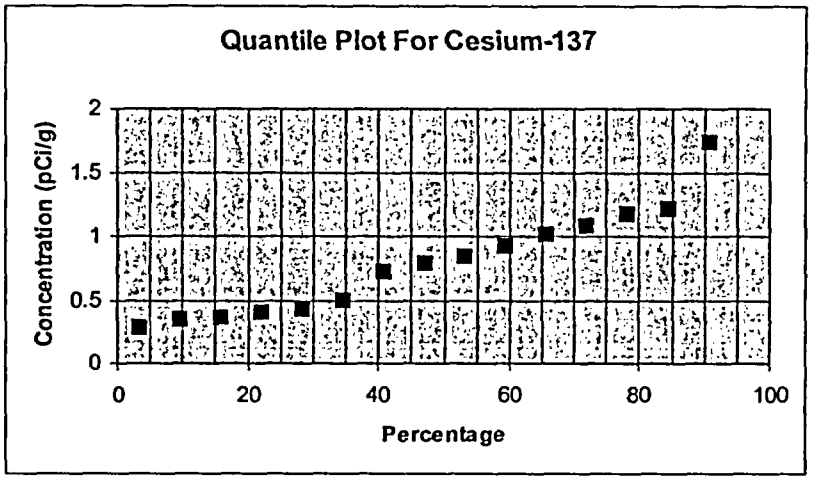



| Upper End Value | Observation Frequency | Observation Frequency |
|---|---|---|
| 0 | 0 | 0% |
| 0.2 | 0 | 0% |
| 0.4 | 3 | 18% |
| 0.6 | 3 | 18% |
| 0.8 | 1 | 6% |
| 1 | 3 | 18% |
| 1.2 | 3 | 18% |
| 1.4 | 1 | 6% |
| 1.6 | 0 | 0% |
| 1.8 | 2 | 12% |
| 2 | 1 | 6% |
| Total = | 17 | 100% |

1.5.05
Submitted by/Date

2/17/05
Reviewed by/Date

Survey Unit: 9526-0001
Survey Unit Name: Northeast Mountain Side

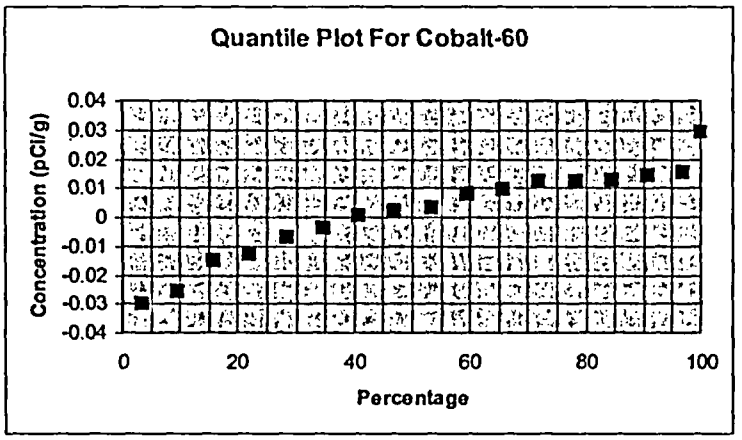



| Cs-137 | Rank | Percentage |
|---|---|---|
| 0.29 | 1 | 3% |
| 0.36 | 2 | 9% |
| 0.38 | 3 | 16% |
| 0.42 | 4 | 22% |
| 0.44 | 5 | 28% |
| 0.51 | 6 | 34% |
| 0.74 | 7 | 41% |
| 0.81 | 8 | 47% |
| 0.86 | 9 | 53% |
| 0.93 | 10 | 59% |
| 1.03 | 11 | 66% |
| 1.10 | 12 | 72% |
| 1.19 | 13 | 78% |
| 1.23 | 14 | 84% |
| 1.75 | 15 | 91% |
| 1.78 | 16 | 97% |
| 1.87 | 17 | 100% |

1.5.05
Submitted By/Date

2/17/05
Reviewed By/Date

Survey Unit: 9526-0001
Survey Unit Name: Northeast Mountain Side




| Cs-137 | Rank | Percentage |
|---|---|---|
| -0.029 | 1 | 3% |
| -0.025 | 2 | 9% |
| -0.014 | 3 | 16% |
| -0.012 | 4 | 22% |
| -0.006 | 5 | 28% |
| -0.003 | 6 | 34% |
| 0.001 | 7 | 41% |
| 0.002 | 8 | 47% |
| 0.004 | 9 | 53% |
| 0.009 | 10 | 59% |
| 0.010 | 11 | 66% |
| 0.013 | 12 | 72% |
| 0.013 | 13 | 78% |
| 0.014 | 14 | 84% |
| 0.015 | 15 | 91% |
| 0.016 | 16 | 97% |
| 0.030 | 17 | 100% |

1.5.05
Submitted By/Date

2/07/05
Reviewed By/Date

# Attachment 2g
# Sign Test Calculation
# (1 Page)

## Sign Test Calculation Sheet For Multiple Radionuclides

| | | |
|---|---|---|
| Survey Unit Number: 9526-0001 | | |
| Survey Unit Name: Northeast Mountain Side | | |
| WP&IR#: 24265-000-GEN-0000-00119-000 | | |
| Classification: 2 | TYPE I (α error): 0.05 | TYPE II (β error): 0.05 |

| Radionuclides: | Cesium-137 | Cobalt-60 |
|---|---|---|
| Survey Design DCGL (pCi/g): | 3.16 | 1.52 |

| Results 1st Radionuclide (pCi/g) | Results 2st Radionuclide (pCi/g) | Weighted sum ($W_s$) | 1 - $W_s$ | Sign |
|---|---|---|---|---|
| 1.10E+00 | 8.60E-03 | 3.54E-01 | 6.46E-01 | 1 |
| 1.87E+00 | -2.91E-02 | 5.73E-01 | 4.27E-01 | 1 |
| 9.34E-01 | -3.09E-03 | 2.94E-01 | 7.06E-01 | 1 |
| 3.64E-01 | 2.98E-02 | 1.35E-01 | 8.65E-01 | 1 |
| 4.44E-01 | 1.35E-02 | 1.49E-01 | 8.51E-01 | 1 |
| 5.09E-01 | 9.99E-03 | 1.68E-01 | 8.32E-01 | 1 |
| 1.19E+00 | 2.46E-03 | 3.78E-01 | 6.22E-01 | 1 |
| 7.35E-01 | -2.53E-02 | 2.16E-01 | 7.84E-01 | 1 |
| 2.91E-01 | 1.58E-02 | 1.02E-01 | 8.98E-01 | 1 |
| 1.75E+00 | 3.84E-03 | 5.56E-01 | 4.44E-01 | 1 |
| 4.15E-01 | -1.24E-02 | 1.23E-01 | 8.77E-01 | 1 |
| 1.23E+00 | 1.47E-02 | 3.99E-01 | 6.01E-01 | 1 |
| 1.78E+00 | 1.08E-03 | 5.64E-01 | 4.36E-01 | 1 |
| 3.80E-01 | 1.26E-02 | 1.29E-01 | 8.71E-01 | 1 |
| 8.05E-01 | -1.42E-02 | 2.45E-01 | 7.55E-01 | 1 |
| 1.03E+00 | -6.23E-03 | 3.22E-01 | 6.78E-01 | 1 |
| 8.60E-01 | 1.28E-02 | 2.81E-01 | 7.19E-01 | 1 |
| | | Number Of Positive Differences (S+): | | 17 |

Critical Value: 12 Survey Unit: Meets Acceptance Criterion

Performed By: [signature] Date: 1.5.05

Independent Review By: [signature] Date: 2/17/05

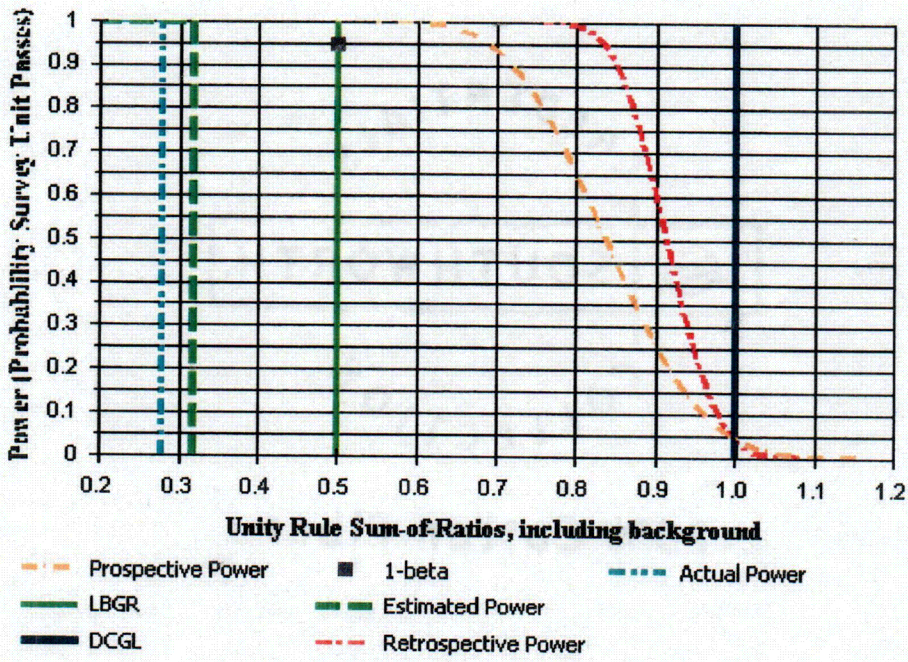
# Attachment 2h
# COMPASS DQA Surface Soil Report with Retrospective Power Curve
# (3 Pages)

# DQA Surface Soil Report

## Assessment Summary

| | | | |
|---|---|---|---|
| Site: | Survey Unit 9526-0001 | | |
| Planner(s): | CE Davis | | |
| Survey Unit Name: | Northeast Mountain Side | | |
| Report Number: | 1 | | |
| Survey Unit Samples: | 17 | | |
| Reference Area Samples: | 0 | | |
| Test Performed: | Sign | Test Result: | Not Performed |
| Judgmental Samples: | 0 | EMC Result: | Not Performed |
| Assessment Conclusion: | ***Reject Null Hypothesis (Survey Unit PASSES)*** | | |

## Retrospective Power Curve



# DQA Surface Soil Report

## Survey Unit Data

NOTE: Type = "S" Indicates survey unit sample.
Type = "R" Indicates reference area sample.

| Sample Number | Type | Co-60 (pCi/g) | Cs-137 (pCi/g) |
|---|---|---|---|
| 9526-0001-001F | S | 0.01 | 1.1 |
| 9526-0001-002F | S | -0.03 | 1.87 |
| 9526-0001-003F | S | 0 | 0.93 |
| 9526-0001-004F | S | 0.03 | 0.36 |
| 9526-0001-005F | S | 0.01 | 0.44 |
| 9526-0001-006F | S | 0.01 | 0.51 |
| 9526-0001-007F | S | 0 | 1.19 |
| 9526-0001-008F | S | -0.03 | 0.74 |
| 9526-0001-009F | S | 0.02 | 0.29 |
| 9526-0001-010F | S | 0 | 1.75 |
| 9526-0001-011F | S | -0.01 | 0.42 |
| 9526-0001-012F | S | 0.01 | 1.23 |
| 9526-0001-013F | S | 0 | 1.78 |
| 9526-0001-014F | S | 0.01 | 0.38 |
| 9526-0001-015F | S | -0.01 | 0.8 |
| 9526-0001-016F | S | -0.01 | 1.03 |
| 9526-0001-017F | S | 0.01 | 0.86 |

## Modified Data (Unity Rule SOR)

NOTE: Type = "S" Indicates survey unit sample.
Type = "R" Indicates reference area sample.

| Sample Number | Type | Sum-of-Ratios (SOR) |
|---|---|---|
| 9526-0001-001F | S | 0.35 |
| 9526-0001-002F | S | 0.57 |
| 9526-0001-003F | S | 0.29 |
| 9526-0001-004F | S | 0.13 |
| 9526-0001-005F | S | 0.15 |
| 9526-0001-006F | S | 0.17 |
| 9526-0001-007F | S | 0.38 |
| 9526-0001-008F | S | 0.22 |
| 9526-0001-009F | S | 0.1 |
| 9526-0001-010F | S | 0.56 |
| 9526-0001-011F | S | 0.12 |
| 9526-0001-012F | S | 0.4 |
| 9526-0001-013F | S | 0.56 |
| 9526-0001-014F | S | 0.13 |
| 9526-0001-015F | S | 0.25 |
| 9526-0001-016F | S | 0.32 |
| 9526-0001-017F | S | 0.28 |

# DQA Surface Soil Report

## Basic Statistical Quantities Summary

| Statistic | Survey Unit | Background | DQO Results |
|---|---|---|---|
| Sample Number | 17 | N/A | N=17 |
| Mean (SOR) | 0.29 | N/A | 0.32 |
| Median (SOR) | 0.28 | N/A | N/A |
| Std Dev (SOR) | 0.16 | N/A | 0.3 |
| High Value (SOR) | 0.57 | N/A | N/A |
| Low Value (SOR) | 0.10 | N/A | N/A |