



# **Final Status Survey Final Report Phase II**

## **Appendix A10**

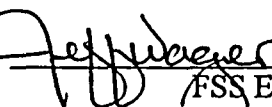
***Survey Unit Release Record***

***9535-0001, Southeast Landfill Area***

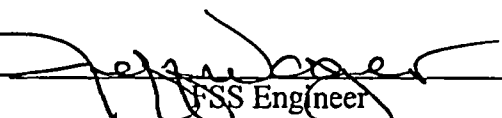
**February 2005**




CYAPCO  
FINAL STATUS SURVEY RELEASE RECORD  
SOUTHEAST LANDFILL  
SURVEY UNIT 9535-0001

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**1. SURVEY UNIT DESCRIPTION**

Survey Unit (SU) 9535-0001, (Southeast Landfill Area) is designated as Final Status Survey (FSS) Class 1 and consists of approximately 1,860 m<sup>2</sup> (0.46 acres) of uninhabited, undeveloped land located 0.81 miles from the center of the Haddam Neck Plant (HNP) Containment Building (see Attachment 1, Figure 1). A Class 3 survey unit (9524-0000) encompasses the Survey Area 9535 in whole. Survey Area 9535 is divided east to west into two survey units. The northern section is SU 9535-0002 a Class 2 survey unit. The southern parcel is SU 9535-0001. The Survey Area 9535 is located north of the pistol range, and between Dibble Creek and the Salmon River. It is 45 meters upgrate from and east of the creek and is separated from the Salmon River by a tall, sandy, tree-lined ridge. The topography of the area has changed considerably as a result of material and spoils removal from the area. The area was graded at the conclusion of remedial actions. Most of the area is sand, although trenching identified some large rock masses.

The reference coordinates associated with SU 9535-0001 are E048 through E052 by S130 through S134 (refer to 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, in the past, vehicle barriers were used to restrict public access to the land space of Survey Area 9535. The landfill, due to its proximity to the road and relatively level surface, was a convenient place to dispose truckloads of construction materials and debris during plant construction and operation. Occasionally small amounts of miscellaneous material were mixed in with fill material. The area has a rhomboid shape that was fenced and posted, "Caution, Radioactive Materials", after the discovery of radioactive soil there. Following the remedial action and remedial action surveys, the fence and posting were no longer necessary and removed (refer to HP Technical Support Document (TSD) CY-HP-0154).

Non-radiological remediation was performed in the landfill area in 2003 using cleanup criteria specified by the Regulatory Affairs group (refer to memorandum RA-CY-03-058, CY). The scope for this project was the physical investigation and cleanup of the landfill to include the removal of all manmade materials, other than unpainted concrete, from the area. Blast rock also remained in the area.

**2. CLASSIFICATION BASIS**

The survey unit was classified in accordance with Procedure RPM 5.1-10, "*Survey Unit Classification*." The historical information and scoping analyses results provide sufficient data to designate SU 9535-0001 as Class 1 in April 2004.

The "*Classification Basis Summary*" conducted for SU 9535-0001 consisted of:



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- a) A review of the 10CFR50.75 (g)(1) 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)(1) database identified several radiological events pertinent to the classification of this survey unit.

- a) ACR 97-0450, 7/17/1997 - Contaminated material found outside the protected area. As part of the Site Characterization Survey, contaminated material and soil were identified in the rifle area. During the implementation of a scoping survey, elevated activity was detected in the landfill adjacent to the rifle range. A subsequent investigation identified two locations of fixed contamination, insulation material and a concrete block.
- b) ACR 97-0785, 9/24/1997 - Follow-up to ACR 97-0450. An assessment of the soil indicates that the amount of radioactivity counted in the soil may exceed the limits of 10CFR20.2203(a)(3)(ii).
- c) Results of Scoping Survey, 9/1/1998 - Results of scoping surveys performed for decommissioning characterization data.
- d) Duratek Shooting Range, 12/7/1999 - Characterization survey to determine the extent and magnitude of plant related radionuclides within the Shooting Range Landfill.

Review of the 10CFR50.75(g)(1) database concluded that the fundamental event was the identification of radioactive material in July, 1997. The remaining items reflect subsequent characterization findings and a couple of non-radiological material discoveries (e.g., asbestos and hydraulic oil).

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

A survey plan was initiated and executed in late 1997 to determine existing conditions and obtain radiological data for scoping. Radiological results from the initial scoping surveys indicated the presence of both Co-60 and Cs-137 in soil. The site characterization group performed radiological surveys of the landfill area with confirmatory surveys conducted by Oak Ridge Institute for Science and Engineering (ORISE). The initial characterization surveys were completed in 1997. Two (2) distinct areas of elevated radioactivity were identified during this characterization study (refer to Attachment A, Figure 2). Results of the radiological survey and ground penetrating radar survey established the size of the landfill area to be approximately 5,000 square meters and an approximate depth of 3 meters. Some contaminated materials were identified during the scoping survey and were removed.

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A characterization study was performed in 1999 to determine the extent and magnitude of the plant-related radionuclides in the area.<sup>1</sup> The maximum reported concentrations were 2.9 pCi/g and 31.4 pCi/g for Co-60 and Cs-137 respectively. One composite sample comprised of media from the three locations exhibiting the highest contamination levels was processed for 10 CFR 61 analyses at an off-site laboratory. Co-60 and Cs-137 were the only plant-related radionuclides reported for the off-site analysis results.

A remedial action plan was developed and implemented starting July 30, 2003, and completed October 21, 2003, based on the final results of the radiation survey and the sample results. Remedial action work was performed under Work Plan and Inspection Record (WP&IR) №. 24265-000-GEN-9535-1002-000. Soil remediation was followed by remedial action surveys conducted under survey and sampling work plan BCY-SSWP-03-07-003 and subsequent addendums. Soil was removed by an excavator and placed in containers for eventual transport and disposition. About forty (40) B-25 containers of soil (approximately 4000 ft<sup>3</sup>) were removed from the area. Items removed from the pit (e.g., blocks of concrete) were surveyed for contamination in accordance with health physics procedures. No materials were found to exceed the radiological release criteria for unrestricted use

Three (3) samples collected during the remedial action were analyzed off-site for the full suite of Easy-to-Detect and Hard-to-Detect (HTD) radionuclides. The gamma spectroscopy results reported Cs-137 at 52.9 pCi/g and Co-60 at 2.21 pCi/g. The HTD analyses identified Sr-90, Ni-63 and C-14 as well. Radiation surveys in the remediation area did not identify elevated areas of activity. Samples collected and analyzed following remediation did not identify plant-related radioactivity other than low-levels of Cs-137. The six (6) soil sample results for Cs-137 and Co-60 from the final remedial action survey are provided in Table 1.

**Table 1 – Basic Statistical Quantities for Cesium-137 and  
Cobalt-60 Derived from Final Remedial Action Data Set.**

Parameter	Cs-137 (pCi/g)	Co-60 (pCi/g)
Minimum Value:	0.0835	0.00149
Maximum Value:	0.408	0.0156
Mean:	0.211	0.00715
Median:	0.182	0.00487
Standard Deviation:	0.121	0.00615
Measurement standard deviation of the weighted sum <sup>(1)</sup> :	0.0727	

(1) MARSSIM Section I.11.3 eq. (I-17) describes the use of the measurement 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).

<sup>1</sup> Shooting Range Landfill Characterization Survey Report; December 1999.

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A review of the soil relocation files shows that soil and spoils were transported to the general vicinity of the shooting range as early as 1976. Specific details relevant to date or time period and exact location of placement were not available.

Recent excavation and trenching were performed in this survey unit for the purposes of removing materials and spoils (e.g., concrete, asphalt, metal, etc.). Radiological surveys for contamination have not identified radioactive material on these items.

Personnel interviews with HNP veteran personnel were conducted during the historical site assessment to ascertain the history of the Southeast Landfill. Individuals responding to the questionnaire stated that spoils originating from construction activities such as new building construction, addition to existing buildings and general site maintenance and repairs were brought to the shooting range landfill.

A Final Status Survey Engineer (FSSE) performed a visual inspection and "walkdown" in April 2004. The visual inspection and walkdown did not conclude any observations impacting the classification of the survey unit.

At the time of FSS, the dose impact from groundwater contamination was not considered. Characterization analyses results provide sufficient data to conclude that FSS sample results will be a small fraction of the 25 mrem/year Derived Concentration Guideline Level (DCGL). However, the past use of the shooting range area for the deposition of materials and spoils, the uncertainty of location where these items were placed and the remedial action performed in this survey unit warrants the Class 1 designation which is consistent with procedural guidance.

### 3. DATA QUALITY OBJECTIVES (DQOs)

The primary objective of the Final Status Survey Plan (FSSP) was to demonstrate that the level of residual radioactivity in SU 9535-0001 did not exceed the release criteria specified in the License Termination Plan (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 Plans*" and the "*Multi-Agency Radiation Survey and Site Investigation Manual*," (MARSSIM). A summary of the main features of the DQO process is 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

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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, Co-60, Sr-90, Ni-63 and C-14 would be the radionuclides of concern during the FSS process for SU 9535-0001. To provide conservatism, the Base Case DCGLs for radionuclides in soil were reduced by 60% to establish the Administrative Level DCGLs. As described by the LTP, Equations 5-9, a surrogate relationship was developed for HTD radionuclides (Sr-90, Ni-63 and C-14) to Cs-137. In the computation of the surrogate DCGL the 95% upper bound surrogate ratios was used to account for the variability and level of uncertainty in the data. Given multiple radionuclides were assumed to be present the "unity rule" or "sum of the fractions" as described by LTP, Equation 5-32, 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 less than Minimum Detectable Concentration (<MDC) 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 (Table 2).

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

Radionuclide	Base Case Soil DCGL (pCi/g) <sup>(1)</sup>	Administrative Level DCGL (pCi/g) <sup>(2)</sup>	Required MDC (pCi/g) <sup>(3)</sup>
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 was 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 FSSE 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 a scan survey coverage of 100% for outdoor Class 1 land areas. The survey design specified that 100% of the total area will receive a scan survey.

Six (6) data points were used to determine the radiological concentration variability in this survey unit. The population data set were from soil samples that were located within the boundaries of this survey unit.

Radionuclide-specific analyses of soil samples collected from this survey unit have identified radionuclides Cs-137, Co-60, Sr-90, Ni-63 and C-14 to be present. The

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data collected prior to FSS indicated that the remaining fifteen (15) 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, Co-60, Sr-90, Ni-63 and C-14 were used in the survey planning of SU 9535-0001. 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 relationships will be used to relate Easy-to-Detect concentrations to Sr-90, C-14 and Ni-63. Cesium-137 will be the surrogate for the three HTDs radionuclides. Cobalt-60 was considered as a surrogate for the activation products C-14 and Ni-63. However, the remedial action data indicates that Co-60 will likely be reported at concentrations below the minimum detection criteria and will not provide a meaningful relationship. Therefore, Cs-137 is considered acceptable as the surrogate since it is likely to be the only Easy-to-Detect radionuclide of concern present in sufficient quantities at the time of FSS. The surrogate ratios were determined from data obtained during the remedial action of the landfill. The reduced Cs-137 Surrogate DCGL was 2.82 pCi/g.

In a Class 1 area a DCGL Elevated Measurement Comparison (DCGL<sub>EMC</sub>) is calculated. The DCGL<sub>EMC</sub> represents the dose to an individual from a small area of residual contamination. The calculated DCGL<sub>EMC</sub> was 7.16 pCi/g for Cs-137 and 1.98 pCi/g for Co-60.

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 surface soil samples for FSS was determined in accordance with Procedure RPM 5.1-12, *"Determination of the Number of Surface Samples for FSS."* In accordance with Procedure RPM 5.1-11 the Lower Boundary of the Gray Region (LBGR) was adjusted from 0.5 to 0.91 to maintain the relative shift ( $\Delta/\sigma$ ) in the range of 1 to 3. The Sign Test was used for non-parametric statistical testing. The sample design required fifteen (15) surface soil samples.

The survey unit was evaluated to assess the need for additional measurements based on the potential for small areas of elevated activity. This assessment, referred to as the Elevated Measurement Comparison (EMC), compared the MDC of the scanning technique to the DCGL<sub>EMC</sub> for the survey unit. The adequacy of the scanning technique was adequate; therefore no additional samples were required. This assessment transpired in accordance with procedure RPM 5.1-12.

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For the FSS, four (4) biased soil SMLs were incorporated in the survey design. The basis for this professional judgment decision was historical documentation review and process knowledge.

Although Procedure RPM 5.1-11 only specified that 5% of the samples be selected for HTD analysis, three (3) soil samples or 20% were randomly selected for HTD radionuclide analysis by the offsite laboratory by using the Microsoft® Excel "RANDBETWEEN" function. Each sample would receive a full suite analysis of the 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 offsite laboratory. These locations were selected randomly using the Microsoft® Excel "RANDBETWEEN" function. The number of quality control samples was determined to be 14% of fifteen samples, rounded up to the next whole number.

The location of the soil samples was determined using Visual Sample Plan (VSP) in accordance with Procedure RPM 5.1-14, "*Identifying and Marking Surface Sample Locations for FSS.*" Pacific Northwest National Laboratory (PNNL) created VSP for the United States Department of Energy. Input parameters included a systematic grid spacing consisting of a triangular pitch pattern, and a random starting point which is appropriate for a Class 1 survey unit.

The sample locations and scan areas were identified using AutoCAD-Lt<sup>®</sup>, a commercially available plotting software, with coordinates consistent with the Connecticut State Plane Coordinate System. The FSSP specified the use of a GPS to locate SMLs and scan area locations in the field. The GPS coordinates for the fifteen (15) SMLs designed for the non-parametric statistical testing are provided in Table 3.

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

Designation	Northing	Easting
9535-0001-001F	236163.1177	673176.5849
9535-0001-002F	236129.1607	673078.5596
9535-0001-003F	236129.1607	673117.7697
9535-0001-004F	236129.1607	673156.9798
9535-0001-005F	236095.2037	673019.7444
9535-0001-006F	236095.2037	673058.9545
9535-0001-007F	236095.2037	673098.1647
9535-0001-008F	236095.2037	673137.3748
9535-0001-009F	236095.2037	673176.5849
9535-0001-010F	236061.2468	673039.3495
9535-0001-011F	236061.2468	673078.5596
9535-0001-012F	236061.2468	673117.7697
9535-0001-013F	236061.2468	673156.9798
9535-0001-014F	236027.2898	673098.1647
9535-0001-015F	236027.2898	673137.3748

In a Class 1 survey unit the Investigation Level is a measurement greater than the  $DCGL_{EMC}$ . In Accordance with the LTP, Table 5.8 this equates to 12,000 cpm for radiation scan surveys.

In a Class 1 survey unit the median concentration is not expected to exceed the LBGR. A prospective power curve was generated using COMPASS, a software package developed under the sponsorship of the United States Nuclear Regulatory Commission for implementation of the MARSSIM in support of the decommissioning license termination rule (10 CFR 20, Subpart E). The prospective power curve showed adequate power for the survey design. The final remedial action survey data of this survey unit indicated the mean concentrations of Co-60 and Cs-137 is below the LBGR. Table 4 provides a synopsis of the FSS design.



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

Feature	Design Criteria	Basis
Survey Unit Size	1,860 m <sup>2</sup>	Based on AutoCAD and Visual Sample Plan calculations
Number of Measurements	15	Type I ( $\alpha$ ) and Type II ( $\beta$ ) errors were 0.05, relative shift ( $\Delta/\sigma$ ) set at 2 by procedure, the LBGR was 0.91
Grid Spacing	12.0 m	Based on triangular grid
Interval Spacing	10.4 m	Based on triangular grid
DCGL	1	Operational DCGL applied to field data <sup>(1)</sup>
Scan Survey Coverage	1860 m <sup>2</sup> (100%)	Class 1 survey unit
Scan Investigation Level	>12,000 cpm	Based on achieving the DCGL <sub>EMC</sub>

(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-9535-01017-000. The WP&IR package included a detailed FSSP, job safety analysis, job planning checklist and related procedures to be used 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 April 19 and April 27, 2004.

Using the GPS, the scan area and SMLs were identified and marked with surveyor's flags. A 100% scan survey of SU 9535-0001 was performed and evaluated for elevated readings. See Attachment 2 for Scan Area results. Scan surveys were performed with an Eberline E-600 using a SPA-3 2"x2" 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.

The fifteen (15) 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 the FSS design. Samples collected were controlled, transported, stored, and transferred to the offsite laboratory using Chain-of-Custody (COC) protocol in

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accordance with Procedure RPM 5.1-5, "*Chain of Custody for Scoping, Characterization and Final Status Survey Samples.*"

Three (3) samples, 9535-0001-002F, 006F and 016F, were selected and sent to the off-site laboratory for gamma spectroscopy and HTD radionuclide analysis.

Four (4) judgmental samples were collected, 9535-0001-016F through 019F, and sent to the off-site laboratory for gamma spectroscopy analysis. See Attachment 1, Figure 5 for a visual depiction.

Two (2) 'split samples', 9535-0001-004F/FS and 008F/FS, were collected for analysis by the off site laboratory.

## 6. SURVEY RESULTS

No scan survey results were in excess of the Investigation Level. No investigations or additional soil samples were required. See Table 5 for a summary of the scan survey results. All scan area results are provided in Attachment 2.

**Table 5 – Scan Area Results**

Scan Area	Investigation Level (cpm)	Range of Logged Reading (cpm)	Elevated Reading Identification
Scan Strips 1-71	12,000	5,460-8,330	None

The off site laboratory employed for the radiological analyses of samples was General Engineering Laboratories, LLC (GEL), Charleston, South Carolina. The laboratory processed and analyzed the fifteen (15) samples taken for non-parametric statistical testing, the associated duplicates and judgmental samples using gamma spectroscopy. Gamma spectroscopy analysis was performed to the required MDC. The results of gamma spectrometry analysis for all of the samples indicated Cs-137 at levels consistent with concentrations of Cs-137 found in soil at offsite locations within the vicinity of the HNP (Health Physics TSD BYC-HP-0063). A summary of the sample results is provided in Table 6.

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

Sample Number	Cs-137 pCi/g	Co-60 pCi/g	f-DCGL <sup>(1)</sup>
9535-0001-001	0.071	0.007	0.030
9535-0001-002	0.099	-0.007	0.031
9535-0001-003	0.103	-0.001	0.036
9535-0001-004	0.097	-0.005	0.031
9535-0001-005	0.313	0.004	0.113
9535-0001-006	0.127	-0.002	0.043
9535-0001-007	0.089	-0.009	0.026
9535-0001-008	0.085	0.003	0.032
9535-0001-009	0.062	0.003	0.024
9535-0001-010	0.093	-0.002	0.032
9535-0001-011	0.138	0.009	0.055
9535-0001-012	0.041	-0.007	0.010
9535-0001-013	0.058	-0.002	0.020
9535-0001-014	0.073	0.002	0.027
9535-0001-015	0.039	0.002	0.015

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

The offsite laboratory processed three (3) samples, 9535-0001-002F, 006F and 016F, for HTD analyses as required by the sample plan. Depending on the radionuclide and the measurement method, the requested analyses included alpha spectroscopy, gas proportional counting and liquid scintillation. The only HTD radionuclide resulting in an identifiable quantity were Sr-90 and Ni-63, in sample 9535-0001-006F (see Table 7). Sample analysis results did not exceed the Investigation Level; therefore, no further actions or investigations were required.

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

Sample Number	Radionuclide and Result		DCGL	f-DCGL <sup>(1)</sup>
9535-0001-006F	Sr-90	0.072	0.620	0.116
9535-0001-006F	Ni-63	15.80	289.000	0.055

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

Four (4) biased samples, 9535-0001-016F through 019F, were analyzed by gamma spectroscopy at the off site laboratory. The analysis was performed to the required MDCs. Sample results were approximately 2% of the Operational DCGL, well below the investigation level. No further actions or investigations were required. Results are summarized in Table 8.

SOUTHEAST LANDFILL  
SURVEY UNIT 9535-0001

RELEASE RECORD

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**Table 8 – Biased Sample Results**

Sample Number	Cs-137 pCi/g	Co-60 pCi/g	f-DCGL
9535-0001-016F	0.054	0.006	0.023
9535-0001-017F	0.102	-0.001	0.035
9535-0001-018F	0.065	0.005	0.026
9535-0001-019F	0.041	0.015	0.025

Radionuclide analyses results identified some radionuclides meeting the accepted criteria for detection (i.e., a result greater than both, the two standard deviations uncertainty and the actual MDC). The maximum reported f-DCGL for any individual soil sample was 17%. Validation/verification of the survey data, a Data Quality Assessment (DQA) and the Sign Test were performed. The data passed the Sign Test. Refer to Attachment 2 for data and DQA results.

## 7. QUALITY CONTROL

The off site laboratory processed the split soil samples and performed gamma spectroscopy analysis. Thirteen percent (13%) of the soil samples were selected for analysis which exceeds the 5% minimum required by the LTP. The data were evaluated using the United States Nuclear regulatory Commission (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

No investigations were performed in this survey unit. All soil sample and scan survey measurements were below the Investigation Levels.

## 9. REMEDIATION AND RESULTS

No remediation was performed in this survey unit as a result of FSS.

Prior to FSS, remedial action and Remedial Action Surveys were conducted. Soil remediation was followed by Remedial Action Surveys conducted under survey and sampling work plan BCY-SSWP-03-07-003 and subsequent two addendums. Soil was removed by an excavator and placed in containers for eventual transport and disposition. About forty (40) B-25 containers of soil (approximately 4000 ft<sup>3</sup>) were removed from the area. Items removed from the pit (e.g., blocks of concrete) were surveyed for contamination in accordance with health physics procedures. The materials were found to exceed the radiological release criteria for unrestricted use. Table 9 provides the before and after remediation basic statistical quantities for Cs-137 and Co-60.

SOUTHEAST LANDFILL  
SURVEY UNIT 9535-0001

RELEASE RECORD

**Table 9 - Pre and Post Remedial Action Soil Sample Results**

Parameter	Pre Cs-137 (pCi/g)	Post Cs-137 (pCi/g)	Pre Co-60 (pCi/g)	Post Co-60 (pCi/g)
Minimum Value:	0.081	0.084	0.002	0.001
Maximum Value:	15.900	0.408	1.900	0.016
Mean:	3.290	0.211	0.273	0.007
Median:	2.790	0.182	0.115	0.005
Standard Deviation:	3.780	0.121	0.518	0.006

## 10. CHANGES FROM THE FINAL STATUS SURVEY PLAN

There were no changes from the FSSP. No FSSP Addendums were created.

## 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 Retrospective Power Curve was generated using COMPASS. The Sign Test was performed on the data and compared the results with the original assumptions of the DQOs. All soil 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 the survey unit was properly designated as Class 1.

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).

The Cs-137 range of the data is about 4.2 standard deviations. Excluding the highest Cs-137 result (3.13E-01 pCi/g) the range of the data is about 1.51. Statistical analyses reveal three positive outliers. This could be attributed to natural variations of environmental soil sampling with inductions from topographical and geological features. The total range of the sample results is consistent with concentrations of Cs-137 found in soil at offsite locations within the vicinity of the HNP. The maximum result is less than the required  $MDC_{Cs-137}$  of 3.16E-01 pCi/g. None of the samples exceeded 12% of the Surrogate  $DCGL_{Cs-137}$ .

The Co-60 range of data was about 3.46 standard deviations. The histogram of the data showed a normal distribution around the mean. None of the samples exceeded 1% of the  $DCGL_{Co-60}$ .

The average level of contamination in SU 9535-0001 is less than the release criteria as defined by the Operational DCGL. Evaluation of soil sample results using the  $DCGL_{EMC}$  is not required as by default all results would be less than the  $DCGL_{EMC}$ .

SOUTHEAST LANDFILL  
SURVEY UNIT 9535-0001

RELEASE RECORD

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The Sign Test was performed on the data and compared the results with the original assumptions of the DQOs. All samples were less than the Operational DCGL. Therefore, the Sign Test shows that the survey unit passes FSS.

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 Technical Support Document (TSD) CY-HP-0193, *"Assessment of Existing Groundwater Dose for Phase II Release Areas of the Final Status Survey Report."*

## 12. ANOMALIES

Soil sample 9535-0001-006F yielded a positive identification of Ni-63 and Sr-90 at 2% and 5% of the Base Case DCGL, respectively. The Ni-63 ratio of sample result to MDC was 15.8:15.3 or 1.03:1.0. Sample data associated with the Offsite Material recovery Program (OMRP) identified two (2) HTD radionuclides meeting the accepted criteria for detection (i.e., a result greater than 2 standard deviations uncertainty and the actual MDC). However, the reported concentrations of Ni-63 and Fe-55 were a very low fraction of the applicable Base Case DCGL for soil (<1%). The combined fraction of the Base Case DCGL including the Ni-63 and Sr-90 results is <13%. The Sr-90 and Ni-63 result did not impact the proper release of SU 9535-0001.

## 13. CONCLUSION

Survey Unit 9535-0001 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 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. The Elevated Measurement Comparison test was not required. No large anomalies were observed in the graphical representation of the data. The survey unit was properly designated as Class 1. 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

CYAPCO  
FINAL STATUS SURVEY RELEASE RECORD  
SOUTHEAST LANDFILL  
SURVEY UNIT 9535-0001

Prepared By: \_\_\_\_\_  
FSS Engineer

Date: \_\_\_\_\_

Reviewed By: \_\_\_\_\_  
FSS Engineer

Date: \_\_\_\_\_

Approved By: \_\_\_\_\_  
FSS Project Lead

Date: \_\_\_\_\_

SOUTHEAST LANDFILL  
SURVEY UNIT 9535-0001

RELEASE RECORD

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14.1 Attachment 1 – Figures (6 pages including cover)	
14.2 Attachment 2 – Sample and Statistical Data (118 pages including covers)	



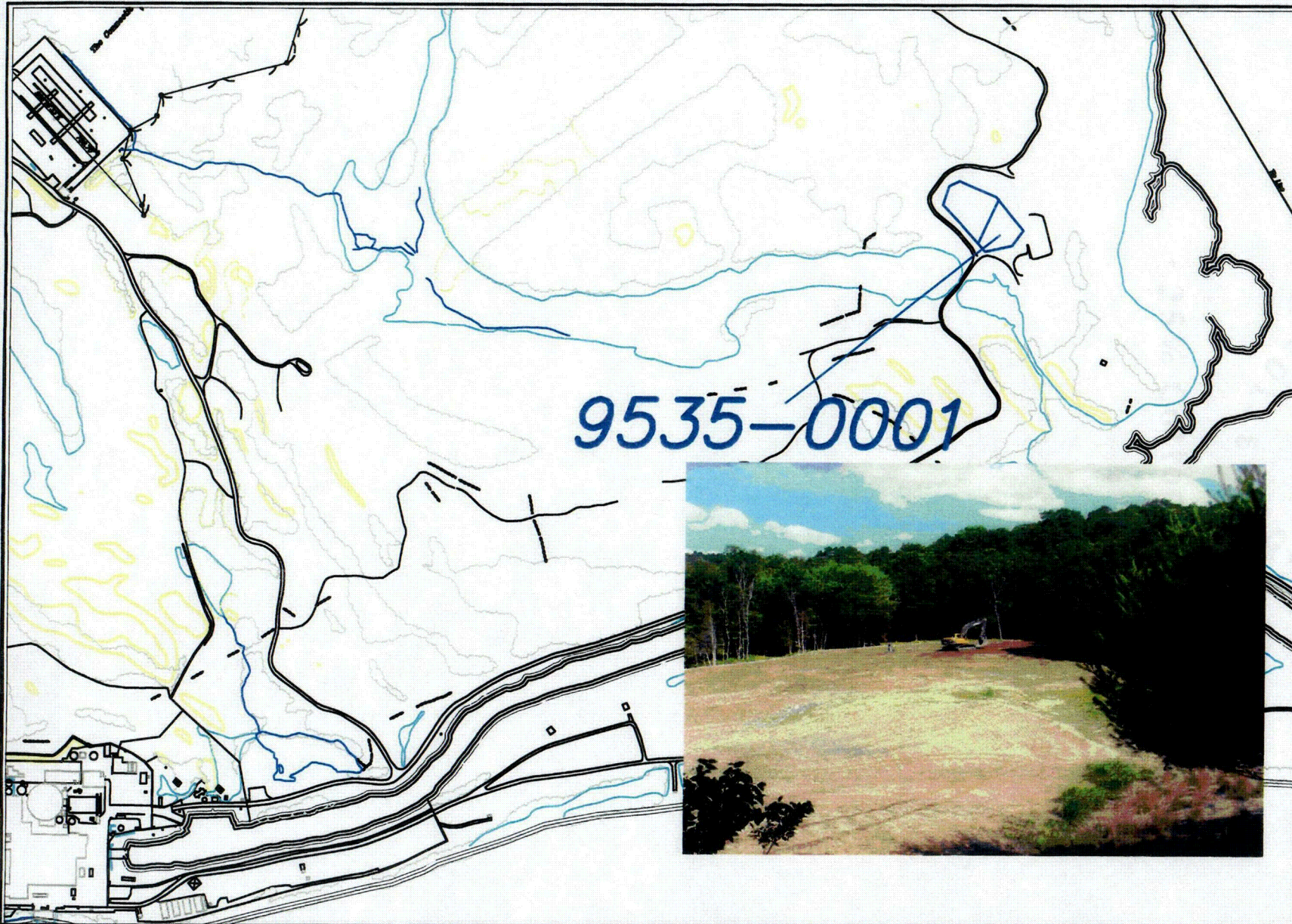
SOUTHEAST LANDFILL  
SURVEY UNIT 9535-0001

RELEASE RECORD

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Attachment 1  
Figures  
(5 Pages)





Legend

Notes

*Figure 1*



*Connecticut Yankee Atomic Power Company*  
*9535-0001 Final Status Survey*

<i>Date</i>	<i>Rev</i>
July 2004	0



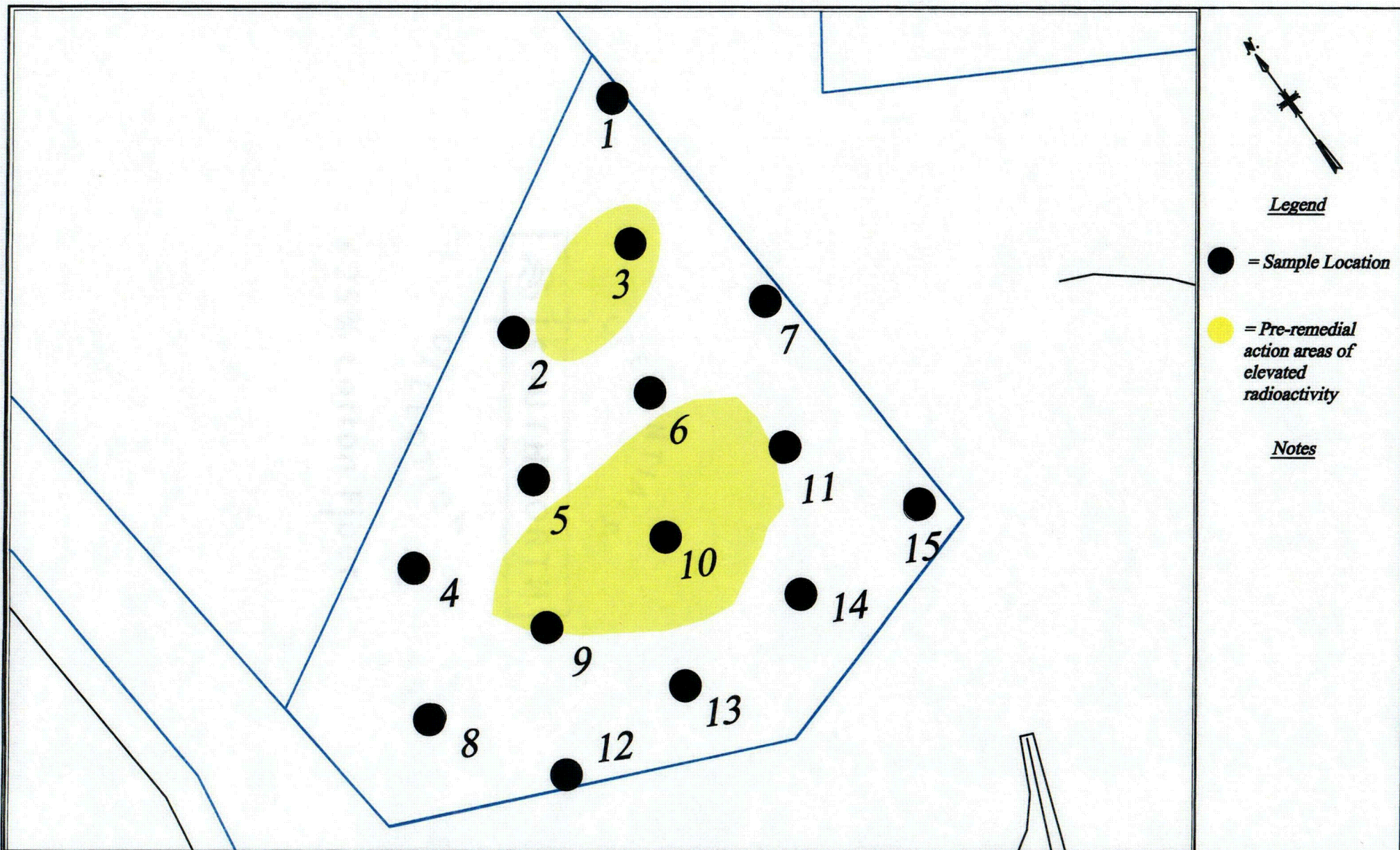


Figure 2



Connecticut Yankee Atomic Power Company  
9535-0001 Final Status Survey Design

Date	Rev
July 15, 2004	0



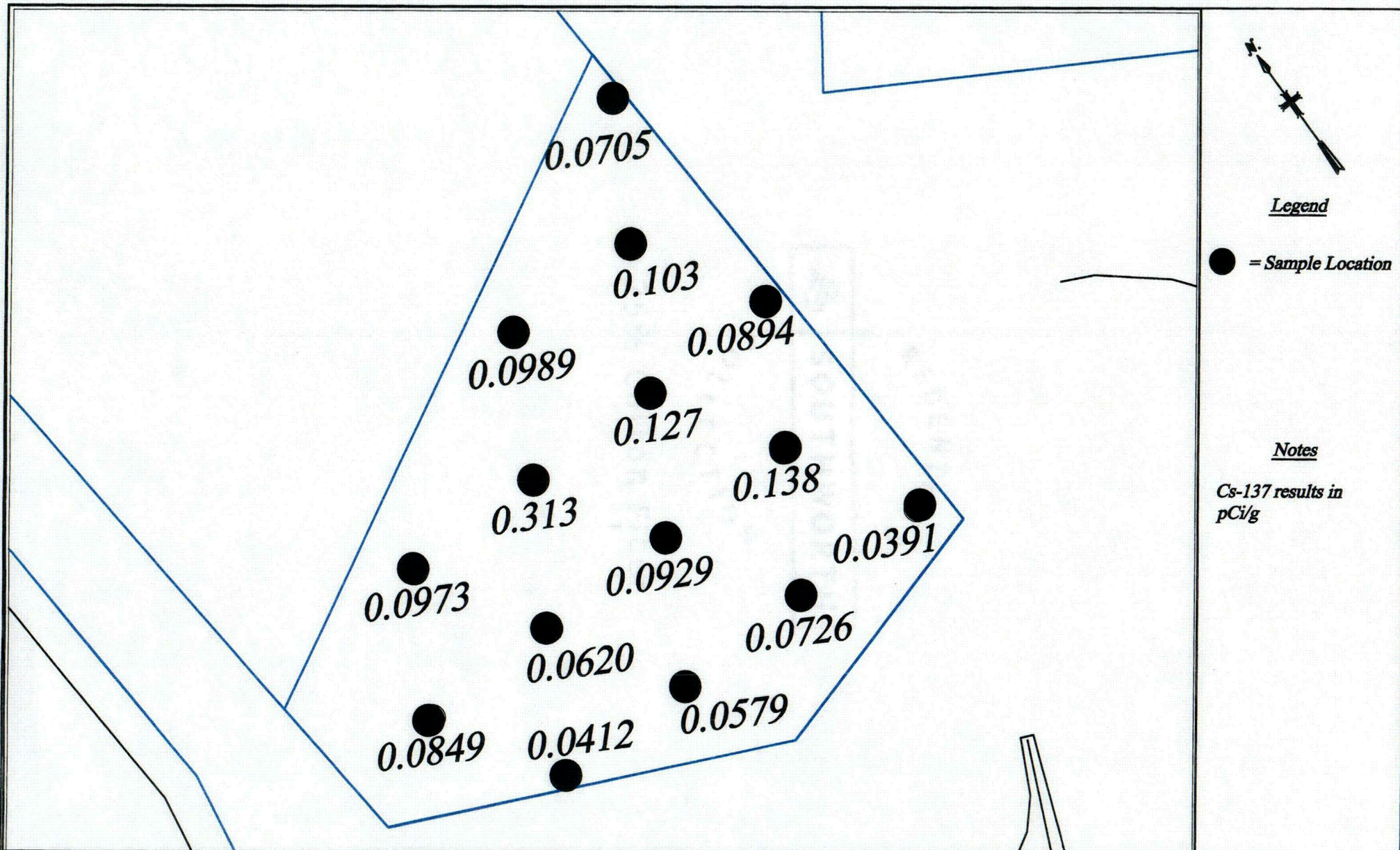


Figure 3



Connecticut Yankee Atomic Power Company  
9535-0001 Final Status Survey Design  
Cesium-137 Posting Plot

Date

Rev

July 15, 2004

0



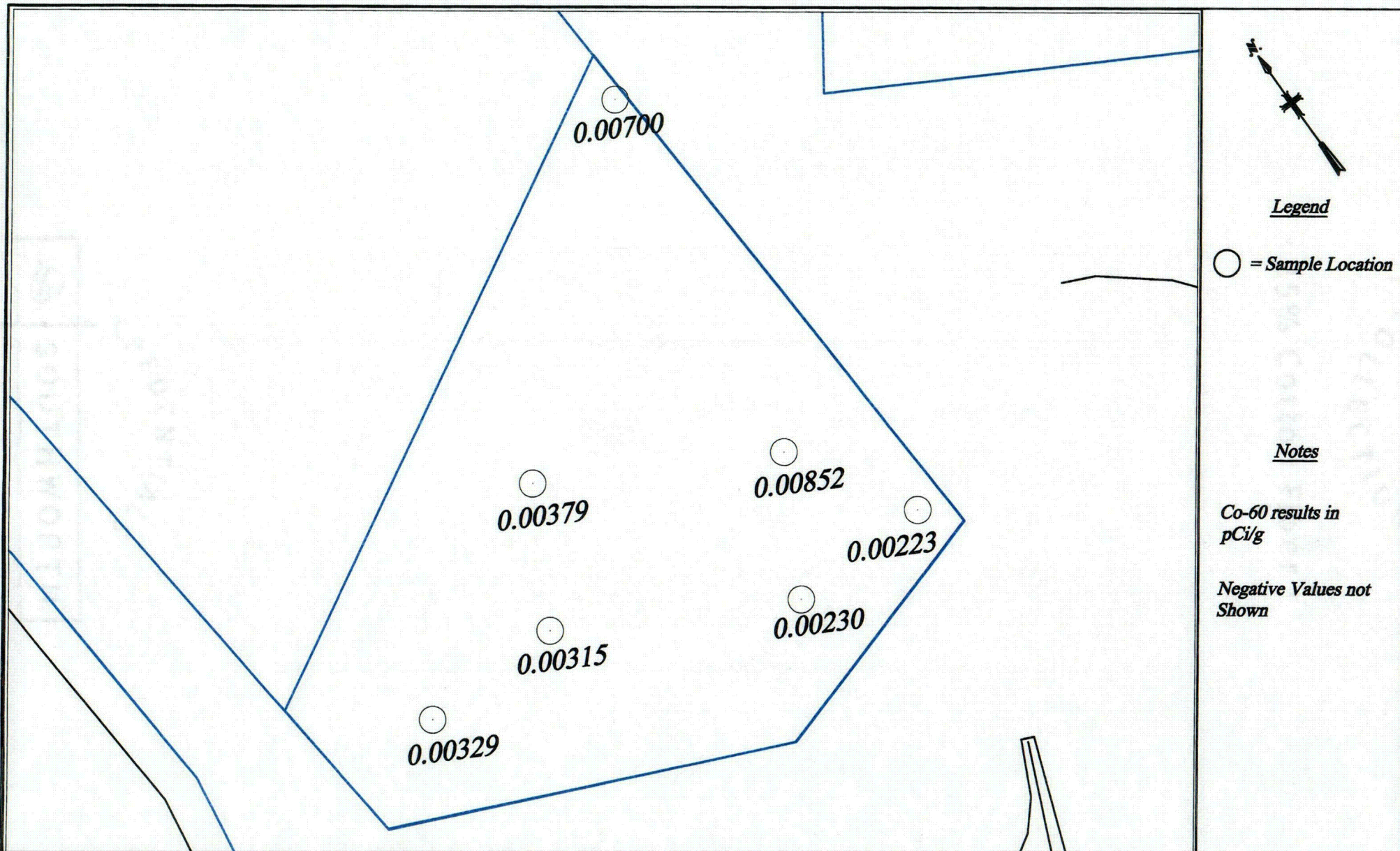


Figure 4



Connecticut Yankee Atomic Power Company  
 9535-0001 Final Status Survey Cobalt-60  
 Posting Plot

Date

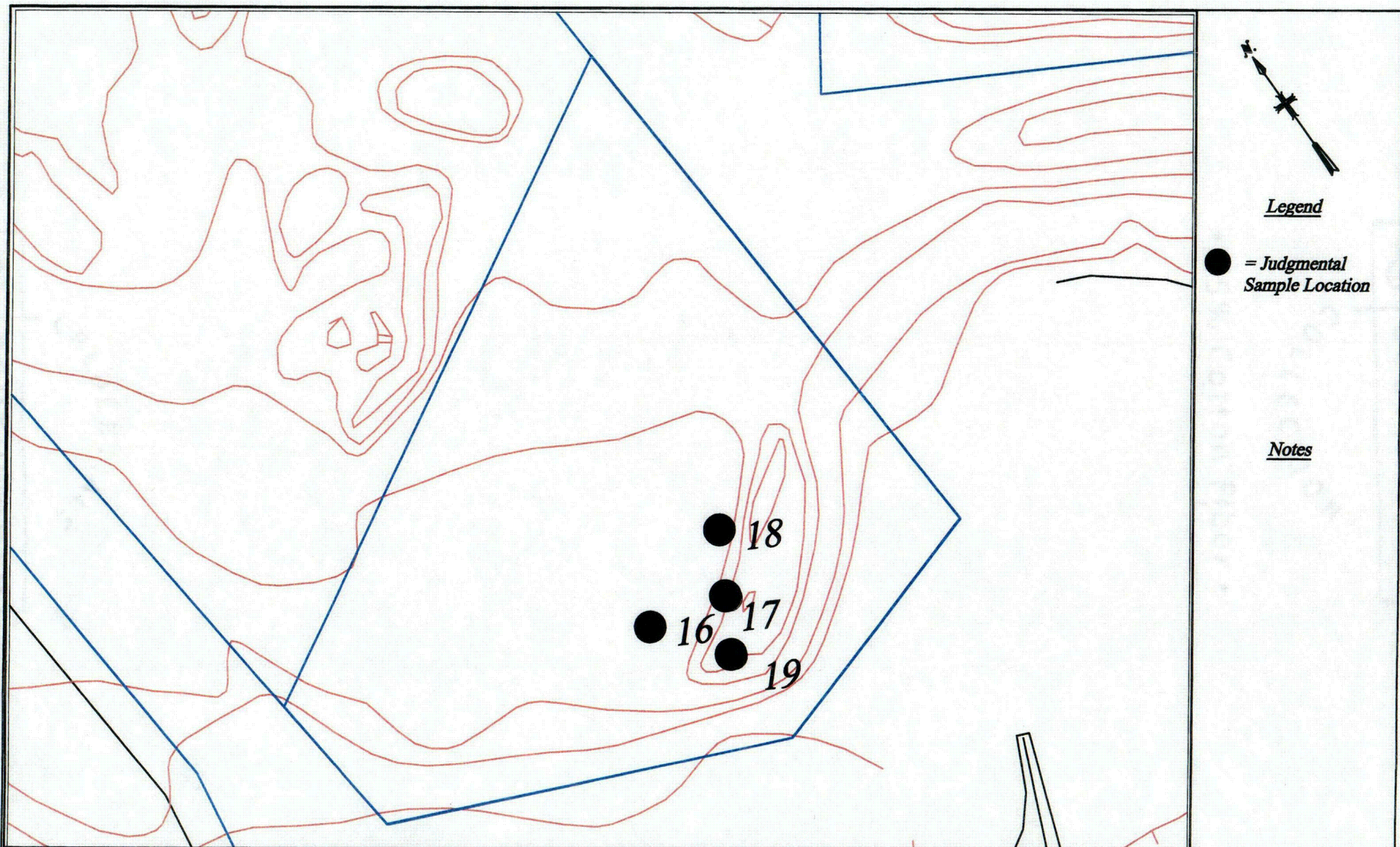
Rev

July 15, 2004

0

004





Legend

● = Judgmental Sample Location

Notes

Figure 5



Connecticut Yankee Atomic Power Company  
9535-0001 FSS Judgmental

Date

Rev

July, 2004

0

SOUTHEAST LANDFILL  
SURVEY UNIT 9535-0001

RELEASE RECORD

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Attachment 2  
Sample and Statistical Data  
(118 pages including covers)

SOUTHEAST LANDFILL  
SURVEY UNIT 9535-0001

RELEASE RECORD

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Attachment 2a  
Gamma Spectroscopy Data  
(87 Pages)



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# CASE NARRATIVE

**CASE NARRATIVE**  
**For**  
**Project: Soils**  
**PO# 002332**  
**Work Order: 113282**  
**SDG: MSR#04-1559**

**June 17, 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 113282 arrived at General Engineering Laboratories, LLC, (GEL) in Charleston, South Carolina May 19, 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:

9535-0001-008F	9535-0001-009F
9535-0001-008FS	9535-0001-012F
9535-0001-001F	9535-0001-013F
9535-0001-018F	9535-0001-014F
9535-0001-001F	9535-0001-015F
9535-0001-003F	9535-0001-017F
9535-0001-004F	9535-0001-019F
9535-0001-004FS	9535-0001-002F
9535-0001-005F	9535-0001-006F
9535-0001-007F	9535-0001-016F.
9535-0001-010F	

**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:**

Eighteen soil samples were analyzed for FSSGAM, and three soil samples were analyzed for FSS ALL.

**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

# CHAIN OF CUSTODY

## Connecticut Yankee Atomic Power Company

362 Injun Hollow Road, East Hampton, CT 06424

860-267-2556

## Chain of Custody Form

No. 2004-00066

1132821

Project Name: Haddam Neck Decommissioning			Media Code	Sample Type Code	Container Size & Type Code	Analyses Requested					Lab Use Only			
Contact Name & Phone: Jack McCarthy 860-267-2556 Ext. 3024						FSSGAM	FSS ALL	FSSHTD	FSSSTRU	FSSOTHR	Comments:			
Analytical Lab (Name, City, State) General Engineering Laboratories 2040 Savage Road Charleston, SC 29407 (843-556-8171) Sarah Kozlik														
Priority: <input checked="" type="checkbox"/> 30 D. <input type="checkbox"/> 14 D. <input type="checkbox"/> 7 D. Other:														
Sample Designation	Date	Time									Comment, Preservation	Lab Sample ID		
9535-0001-008F	4/22/2004	1544	TS	G	BP	X								
9535-0001-008FS	4/22/2004	1544	TS	G	BP	X								
9535-0001-011F	4/22/2004	1526	TS	G	BP	X								
9535-0001-018F	4/22/2004	1531	TS	G	BP	X								
NOTES: PO #: 002332      MSR #: 04-1559 <input checked="" type="checkbox"/> LTP QA <input type="checkbox"/> Radwaste QA <input type="checkbox"/> Non QA											Samples Shipped Via: <input checked="" type="checkbox"/> Fed Ex <input type="checkbox"/> UPS <input type="checkbox"/> Hand  <input type="checkbox"/> Other _____		Internal Container Temp.: 23.0 Deg. C  Custody Sealed? Y <input checked="" type="checkbox"/> N <input type="checkbox"/> Custody Seal Intact? Y <input checked="" type="checkbox"/> N <input type="checkbox"/> * no custody tape	
1) Relinquished By <i>[Signature]</i> Date/Time 5/18/04 1440			2) Received By <i>[Signature]</i> Date/Time 5-19-04 9:00			7918 4535 2783 Bill of Lading #								
3) Relinquished By _____ Date/Time _____			4) Received By _____ Date/Time _____											
5) Relinquished By _____ Date/Time _____			6) Received By _____ Date/Time _____											

## Connecticut Yankee Atomic Power Company

362 Injun Hollow Road, East Hampton, CT 06424  
860-267-2556

## Chain of Custody Form

No. 2004-00064

1132821

Project Name: Haddam Neck Decommissioning			Media Code	Sample Type Code	Container Size & Type Code	Analyses Requested					Lab Use Only	
Contact Name & Phone: Jack McCarthy 860-267-2556 Ext. 3024						FSSGAM	FSS ALL	FSSHTD	FSSTRU	FSSOTHR	Comments:	
Analytical Lab (Name, City, State) General Engineering Laboratories 2040 Savage Road Charleston, SC 29407 (843-556-8171) Sarah Kozlik												
Priority: <input checked="" type="checkbox"/> 30 D. <input type="checkbox"/> 14 D. <input type="checkbox"/> 7 D. Other:												
Sample Designation	Date	Time									Comment, Preservation	Lab Sample ID
9535-0001-001F	4/22/2004	1435	TS	G	BP	X						
9535-0001-002F	4/22/2004	1501	TS	G	BP		X					
9535-0001-003F	4/22/2004	1453	TS	G	BP	X						
9535-0001-004F	4/22/2004	1447	TS	G	BP	X						
9535-0001-004FS	4/22/2004	1447	TS	G	BP	X						
9535-0001-005F	4/22/2004	1513	TS	G	BP	X						
9535-0001-006F	4/22/2004	1507	TS	G	BP		X					
9535-0001-007F	4/22/2004	1535	TS	G	BP	X						
9535-0001-010F	4/22/2004	1520	TS	G	BP	X						
NOTES: PO #: 002332    MSR #: 04-1559 <input checked="" type="checkbox"/> LTP QA <input type="checkbox"/> Radwaste QA <input type="checkbox"/> Non QA NOTE Do not dry sample until sufficient sample media has been obtained for volatile Hard To Detect analyses are complete.										Samples Shipped Via: <input checked="" type="checkbox"/> Fed Ex <input type="checkbox"/> UPS <input type="checkbox"/> Hand <input type="checkbox"/> Other _____		Internal Container Temp.: <u>23.0</u> Deg. C  Custody Sealed? _____ Custody Seal Intact? _____  Y <input checked="" type="checkbox"/> N <input type="checkbox"/> *no custody tape
1) Relinquished By <u>[Signature]</u> Date/Time <u>5/18/04 1440</u>			2) Received By <u>[Signature]</u> Date/Time <u>5-19-04 9:00</u>			7918 4535 2783 Bill of Lading #						
3) Relinquished By _____ Date/Time _____			4) Received By _____ Date/Time _____									
5) Relinquished By _____ Date/Time _____			6) Received By _____ Date/Time _____									

## Connecticut Yankee Atomic Power Company

362 Injun Hollow Road, East Hampton, CT 06424  
860-267-2556

## Chain of Custody Form

No. 2004-00065

113282/

Project Name: Haddam Neck Decommissioning			Media Code	Sample Type Code	Container Size & Type Code	Analyses Requested					Lab Use Only	
Contact Name & Phone: Jack McCarthy 860-267-2556 Ext. 3024						FSSGAM	FSS ALL	FSSHTD	FSSSTRU	FSSOTHR	Comments:	
Analytical Lab (Name, City, State) General Engineering Laboratories 2040 Savage Road Charleston, SC 29407 (843-556-8171) Sarah Kozlik												
Priority: <input checked="" type="checkbox"/> 30 D. <input type="checkbox"/> 14 D. <input type="checkbox"/> 7 D. Other:												
Sample Designation	Date	Time									Comment, Preservation	Lab Sample ID
9535-0001-009F	4/27/2004	0848	TS	G	BP	X						
9535-0001-012F	4/27/2004	0818	TS	G	BP	X						
9535-0001-013F	4/27/2004	0838	TS	G	BP	X						
9535-0001-014F	4/27/2004	0810	TS	G	BP	X						
9535-0001-015F	4/27/2004	0834	TS	G	BP	X						
9535-0001-016F	4/27/2004	0826	TS	G	BP		X					
9535-0001-017F	4/27/2004	0843	TS	G	BP	X						
9535-0001-019F	4/27/2004	0805	TS	G	BP	X						
NOTES: PO #: 002332    MSR #: 04-1559 <input checked="" type="checkbox"/> LTP QA <input type="checkbox"/> Radwaste QA <input type="checkbox"/> Non QA NOTE Do not dry sample until sufficient sample media has been obtained for volatile Hard To Detect analyses are complete.										Samples Shipped Via: <input checked="" type="checkbox"/> Fed Ex <input type="checkbox"/> UPS <input type="checkbox"/> Hand <input type="checkbox"/> Other _____		Internal Container Temp: <u>23.0</u> Deg. C  Custody Sealed? <u>Y</u> <input type="checkbox"/> N <input type="checkbox"/> Custody Seal Intact? <u>Y</u> <input type="checkbox"/> N <input type="checkbox"/>  <u>x no custody tape</u>
1) Relinquished By <u>[Signature]</u> Date/Time <u>5/18/04 1440</u>			2) Received By <u>[Signature]</u> Date/Time <u>5-19-04 9:00</u>			Bill of Lading # <u>79184535 2783</u>						
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: 5-19-04 9:00

SDG#: MSR# 04-1559

Work Order Number: \_\_\_\_\_

Shipping Container ID: 7918 45352783 Chain of Custody # 2004-00066; 2004-00065  
2004-00064

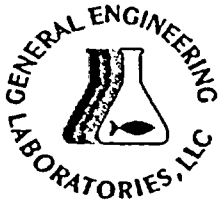
1. Custody Seals on shipping container intact? Yes ☐ No ☒
2. Custody Seals dated and signed? Yes ☐ No ☒
3. Chain-of-Custody record present? Yes ☒ No ☐
4. Cooler temperature 23.0
5. Vermiculite/packing materials is: Wet ☐ Dry ☐
6. Number of samples in shipping container: 21
7. Sample holding times exceeded? Yes ☐ No ☐

8. Samples have:	
<input checked="" type="checkbox"/> tape	<input type="checkbox"/> hazard labels
<input type="checkbox"/> custody seals	<input type="checkbox"/> appropriate sample labels
9. Samples are:	
<input checked="" type="checkbox"/> in good condition	<input type="checkbox"/> leaking
<input type="checkbox"/> broken	<input type="checkbox"/> have air bubbles

10. Were any anomalies identified in sample receipt? Yes ☐ No ☒
11. Description of anomalies (include sample numbers): \_\_\_\_\_

Sample Custodian/Laboratory: Alfred Thier Date: 5-19-04

Telephoned to: \_\_\_\_\_ On \_\_\_\_\_ By \_\_\_\_\_



# SAMPLE RECEIPT & REVIEW FORM

PM use only

Client:	SDG/ARCO/Work Order:
Date Received:	PM(A) Review (ensure non-conforming items are resolved prior to signing):
Received By:	

Sample Receipt Criteria	Conforming	NA	Non-Conforming	Comments/Qualifiers (Required for Non-Conforming Items)
1 Shipping containers received intact and sealed?				Circle Applicable: seals broken damaged container leaking container other (describe)
2 Samples requiring cold preservation within (4 +/- 2 C)? Record preservation method.				ice bags blue ice dry ice none other(describe)
3 Chain of custody documents included with shipment?				
4 Sample containers intact and sealed?				Circle Applicable: seals broken damaged container leaking container other (describe)
5 Samples requiring chemical preservation at proper pH?				Sample ID's, containers affected and observed pH:
6 VOA vials free of headspace (defined as < 6mm bubble)?				Sample ID's and containers affected:
7 Samples received within holding time?				ID's and tests affected:
8 Sample ID's on COC match ID's on bottles?				Sample ID's and containers affected:
9 Date & time on COC match date & time on bottles?				Sample ID's affected:
10 Number of containers received match number indicated on COC?				Sample ID's affected:
11 COC form is properly signed in relinquished/received sections?				
12 Air Bill & Tracking #'s				

<b>Radiological Information</b>	Non-RAD	RAD	RAD	RSO RAD Receipt #
What is the radiological classification of the samples?				Comments
Radioactivity Screening Results (maximum observed CPM)	30-0m			If > 12 area background is observed on a non-radioactive sample, contact the RSO to investigate.

# RADIOLOGICAL ANALYSIS

**Radiochemistry Case Narrative  
Connecticut Yankee Atomic Power Co. (YANK)  
SDG MSR#04-1559**

**Method/Analysis Information**

<b>Product:</b>	Alphaspec Am241, Cm, Solid ALL FSS
<b>Analytical Method:</b>	DOE EML HASL-300, Am-05-RC Modified
<b>Prep Method:</b>	Ash Soil Prep
<b>Dry Soil Prep GL-RAD-A-021 Method:</b>	Dry Soil Prep
<b>Analytical Batch Number:</b>	338561
<b>Prep Batch Number:</b>	334895
<b>Dry Soil Prep GL-RAD-A-021 Batch Number:</b>	334885

<b>Sample ID</b>	<b>Client ID</b>
113282019	9535-0001-002F
113282020	9535-0001-006F
113282021	9535-0001-016F
1200637713	Method Blank (MB)
1200637716	Laboratory Control Sample (LCS)
1200637714	113282019(9535-0001-002F) Sample Duplicate (DUP)
1200637715	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-011 REV# 13.

**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**

Sample 113282020 (9535-0001-006F) was recounted due to poor resolution.

**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.

**Method/Analysis Information**

<b>Product:</b>	Alphaspec Pu, Solid-ALL FSS
<b>Analytical Method:</b>	DOE EML HASL-300, Pu-11-RC Modified
<b>Prep Method:</b>	Ash Soil Prep
<b>Dry Soil Prep GL-RAD-A-021 Method:</b>	Dry Soil Prep
<b>Analytical Batch Number:</b>	338562
<b>Prep Batch Number:</b>	334895
<b>Dry Soil Prep GL-RAD-A-021 Batch Number:</b>	334885

<b>Sample ID</b>	<b>Client ID</b>
113282019	9535-0001-002F
113282020	9535-0001-006F
113282021	9535-0001-016F
1200637717	Method Blank (MB)
1200637720	Laboratory Control Sample (LCS)
1200637718	113282019(9535-0001-002F) Sample Duplicate (DUP)
1200637719	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-011 REV# 13.

**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.

**Method/Analysis Information****Product:**

Liquid Scint Pu241, Solid-ALL FSS

**Analytical Method:**

DOE EML HASL-300, Pu-11-RC Modified

**Prep Method:**

Ash Soil Prep

**Dry Soil Prep GL-RAD-A-021 Method:**

Dry Soil Prep

**Analytical Batch Number:**

338563

**Prep Batch Number:**

334895

**Dry Soil Prep GL-RAD-A-021 Batch Number:**

334885

**Sample ID****Client ID**

113282019

9535-0001-002F

113282020

9535-0001-006F

113282021

9535-0001-016F

1200637721

Method Blank (MB)

1200637724

Laboratory Control Sample (LCS)

1200637722

113282019(9535-0001-002F) Sample Duplicate (DUP)

1200637723

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-035 REV# 5.

**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.

**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:	335643
Prep Batch Number:	334885

<b>Sample ID</b>	<b>Client ID</b>
113282021	9535-0001-016F
1200630675	Method Blank (MB)
1200630677	Laboratory Control Sample (LCS)
1200630676	113280002(3100-0000-186-C-1C-02) 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: 113280002 (3100-0000-186-C-1C-02).

**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. The following NCR was generated for this SDG:  
NCR 118232 was generated due to Non-Rad samples being analyzed with Rad Samples. Sample 113282021, which is non-rad, was analyzed with rad samples. The sample was prepared for gamma analysis independent of Rad samples. The batch results were reviewed and verified that no cross contamination is evident in the non-rad sample. The results are being reported.

**Qualifier Information**

Qualifier	Reason	Analyte	Sample
UI	Data rejected due to low abundance.	Cesium-134	1200630676
UI	Data rejected due to no valid peak.	Thallium-208	1200630675

**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: 335651  
Prep Batch Number: 334885

<b>Sample ID</b>	<b>Client ID</b>
113282001	9535-0001-008F
113282002	9535-0001-008FS

113282003	9535-0001-001F
113282004	9535-0001-018F
113282005	9535-0001-001F
113282006	9535-0001-003F
113282007	9535-0001-004F
113282008	9535-0001-004FS
113282009	9535-0001-005F
113282010	9535-0001-007F
113282011	9535-0001-010F
113282012	9535-0001-009F
113282013	9535-0001-012F
113282014	9535-0001-013F
113282015	9535-0001-014F
113282016	9535-0001-015F
113282017	9535-0001-017F
113282018	9535-0001-019F
113282019	9535-0001-002F
113282020	9535-0001-006F
1200630700	Method Blank (MB)
1200630702	Laboratory Control Sample (LCS)
1200630701	113282001(9535-0001-008F) 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: 113282001 (9535-0001-008F).

##### **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	113282003
			113282005
			113282006
UI	Data rejected due to low abundance.	Manganese-54	113282011
		Americium-241	113282008
		Cesium-134	113282002
			113282003
			113282005
			113282007
			113282008
			113282010
			113282014
			113282017
UI	Data rejected due to no valid peak.	Niobium-94	113282018
		Potassium-40	1200630700

**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:**

334895

**Dry Soil Prep GL-RAD-A-021 Batch Number:**

334885

**Sample ID****Client ID**

113282019

9535-0001-002F

113282020

9535-0001-006F

113282021

9535-0001-016F

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 113282020 (9535-0001-006F), 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:****Analytical Method:****Analytical Batch Number:**

Liquid Scint Tc99, Solid-ALL FSS

DOE EML HASL-300, Tc-02-RC Modified  
339685

**Sample ID**

113282019

113282020

**Client ID**

9535-0001-002F

9535-0001-006F

113282021	9535-0001-016F
1200640376	Method Blank (MB)
1200640379	Laboratory Control Sample (LCS)
1200640377	113282019(9535-0001-002F) Sample Duplicate (DUP)
1200640378	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-005 REV# 11.

#### **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. The following NCR was generated for this SDG: NCR 121134 was generated due to Failure to maintain Custody. 1. The analyst did not scan the samples (113282019, 113282020, 113282021, 113283017, 113283018) into the batch prior to analysis, however the samples did remain in their custody at all times. The error has been corrected and the analyst has been instructed on proper scanning procedures. 1. Reporting results.

##### **Qualifier Information**

Manual qualifiers were not required.

**Method/Analysis Information**

<b>Product:</b>	Liquid Scint Fe55, Solid-ALL FSS
<b>Analytical Method:</b>	DOE RESL Fe-1, Modified
<b>Prep Method:</b>	Ash Soil Prep
<b>Dry Soil Prep GL-RAD-A-021 Method:</b>	Dry Soil Prep
<b>Analytical Batch Number:</b>	342541
<b>Prep Batch Number:</b>	334895
<b>Dry Soil Prep GL-RAD-A-021 Batch Number:</b>	334885

<b>Sample ID</b>	<b>Client ID</b>
113282019	9535-0001-002F
113282020	9535-0001-006F
113282021	9535-0001-016F
1200647440	Method Blank (MB)
1200647443	Laboratory Control Sample (LCS)
1200647441	113282019(9535-0001-002F) Sample Duplicate (DUP)
1200647442	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-040 REV# 2.

**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**

Samples 113282020 (9535-0001-006F), 113282021 (9535-0001-016F), 1200647440 (MB) and 1200647441 (9535-0001-002F) were recounted due to a negative result greater than three times the error. Samples were reprepared due to low/high recovery.

#### **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**

The absolute value of sample activity 1200647440 (MB) is greater than three times the one sigma total propagated uncertainty due to subtraction of the cross talk from the Iron-59 tracer.

##### **Qualifier Information**

Manual qualifiers were not required.

#### **Method/Analysis Information**

<b>Product:</b>	<b>Liquid Scint Ni63, Solid-ALL FSS</b>
<b>Analytical Method:</b>	<b>DOE RESL Ni-1, Modified</b>
<b>Prep Method:</b>	<b>Ash Soil Prep</b>
<b>Dry Soil Prep GL-RAD-A-021 Method:</b>	<b>Dry Soil Prep</b>
<b>Analytical Batch Number:</b>	<b>339689</b>
<b>Prep Batch Number:</b>	<b>334895</b>
<b>Dry Soil Prep GL-RAD-A-021 Batch Number:</b>	<b>334885</b>

<b>Sample ID</b>	<b>Client ID</b>
113282019	9535-0001-002F
113282020	9535-0001-006F
113282021	9535-0001-016F
1200640384	Method Blank (MB)
1200640387	Laboratory Control Sample (LCS)
1200640385	113282019(9535-0001-002F) Sample Duplicate (DUP)
1200640386	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-022 REV# 6.

#### **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.

**Method/Analysis Information****Product:**

LSC, Tritium Dist, Solid-IITD2,ALL FSS

**Analytical Method:**

EPA 906.0 Modified

**Analytical Batch Number:**

339628

**Sample ID****Client ID**

113282019

9535-0001-002F

113282020

9535-0001-006F

113282021

9535-0001-016F

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.

**Method/Analysis Information**

**Product:**

**Liquid Scint C14, Solid FSS**

**Analytical Method:**

**EPA EERF C-01 Modified**

**Analytical Batch Number:**

**342387**

**Sample ID**

**Client ID**

113282019 9535-0001-002F

113282020 9535-0001-006F

113282021 9535-0001-016F

1200647032 Method Blank (MB)

1200647035 Laboratory Control Sample (LCS)

1200647033 113282020(9535-0001-006F) Sample Duplicate (DUP)

1200647034 113282020(9535-0001-006F) 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-003 REV# 7.

**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: 113282020 (9535-0001-006F).

**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**

Samples 1200647032 (MB) and 1200647033 (9535-0001-006F) were recounted due to high MDAs.

Samples were reprepared due to low/high recovery.

**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:

*A. Cellier* *6/24/04*

Reviewer: \_\_\_\_\_

COMPANY - WIDE NONCONFORMANCE REPORT			
Mo. Day Yr. 10-JUN-04	Division: Radiochemistry		Type: Process
Instrument Type: GAMMA SPECTROMETER	Quality Criteria: Specifications		Client Code: YANK
Test / Method: EML HASL 300, 4.5.2.3	Matrix Type: Solid	Batch ID: 335643	Sample Numbers: See Below
Potentially affected work order(s)(SDG): 113280(MSR#04-1488), 113282(MSR#04-1559)			
Application Issues: Non-Rad samples analyzed with Rad Samples			
Specification and Requirements Nonconformance Description:		NRG Disposition:	
Sample 113282021, which is non-rad, was analyzed with rad samples.		Sample was prepared for gamma analysis independent of Rad samples. The batch results were reviewed and verification that no cross contamination is evident in the non-rad sample. Reporting results.	

Originator's Name:  
michael hilton 10-JUN-04

Quality Review:  
Lonnie Morris 11-JUN-04

Director:

Data Validator/Group Leader:  
Scott Baskett 10-JUN-04

Corrective Action:

Corrective Action ID and Complete Date:

COMPANY - WIDE NONCONFORMANCE REPORT			
Mo.Day Yr. 21-JUN-04	Division: Radiochemistry		Type: Process
Instrument Type: LSC	Quality Criteria: Specifications		Client Code: YANK
Test / Method: DOE EML HASL-300, Tc-02-RC Modified	Matrix Type: Solid	Batch ID: 339685	Sample Numbers: See Below
Potentially affected work order(s)(SDG): 113282(MSR#04-1559),113283(MSR#04-1558)			
Application Issues: Failure to maintain Custody			
Specification and Requirements Nonconformance Description:		NRG Disposition:	
<p>1. The analyst did not scan the samples(113282019, 113282020,113282021,113283017,113283018)into the batch prior to analysis, however the samples did remain in their custody at all times. The error has been corrected and the analyst has been instructed on proper scanning procedures.</p>		<p>1. Reporting results.</p>	

Originator's Name:

Jimmy Hartley 21-JUN-04

Quality Review:

Director:

Data Validator/Group Leader:

Joseph Jones 21-JUN-04

Corrective Action:

Corrective Action ID and Complete Date:

# 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 24, 2004

Page 1 of 2

Client Sample ID: 9535-0001-008F  
Sample ID: 113282001  
Matrix: Soil  
Collect Date: 22-APR-04  
Receive Date: 19-MAY-04  
Collector: Client  
Moisture: 3.41%

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

Parameter	Qualifier	Result	Uncertainty	LC	TPU	MDA	Units	DF	Analyst	Date	Time	Batch	Mtd.
<b>Rad Gamma Spec Analysis</b>													
<i>GammaSpec, Gamma, Solid-FSS GAM &amp; ALL FSS</i>													
Actinium-228		0.531	+/-0.105	0.0287	+/-0.103	0.060	pCi/g						
Americium-241	U	-0.016	+/-0.0416	0.0368	+/-0.0408	0.0749	pCi/g		SRB	06/07/04	1942	335651	1
Bismuth-212		0.292	+/-0.149	0.0622	+/-0.146	0.129	pCi/g						
Bismuth-214		0.466	+/-0.0591	0.0144	+/-0.0579	0.0299	pCi/g						
Cesium-134	U	0.0196	+/-0.0166	0.0103	+/-0.0162	0.0214	pCi/g						
Cesium-137		0.0849	+/-0.0188	0.00832	+/-0.0185	0.0173	pCi/g						
Cobalt-60	U	0.00329	+/-0.0106	0.00914	+/-0.0104	0.0193	pCi/g						
Europium-152	U	0.00861	+/-0.0265	0.023	+/-0.026	0.0472	pCi/g						
Europium-154	U	-0.0363	+/-0.033	0.026	+/-0.0323	0.0547	pCi/g						
Europium-155	U	0.0229	+/-0.0259	0.025	+/-0.0254	0.0509	pCi/g						
Lead-212		0.460	+/-0.0486	0.0137	+/-0.0476	0.0279	pCi/g						
Lead-214		0.502	+/-0.0625	0.0164	+/-0.0612	0.0336	pCi/g						
Manganese-54	U	-0.00366	+/-0.0102	0.00847	+/-0.010	0.0176	pCi/g						
Niobium-94	U	0.00155	+/-0.00854	0.0074	+/-0.00837	0.0153	pCi/g						
Potassium-40		12.2	+/-0.972	0.0688	+/-0.953	0.147	pCi/g						
Radium-226		0.466	+/-0.0591	0.0144	+/-0.0579	0.0299	pCi/g						
Silver-108m	U	0.00367	+/-0.00871	0.00744	+/-0.00853	0.0153	pCi/g						
Thallium-208		0.159	+/-0.0277	0.00851	+/-0.0272	0.0176	pCi/g						

### The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	MJM1	05/20/04	1441	334885

### The following Analytical Methods were performed

Method	Description
1	EML HASL 300, 4.5.2.3

### 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.

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## 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 24, 2004

Page 2 of 2

Client Sample ID: 9535-0001-008F  
Sample ID: 113282001

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

Parameter	Qualifier	Result	Uncertainty	LC	TPU	MDA	Units	DF	Analyst	Date	Time	Batch	Mtd.
-----------	-----------	--------	-------------	----	-----	-----	-------	----	---------	------	------	-------	------

- 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.

Hollenbeck C. C. Oll

Reviewed by

# GENERAL ENGINEERING LABORATORIES, LLC

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## Certificate of Analysis

Company : Connecticut Yankee Atomic Power  
Address : Haddam Neck Plant  
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Contact: Mr. Pete Hollenbeck  
Project: Soils PO# 002332

Report Date: June 24, 2004

Page 1 of 2

Client Sample ID: 9535-0001-008FS  
Sample ID: 113282002  
Matrix: Soil  
Collect Date: 22-APR-04  
Receive Date: 19-MAY-04  
Collector: Client  
Moisture: 3.57%

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

Parameter	Qualifier	Result	Uncertainty	LC	TPU	MDA	Units	DF	Analyst	Date	Time	Batch	Mtd.
<b>Rad Gamma Spec Analysis</b>													
<i>GammaSpec, Gamma, Solid-FSS GAM &amp; ALL FSS</i>													
Actinium-228		0.524	+/-0.091	0.0259	+/-0.0892	0.054	pCi/g		SRB	06/07/04	1942	335651	1
Americium-241	U	-0.00613	+/-0.0393	0.034	+/-0.0385	0.0692	pCi/g						
Bismuth-212		0.326	+/-0.127	0.0522	+/-0.125	0.109	pCi/g						
Bismuth-214		0.446	+/-0.0612	0.0134	+/-0.060	0.0277	pCi/g						
Cesium-134	U	0.00	+/-0.0168	0.0104	+/-0.0165	0.0215	pCi/g						
Cesium-137	UI	0.172	+/-0.0222	0.00769	+/-0.0217	0.0159	pCi/g						
Cobalt-60	U	0.00842	+/-0.00966	0.00847	+/-0.00946	0.0178	pCi/g						
Europium-152	U	-0.00254	+/-0.0214	0.0193	+/-0.021	0.0397	pCi/g						
Europium-154	U	0.0515	+/-0.0341	0.0257	+/-0.0334	0.0537	pCi/g						
Europium-155	U	0.0444	+/-0.0366	0.0221	+/-0.0358	0.045	pCi/g						
Lead-212		0.510	+/-0.0466	0.0113	+/-0.0457	0.023	pCi/g						
Lead-214		0.454	+/-0.0529	0.0141	+/-0.0519	0.029	pCi/g						
Manganese-54	U	0.00935	+/-0.0125	0.00794	+/-0.0123	0.0165	pCi/g						
Niobium-94	U	-0.00345	+/-0.00784	0.00646	+/-0.00768	0.0134	pCi/g						
Potassium-40		11.0	+/-0.824	0.0673	+/-0.808	0.143	pCi/g						
Radium-226		0.446	+/-0.0612	0.0134	+/-0.060	0.0277	pCi/g						
Silver-108m	U	-0.0067	+/-0.00749	0.00641	+/-0.00734	0.0132	pCi/g						
Thallium-208		0.159	+/-0.0245	0.00801	+/-0.024	0.0165	pCi/g						

### The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	MJM1	05/20/04	1441	334885

### The following Analytical Methods were performed

Method	Description
1	EML HASL 300, 4.5.2.3

### 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.



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Project : Soils PO# 002332

Report Date: June 24, 2004

Page 2 of 2

Client Sample ID: 9535-0001-008FS  
Sample ID: 113282002

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

Parameter	Qualifier	Result	Uncertainty	LC	TPU	MDA	Units	DF	Analyst	Date	Time	Batch	Mtd.
-----------	-----------	--------	-------------	----	-----	-----	-------	----	---------	------	------	-------	------

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.

Heidi G. C. 6/24/04  
Reviewed by

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## Certificate of Analysis

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Contact: Mr. Pete Hollenbeck  
Project: Soils PO# 002332

Report Date: June 24, 2004

Page 1 of 2

Client Sample ID: 9535-0001-001F  
Sample ID: 113282003  
Matrix: Soil  
Collect Date: 22-APR-04  
Receive Date: 19-MAY-04  
Collector: Client  
Moisture: 4.2%

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

Parameter	Qualifier	Result	Uncertainty	LC	TPU	MDA	Units	DF	Analyst	Date	Time	Batch	Mtd.
<b>Rad Gamma Spec Analysis</b>													
<i>GammaSpec, Gamma, Solid-FSS GAM &amp; ALL FSS</i>													
Actinium-228		0.568	+/-0.104	0.0269	+/-0.102	0.056	pCi/g						
Americium-241	U	0.0143	+/-0.0378	0.0333	+/-0.0371	0.0677	pCi/g						
Bismuth-212		0.456	+/-0.124	0.0578	+/-0.122	0.120	pCi/g						
Bismuth-214		0.720	+/-0.0752	0.0139	+/-0.0737	0.0286	pCi/g						
Cesium-134	U	0.00	+/-0.0162	0.0101	+/-0.0159	0.0208	pCi/g						
	UI												
Cesium-137		0.138	+/-0.0185	0.00757	+/-0.0181	0.0157	pCi/g						
Cobalt-60	U	0.00852	+/-0.0104	0.009	+/-0.0102	0.0189	pCi/g						
Europium-152	U	-0.0014	+/-0.0239	0.0201	+/-0.0235	0.0411	pCi/g						
Europium-154	U	0.00212	+/-0.0556	0.0267	+/-0.0545	0.0557	pCi/g						
Europium-155	U	0.00	+/-0.0337	0.0205	+/-0.033	0.0418	pCi/g						
	UI												
Lead-212		0.606	+/-0.0537	0.0116	+/-0.0526	0.0236	pCi/g						
Lead-214		0.855	+/-0.0857	0.0137	+/-0.084	0.0281	pCi/g						
Manganese-54	U	-0.0056	+/-0.0106	0.00849	+/-0.0104	0.0176	pCi/g						
Niobium-94	U	0.00697	+/-0.0086	0.00745	+/-0.00843	0.0154	pCi/g						
Potassium-40		11.7	+/-0.891	0.0687	+/-0.873	0.146	pCi/g						
Radium-226		0.720	+/-0.0752	0.0139	+/-0.0737	0.0286	pCi/g						
Silver-108m	U	0.00125	+/-0.00759	0.00674	+/-0.00744	0.0139	pCi/g						
Thallium-208		0.203	+/-0.0286	0.00743	+/-0.028	0.0153	pCi/g						

### The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	MJM1	05/20/04	1441	334885

### The following Analytical Methods were performed

Method	Description
1	EML HASL 300, 4.5.2.3

### 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.

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Contact: Mr. Pete Hollenbeck  
Project: Soils PO# 002332

Report Date: June 24, 2004

Page 2 of 2

Client Sample ID: 9535-0001-001F  
Sample ID: 113282003

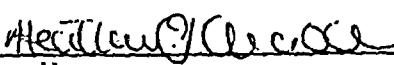
Project: YANK00504  
Client ID: YANK001  
Vol. Recv.:

Parameter	Qualifier	Result	Uncertainty	LC	TPU	MDA	Units	DF	Analyst	Date	Time	Batch	Mtd.
-----------	-----------	--------	-------------	----	-----	-----	-------	----	---------	------	------	-------	------

- 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

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Contact: Mr. Pete Hollenbeck  
Project: Soils PO# 002332

Report Date: June 24, 2004

Page 1 of 2

Client Sample ID: 9535-0001-018F  
Sample ID: 113282004  
Matrix: Soil  
Collect Date: 22-APR-04  
Receive Date: 19-MAY-04  
Collector: Client  
Moisture: 4.63%

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

Parameter	Qualifier	Result	Uncertainty	LC	TPU	MDA	Units	DF	Analyst	Date	Time	Batch	Mtd.
<b>Rad Gamma Spec Analysis</b>													
<i>GammaSpec, Gamma, Solid-FSS GAM &amp; ALL FSS</i>													
Actinium-228		0.549	+/-0.0881	0.0245	+/-0.0863	0.0514	pCi/g		SRB	06/07/04	2022	335651	1
Americium-241	U	0.0154	+/-0.0323	0.0314	+/-0.0317	0.0639	pCi/g						
Bismuth-212		0.365	+/-0.118	0.0521	+/-0.115	0.109	pCi/g						
Bismuth-214		0.527	+/-0.058	0.0127	+/-0.0568	0.0263	pCi/g						
Cesium-134	U	0.0161	+/-0.0167	0.0094	+/-0.0164	0.0195	pCi/g						
Cesium-137		0.102	+/-0.0172	0.00725	+/-0.0169	0.0151	pCi/g						
Cobalt-60	U	-0.00111	+/-0.0107	0.00793	+/-0.0105	0.0168	pCi/g						
Europium-152	U	-0.011	+/-0.0225	0.0189	+/-0.0221	0.0389	pCi/g						
Europium-154	U	0.0258	+/-0.0287	0.0247	+/-0.0281	0.0518	pCi/g						
Europium-155	U	0.0309	+/-0.0333	0.021	+/-0.0327	0.0428	pCi/g						
Lead-212		0.548	+/-0.0494	0.0112	+/-0.0484	0.0229	pCi/g						
Lead-214		0.578	+/-0.0635	0.0132	+/-0.0622	0.0272	pCi/g						
Manganese-54	U	0.00191	+/-0.00863	0.00741	+/-0.00846	0.0155	pCi/g						
Niobium-94	U	0.00715	+/-0.00744	0.00669	+/-0.00729	0.0139	pCi/g						
Potassium-40		11.3	+/-0.848	0.0769	+/-0.831	0.163	pCi/g						
Radium-226		0.527	+/-0.058	0.0127	+/-0.0568	0.0263	pCi/g						
Silver-108m	U	-0.0045	+/-0.0073	0.00593	+/-0.00715	0.0123	pCi/g						
Thallium-208		0.160	+/-0.0233	0.007	+/-0.0229	0.0145	pCi/g						

### The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	MJM1	05/20/04	1441	334885

### The following Analytical Methods were performed

Method	Description
1	EML HASL 300, 4.5.2.3

### 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.

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Contact: Mr. Pete Hollenbeck  
Project: Soils PO# 002332

Report Date: June 24, 2004

Page 2 of 2

Client Sample ID: 9535-0001-018F  
Sample ID: 113282004

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

Parameter	Qualifier	Result	Uncertainty	LC	TPU	MDA	Units	DF	Analyst	Date	Time	Batch	Mtd.
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- 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.

Hollenbeck  
Reviewed by

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Project: Soils PO# 002332

Report Date: June 24, 2004

Page 1 of 2

Client Sample ID: 9535-0001-001F  
Sample ID: 113282005  
Matrix: Soil  
Collect Date: 22-APR-04  
Receive Date: 19-MAY-04  
Collector: Client  
Moisture: 2.78%

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

Parameter	Qualifier	Result	Uncertainty	LC	TPU	MDA	Units	DF	Analyst	Date	Time	Batch	Mtd.
<b>Rad Gamma Spec Analysis</b>													
<i>GammaSpec, Gamma, Solid-FSS GAM &amp; ALL FSS</i>													
Actinium-228		0.689	+/-0.113	0.0252	+/-0.111	0.0525	pCi/g		SRB	06/07/04	2023	335651	1
Americium-241	U	0.00691	+/-0.069	0.0563	+/-0.0676	0.115	pCi/g						
Bismuth-212		0.508	+/-0.131	0.0556	+/-0.128	0.115	pCi/g						
Bismuth-214		0.535	+/-0.0599	0.0133	+/-0.0587	0.0275	pCi/g						
Cesium-134	U	0.00	+/-0.0165	0.010	+/-0.0162	0.0206	pCi/g						
	UI												
Cesium-137		0.0705	+/-0.0154	0.00685	+/-0.0151	0.0142	pCi/g						
Cobalt-60	U	0.007	+/-0.0134	0.0082	+/-0.0131	0.0172	pCi/g						
Europium-152	U	-0.0187	+/-0.0229	0.019	+/-0.0224	0.0391	pCi/g						
Europium-154	U	0.00848	+/-0.028	0.0243	+/-0.0275	0.0507	pCi/g						
Europium-155	U	0.00	+/-0.0428	0.024	+/-0.0419	0.0488	pCi/g						
	UI												
Lead-212		0.715	+/-0.0679	0.0129	+/-0.0665	0.0264	pCi/g						
Lead-214		0.612	+/-0.0666	0.0141	+/-0.0652	0.029	pCi/g						
Manganese-54	U	0.00782	+/-0.0137	0.00698	+/-0.0135	0.0145	pCi/g						
Niobium-94	U	0.00621	+/-0.00794	0.00703	+/-0.00778	0.0145	pCi/g						
Potassium-40		11.7	+/-1.03	0.0651	+/-1.01	0.139	pCi/g						
Radium-226		0.535	+/-0.0599	0.0133	+/-0.0587	0.0275	pCi/g						
Silver-108m	U	0.00137	+/-0.00733	0.00665	+/-0.00718	0.0137	pCi/g						
Thallium-208		0.219	+/-0.0267	0.00719	+/-0.0262	0.0149	pCi/g						

### The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	MJM1	05/20/04	1441	334885

### The following Analytical Methods were performed

Method	Description
1	EML HASL 300, 4.5.2.3

### Notes:

The Qualifiers in this report are defined as follows :

- B Target analyte was detected in the sample as well as the associated blank.
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Contact: Mr. Pete Hollenbeck  
Project: Soils PO# 002332

Report Date: June 24, 2004

Page 2 of 2

Client Sample ID: 9535-0001-001F  
Sample ID: 113282005

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

Parameter	Qualifier	Result	Uncertainty	LC	TPU	MDA	Units	DF	Analyst	Date	Time	Batch	Mtd.
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- 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.



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Contact: Mr. Pete Hollenbeck  
Project: Soils PO# 002332

Report Date: June 24, 2004

Page 1 of 2

Client Sample ID: 9535-0001-003F  
Sample ID: 113282006  
Matrix: Soil  
Collect Date: 22-APR-04  
Receive Date: 19-MAY-04  
Collector: Client  
Moisture: 4.22%

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

Parameter	Qualifier	Result	Uncertainty	LC	TPU	MDA	Units	DF	Analyst	Date	Time	Batch	Mtd.
<b>Rad Gamma Spec Analysis</b>													
<i>GammaSpec, Gamma, Solid-FSS GAM &amp; ALL FSS</i>													
Actinium-228		0.511	+/-0.0994	0.0318	+/-0.0974	0.0665	pCi/g		SRB	06/07/04	2026	335651	1
Americium-241	U	-0.00513	+/-0.0134	0.0124	+/-0.0131	0.0252	pCi/g						
Bismuth-212		0.316	+/-0.162	0.0736	+/-0.159	0.153	pCi/g						
Bismuth-214		0.596	+/-0.0733	0.0168	+/-0.0718	0.0347	pCi/g						
Cesium-134	U	0.0195	+/-0.0183	0.0114	+/-0.0179	0.0237	pCi/g						
Cesium-137		0.103	+/-0.0208	0.00868	+/-0.0204	0.018	pCi/g						
Cobalt-60	U	-0.000693	+/-0.0113	0.00967	+/-0.0111	0.0204	pCi/g						
Europium-152	U	0.00902	+/-0.0238	0.0213	+/-0.0234	0.0437	pCi/g						
Europium-154	U	-0.00962	+/-0.0334	0.0283	+/-0.0328	0.0594	pCi/g						
Europium-155	U	0.00	+/-0.0334	0.0189	+/-0.0327	0.0385	pCi/g						
Lead-212	UI	0.534	+/-0.0532	0.0127	+/-0.0521	0.026	pCi/g						
Lead-214		0.598	+/-0.0689	0.0156	+/-0.0675	0.0321	pCi/g						
Manganese-54	U	0.0035	+/-0.0142	0.00895	+/-0.0139	0.0187	pCi/g						
Niobium-94	U	0.00947	+/-0.00962	0.00872	+/-0.00943	0.018	pCi/g						
Potassium-40		11.6	+/-0.849	0.0807	+/-0.832	0.172	pCi/g						
Radium-226		0.596	+/-0.0733	0.0168	+/-0.0718	0.0347	pCi/g						
Silver-108m	U	0.00218	+/-0.00861	0.00747	+/-0.00843	0.0154	pCi/g						
Thallium-208		0.172	+/-0.0284	0.00916	+/-0.0278	0.019	pCi/g						

### The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	MJM1	05/20/04	1441	334885

### The following Analytical Methods were performed

Method	Description
1	EML HASL 300, 4.5.2.3

### 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.



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## 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 24, 2004

Page 2 of 2

Client Sample ID: 9535-0001-003F  
Sample ID: 113282006

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

Parameter	Qualifier	Result	Uncertainty	LC	TPU	MDA	Units	DF	Analyst	Date	Time	Batch	Mtd.
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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.

Heather Wood

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# GENERAL ENGINEERING LABORATORIES, LLC

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## Certificate of Analysis

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

Report Date: June 24, 2004

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Client Sample ID: 9535-0001-004F  
Sample ID: 113282007  
Matrix: Soil  
Collect Date: 22-APR-04  
Receive Date: 19-MAY-04  
Collector: Client  
Moisture: 4.58%

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

Parameter	Qualifier	Result	Uncertainty	LC	TPU	MDA	Units	DF	Analyst	Date	Time	Batch	Mtd.
<b>Rad Gamma Spec Analysis</b>													
<i>Gammascpec, Gamma, Solid-FSS GAM &amp; ALL FSS</i>													
Actinium-228		0.487	+/-0.0965	0.0262	+/-0.0946	0.0546	pCi/g		SRB	06/07/04	2047	335631	1
Americium-241	U	-0.0199	+/-0.0363	0.0332	+/-0.0355	0.0675	pCi/g						
Bismuth-212		0.354	+/-0.168	0.0579	+/-0.164	0.120	pCi/g						
Bismuth-214		0.567	+/-0.0659	0.0133	+/-0.0646	0.0275	pCi/g						
Cesium-134	U	0.00	+/-0.0161	0.00992	+/-0.0158	0.0205	pCi/g						
	UI												
Cesium-137		0.0973	+/-0.0193	0.00756	+/-0.0189	0.0156	pCi/g						
Cobalt-60	U	-0.00465	+/-0.00919	0.00739	+/-0.00901	0.0156	pCi/g						
Europium-152	U	-0.00685	+/-0.0223	0.0196	+/-0.0218	0.0402	pCi/g						
Europium-154	U	0.000185	+/-0.029	0.0243	+/-0.0284	0.0507	pCi/g						
Europium-155	U	0.0247	+/-0.0235	0.0234	+/-0.023	0.0475	pCi/g						
Lead-212		0.578	+/-0.0533	0.0116	+/-0.0522	0.0237	pCi/g						
Lead-214		0.542	+/-0.0625	0.0139	+/-0.0612	0.0285	pCi/g						
Manganese-54	U	0.00894	+/-0.0184	0.0079	+/-0.0181	0.0164	pCi/g						
Niobium-94	U	0.00373	+/-0.00796	0.0068	+/-0.0078	0.0141	pCi/g						
Potassium-40		12.3	+/-0.992	0.0645	+/-0.972	0.137	pCi/g						
Radium-226		0.567	+/-0.0659	0.0133	+/-0.0646	0.0275	pCi/g						
Silver-108m	U	0.00789	+/-0.00845	0.00676	+/-0.00828	0.0139	pCi/g						
Thallium-208		0.180	+/-0.0248	0.00739	+/-0.0243	0.0153	pCi/g						

### The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	MJM1	05/20/04	1441	334885

### The following Analytical Methods were performed

Method	Description
1	EML HASL 300, 4.5.2.3

### 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.

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**Company :** Connecticut Yankee Atomic Power  
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East Hampton, Connecticut 06424  
**Contact:** Mr. Pete Hollenbeck  
**Project:** Soils PO# 002332

Report Date: June 24, 2004

Page 2 of 2

**Client Sample ID:** 9535-0001-004F  
**Sample ID:** 113282007

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

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

Aktuelle Vorgänge

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Contact: Mr. Pete Hollenbeck  
Project: Soils PO# 002332

Report Date: June 24, 2004

Page 1 of 2

Client Sample ID: 9535-0001-004FS  
Sample ID: 113282008  
Matrix: Soil  
Collect Date: 22-APR-04  
Receive Date: 19-MAY-04  
Collector: Client  
Moisture: 4.31%

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

Parameter	Qualifier	Result	Uncertainty	LC	TPU	MDA	Units	DF	Analyst	Date	Time	Batch	Mtd.
<b>Rad Gamma Spec Analysis</b>													
<i>GammaSpec, Gamma, Solid-FSS GAM &amp; ALL FSS</i>													
Actinium-228		0.552	+/-0.102	0.026	+/-0.0999	0.0541	pCi/g						
Americium-241	U	0.00	+/-0.0384	0.0336	+/-0.0376	0.0682	pCi/g						
	UI												
Bismuth-212		0.395	+/-0.148	0.0588	+/-0.146	0.122	pCi/g						
Bismuth-214		0.585	+/-0.065	0.0138	+/-0.0637	0.0285	pCi/g						
Cesium-134	U	0.00	+/-0.0143	0.00983	+/-0.014	0.0203	pCi/g						
	UI												
Cesium-137		0.0971	+/-0.0174	0.00838	+/-0.017	0.0173	pCi/g						
Cobalt-60	U	0.00915	+/-0.00986	0.00875	+/-0.00966	0.0183	pCi/g						
Europium-152	U	-0.00345	+/-0.0238	0.0209	+/-0.0233	0.0427	pCi/g						
Europium-154	U	-0.0294	+/-0.0313	0.0252	+/-0.0307	0.0526	pCi/g						
Europium-155	U	0.00908	+/-0.026	0.0237	+/-0.0255	0.0482	pCi/g						
Lead-212		0.547	+/-0.0514	0.0126	+/-0.0503	0.0256	pCi/g						
Lead-214		0.620	+/-0.066	0.0147	+/-0.0647	0.030	pCi/g						
Manganese-54	U	9.660E-05	+/-0.010	0.00855	+/-0.00984	0.0177	pCi/g						
Niobium-94	U	-0.000439	+/-0.0081	0.00701	+/-0.00793	0.0145	pCi/g						
Potassium-40		11.5	+/-0.887	0.0667	+/-0.869	0.142	pCi/g						
Radium-226		0.585	+/-0.065	0.0138	+/-0.0637	0.0285	pCi/g						
Silver-108m	U	0.00184	+/-0.00785	0.00682	+/-0.00769	0.014	pCi/g						
Thallium-208		0.170	+/-0.0241	0.00794	+/-0.0236	0.0164	pCi/g						

### The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	MJM1	05/20/04	1441	334885

### The following Analytical Methods were performed

Method	Description
1	EML HASL 300, 4.5.2.3

### 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.

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Contact: Mr. Pete Hollenbeck  
Project: Soils PO# 002332

Report Date: June 24, 2004

Page 2 of 2

Client Sample ID: 9535-0001-004FS  
Sample ID: 113282008

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

Parameter	Qualifier	Result	Uncertainty	LC	TPU	MDA	Units	DF	Analyst	Date	Time	Batch	Mtd.
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- 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.

Heather C. Coda

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Contact: Mr. Pete Hollenbeck  
Project: Soils PO# 002332

Report Date: June 24, 2004

Page 1 of 2

Client Sample ID: 9535-0001-005F  
Sample ID: 113282009  
Matrix: Soil  
Collect Date: 22-APR-04  
Receive Date: 19-MAY-04  
Collector: Client  
Moisture: 6.4%

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

Parameter	Qualifier	Result	Uncertainty	LC	TPU	MDA	Units	DF	Analyst	Date	Time	Batch	Mtd.
<b>Rad Gamma Spec Analysis</b>													
<i>GammaSpec, Gamma, Solid-FSS GAM &amp; ALL FSS</i>													
Actinium-228		0.512	+/-0.0971	0.0258	+/-0.0952	0.0537	pCi/g		SRB	06/07/04	2124	335651	1
Americium-241	U	-0.00397	+/-0.0521	0.0439	+/-0.0511	0.0893	pCi/g						
Bismuth-212		0.380	+/-0.142	0.0562	+/-0.139	0.117	pCi/g						
Bismuth-214		0.594	+/-0.0654	0.0133	+/-0.0641	0.0274	pCi/g						
Cesium-134	U	0.018	+/-0.0168	0.00964	+/-0.0164	0.0199	pCi/g						
Cesium-137		0.313	+/-0.0288	0.00715	+/-0.0282	0.0148	pCi/g						
Cobalt-60	U	0.00379	+/-0.00997	0.0085	+/-0.00977	0.0179	pCi/g						
Europium-152	U	-0.00278	+/-0.0222	0.0198	+/-0.0218	0.0406	pCi/g						
Europium-154	U	0.00143	+/-0.0292	0.0245	+/-0.0286	0.0513	pCi/g						
Europium-155	U	0.0258	+/-0.0253	0.0233	+/-0.0248	0.0475	pCi/g						
Lead-212		0.592	+/-0.0587	0.0113	+/-0.0575	0.0231	pCi/g						
Lead-214		0.589	+/-0.0634	0.0138	+/-0.0621	0.0283	pCi/g						
Manganese-54	U	0.00719	+/-0.0101	0.00752	+/-0.00989	0.0156	pCi/g						
Niobium-94	U	0.000164	+/-0.00861	0.00634	+/-0.00844	0.0131	pCi/g						
Potassium-40		11.9	+/-0.989	0.0589	+/-0.970	0.126	pCi/g						
Radium-226		0.594	+/-0.0654	0.0133	+/-0.0641	0.0274	pCi/g						
Silver-108m	U	0.00227	+/-0.00744	0.0066	+/-0.00729	0.0136	pCi/g						
Thallium-208		0.167	+/-0.0245	0.00702	+/-0.024	0.0145	pCi/g						

### The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	MJM1	05/20/04	1441	334885

### The following Analytical Methods were performed

Method	Description
1	EML HASL 300, 4.5.2.3

### 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.

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Contact: Mr. Pete Hollenbeck  
Project: Soils PO# 002332

Report Date: June 24, 2004

Page 2 of 2

Client Sample ID: 9535-0001-005F  
Sample ID: 113282009

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

Parameter	Qualifier	Result	Uncertainty	LC	TPU	MDA	Units	DF	Analyst	Date	Time	Batch	Mtd.
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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.



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## Certificate of Analysis

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Contact: Mr. Pete Hollenbeck  
Project: Soils PO# 002332

Report Date: June 24, 2004

Page 1 of 2

Client Sample ID: 9535-0001-007F  
Sample ID: 113282010  
Matrix: Soil  
Collect Date: 22-APR-04  
Receive Date: 19-MAY-04  
Collector: Client  
Moisture: 4.8%

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

Parameter	Qualifier	Result	Uncertainty	LC	TPU	MDA	Units	DF	Analyst	Date	Time	Batch	Mtd.
<b>Rad Gamma Spec Analysis</b>													
<i>GammaSpec, Gamma, Solid-FSS GAM &amp; ALL FSS</i>													
Actinium-228		0.437	+/-0.0958	0.0259	+/-0.0939	0.0541	pCi/g						
Americium-241	U	-0.00235	+/-0.0503	0.0442	+/-0.0493	0.0902	pCi/g						
Bismuth-212		0.273	+/-0.121	0.0536	+/-0.119	0.112	pCi/g						
Bismuth-214		0.481	+/-0.0596	0.0132	+/-0.0584	0.0273	pCi/g						
Cesium-134	U	0.00	+/-0.014	0.00963	+/-0.0138	0.0199	pCi/g						
	UI												
Cesium-137		0.0894	+/-0.0216	0.00733	+/-0.0212	0.0152	pCi/g						
Cobalt-60	U	-0.00943	+/-0.00898	0.00692	+/-0.0088	0.0148	pCi/g						
Europium-152	U	-0.0157	+/-0.0237	0.0196	+/-0.0232	0.0404	pCi/g						
Europium-154	U	0.015	+/-0.0308	0.0266	+/-0.0301	0.0557	pCi/g						
Europium-155	U	0.0334	+/-0.0329	0.0228	+/-0.0323	0.0464	pCi/g						
Lead-212		0.496	+/-0.057	0.0124	+/-0.0558	0.0253	pCi/g						
Lead-214		0.592	+/-0.0677	0.0138	+/-0.0664	0.0285	pCi/g						
Manganese-54	U	0.0101	+/-0.0097	0.00848	+/-0.00951	0.0176	pCi/g						
Niobium-94	U	0.00724	+/-0.00787	0.00696	+/-0.00771	0.0144	pCi/g						
Potassium-40		12.0	+/-0.964	0.0633	+/-0.944	0.136	pCi/g						
Radium-226		0.481	+/-0.0596	0.0132	+/-0.0584	0.0273	pCi/g						
Silver-108m	U	0.000791	+/-0.00728	0.00653	+/-0.00713	0.0135	pCi/g						
Thallium-208		0.158	+/-0.025	0.00713	+/-0.0245	0.0148	pCi/g						

### The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	MJM1	05/20/04	1441	334885

### The following Analytical Methods were performed

Method	Description
1	EML HASL 300, 4.5.2.3

### 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.



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Project: Soils PO# 002332

Report Date: June 24, 2004

Page 2 of 2

Client Sample ID: 9535-0001-007F  
Sample ID: 113282010

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

Parameter	Qualifier	Result	Uncertainty	LC	TPU	MDA	Units	DF	Analyst	Date	Time	Batch	Mtd.
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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.

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East Hampton, Connecticut 06424  
Contact: Mr. Pete Hollenbeck  
Project: Soils PO# 002332

Report Date: June 24, 2004

Page 1 of 2

Client Sample ID: 9535-0001-010F  
Sample ID: 113282011  
Matrix: Soil  
Collect Date: 22-APR-04  
Receive Date: 19-MAY-04  
Collector: Client  
Moisture: 3.19%

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

Parameter	Qualifier	Result	Uncertainty	LC	TPU	MDA	Units	DF	Analyst	Date	Time	Batch	Mtd.
<b>Rad Gamma Spec Analysis</b>													
<i>GammaSpec, Gamma, Solid-FSS GAM &amp; ALL FSS</i>													
Actinium-228		0.663	+/-0.130	0.0476	+/-0.127	0.102	pCi/g						
Americium-241	U	-0.0011	+/-0.0639	0.0555	+/-0.0626	0.115	pCi/g						
Bismuth-212		0.437	+/-0.273	0.0983	+/-0.267	0.210	pCi/g						
Bismuth-214		0.462	+/-0.0761	0.0228	+/-0.0746	0.0484	pCi/g						
Cesium-134	U	0.0271	+/-0.0299	0.0169	+/-0.0293	0.0359	pCi/g						
Cesium-137		0.0929	+/-0.0261	0.0118	+/-0.0256	0.0252	pCi/g						
Cobalt-60	U	-0.00222	+/-0.0132	0.0111	+/-0.013	0.0249	pCi/g						
Europium-152	U	-0.00975	+/-0.0355	0.0298	+/-0.0348	0.0627	pCi/g						
Europium-154	U	0.0165	+/-0.0549	0.0461	+/-0.0538	0.0994	pCi/g						
Europium-155	U	0.0359	+/-0.0502	0.0375	+/-0.0492	0.0775	pCi/g						
Lead-212		0.525	+/-0.0589	0.0194	+/-0.0577	0.0402	pCi/g						
Lead-214		0.539	+/-0.0857	0.0212	+/-0.084	0.0446	pCi/g						
Manganese-54	U	0.00	+/-0.0346	0.0132	+/-0.0339	0.0283	pCi/g						
	UT												
Niobium-94	U	0.00273	+/-0.0129	0.0114	+/-0.0127	0.0242	pCi/g						
Potassium-40		13.5	+/-1.17	0.103	+/-1.14	0.233	pCi/g						
Radium-226		0.462	+/-0.0761	0.0228	+/-0.0746	0.0484	pCi/g						
Silver-108m	U	0.00898	+/-0.0131	0.0115	+/-0.0128	0.0242	pCi/g						
Thallium-208		0.175	+/-0.0347	0.013	+/-0.034	0.0276	pCi/g						

### The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	MJM1	05/20/04	1441	334885

### The following Analytical Methods were performed

Method	Description
1	EML HASL 300, 4.5.2.3

### 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.

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**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 24, 2004

Page 2 of 2

Client Sample ID: 9535-0001-010F  
Sample ID: 113282011

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

Parameter	Qualifier	Result	Uncertainty	LC	TPU	MDA	Units	DF	Analyst	Date	Time	Batch	Mtd.
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- 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.

Heather J. Cole  
Reviewed by

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## Certificate of Analysis

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Contact: Mr. Pete Hollenbeck  
Project: Soils PO# 002332

Report Date: June 24, 2004

Page 1 of 2

Client Sample ID: 9535-0001-009F  
Sample ID: 113282012  
Matrix: Soil  
Collect Date: 27-APR-04  
Receive Date: 19-MAY-04  
Collector: Client  
Moisture: 9.48%

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

Parameter	Qualifier	Result	Uncertainty	LC	TPU	MDA	Units	DF	Analyst	Date	Time	Batch	Mtd.
<b>Rad Gamma Spec Analysis</b>													
<i>GammaSpec, Gamma, Solid-FSS GAM &amp; ALL FSS</i>													
Actinium-228		0.524	+/-0.132	0.0455	+/-0.129	0.097	pCi/g						
Americium-241	U	0.0641	+/-0.0761	0.0742	+/-0.0746	0.153	pCi/g		SRB	06/08/04	0947	335651	1
Bismuth-212		0.195	+/-0.141	0.0839	+/-0.138	0.180	pCi/g						
Bismuth-214		0.557	+/-0.075	0.0236	+/-0.0735	0.0496	pCi/g						
Cesium-134	U	0.0221	+/-0.0193	0.015	+/-0.0189	0.0318	pCi/g						
Cesium-137		0.062	+/-0.0243	0.0121	+/-0.0238	0.0257	pCi/g						
Cobalt-60	U	0.00315	+/-0.0169	0.0144	+/-0.0165	0.0312	pCi/g						
Europium-152	U	-0.00603	+/-0.0344	0.0307	+/-0.0337	0.0643	pCi/g						
Europium-154	U	-0.0159	+/-0.0485	0.0395	+/-0.0475	0.0854	pCi/g						
Europium-155	U	-0.00393	+/-0.0405	0.0371	+/-0.0397	0.0765	pCi/g						
Lead-212		0.494	+/-0.0611	0.0199	+/-0.0599	0.0412	pCi/g						
Lead-214		0.536	+/-0.079	0.022	+/-0.0775	0.0459	pCi/g						
Manganese-54	U	-0.00291	+/-0.0149	0.0121	+/-0.0146	0.0259	pCi/g						
Niobium-94	U	0.00149	+/-0.0128	0.0109	+/-0.0126	0.0232	pCi/g						
Potassium-40		12.9	+/-1.23	0.102	+/-1.20	0.228	pCi/g						
Radium-226		0.557	+/-0.075	0.0236	+/-0.0735	0.0496	pCi/g						
Silver-108m	U	0.0109	+/-0.0107	0.0103	+/-0.0104	0.0216	pCi/g						
Thallium-208		0.189	+/-0.0306	0.012	+/-0.030	0.0253	pCi/g						

### The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	MJM1	05/20/04	1441	334885

### The following Analytical Methods were performed

Method	Description
1	EML HASL 300, 4.5.2.3

### Notes:

The Qualifiers in this report are defined as follows :

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- E Concentration of the target analyte exceeds the instrument calibration range.

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Project: Soils PO# 002332

Report Date: June 24, 2004

Page 2 of 2

Client Sample ID: 9535-0001-009F  
Sample ID: 113282012

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

Parameter	Qualifier	Result	Uncertainty	LC	TPU	MDA	Units	DF	Analyst	Date	Time	Batch	Mid.
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- 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.

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Heather G. C. C. C.  
Reviewed by

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Contact: Mr. Pete Hollenbeck  
Project: Soils PO# 002332

Report Date: June 24, 2004

Page 1 of 2

Client Sample ID: 9535-0001-012F  
Sample ID: 113282013  
Matrix: Soil  
Collect Date: 27-APR-04  
Receive Date: 19-MAY-04  
Collector: Client  
Moisture: 12.5%

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

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		0.471	+/-0.130	0.0468	+/-0.127	0.100	pCi/g						
Americium-241	U	0.00555	+/-0.0618	0.0539	+/-0.0605	0.111	pCi/g						
Bismuth-212		0.494	+/-0.217	0.0998	+/-0.213	0.213	pCi/g						
Bismuth-214		0.569	+/-0.0829	0.0224	+/-0.0812	0.0476	pCi/g						
Cesium-134	U	0.00479	+/-0.0182	0.0154	+/-0.0178	0.0327	pCi/g						
Cesium-137		0.0412	+/-0.0227	0.0139	+/-0.0222	0.0295	pCi/g						
Cobalt-60	U	-0.00668	+/-0.017	0.0134	+/-0.0167	0.0294	pCi/g						
Europium-152	U	0.0254	+/-0.0373	0.0325	+/-0.0365	0.0681	pCi/g						
Europium-154	U	0.0239	+/-0.0621	0.0469	+/-0.0608	0.101	pCi/g						
Europium-155	U	0.0133	+/-0.0375	0.0352	+/-0.0368	0.0726	pCi/g						
Lead-212		0.527	+/-0.0589	0.0192	+/-0.0577	0.0398	pCi/g						
Lead-214		0.571	+/-0.0832	0.0226	+/-0.0815	0.0473	pCi/g						
Manganese-54	U	-0.00404	+/-0.0182	0.0147	+/-0.0178	0.0312	pCi/g						
Niobium-94	U	0.00392	+/-0.0137	0.0118	+/-0.0135	0.025	pCi/g						
Potassium-40		13.1	+/-1.16	0.122	+/-1.14	0.270	pCi/g						
Radium-226		0.569	+/-0.0829	0.0224	+/-0.0812	0.0476	pCi/g						
Silver-108m	U	-0.00373	+/-0.0121	0.0104	+/-0.0119	0.022	pCi/g						
Thallium-208		0.179	+/-0.0388	0.013	+/-0.038	0.0275	pCi/g						

### The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	MM1	05/20/04	1441	334885

### The following Analytical Methods were performed

Method	Description
1	EML HASL 300, 4.5.2.3

### Notes:

The Qualifiers in this report are defined as follows :

- B Target analyte was detected in the sample as well as the associated blank.
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- E Concentration of the target analyte exceeds the instrument calibration range.

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Project: Soils PO# 002332

Report Date: June 24, 2004

Page 2 of 2

Client Sample ID: 9535-0001-012F  
Sample ID: 113282013

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

Parameter	Qualifier	Result	Uncertainty	LC	TPU	MDA	Units	DF	Analyst	Date	Time	Batch	Mtd.
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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.

Headline/Cle 000  
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Project: Soils PO# 002332

Report Date: June 24, 2004

Page 1 of 2

Client Sample ID: 9535-0001-013F  
Sample ID: 113282014  
Matrix: Soil  
Collect Date: 27-APR-04  
Receive Date: 19-MAY-04  
Collector: Client  
Moisture: 12%

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

Parameter	Qualifier	Result	Uncertainty	LC	TPU	MDA	Units	DF	Analyst	Date	Time	Batch	Mtd.
<b>Rad Gamma Spec Analysis</b>													
<i>GammaSpec, Gamma, Solid-FSS GAM &amp; ALL FSS</i>													
Actinium-228		0.734	+/-0.156	0.0436	+/-0.153	0.0935	pCi/g						
Americium-241	U	0.0224	+/-0.0713	0.0603	+/-0.0698	0.124	pCi/g		SRB	06/08/04	0949	335651	1
Bismuth-212		0.593	+/-0.240	0.103	+/-0.235	0.217	pCi/g						
Bismuth-214		0.573	+/-0.0881	0.0236	+/-0.0863	0.0497	pCi/g						
Cesium-134	U	0.00	+/-0.0293	0.0193	+/-0.0287	0.0404	pCi/g						
Cesium-137	UI	0.0579	+/-0.0263	0.013	+/-0.0258	0.0276	pCi/g						
Cobalt-60	U	-0.00151	+/-0.0177	0.0126	+/-0.0174	0.0276	pCi/g						
Europium-152	U	-0.000172	+/-0.0398	0.0355	+/-0.039	0.074	pCi/g						
Europium-154	U	-0.00278	+/-0.046	0.0383	+/-0.0451	0.0831	pCi/g						
Europium-155	U	0.0106	+/-0.0457	0.0416	+/-0.0448	0.0855	pCi/g						
Lead-212		0.761	+/-0.0775	0.0212	+/-0.076	0.0437	pCi/g						
Lead-214		0.657	+/-0.0949	0.0246	+/-0.0931	0.0513	pCi/g						
Manganese-54	U	0.00112	+/-0.0157	0.0138	+/-0.0154	0.0293	pCi/g						
Niobium-94	U	0.0138	+/-0.0141	0.0126	+/-0.0138	0.0266	pCi/g						
Potassium-40		11.4	+/-1.08	0.127	+/-1.06	0.277	pCi/g						
Radium-226		0.573	+/-0.0881	0.0236	+/-0.0863	0.0497	pCi/g						
Silver-108m	U	0.00368	+/-0.0135	0.012	+/-0.0133	0.0252	pCi/g						
Thallium-208		0.238	+/-0.038	0.0141	+/-0.0372	0.0296	pCi/g						

### The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	MM1	05/20/04	1441	334885

### The following Analytical Methods were performed

Method	Description
1	EML HASL 300, 4.5.2.3

### Notes:

The Qualifiers in this report are defined as follows :

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- 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.



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Contact: Mr. Pete Hollenbeck  
Project: Soils PO# 002332

Report Date: June 24, 2004

Page 2 of 2

Client Sample ID: 9535-0001-013F  
Sample ID: 113282014

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

Parameter	Qualifier	Result	Uncertainty	LC	TPU	MDA	Units	DF	Analyst	Date	Time	Batch	Mtd.
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- 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.

Heidi C. C. C.  
Reviewed by

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Contact: Mr. Pete Hollenbeck  
Project: Soils PO# 002332

Report Date: June 24, 2004

Page 1 of 2

Client Sample ID: 9535-0001-014F  
Sample ID: 113282015  
Matrix: Soil  
Collect Date: 27-APR-04  
Receive Date: 19-MAY-04  
Collector: Client  
Moisture: 8.6%

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

Parameter	Qualifier	Result	Uncertainty	LC	TPU	MDA	Units	DF	Analyst	Date	Time	Batch	Mtd.
<b>Rad Gamma Spec Analysis</b>													
<i>GammaSpec, Gamma, Solid-FSS GAM &amp; ALL FSS</i>													
Actinium-228		0.530	+/-0.187	0.062	+/-0.184	0.131	pCi/g						
Americium-241	U	-0.0135	+/-0.0297	0.0233	+/-0.0292	0.0478	pCi/g						
Bismuth-212		0.499	+/-0.301	0.133	+/-0.295	0.280	pCi/g						
Bismuth-214		0.504	+/-0.0954	0.0327	+/-0.0935	0.0681	pCi/g						
Cesium-134	U	0.0358	+/-0.0301	0.0217	+/-0.0295	0.0453	pCi/g						
Cesium-137		0.0726	+/-0.0313	0.0181	+/-0.0306	0.0379	pCi/g						
Cobalt-60	U	0.0023	+/-0.0218	0.018	+/-0.0214	0.0386	pCi/g						
Europium-152	U	-0.0158	+/-0.0451	0.0398	+/-0.0442	0.0826	pCi/g						
Europium-154	U	0.0082	+/-0.0694	0.0575	+/-0.068	0.122	pCi/g						
Europium-155	U	0.080	+/-0.0436	0.0422	+/-0.0428	0.0864	pCi/g						
Lead-212		0.528	+/-0.0682	0.0235	+/-0.0669	0.0485	pCi/g						
Lead-214		0.569	+/-0.094	0.0292	+/-0.0921	0.0605	pCi/g						
Manganese-54	U	0.024	+/-0.0234	0.0194	+/-0.0229	0.0406	pCi/g						
Niobium-94	U	0.00698	+/-0.0193	0.0164	+/-0.0189	0.0342	pCi/g						
Potassium-40		12.0	+/-1.14	0.145	+/-1.12	0.316	pCi/g						
Radium-226		0.504	+/-0.0954	0.0327	+/-0.0935	0.0681	pCi/g						
Silver-108m	U	0.00275	+/-0.0165	0.0145	+/-0.0161	0.0303	pCi/g						
Thallium-208		0.196	+/-0.0426	0.0183	+/-0.0418	0.0382	pCi/g						

### The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	MJM1	05/20/04	1441	334885

### The following Analytical Methods were performed

Method	Description
1	EML HASL 300, 4.5.2.3

### Notes:

The Qualifiers in this report are defined as follows :

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Report Date: June 24, 2004

Page 2 of 2

Client Sample ID: 9535-0001-014F  
Sample ID: 113282015

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

Parameter	Qualifier	Result	Uncertainty	LC	TPU	MDA	Units	DF	Analyst	Date	Time	Batch	Mtd.
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- 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.

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Project: Soils PO# 002332

Report Date: June 24, 2004

Page 1 of 2

Client Sample ID: 9535-0001-015F  
Sample ID: 113282016  
Matrix: Soil  
Collect Date: 27-APR-04  
Receive Date: 19-MAY-04  
Collector: Client  
Moisture: 11.3%

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

Parameter	Qualifier	Result	Uncertainty	LC	TPU	MDA	Units	DF	Analyst	Date	Time	Batch	Mtd.
<b>Rad Gamma Spec Analysis</b>													
<i>GammaSpec, Gamma, Solid-FSS GAM &amp; ALL FSS</i>													
Actinium-228		0.613	+/-0.159	0.0444	+/-0.156	0.0953	pCi/g						
Americium-241	U	0.00576	+/-0.110	0.0894	+/-0.108	0.185	pCi/g						
Bismuth-212		0.398	+/-0.200	0.0881	+/-0.196	0.189	pCi/g						
Bismuth-214		0.438	+/-0.0703	0.0231	+/-0.0689	0.0488	pCi/g						
Cesium-134	U	0.0341	+/-0.0244	0.0169	+/-0.024	0.0356	pCi/g						
Cesium-137		0.0391	+/-0.0342	0.0126	+/-0.0335	0.0268	pCi/g						
Cobalt-60	U	0.00223	+/-0.0159	0.0136	+/-0.0155	0.0298	pCi/g						
Europium-152	U	-0.0151	+/-0.0388	0.0323	+/-0.038	0.0677	pCi/g						
Europium-154	U	0.015	+/-0.0444	0.039	+/-0.0435	0.085	pCi/g						
Europium-155	U	0.0062	+/-0.0423	0.0399	+/-0.0414	0.0825	pCi/g						
Lead-212		0.590	+/-0.068	0.0228	+/-0.0666	0.0472	pCi/g						
Lead-214		0.500	+/-0.0807	0.024	+/-0.0791	0.0503	pCi/g						
Manganese-54	U	0.00948	+/-0.0154	0.0136	+/-0.0151	0.029	pCi/g						
Niobium-94	U	0.00423	+/-0.0132	0.0116	+/-0.0129	0.0246	pCi/g						
Potassium-40		10.4	+/-1.10	0.124	+/-1.08	0.273	pCi/g						
Radium-226		0.438	+/-0.0703	0.0231	+/-0.0689	0.0488	pCi/g						
Silver-108m	U	-0.00371	+/-0.0124	0.0109	+/-0.0121	0.023	pCi/g						
Thallium-208		0.192	+/-0.0337	0.0122	+/-0.033	0.0259	pCi/g						

### The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	MJM1	05/20/04	1441	334885

### The following Analytical Methods were performed

Method	Description
1	EML HASL 300, 4.5.2.3

### 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.

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## 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 24, 2004

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Client Sample ID:

9535-0001-015F

Sample ID:

113282016

Project:

YANK00504

Client ID:

YANK001

Vol. Recv.:

Parameter	Qualifier	Result	Uncertainty	LC	TPU	MDA	Units	DF	Analyst	Date	Time	Batch	Mtd.
-----------	-----------	--------	-------------	----	-----	-----	-------	----	---------	------	------	-------	------

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.

A. 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 24, 2004

Page 1 of 2

Client Sample ID: 9535-0001-017F  
Sample ID: 113282017  
Matrix: Soil  
Collect Date: 27-APR-04  
Receive Date: 19-MAY-04  
Collector: Client  
Moisture: 10.9%

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

Parameter	Qualifier	Result	Uncertainty	LC	TPU	MDA	Units	DF	Analyst	Date	Time	Batch	Mtd.
<b>Rad Gamma Spec Analysis</b>													
<i>Gammascpec, Gamma, Solid-FSS GAM &amp; ALL FSS</i>													
Actinium-228		0.610	+/-0.186	0.0625	+/-0.182	0.134	pCi/g						
Americium-241	U	-0.00549	+/-0.0245	0.0225	+/-0.024	0.0463	pCi/g						
Bismuth-212		0.583	+/-0.238	0.130	+/-0.233	0.276	pCi/g						
Bismuth-214		0.669	+/-0.112	0.0286	+/-0.109	0.0606	pCi/g						
Cesium-134	U	0.00	+/-0.0343	0.0227	+/-0.0336	0.048	pCi/g						
	UI												
Cesium-137		0.0651	+/-0.0382	0.0175	+/-0.0374	0.0371	pCi/g						
Cobalt-60	U	0.00508	+/-0.0236	0.0206	+/-0.0231	0.0444	pCi/g						
Europium-152	U	-0.0148	+/-0.0433	0.0373	+/-0.0425	0.0783	pCi/g						
Europium-154	U	0.0138	+/-0.064	0.0561	+/-0.0627	0.121	pCi/g						
Europium-155	U	0.0337	+/-0.0411	0.0375	+/-0.0402	0.0774	pCi/g						
Lead-212		0.710	+/-0.0792	0.0232	+/-0.0776	0.0481	pCi/g						
Lead-214		0.569	+/-0.0929	0.0265	+/-0.091	0.0556	pCi/g						
Manganese-54	U	-0.00372	+/-0.0208	0.0175	+/-0.0204	0.0374	pCi/g						
Niobium-94	U	0.00281	+/-0.0172	0.0152	+/-0.0169	0.0322	pCi/g						
Potassium-40		15.6	+/-1.33	0.134	+/-1.30	0.301	pCi/g						
Radium-226		0.669	+/-0.112	0.0286	+/-0.109	0.0606	pCi/g						
Silver-108m	U	-0.0107	+/-0.0149	0.0121	+/-0.0146	0.0256	pCi/g						
Thallium-208		0.230	+/-0.0432	0.0173	+/-0.0423	0.0365	pCi/g						

### The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	MJM1	05/20/04	1441	334885

### The following Analytical Methods were performed

Method	Description
1	EML HASL 300, 4.5.2.3

### 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.

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### Certificate of Analysis

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Contact: Mr. Pete Hollenbeck  
Project: Soils PO# 002332

Report Date: June 24, 2004

Page 2 of 2

Client Sample ID: 9535-0001-017F  
Sample ID: 113282017

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

Parameter	Qualifier	Result	Uncertainty	LC	TPU	MDA	Units	DF	Analyst	Date	Time	Batch	Mtd.
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- 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.

Heidi G. Cleaveland  
Reviewed by

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Contact: Mr. Pete Hollenbeck  
Project: Soils PO# 002332

Report Date: June 24, 2004

Page 1 of 2

Client Sample ID: 9535-0001-019F  
Sample ID: 113282018  
Matrix: Soil  
Collect Date: 27-APR-04  
Receive Date: 19-MAY-04  
Collector: Client  
Moisture: 10.6%

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

Parameter	Qualifier	Result	Uncertainty	LC	TPU	MDA	Units	DF	Analyst	Date	Time	Batch	Mtd.
<b>Rad Gamma Spec Analysis</b>													
<i>GammaSpec, Gamma, Solid-FSS GAM &amp; ALL FSS</i>													
Actinium-228		0.499	+/-0.111	0.0304	+/-0.109	0.0642	pCi/g						
Americium-241	U	-0.0372	+/-0.0413	0.035	+/-0.0405	0.0719	pCi/g		SRB	06/08/04	0951	335651	1
Bismuth-212		0.318	+/-0.130	0.0666	+/-0.128	0.140	pCi/g						
Bismuth-214		0.451	+/-0.0699	0.0172	+/-0.0685	0.0358	pCi/g						
Cesium-134	U	0.00	+/-0.0226	0.0123	+/-0.0222	0.0257	pCi/g						
Cesium-137	UI	0.0413	+/-0.0153	0.00978	+/-0.015	0.0204	pCi/g						
Cobalt-60	U	0.0152	+/-0.0173	0.010	+/-0.0169	0.0214	pCi/g						
Europium-152	U	-0.0218	+/-0.0279	0.024	+/-0.0273	0.0499	pCi/g						
Europium-154	U	-0.0162	+/-0.0364	0.0298	+/-0.0357	0.0631	pCi/g						
Europium-155	U	0.0495	+/-0.0335	0.0326	+/-0.0328	0.0667	pCi/g						
Lead-212		0.529	+/-0.0527	0.015	+/-0.0517	0.0309	pCi/g						
Lead-214		0.548	+/-0.0617	0.0175	+/-0.0605	0.0362	pCi/g						
Manganese-54	U	0.0115	+/-0.00942	0.00894	+/-0.00923	0.0189	pCi/g						
Niobium-94	U	0.00	+/-0.015	0.00818	+/-0.0147	0.0171	pCi/g						
	UI												
Potassium-40		11.8	+/-0.946	0.0711	+/-0.927	0.155	pCi/g						
Radium-226		0.451	+/-0.0699	0.0172	+/-0.0685	0.0358	pCi/g						
Silver-108m	U	0.00138	+/-0.0096	0.00843	+/-0.00941	0.0175	pCi/g						
Thallium-208		0.165	+/-0.029	0.00868	+/-0.0284	0.0182	pCi/g						

### The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	MJM1	05/20/04	1441	334885

### The following Analytical Methods were performed

Method	Description
1	EML HASL 300, 4.5.2.3

### 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.



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Contact: Mr. Pete Hollenbeck  
Project: Solls PO# 002332

Report Date: June 24, 2004

Page 2 of 2

Client Sample ID: 9535-0001-019F  
Sample ID: 113282018

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

Parameter	Qualifier	Result	Uncertainty	LC	TPU	MDA	Units	DF	Analyst	Date	Time	Batch	Mtd.
-----------	-----------	--------	-------------	----	-----	-----	-------	----	---------	------	------	-------	------

- 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.

Hollenbeck, Pete  
Reviewed by

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## Certificate of Analysis

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East Hampton, Connecticut 06424  
Contact : Mr. Pete Hollenbeck  
Project : Soils PO# 002332

Report Date: June 24, 2004

Page 1 of 3

Client Sample ID: 9535-0001-002F  
Sample ID: 113282019  
Matrix: Soil  
Collect Date: 22-APR-04  
Receive Date: 19-MAY-04  
Collector: Client  
Moisture: 3.37%

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

Parameter	Qualifier	Result	Uncertainty	LC	TPU	MDA	Units	DF	Analyst	Date	Time	Batch	Mtd.
<b>Rad Alpha Spec Analysis</b>													
<i>Alphaspec Am241, Cm, Solid ALL FSS</i>													
Americium-241	U	0.00	+/-0.0487	0.00	+/-0.0487	0.0673	pCi/g	JAS1	06/10/04	0943	338561	1	
Curium-242	U	0.00	+/-0.0601	0.00	+/-0.0601	0.0831	pCi/g						
Curium-243/244	U	0.019	+/-0.0503	0.0284	+/-0.0504	0.125	pCi/g						
<i>Alphaspec Pu, Solid-ALL FSS</i>													
Plutonium-238	U	-0.0175	+/-0.0515	0.0479	+/-0.0515	0.161	pCi/g	JAS1	06/10/04	0944	338562	2	
Plutonium-239/240	U	-0.00581	+/-0.0488	0.0276	+/-0.0489	0.121	pCi/g						
<i>Liquid Scint Pu241, Solid-ALL FSS</i>													
Plutonium-241	U	3.38	+/-6.01	4.94	+/-6.02	10.2	pCi/g	JAS1	06/11/04	0213	338563	3	
<b>Rad Gamma Spec Analysis</b>													
<i>Gammascpec, Gamma, Solid-FSS GAM &amp; ALL FSS</i>													
Actinium-228		0.504	+/-0.175	0.0601	+/-0.171	0.131	pCi/g	SRB	06/08/04	0952	335651	4	
Americium-241	U	-0.0123	+/-0.0516	0.0425	+/-0.0506	0.0872	pCi/g						
Bismuth-212		0.726	+/-0.401	0.152	+/-0.393	0.325	pCi/g						
Bismuth-214		0.566	+/-0.108	0.0349	+/-0.106	0.0741	pCi/g						
Cesium-134	U	0.015	+/-0.0491	0.025	+/-0.0482	0.053	pCi/g						
Cesium-137		0.0989	+/-0.0529	0.0199	+/-0.0518	0.0422	pCi/g						
Cobalt-60	U	-0.00653	+/-0.0238	0.019	+/-0.0233	0.042	pCi/g						
Europium-152	U	0.0139	+/-0.0569	0.0513	+/-0.0558	0.107	pCi/g						
Europium-154	U	0.00412	+/-0.0707	0.0593	+/-0.0693	0.129	pCi/g						
Europium-155	U	0.00675	+/-0.0582	0.0526	+/-0.057	0.108	pCi/g						
Lead-212		0.466	+/-0.0724	0.0278	+/-0.071	0.0575	pCi/g						
Lead-214		0.553	+/-0.113	0.0358	+/-0.111	0.0748	pCi/g						
Manganese-54	U	0.0247	+/-0.0241	0.0225	+/-0.0236	0.048	pCi/g						
Niobium-94	U	-0.00451	+/-0.0223	0.0183	+/-0.0218	0.0388	pCi/g						
Potassium-40		10.5	+/-1.19	0.153	+/-1.16	0.345	pCi/g						
Radium-226		0.566	+/-0.108	0.0349	+/-0.106	0.0741	pCi/g						
Silver-108m	U	-0.0147	+/-0.0195	0.0161	+/-0.0191	0.034	pCi/g						
Thallium-208		0.218	+/-0.0557	0.0179	+/-0.0546	0.0382	pCi/g						
<b>Rad Gas Flow Proportional Counting</b>													
<i>GFPC, Sr90, solid-ALL FSS</i>													
Strontium-90	U	0.00426	+/-0.0179	0.0183	+/-0.0179	0.0387	pCi/g	HOB1	06/03/04	1844	335956	5	
<b>Rad Liquid Scintillation Analysis</b>													
<i>LSC, Tritium Dist, Solid-HTD2, ALL FSS</i>													
Tritium	U	-3.19	+/-4.96	4.39	+/-4.97	8.78	pCi/g	JLB1	06/11/04	2101	339628	6	
<i>Liquid Scint C14, Solid FSS</i>													

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Contact : Mr. Pete Hollenbeck  
Project : Soils PO# 002332

Report Date: June 24, 2004

Page 2 of 3

Client Sample ID: 9535-0001-002F  
Sample ID: 113282019

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

Parameter	Qualifier	Result	Uncertainty	LC	TPU	MDA	Units	DF	Analyst	Date	Time	Batch	Mtd.
<b>Rad Liquid Scintillation Analysis</b>													
<i>Liquid Scint C14, Solid FSS</i> Carbon-14	U	0.0289	+/-0.119	0.0984	+/-0.119	0.204	pCi/g		MWX	06/20/04	0758	342387	7
													1
<i>Liquid Scint Fe55, Solid-ALL FSS</i> Iron-55	U	-31.4	+/-41.4	16.9	+/-41.4	35.3	pCi/g		JLB1	06/22/04	1919	342541	9
<i>Liquid Scint Ni63, Solid-ALL FSS</i> Nickel-63	U	4.54	+/-6.93	5.74	+/-6.93	11.7	pCi/g		JLB1	06/12/04	0400	339689	12
<i>Liquid Scint Tc99, Solid-ALL FSS</i> Technetium-99	U	0.270	+/-0.242	0.199	+/-0.242	0.404	pCi/g		DAJ1	06/18/04	2137	339685	13

### The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
Ash Soil Prep	Ash Soil Prep, GL-RAD-A-021B	AP1	05/21/04	1445	334895
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	MJM1	05/20/04	1441	334885

### The following Analytical Methods were performed

Method	Description
1	DOE EML HASL-300, Am-05-RC Modified
2	DOE EML HASL-300, Pu-11-RC Modified
3	DOE EML HASL-300, Pu-11-RC Modified
4	EML HASL 300, 4.5.2.3
5	EPA 905.0 Modified
6	EPA 906.0 Modified
7	EPA EERF C-01 Modified
8	EPA EERF C-01 Modified
9	DOE RESL Fe-1, Modified
10	DOE RESL Fe-1, Modified
11	DOE RESL Fe-1, Modified
12	DOE RESL Ni-1, Modified
13	DOE EML HASL-300, Tc-02-RC Modified

Surrogate/Tracer recovery	Test	Recovery %	Acceptable Limits
Americium-243	Alphaspec Am241, Cm, Solid ALL	84	(25%-125%)
Plutonium-242	Alphaspec Pu, Solid-ALL FSS	89	

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Page 3 of 3

Client Sample ID: 9535-0001-002F  
Sample ID: 113282019

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

Parameter	Qualifier	Result	Uncertainty	LC	TPU	MDA	Units	DF	Analyst	Date	Time	Batch	Mtd.
Carrier/Tracer Recovery		Liquid Scint Pu241, Solid-ALL FS			100								
Carrier/Tracer Recovery		GFPC, Sr90, solid-ALL FSS			96		(25%-125%)						
Carrier/Tracer Recovery		Liquid Scint Fe55, Solid-ALL FS			87								
Carrier/Tracer Recovery		Liquid Scint Ni63, Solid-ALL FS			74								
Carrier/Tracer Recovery		Liquid Scint Tc99, Solid-ALL FS			51								

**Notes:**

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- 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.

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*Sarah Kozlik*

Reviewed by

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## Certificate of Analysis

Company : Connecticut Yankee Atomic Power  
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Project: Soils PO# 002332

Report Date: June 24, 2004

Page 1 of 3

Client Sample ID: 9535-0001-006F  
Sample ID: 113282020  
Matrix: Soil  
Collect Date: 22-APR-04  
Receive Date: 19-MAY-04  
Collector: Client  
Moisture: 4.66%

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

Parameter	Qualifier	Result	Uncertainty	LC	TPU	MDA	Units	DF	Analyst	Date	Time	Batch	Mtd.
<b>Rad Alpha Spec Analysis</b>													
<i>Alphaspec Am241, Cm, Solid ALL FSS</i>													
Americium-241	U	0.0488	+/-0.128	0.110	+/-0.128	0.303	pCi/g		JAS1	06/11/04	1323	338561	1
Curium-242	U	0.0318	+/-0.139	0.129	+/-0.139	0.361	pCi/g						
Curium-243/244	U	0.156	+/-0.232	0.201	+/-0.233	0.484	pCi/g						
<i>Alphaspec Pu, Solid-ALL FSS</i>													
Plutonium-238	U	0.0142	+/-0.076	0.0707	+/-0.0761	0.210	pCi/g		JAS1	06/10/04	0944	338562	2
Plutonium-239/240	U	0.00	+/-0.0496	0.00	+/-0.0496	0.0686	pCi/g						
<i>Liquid Scint Pu241, Solid-ALL FSS</i>													
Plutonium-241	U	-0.559	+/-6.63	5.59	+/-6.63	11.5	pCi/g		JAS1	06/11/04	0245	338563	3
<b>Rad Gamma Spec Analysis</b>													
<i>Gammascpec, Gamma, Solid-FSS GAM &amp; ALL FSS</i>													
Actinium-228		0.474	+/-0.138	0.0439	+/-0.135	0.0942	pCi/g		SRB	06/08/04	0953	335651	4
Americium-241	U	0.00339	+/-0.0863	0.0575	+/-0.0846	0.118	pCi/g						
Bismuth-212		0.407	+/-0.186	0.103	+/-0.182	0.220	pCi/g						
Bismuth-214		0.564	+/-0.0793	0.0222	+/-0.0777	0.0471	pCi/g						
Cesium-134	U	0.0273	+/-0.0264	0.0172	+/-0.0258	0.0363	pCi/g						
Cesium-137		0.127	+/-0.0272	0.0127	+/-0.0266	0.0271	pCi/g						
Cobalt-60	U	-0.00247	+/-0.017	0.0141	+/-0.0167	0.0308	pCi/g						
Europium-152	U	0.0164	+/-0.0424	0.0378	+/-0.0415	0.0786	pCi/g						
Europium-154	U	-0.0227	+/-0.0514	0.0417	+/-0.0504	0.0902	pCi/g						
Europium-155	U	0.0392	+/-0.0449	0.0415	+/-0.044	0.0852	pCi/g						
Lead-212		0.552	+/-0.0636	0.0208	+/-0.0624	0.0431	pCi/g						
Lead-214		0.616	+/-0.0925	0.0252	+/-0.0907	0.0526	pCi/g						
Manganese-54	U	-0.0057	+/-0.0182	0.0151	+/-0.0178	0.032	pCi/g						
Niobium-94	U	-0.000592	+/-0.0136	0.0117	+/-0.0133	0.0248	pCi/g						
Potassium-40		11.2	+/-1.08	0.127	+/-1.06	0.280	pCi/g						
Radium-226		0.564	+/-0.0793	0.0222	+/-0.0777	0.0471	pCi/g						
Silver-108m	U	0.0033	+/-0.0154	0.0118	+/-0.0151	0.0247	pCi/g						
Thallium-208		0.170	+/-0.0364	0.0133	+/-0.0357	0.0282	pCi/g						
<b>Rad Gas Flow Proportional Counting</b>													
<i>GFPC, Sr90, solid-ALL FSS</i>													
Strontium-90		0.0722	+/-0.0182	0.0114	+/-0.024	0.0249	pCi/g		HOB1	06/03/04	1844	335956	5
<b>Rad Liquid Scintillation Analysis</b>													
<i>LSC, Tritium Dist, Solid-HTD2, ALL FSS</i>													
Tritium	U	-3.2	+/-4.29	3.83	+/-4.30	7.67	pCi/g		JLB1	06/11/04	2133	339628	6
<i>Liquid Scint C14, Solid FSS</i>													

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## 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 24, 2004

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Client Sample ID: 9535-0001-006F  
Sample ID: 113282020

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

Parameter	Qualifier	Result	Uncertainty	LC	TPU	MDA	Units	DF	Analyst	Date	Time	Batch	Mtd.
<b>Rad Liquid Scintillation Analysis</b>													
<i>Liquid Scint C14, Solid FSS</i>													
Carbon-14	U	-0.0219	+/-0.115	0.0976	+/-0.115	0.203	pCi/g		MWX	06/20/04	0901	342387	7
<i>Liquid Scint Fe55, Solid-ALL FSS</i>													
Iron-55	U	-49.7	+/-41.9	16.7	+/-41.9	34.8	pCi/g		JLB1	06/23/04	1430	342541	9
<i>Liquid Scint Ni63, Solid-ALL FSS</i>													
Nickel-63		15.8	+/-9.30	7.54	+/-9.30	15.3	pCi/g		JLB1	06/12/04	0531	339689	12
<i>Liquid Scint Tc99, Solid-ALL FSS</i>													
Technetium-99	U	0.319	+/-0.212	0.173	+/-0.212	0.351	pCi/g		DAJ1	06/18/04	2312	339685	13

### The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
Ash Soil Prep	Ash Soil Prep, GL-RAD-A-021B	AF1	05/21/04	1445	334895
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	MJM1	05/20/04	1441	334885

### The following Analytical Methods were performed

Method	Description
1	DOE EML HASL-300, Am-05-RC Modified
2	DOE EML HASL-300, Pu-11-RC Modified
3	DOE EML HASL-300, Pu-11-RC Modified
4	EML HASL 300, 4.5.2.3
5	EPA 905.0 Modified
6	EPA 906.0 Modified
7	EPA EERF C-01 Modified
8	EPA EERF C-01 Modified
9	DOE RESL Fe-1, Modified
10	DOE RESL Fe-1, Modified
11	DOE RESL Fe-1, Modified
12	DOE RESL Ni-1, Modified
13	DOE EML HASL-300, Tc-02-RC Modified

Surrogate/Tracer recovery	Test	Recovery %	Acceptable Limits
Americium-243	Alphaspec Am241, Cm, Solid ALL	77	(25%-125%)
Plutonium-242	Alphaspec Pu, Solid-ALL FSS	85	

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Project: Solls PO# 002332

Report Date: June 24, 2004

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Client Sample ID: 9535-0001-006F  
Sample ID: 113282020

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

Parameter	Qualifier	Result	Uncertainty	LC	TPU	MDA	Units	DF	Analyst	Date	Time	Batch	Mtd.
Carrier/Tracer Recovery		Liquid Scint Pu241, Solid-ALL FS			88								
Carrier/Tracer Recovery		GFPC, Sr90, solid-ALL FSS			103		(25%-125%)						
Carrier/Tracer Recovery		Liquid Scint Fe55, Solid-ALL FS			89								
Carrier/Tracer Recovery		Liquid Scint Ni63, Solid-ALL FS			69								
Carrier/Tracer Recovery		Liquid Scint Tc99, Solid-ALL FS			60								

### 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.

*Heather G. O'Connell*

Reviewed by

# GENERAL ENGINEERING LABORATORIES, LLC

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## Certificate of Analysis

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Project: Soils PO# 002332

Report Date: June 24, 2004

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Client Sample ID: 9535-0001-016F  
Sample ID: 113282021  
Matrix: Soil  
Collect Date: 27-APR-04  
Receive Date: 19-MAY-04  
Collector: Client  
Moisture: 11.5%

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

Parameter	Qualifier	Result	Uncertainty	LC	TPU	MDA	Units	DF	Analyst	Date	Time	Batch	Mtd.
<b>Rad Alpha Spec Analysis</b>													
<i>Alphaspec Am241, Cm, Solid ALL FSS</i>													
Americium-241	U	0.0335	+/-0.0755	0.0516	+/-0.0756	0.174	pCi/g		JAS1	06/10/04	0943	338561	1
Curium-242	U	0.0316	+/-0.0619	0.00	+/-0.062	0.0855	pCi/g						
Curium-243/244	U	-0.0126	+/-0.0175	0.0423	+/-0.0175	0.156	pCi/g						
<i>Alphaspec Pu, Solid-ALL FSS</i>													
Plutonium-238	U	0.0345	+/-0.142	0.135	+/-0.142	0.351	pCi/g		JAS1	06/10/04	0943	338562	2
Plutonium-239/240	U	-0.0332	+/-0.0965	0.122	+/-0.0965	0.324	pCi/g						
<i>Liquid Scint Pu241, Solid-ALL FSS</i>													
Plutonium-241	U	2.61	+/-6.70	5.54	+/-6.70	11.4	pCi/g		JAS1	06/11/04	0316	338563	3
<b>Rad Gamma Spec Analysis</b>													
<i>GammaSpec, Gamma, Solid-FSS GAM &amp; ALL FSS</i>													
Actinium-228		0.535	+/-0.119	0.0344	+/-0.117	0.0725	pCi/g		SRB	06/08/04	1203	335643	4
Americium-241	U	-0.0168	+/-0.0755	0.061	+/-0.074	0.125	pCi/g						
Bismuth-212		0.306	+/-0.167	0.0787	+/-0.163	0.165	pCi/g						
Bismuth-214		0.442	+/-0.062	0.0195	+/-0.0608	0.0406	pCi/g						
Cesium-134	U	0.0198	+/-0.0246	0.0138	+/-0.0241	0.0286	pCi/g						
Cesium-137		0.0544	+/-0.0266	0.0109	+/-0.0261	0.0227	pCi/g						
Cobalt-60	U	0.0057	+/-0.0118	0.0104	+/-0.0116	0.0222	pCi/g						
Europium-152	U	-0.00602	+/-0.0319	0.0274	+/-0.0312	0.0569	pCi/g						
Europium-154	U	-0.0185	+/-0.0348	0.0282	+/-0.0341	0.0604	pCi/g						
Europium-155	U	0.0536	+/-0.0418	0.0384	+/-0.0409	0.0787	pCi/g						
Lead-212		0.538	+/-0.0562	0.0172	+/-0.055	0.0353	pCi/g						
Lead-214		0.569	+/-0.0702	0.018	+/-0.0688	0.0375	pCi/g						
Manganese-54	U	0.00357	+/-0.0131	0.0112	+/-0.0128	0.0235	pCi/g						
Niobium-94	U	-0.00122	+/-0.0111	0.00948	+/-0.0109	0.0198	pCi/g						
Potassium-40		11.3	+/-0.987	0.0814	+/-0.967	0.177	pCi/g						
Radium-226		0.442	+/-0.062	0.0195	+/-0.0608	0.0406	pCi/g						
Silver-108m	U	-0.000399	+/-0.0112	0.00954	+/-0.011	0.0198	pCi/g						
Thallium-208		0.155	+/-0.0282	0.0102	+/-0.0276	0.0213	pCi/g						
<b>Rad Gas Flow Proportional Counting</b>													
<i>GFPC, Sr90, solid-ALL FSS</i>													
Strontium-90	U	0.0257	+/-0.0159	0.0138	+/-0.0169	0.0297	pCi/g		HOB1	06/03/04	1843	335956	5
<b>Rad Liquid Scintillation Analysis</b>													
<i>LSC, Tritium Dist, Solid-HTD2, ALL FSS</i>													
Tritium	U	-2.28	+/-3.80	3.35	+/-3.80	6.70	pCi/g		JLB1	06/11/04	2206	339628	6
<i>Liquid Scint C14, Solid FSS</i>													



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**Certificate of Analysis**

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Contact: Mr. Pete Hollenbeck  
Project: Soils PO# 002332

Report Date: June 24, 2004

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Client Sample ID: 9535-0001-016F  
Sample ID: 113282021

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

Parameter	Qualifier	Result	Uncertainty	LC	TPU	MDA	Units	DF	Analyst	Date	Time	Batch	Mtd.
<b>Rad Liquid Scintillation Analysis</b>													
<i>Liquid Scint C14, Solid FSS</i>													
Carbon-14	U	-0.0695	+/-0.103	0.0895	+/-0.103	0.186	pCi/g		MWX	06/20/04	1003	342387	7
<i>Liquid Scint Fe55, Solid-ALL FSS</i>													
Iron-55	U	-63	+/-42.4	17.5	+/-42.5	36.5	pCi/g		JLB1	06/23/04	1502	342541	9
<i>Liquid Scint Ni63, Solid-ALL FSS</i>													
Nickel-63	U	14.1	+/-14.0	11.6	+/-14.0	23.5	pCi/g		JLB1	06/12/04	0703	339689	12
<i>Liquid Scint Tc99, Solid-ALL FSS</i>													
Technetium-99	U	0.383	+/-0.254	0.208	+/-0.254	0.422	pCi/g		DAJ1	06/19/04	0046	339685	13

**The following Prep Methods were performed**

Method	Description	Analyst	Date	Time	Prep Batch
Ash Soil Prep	Ash Soil Prep, GL-RAD-A-021B	AP1	05/21/04	1445	334895
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	MJM1	05/20/04	1441	334885

**The following Analytical Methods were performed**

Method	Description
1	DOE EML HASL-300, Am-05-RC Modified
2	DOE EML HASL-300, Pu-11-RC Modified
3	DOE EML HASL-300, Pu-11-RC Modified
4	EML HASL 300, 4.5.2.3
5	EPA 905.0 Modified
6	EPA 906.0 Modified
7	EPA EERF C-01 Modified
8	EPA EERF C-01 Modified
9	DOE RESL Fe-1, Modified
10	DOE RESL Fe-1, Modified
11	DOE RESL Fe-1, Modified
12	DOE RESL Ni-1, Modified
13	DOE EML HASL-300, Tc-02-RC Modified

Surrogate/Tracer recovery	Test	Recovery %	Acceptable Limits
Americium-243	Alphaspec Am241, Cm, Solid ALL	79	(25%-125%)
Plutonium-242	Alphaspec Pu, Solid-ALL FSS	80	

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Contact: Mr. Pete Hollenbeck  
Project: Soils PO# 002332

Report Date: June 24, 2004

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Client Sample ID: 9535-0001-016F  
Sample ID: 113282021

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

Parameter	Qualifier	Result	Uncertainty	LC	TPU	MDA	Units	DF	Analyst	Date	Time	Batch	Mtd.
Carrier/Tracer Recovery		Liquid Scint Pu241, Solid-ALL FS			90								
Carrier/Tracer Recovery		GFPC, Sr90, solid-ALL FSS			100		(25%-125%)						
Carrier/Tracer Recovery		Liquid Scint Fe55, Solid-ALL FS			82								
Carrier/Tracer Recovery		Liquid Scint Ni63, Solid-ALL FS			49								
Carrier/Tracer Recovery		Liquid Scint Tc99, Solid-ALL FS			49								

**Notes:**

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- 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.

Hellen P. Cecile

Reviewed by

# QUALITY CONTROL DATA

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

**QC Summary**

Report Date: June 24, 2004  
Page 1 of 12

Client : Connecticut Yankee Atomic Power  
Haddam Neck Plant  
362 Injun Hollow Road  
East Hampton, Connecticut  
Contact: Mr. Pete Hollenbeck  
Workorder: 113282

Parname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Rad Alpha Spec Batch 338561											
QC1200637714 113282019 DUP											
Americium-241	U	0.00	U	0.0786	pCi/g	200		(0% - 100%)	JAS1	06/10/04	09:44
	Uncert:	+/-0.0487		+/-0.096							
	TPU:	+/-0.0487		+/-0.0965							
Curium-242	U	0.00	U	0.0154	pCi/g	200		(0% - 100%)			
	Uncert:	+/-0.0601		+/-0.0612							
	TPU:	+/-0.0601		+/-0.0612							
Curium-243/244	U	0.019	U	0.00674	pCi/g	95		(0% - 100%)			
	Uncert:	+/-0.0503		+/-0.0511							
	TPU:	+/-0.0504		+/-0.0511							
QC1200637716 LCS											
Americium-241	10.7			10.9	pCi/g		102	(75%-125%)			
	Uncert:			+/-0.957							
	TPU:			+/-1.60							
Curium-242			U	0.0169	pCi/g						
	Uncert:			+/-0.0447							
	TPU:			+/-0.0448							
Curium-243/244	13.8			12.9	pCi/g		94	(75%-125%)			
	Uncert:			+/-1.04							
	TPU:			+/-1.85							
QC1200637713 MB											
Americium-241			U	0.014	pCi/g					06/10/04	09:43
	Uncert:			+/-0.0555							
	TPU:			+/-0.0556							
Curium-242			U	-0.00653	pCi/g						
	Uncert:			+/-0.0128							
	TPU:			+/-0.0128							
Curium-243/244			U	0.00	pCi/g						
	Uncert:			+/-0.0526							
	TPU:			+/-0.0526							
QC1200637715 113282019 MS											
Americium-241	20.9 U	0.00		23.4	pCi/g		112	(75%-125%)		06/10/04	09:44
	Uncert:	+/-0.0487		+/-2.14							
	TPU:	+/-0.0487		+/-3.75							
Curium-242	U	0.00	U	0.048	pCi/g						
	Uncert:	+/-0.0601		+/-0.127							
	TPU:	+/-0.0601		+/-0.127							
Curium-243/244	27.0 U	0.019		29.3	pCi/g		108	(75%-125%)			
	Uncert:	+/-0.0503		+/-2.41							
	TPU:	+/-0.0504		+/-4.55							
Batch 338562											
QC1200637718 113282019 DUP											
Plutonium-238	U	-0.0175	U	0.000883	pCi/g	N/A		(0% - 100%)	JAS1	06/10/04	12:50

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**QC Summary**

Workorder: 113282

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Rad Alpha Spec											
Batch	338562										
		Uncert:	+/-0.0515	+/-0.048							
		TPU:	+/-0.0515	+/-0.048							
Plutonium-239/240		U	-0.00581	U	0.0168	pCi/g	N/A	(0% - 100%)			
		Uncert:	+/-0.0488	+/-0.0444							
		TPU:	+/-0.0489	+/-0.0445							
QC1200637720	LCS										
Plutonium-238				U	-0.00584	pCi/g					
		Uncert:		+/-0.049							
		TPU:		+/-0.0491							
Plutonium-239/240		9.56			10.7	pCi/g		112			
		Uncert:		+/-0.999							
		TPU:		+/-1.60							
QC1200637717	MB										
Plutonium-238				U	0.0122	pCi/g					
		Uncert:		+/-0.0486							
		TPU:		+/-0.0486							
Plutonium-239/240				U	0.047	pCi/g					
		Uncert:		+/-0.0651							
		TPU:		+/-0.0653							
QC1200637719	113282019	MS									
Plutonium-238		U	-0.0175	U	0.146	pCi/g					
		Uncert:	+/-0.0515	+/-0.193							
		TPU:	+/-0.0515	+/-0.194							
Plutonium-239/240		18.6	U	-0.00581	21.4	pCi/g		115			
		Uncert:	+/-0.0488	+/-1.98							
		TPU:	+/-0.0489	+/-3.33							
Batch	338563										
QC1200637722	113282019	DUP									
Plutonium-241		U	3.38	U	0.604	pCi/g	0	(0% - 100%)	JAS1	06/11/04	05:22
		Uncert:	+/-6.01	+/-6.33							
		TPU:	+/-6.02	+/-6.33							
QC1200637724	LCS										
Plutonium-241		142			128	pCi/g		90	(75%-125%)		06/11/04 06:24
		Uncert:			+/-14.4						
		TPU:			+/-19.7						
QC1200637721	MB										
Plutonium-241				U	3.04	pCi/g					06/11/04 04:50
		Uncert:			+/-7.35						
		TPU:			+/-7.35						
QC1200637723	113282019	MS									
Plutonium-241		237	U	3.38	211	pCi/g		88	(75%-125%)		06/11/04 05:53
		Uncert:	+/-6.01	+/-17.7							
		TPU:	+/-6.02	+/-25.8							
Rad Gamma Spec											
Batch	335643										
QC1200630676	113280002	DUP									
Actinium-228			0.490		0.534	pCi/g	9	(0% - 100%)	SRB	06/07/04	14:16
		Uncert:	+/-0.0971	+/-0.152							
				+/-0.149							

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**QC Summary**

Workorder: 113282

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Rad Gamma Spec Batch 335643											
Americium-241		TPU: +/-0.0952									
	U	0.0171	U	-0.00508	pCi/g	N/A		(0% - 100%)			
		Uncert: +/-0.0464		+/-0.0245							
Bismuth-212		TPU: +/-0.0455		+/-0.024							
		0.270		0.355	pCi/g	27		(0% - 100%)			
		Uncert: +/-0.142		+/-0.321							
Bismuth-214		TPU: +/-0.139		+/-0.314							
		0.462		0.449	pCi/g	3		(0% - 100%)			
		Uncert: +/-0.0641		+/-0.0894							
Cesium-134		TPU: +/-0.0629		+/-0.0876							
	UUI	0.00	UUI	0.00	pCi/g	62		(0% - 100%)			
		Uncert: +/-0.018		+/-0.0342							
Cesium-137		TPU: +/-0.0176		+/-0.0335							
		1.59		1.64	pCi/g	3		(0% - 100%)			
		Uncert: +/-0.112		+/-0.162							
Cobalt-60		TPU: +/-0.110		+/-0.158							
	U	0.011	U	0.0176	pCi/g	46		(0% - 100%)			
		Uncert: +/-0.0121		+/-0.0226							
		TPU: +/-0.0119		+/-0.0221							
Europium-152		U	U	-0.00321	pCi/g	N/A		(0% - 100%)			
		Uncert: +/-0.0336		+/-0.0472							
		TPU: +/-0.0329		+/-0.0463							
Europium-154		U	U	-0.0119	pCi/g	N/A		(0% - 100%)			
		Uncert: +/-0.0318		+/-0.0621							
		TPU: +/-0.0312		+/-0.0609							
Europium-155		U	U	-0.016	pCi/g	N/A		(0% - 100%)			
		Uncert: +/-0.0294		+/-0.0405							
		TPU: +/-0.0288		+/-0.0397							
Lead-212		0.488		0.490	pCi/g	0		(0% - 100%)			
		Uncert: +/-0.0554		+/-0.0636							
		TPU: +/-0.0543		+/-0.0624							
Lead-214		0.525		0.449	pCi/g	16					
		Uncert: +/-0.0717		+/-0.0788							
		TPU: +/-0.0703		+/-0.0772							
Manganese-54		U	U	0.00951	pCi/g	150		(0% - 100%)			
		Uncert: +/-0.0108		+/-0.0202							
		TPU: +/-0.0106		+/-0.0198							
Niobium-94		U	U	0.0163	pCi/g	100		(0% - 100%)			
		Uncert: +/-0.00968		+/-0.0355							
		TPU: +/-0.00949		+/-0.0348							
Potassium-40		8.27		8.05	pCi/g	3		(0% - 20%)			
		Uncert: +/-0.744		+/-0.870							
		TPU: +/-0.729		+/-0.852							
Radium-226		0.462		0.449	pCi/g	3		(0% - 100%)			
		Uncert: +/-0.0641		+/-0.0894							
		TPU: +/-0.0629		+/-0.0876							
Silver-108m		U	U	-0.0028	pCi/g	N/A		(0% - 100%)			
		Uncert: +/-0.0115		+/-0.0183							

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Rad Gamma Spec Batch 335643											
Thallium-208	TPU: +/-0.0113 0.170 Uncert: +/-0.0287 TPU: +/-0.0281			+/-0.018 0.178 +/-0.0396 +/-0.0388	pCi/g	4		(0% - 100%)			
QC1200630677 LCS Actinium-228			U	-0.121 +/-0.605 TPU: +/-0.593	pCi/g					06/07/04	14:48
Americium-241	23.4 Uncert: +/-2.53 TPU: +/-2.48			23.9 +/-2.53 +/-2.48	pCi/g		102	(75%-125%)			
Bismuth-212			U	0.130 +/-1.05 TPU: +/-1.03	pCi/g						
Bismuth-214			U	-0.0372 +/-0.260 TPU: +/-0.254	pCi/g						
Cesium-134			U	0.0528 +/-0.177 TPU: +/-0.174	pCi/g						
Cesium-137	9.25 Uncert: +/-0.794 TPU: +/-0.778			10.0 +/-0.794 +/-0.778	pCi/g		108	(75%-125%)			
Cobalt-60	14.4 Uncert: +/-1.18 TPU: +/-1.16			15.3 +/-1.18 +/-1.16	pCi/g		106	(75%-125%)			
Europium-152			U	-0.162 +/-0.317 TPU: +/-0.311	pCi/g						
Europium-154			U	-0.166 +/-0.341 TPU: +/-0.334	pCi/g						
Europium-155			U	-0.154 +/-0.363 TPU: +/-0.355	pCi/g						
Lead-212			U	-0.0395 +/-0.171 TPU: +/-0.168	pCi/g						
Lead-214			U	-0.0111 +/-0.230 TPU: +/-0.225	pCi/g						
Manganese-54			U	0.0255 +/-0.144 TPU: +/-0.141	pCi/g						
Niobium-94			U	0.00158 +/-0.128 TPU: +/-0.126	pCi/g						
Potassium-40			U	0.255	pCi/g						

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Parmname	NOM	Sample Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Rad Gamma Spec Batch 335643										
			Uncert: +/-1.27							
			TPU: +/-1.24							
Radium-226		U	-0.0372	pCi/g			(75%-125%)			
			Uncert: +/-0.260							
			TPU: +/-0.254							
Silver-108m		U	-0.0412	pCi/g						
			Uncert: +/-0.121							
			TPU: +/-0.119							
Thallium-208		U	0.0261	pCi/g						
			Uncert: +/-0.134							
			TPU: +/-0.131							
QC1200630675 MB Actinium-228		U	0.0129	pCi/g					06/07/04	11:17
			Uncert: +/-0.0917							
			TPU: +/-0.0899							
Americium-241		U	0.00835	pCi/g						
			Uncert: +/-0.0367							
			TPU: +/-0.0359							
Bismuth-212		U	0.0543	pCi/g						
			Uncert: +/-0.0954							
			TPU: +/-0.0935							
Bismuth-214		U	0.0275	pCi/g						
			Uncert: +/-0.0314							
			TPU: +/-0.0308							
Cesium-134		U	-0.0115	pCi/g						
			Uncert: +/-0.0137							
			TPU: +/-0.0134							
Cesium-137		U	-0.000339	pCi/g						
			Uncert: +/-0.0124							
			TPU: +/-0.0122							
Cobalt-60		U	-0.0114	pCi/g						
			Uncert: +/-0.0144							
			TPU: +/-0.0141							
Europium-152		U	0.0317	pCi/g						
			Uncert: +/-0.0373							
			TPU: +/-0.0365							
Europium-154		U	0.0151	pCi/g						
			Uncert: +/-0.0435							
			TPU: +/-0.0427							
Europium-155		U	0.0124	pCi/g						
			Uncert: +/-0.0367							
			TPU: +/-0.036							
Lead-212		U	0.0191	pCi/g						
			Uncert: +/-0.0395							
			TPU: +/-0.0388							
Lead-214		U	0.0168	pCi/g						
			Uncert: +/-0.0275							
			TPU: +/-0.027							



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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Analst	Date	Time
Rad Gamma Spec Batch 335643											
Manganes-54			U	0.00156	pCi/g						
	Uncert:			+/-0.012							
	TPU:			+/-0.0118							
Niobium-94			U	-0.00659	pCi/g						
	Uncert:			+/-0.0129							
	TPU:			+/-0.0127							
Potassium-40			U	0.0486	pCi/g						
	Uncert:			+/-0.249							
	TPU:			+/-0.244							
Radium-226			U	0.0275	pCi/g						
	Uncert:			+/-0.0314							
	TPU:			+/-0.0308							
Silver-108m			U	-0.0074	pCi/g						
	Uncert:			+/-0.0121							
	TPU:			+/-0.0119							
Thallium-208			UU1	0.00	pCi/g						
	Uncert:			+/-0.0227							
	TPU:			+/-0.0223							
Batch 335651											
QC1200630701 113282001 DUP											
Actinium-228				0.531	pCi/g	28		(0% - 100%)	SRB	06/08/04	10:56
	Uncert:			+/-0.105							
	TPU:			+/-0.103							
Americium-241		U		-0.016	pCi/g	N/A		(0% - 100%)			
	Uncert:			+/-0.0416							
	TPU:			+/-0.0408							
Bismuth-212				0.292	pCi/g	25		(0% - 100%)			
	Uncert:			+/-0.149							
	TPU:			+/-0.146							
Bismuth-214				0.466	pCi/g	1		(0% - 100%)			
	Uncert:			+/-0.0591							
	TPU:			+/-0.0579							
Cesium-134		U		0.0196	pCi/g	145		(0% - 100%)			
	Uncert:			+/-0.0166							
	TPU:			+/-0.0162							
Cesium-137				0.0849	pCi/g	4		(0% - 100%)			
	Uncert:			+/-0.0188							
	TPU:			+/-0.0185							
Cobalt-60		U		0.00329	pCi/g	15		(0% - 100%)			
	Uncert:			+/-0.0106							
	TPU:			+/-0.0104							
Europium-152		U		0.00861	pCi/g	N/A		(0% - 100%)			
	Uncert:			+/-0.0265							
	TPU:			+/-0.026							
Europium-154		U		-0.0363	pCi/g	N/A		(0% - 100%)			
	Uncert:			+/-0.033							
	TPU:			+/-0.0323							
Europium-155		U		0.0229	pCi/g	N/A		(0% - 100%)			

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Rad Gamma Spec											
Batch 335651											
Lead-212		Uncert:	+/-0.0259	+/-0.0415	pCi/g	7		(0% - 100%)			
		TPU:	+/-0.0254	+/-0.0406							
			0.460	0.493							
Lead-214		Uncert:	+/-0.0486	+/-0.0669	pCi/g	0					
		TPU:	+/-0.0476	+/-0.0655							
			0.502	0.500							
Manganes-54	U	Uncert:	+/-0.0625	+/-0.0752	pCi/g	N/A		(0% - 100%)			
		TPU:	+/-0.0612	+/-0.0737							
			-0.00366	0.019							
Niobium-94	U	Uncert:	+/-0.0102	+/-0.0166	pCi/g	163		(0% - 100%)			
		TPU:	+/-0.010	+/-0.0163							
			0.00155	0.0153							
Potassium-40		Uncert:	+/-0.00854	+/-0.0126	pCi/g	1		(0% - 20%)			
		TPU:	+/-0.00837	+/-0.0123							
			12.2	12.3							
Radium-226		Uncert:	+/-0.972	+/-1.16	pCi/g	1		(0% - 100%)			
		TPU:	+/-0.953	+/-1.14							
			0.466	0.460							
Silver-108m	U	Uncert:	+/-0.0591	+/-0.0711	pCi/g	N/A		(0% - 100%)			
		TPU:	+/-0.0579	+/-0.0696							
			0.00367	-0.002							
Thallium-208		Uncert:	+/-0.00871	+/-0.0116	pCi/g	14		(0% - 100%)			
		TPU:	+/-0.00853	+/-0.0114							
			0.159	0.139							
Actinium-228	U	Uncert:	+/-0.0277	+/-0.0306	pCi/g						06/08/04 13:18
		TPU:	+/-0.0272	+/-0.030							
				0.127							
Americium-241	23.4	Uncert:		+/-0.538	pCi/g		103	(75%-125%)			
		TPU:		+/-0.527							
				24.2							
Bismuth-212	U	Uncert:		+/-2.93	pCi/g						
		TPU:		+/-2.87							
				-0.0518							
Bismuth-214	U	Uncert:		+/-1.07	pCi/g						
		TPU:		+/-1.05							
				0.00698							
Cesium-134	U	Uncert:		+/-0.250	pCi/g						
		TPU:		+/-0.245							
				-0.0422							
Cesium-137	9.25	Uncert:		+/-0.141	pCi/g		104	(75%-125%)			
		TPU:		+/-0.138							
				9.66							
Cobalt-60	14.4	Uncert:		+/-0.791	pCi/g		104	(75%-125%)			
		TPU:		+/-0.775							
				15.0							
		Uncert:		+/-1.25							
		TPU:		+/-1.22							

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Parmname	NOM	Sample Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Rad Gamma Spec Batch 335651										
Europium-152		U	0.184	pCi/g						
	Uncert:		+/-0.324							
	TPU:		+/-0.317							
Europium-154		U	-0.103	pCi/g						
	Uncert:		+/-0.312							
	TPU:		+/-0.306							
Europium-155		U	0.121	pCi/g						
	Uncert:		+/-0.335							
	TPU:		+/-0.328							
Lead-212		U	0.0649	pCi/g						
	Uncert:		+/-0.178							
	TPU:		+/-0.174							
Lead-214		U	-0.0605	pCi/g						
	Uncert:		+/-0.239							
	TPU:		+/-0.234							
Manganese-54		U	0.0267	pCi/g						
	Uncert:		+/-0.141							
	TPU:		+/-0.139							
Niobium-94		U	-0.00218	pCi/g						
	Uncert:		+/-0.123							
	TPU:		+/-0.121							
Potassium-40		U	1.06	pCi/g						
	Uncert:		+/-1.37							
	TPU:		+/-1.34							
Radium-226		U	0.00698	pCi/g			(75%-125%)			
	Uncert:		+/-0.250							
	TPU:		+/-0.245							
Silver-108m		U	-0.0801	pCi/g						
	Uncert:		+/-0.133							
	TPU:		+/-0.131							
Thallium-208		U	0.0829	pCi/g						
	Uncert:		+/-0.122							
	TPU:		+/-0.120							
QC1200630700 MB										
Actinium-228		U	0.057	pCi/g					06/08/04	15:38
	Uncert:		+/-0.135							
	TPU:		+/-0.133							
Americium-241		U	-0.0612	pCi/g						
	Uncert:		+/-0.0856							
	TPU:		+/-0.0839							
Bismuth-212		U	0.00539	pCi/g						
	Uncert:		+/-0.152							
	TPU:		+/-0.149							
Bismuth-214		U	0.0655	pCi/g						
	Uncert:		+/-0.049							
	TPU:		+/-0.048							
Cesium-134		U	0.00286	pCi/g						
	Uncert:		+/-0.0211							

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Parmname	NOM	Sample Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Rad Gamma Spec										
Batch	335651									
Cesium-137	TPU:		+/-0.0207							
		U	0.016	pCi/g						
Cobalt-60	Uncert:		+/-0.0193							
	TPU:		+/-0.019							
		U	0.00882	pCi/g						
	Uncert:		+/-0.032							
Europium-152	TPU:		+/-0.0314							
		U	-0.0213	pCi/g						
	Uncert:		+/-0.0606							
	TPU:		+/-0.0594							
Europium-154		U	-0.00826	pCi/g						
	Uncert:		+/-0.0665							
	TPU:		+/-0.0652							
		U	-0.00895	pCi/g						
Europium-155	Uncert:		+/-0.0505							
	TPU:		+/-0.0495							
Lead-212		U	0.0536	pCi/g						
	Uncert:		+/-0.0362							
	TPU:		+/-0.0354							
		U	0.0749	pCi/g						
Lead-214	Uncert:		+/-0.0475							
	TPU:		+/-0.0466							
Mangancse-54		U	-0.00208	pCi/g						
	Uncert:		+/-0.0208							
	TPU:		+/-0.0204							
		U	-0.00377	pCi/g						
Niobium-94	Uncert:		+/-0.0189							
	TPU:		+/-0.0185							
Potassium-40		UUI	0.00	pCi/g						
	Uncert:		+/-0.363							
	TPU:		+/-0.356							
		U	0.0655	pCi/g						
Radium-226	Uncert:		+/-0.049							
	TPU:		+/-0.048							
Silver-108m		U	-0.0101	pCi/g						
	Uncert:		+/-0.0192							
	TPU:		+/-0.0188							
		U	0.00652	pCi/g						
Thallium-208	Uncert:		+/-0.0421							
	TPU:		+/-0.0413							
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

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Rad Gas Flow</b>											
Batch	335956										
				Uncert:							
				TPU:							
QC1200631487	MB										
Strontium-90				0.0485	pCi/g					06/03/04	19:12
				Uncert:							
				TPU:							
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			
<b>Rad Liquid Scintillation</b>											
Batch	339628										
QC1200640252	113282019	DUP									
Tritium			U	-3.19	U	-1.94			pCi/g	N/A	(0% - 100%) JLB1 06/12/04 01:21
				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		-2.26			pCi/g		06/12/04 00:48
				Uncert:		+/-3.03					
				TPU:		+/-3.03					
QC1200640253	113282019	MS									
Tritium			U	80.9		-3.19		70.7	pCi/g	87 (75%-125%)	06/12/04 01:54
				Uncert:		+/-4.96		+/-8.79			
				TPU:		+/-4.97		+/-10.6			
Batch	339685										
QC1200640377	113282019	DUP									
Technetium-99			U	0.270	U	0.244			pCi/g	0	(0% - 100%) DAJ1 06/19/04 07:05
				Uncert:		+/-0.242		+/-0.268			
				TPU:		+/-0.242		+/-0.269			
QC1200640379	LCS										
Technetium-99				16.3		18.7			pCi/g	114 (75%-125%)	06/19/04 09:51
				Uncert:		+/-0.614					
				TPU:		+/-0.895					
QC1200640376	MB										
Technetium-99			U	0.172		0.172			pCi/g		06/19/04 05:30
				Uncert:		+/-0.192					
				TPU:		+/-0.192					
QC1200640378	113282019	MS									
Technetium-99			U	16.7		0.270		18.6	pCi/g	109 (75%-125%)	06/19/04 09:18
				Uncert:		+/-0.242		+/-0.790			
				TPU:		+/-0.242		+/-1.02			
Batch	339689										
QC1200640385	113282019	DUP									
Nickel-63			U	4.54	U	7.25			pCi/g	0	(0% - 100%) JLB1 06/12/04 13:11

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Rad Liquid Scintillation											
Batch 339689											
		Uncert:	+/-6.93	+/-7.82							
		TPU:	+/-6.93	+/-7.83							
QC1200640387 LCS											
Nickel-63	353			345	pCi/g		98	(75%-125%)		06/12/04	16:15
		Uncert:		+/-10.2							
		TPU:		+/-12.3							
QC1200640384 MB											
Nickel-63			U	2.73	pCi/g					06/12/04	11:39
		Uncert:		+/-5.67							
		TPU:		+/-5.67							
QC1200640386 113282019 MS											
Nickel-63	538	U	4.54	524	pCi/g		97	(75%-125%)		06/12/04	14:43
		Uncert:	+/-6.93	+/-17.3							
		TPU:	+/-6.93	+/-20.2							
Batch 342387											
QC1200647033 113282020 DUP											
Carbon-14		U	-0.0219	U 0.0321	pCi/g	N/A		(0% - 100%)	MWX	06/22/04	01:09
		Uncert:	+/-0.115	+/-0.155							
		TPU:	+/-0.115	+/-0.155							
QC1200647035 LCS											
Carbon-14	8.21			7.60	pCi/g		93	(75%-125%)		06/20/04	17:23
		Uncert:		+/-0.541							
		TPU:		+/-0.554							
QC1200647032 MB											
Carbon-14			U	0.122	pCi/g					06/21/04	22:36
		Uncert:		+/-0.184							
		TPU:		+/-0.184							
QC1200647034 113282020 MS											
Carbon-14	8.15	U	-0.0219	7.75	pCi/g		95	(75%-125%)		06/20/04	16:51
		Uncert:	+/-0.115	+/-0.614							
		TPU:	+/-0.115	+/-0.626							
Batch 342541											
QC1200647441 113282019 DUP											
Iron-55		U	-31.4	U -45.5	pCi/g	N/A		(0% - 100%)	JLB1	06/23/04	17:41
		Uncert:	+/-41.4	+/-40.7							
		TPU:	+/-41.4	+/-40.8							
QC1200647443 LCS											
Iron-55	1170			1110	pCi/g		95	(75%-125%)		06/23/04	00:37
		Uncert:		+/-58.2							
		TPU:		+/-75.4							
QC1200647440 MB											
Iron-55			U	-73.1	pCi/g					06/23/04	17:09
		Uncert:		+/-37.1							
		TPU:		+/-37.2							
QC1200647442 113282019 MS											
Iron-55	1510	U	-31.4	1450	pCi/g		96	(75%-125%)		06/23/04	00:05
		Uncert:	+/-41.4	+/-53.5							
		TPU:	+/-41.4	+/-82.4							

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Parmname	NOM	Sample Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
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**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 acceptance 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.

SOUTHEAST LANDFILL  
SURVEY UNIT 9535-0001

RELEASE RECORD

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Attachment 2b  
Hard-To-Detect Data  
(Pages 9)



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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 24, 2004**

Page 1 of 3

Client Sample ID:	9535-0001-002F
Sample ID:	113282019
Matrix:	Soil
Collect Date:	22-APR-04
Receive Date:	19-MAY-04
Collector:	Client
Moisture:	3.37%

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

Parameter	Qualifier	Result	Uncertainty	LC	TPU	MDA	Units	DF	Analyst	Date	Time	Batch	Mtd.
<b>Rad Alpha Spec Analysis</b>													
<i>Alphaspec Am241, Cm, Solid ALL FSS</i>													
Americium-241	U	0.00	+/-0.0487	0.00	+/-0.0487	0.0673	pCi/g		JAS1	06/10/04	0943	338561	1
Curium-242	U	0.00	+/-0.0601	0.00	+/-0.0601	0.0831	pCi/g						
Curium-243/244	U	0.019	+/-0.0503	0.0284	+/-0.0504	0.125	pCi/g						
<i>Alphaspec Pu, Solid-ALL FSS</i>													
Plutonium-238	U	-0.0175	+/-0.0515	0.0479	+/-0.0515	0.161	pCi/g		JAS1	06/10/04	0944	338562	2
Plutonium-239/240	U	-0.00581	+/-0.0488	0.0276	+/-0.0489	0.121	pCi/g						
<i>Liquid Scint Pu241, Solid-ALL FSS</i>													
Plutonium-241	U	3.38	+/-6.01	4.94	+/-6.02	10.2	pCi/g		JAS1	06/11/04	0213	338563	3
<b>Rad Gamma Spec Analysis</b>													
<i>Gammasepec, Gamma, Solid-FSS GAM &amp; ALL FSS</i>													
Actinium-228		0.504	+/-0.175	0.0601	+/-0.171	0.131	pCi/g		SRB	06/08/04	0952	335651	4
Americium-241	U	-0.0123	+/-0.0516	0.0425	+/-0.0506	0.0872	pCi/g						
Bismuth-212		0.726	+/-0.401	0.152	+/-0.393	0.325	pCi/g						
Bismuth-214		0.566	+/-0.108	0.0349	+/-0.106	0.0741	pCi/g						
Cesium-134	U	0.015	+/-0.0491	0.025	+/-0.0482	0.053	pCi/g						
Cesium-137		0.0989	+/-0.0529	0.0199	+/-0.0518	0.0422	pCi/g						
Cobalt-60	U	-0.00653	+/-0.0238	0.019	+/-0.0233	0.042	pCi/g						
Europium-152	U	0.0139	+/-0.0569	0.0513	+/-0.0558	0.107	pCi/g						
Europium-154	U	0.00412	+/-0.0707	0.0593	+/-0.0693	0.129	pCi/g						
Europium-155	U	0.00673	+/-0.0582	0.0526	+/-0.057	0.108	pCi/g						
Lead-212		0.466	+/-0.0724	0.0278	+/-0.071	0.0575	pCi/g						
Lead-214		0.553	+/-0.113	0.0358	+/-0.111	0.0748	pCi/g						
Manganese-54	U	0.0247	+/-0.0241	0.0225	+/-0.0236	0.048	pCi/g						
Niobium-94	U	-0.00451	+/-0.0223	0.0183	+/-0.0218	0.0388	pCi/g						
Potassium-40		10.5	+/-1.19	0.153	+/-1.16	0.345	pCi/g						
Radium-226		0.566	+/-0.108	0.0349	+/-0.106	0.0741	pCi/g						
Silver-108m	U	-0.0147	+/-0.0195	0.0161	+/-0.0191	0.034	pCi/g						
Thallium-208		0.218	+/-0.0557	0.0179	+/-0.0546	0.0382	pCi/g						
<b>Rad Gas Flow Proportional Counting</b>													
<i>GFPC, Sr90, solid-ALL FSS</i>													
Strontium-90	U	0.00426	+/-0.0179	0.0183	+/-0.0179	0.0387	pCi/g		HOB1	06/03/04	1844	335956	5
<b>Rad Liquid Scintillation Analysis</b>													
<i>LSC, Tritium Dist, Solid-HTD2, ALL FSS</i>													
Tritium	U	-3.19	+/-4.96	4.39	+/-4.97	8.78	pCi/g		JLB1	06/11/04	2101	339628	6
<i>Liquid Scint C14, Solid FSS</i>													

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362 Injun Hollow Road  
East Hampton, Connecticut 06424  
Contact: Mr. Pete Hollenbeck  
Project: Soils PO# 002332

Report Date: June 24, 2004

Page 2 of 3

Client Sample ID: 9535-0001-002F  
Sample ID: 113282019

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

Parameter	Qualifier	Result	Uncertainty	LC	TPU	MDA	Units	DF	Analyst	Date	Time	Batch	Mtd.
<b>Rad Liquid Scintillation Analysis</b>													
<i>Liquid Scint C14, Solid FSS</i>													
Carbon-14	U	0.0289	+/-0.119	0.0984	+/-0.119	0.204	pCi/g		MWX	06/20/04	0758	342387	7
<i>Liquid Scint Fe55, Solid-ALL FSS</i>													
Iron-55	U	-31.4	+/-41.4	16.9	+/-41.4	35.3	pCi/g		JLB1	06/22/04	1919	342541	9
<i>Liquid Scint Ni63, Solid-ALL FSS</i>													
Nickel-63	U	4.54	+/-6.93	5.74	+/-6.93	11.7	pCi/g		JLB1	06/12/04	0400	339689	12
<i>Liquid Scint Tc99, Solid-ALL FSS</i>													
Technetium-99	U	0.270	+/-0.242	0.199	+/-0.242	0.404	pCi/g		DAJ1	06/18/04	2137	339685	13

### The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
Ash Soil Prep	Ash Soil Prep, GL-RAD-A-021B	AF1	05/21/04	1445	334895
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	MJM1	05/20/04	1441	334885

### The following Analytical Methods were performed

Method	Description
1	DOE EML HASL-300, Am-05-RC Modified
2	DOE EML HASL-300, Pu-11-RC Modified
3	DOE EML HASL-300, Pu-11-RC Modified
4	EML HASL 300, 4.5.2.3
5	EPA 905.0 Modified
6	EPA 906.0 Modified
7	EPA EERF C-01 Modified
8	EPA EERF C-01 Modified
9	DOE RESL Fe-1, Modified
10	DOE RESL Fe-1, Modified
11	DOE RESL Fe-1, Modified
12	DOE RESL Ni-1, Modified
13	DOE EML HASL-300, Tc-02-RC Modified

Surrogate/Tracer recovery	Test	Recovery %	Acceptable Limits
Americium-243	Alphaspec Am241, Cm, Solid ALL	84	(25%-125%)
Plutonium-242	Alphaspec Pu, Solid-ALL FSS	89	

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Project: Soils PO# 002332

Report Date: June 24, 2004

Page 3 of 3

Client Sample ID: 9535-0001-002F  
Sample ID: 113282019

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

Parameter	Qualifier	Result	Uncertainty	LC	TPU	MDA	Units	DF	Analyst	Date	Time	Batch	Mtd.
Carrier/Tracer Recovery		Liquid Scint Pu241, Solid-ALL FS			100								
Carrier/Tracer Recovery		GFPC, Sr90, solid-ALL FSS			96		(25%-125%)						
Carrier/Tracer Recovery		Liquid Scint Fe55, Solid-ALL FS			87								
Carrier/Tracer Recovery		Liquid Scint Ni63, Solid-ALL FS			74								
Carrier/Tracer Recovery		Liquid Scint Tc99, Solid-ALL FS			51								

### 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.

*Sarah Kozlik*

Reviewed by

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## Certificate of Analysis

Page 1 of 3

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

Parameter	Qualifier	Result	Uncertainty	LC	TPU	MDA	Units	DF	Analyst	Date	Time	Batch	Mtd.
<b>Rad Alpha Spec Analysis</b>													
<i>Alphaspec Am241, Cm, Solid ALL FSS</i>													
Americium-241	U	0.0488	+/-0.128	0.110	+/-0.128	0.303	pCi/g		JAS1	06/11/04	1323	338561	1
Curium-242	U	0.0318	+/-0.139	0.129	+/-0.139	0.361	pCi/g						
Curium-243/244	U	0.156	+/-0.232	0.201	+/-0.233	0.484	pCi/g						
<i>Alphaspec Pu, Solid-ALL FSS</i>													
Plutonium-238	U	0.0142	+/-0.076	0.0707	+/-0.0761	0.210	pCi/g		JAS1	06/10/04	0944	338562	2
Plutonium-239/240	U	0.00	+/-0.0496	0.00	+/-0.0496	0.0686	pCi/g						
<i>Liquid Scint Pu241, Solid-ALL FSS</i>													
Plutonium-241	U	-0.559	+/-6.63	5.59	+/-6.63	11.5	pCi/g		JAS1	06/11/04	0245	338563	3
<b>Rad Gamma Spec Analysis</b>													
<i>Gammasepec, Gamma, Solid-FSS GAM &amp; ALL FSS</i>													
Actinium-228		0.474	+/-0.138	0.0439	+/-0.135	0.0942	pCi/g		SRB	06/08/04	0953	335651	4
Americium-241	U	0.00339	+/-0.0863	0.0575	+/-0.0846	0.118	pCi/g						
Bismuth-212		0.407	+/-0.186	0.103	+/-0.182	0.220	pCi/g						
Bismuth-214		0.564	+/-0.0793	0.0222	+/-0.0777	0.0471	pCi/g						
Cesium-134	U	0.0273	+/-0.0264	0.0172	+/-0.0258	0.0363	pCi/g						
Cesium-137		0.127	+/-0.0272	0.0127	+/-0.0266	0.0271	pCi/g						
Cobalt-60	U	-0.00247	+/-0.017	0.0141	+/-0.0167	0.0308	pCi/g						
Europium-152	U	0.0164	+/-0.0424	0.0378	+/-0.0415	0.0786	pCi/g						
Europium-154	U	-0.0227	+/-0.0514	0.0417	+/-0.0504	0.0902	pCi/g						
Europium-155	U	0.0392	+/-0.0449	0.0415	+/-0.044	0.0852	pCi/g						
Lead-212		0.552	+/-0.0636	0.0208	+/-0.0624	0.0431	pCi/g						
Lead-214		0.616	+/-0.0925	0.0252	+/-0.0907	0.0526	pCi/g						
Manganese-54	U	-0.0057	+/-0.0182	0.0151	+/-0.0178	0.032	pCi/g						
Niobium-94	U	-0.000592	+/-0.0136	0.0117	+/-0.0133	0.0248	pCi/g						
Potassium-40		11.2	+/-1.08	0.127	+/-1.06	0.280	pCi/g						
Radium-226		0.564	+/-0.0793	0.0222	+/-0.0777	0.0471	pCi/g						
Silver-108m	U	0.0033	+/-0.0154	0.0118	+/-0.0151	0.0247	pCi/g						
Thallium-208		0.170	+/-0.0364	0.0133	+/-0.0357	0.0282	pCi/g						
<b>Rad Gas Flow Proportional Counting</b>													
<i>GFPC, Sr90, solid-ALL FSS</i>													
Strontium-90		0.0722	+/-0.0182	0.0114	+/-0.024	0.0249	pCi/g		HOB1	06/03/04	1844	335956	5
<b>Rad Liquid Scintillation Analysis</b>													
<i>LSC, Tritium Dist, Solid-HTD2, ALL FSS</i>													
Tritium	U	-3.2	+/-4.29	3.83	+/-4.30	7.67	pCi/g		JLB1	06/11/04	2133	339628	6
<i>Liquid Scint C14, Solid FSS</i>													

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## Certificate of Analysis

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

Report Date: June 24, 2004

Page 2 of 3

Client Sample ID: 9535-0001-006F  
Sample ID: 113282020

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

Parameter	Qualifier	Result	Uncertainty	LC	TPU	MDA	Units	DF	Analyst	Date	Time	Batch	Mtd.
<b>Rad Liquid Scintillation Analysis</b>													
<i>Liquid Scint C14, Solid FSS</i>													
Carbon-14	U	-0.0219	+/-0.115	0.0976	+/-0.115	0.203	pCi/g		MWX	06/20/04	0901	342387	7
<i>Liquid Scint Fe55, Solid-ALL FSS</i>													
Iron-55	U	-49.7	+/-41.9	16.7	+/-41.9	34.8	pCi/g		JLB1	06/23/04	1430	342541	9
<i>Liquid Scint Ni63, Solid-ALL FSS</i>													
Nickel-63		15.8	+/-9.30	7.54	+/-9.30	15.3	pCi/g		JLB1	06/12/04	0531	339689	12
<i>Liquid Scint Tc99, Solid-ALL FSS</i>													
Technetium-99	U	0.319	+/-0.212	0.173	+/-0.212	0.351	pCi/g		DAJ1	06/18/04	2312	339685	13

### The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
Ash Soil Prep	Ash Soil Prep, GL-RAD-A-021B	AF1	05/21/04	1445	334895
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	MJM1	05/20/04	1441	334885

### The following Analytical Methods were performed

Method	Description
1	DOE EML HASL-300, Am-05-RC Modified
2	DOE EML HASL-300, Pu-11-RC Modified
3	DOE EML HASL-300, Pu-11-RC Modified
4	EML HASL 300, 4.5.2.3
5	EPA 905.0 Modified
6	EPA 906.0 Modified
7	EPA BERT C-01 Modified
8	EPA BERT C-01 Modified
9	DOE RESL Fe-1, Modified
10	DOE RESL Fe-1, Modified
11	DOE RESL Fe-1, Modified
12	DOE RESL Ni-1, Modified
13	DOE EML HASL-300, Tc-02-RC Modified

Surrogate/Tracer recovery	Test	Recovery%	Acceptable Limits
Americium-243	Alphaspec Am241, Cm, Solid ALL	77	(25%-125%)
Plutonium-242	Alphaspec Pu, Solid-ALL FSS	85	

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Project: Soils PO# 002332

Report Date: June 24, 2004

Page 3 of 3

Client Sample ID: 9535-0001-006F  
Sample ID: 113282020

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

Parameter	Qualifier	Result	Uncertainty	LC	TPU	MDA	Units	DF	Analyst	Date	Time	Batch	Mtd.
Carrier/Tracer Recovery		Liquid Scint Pu241, Solid-ALL FS			88								
Carrier/Tracer Recovery		GFPC, Sr90, solid-ALL FSS			103		(25%-125%)						
Carrier/Tracer Recovery		Liquid Scint Fe55, Solid-ALL FS			89								
Carrier/Tracer Recovery		Liquid Scint Ni63, Solid-ALL FS			69								
Carrier/Tracer Recovery		Liquid Scint Tc99, Solid-ALL FS			60								

### Notes:

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- 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.

*Heather Levee*

Reviewed by

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## Certificate of Analysis

Page 1 of 3

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

Parameter	Qualifier	Result	Uncertainty	LC	TPU	MDA	Units	DF	Analyst	Date	Time	Batch	Mid.
Rad Alpha Spec Analysis													
Alphaspec Am241, Cm, Solid ALL FSS													
Americium-241	U	0.0335	+/-0.0755	0.0516	+/-0.0756	0.174	pCi/g		JAS1	06/10/04	0943	338561	1
Curium-242	U	0.0316	+/-0.0619	0.00	+/-0.062	0.0855	pCi/g						
Curium-243/244	U	-0.0126	+/-0.0175	0.0423	+/-0.0175	0.156	pCi/g						
Alphaspec Pu, Solid-ALL FSS													
Plutonium-238	U	0.0345	+/-0.142	0.135	+/-0.142	0.351	pCi/g		JAS1	06/10/04	0943	338562	2
Plutonium-239/240	U	-0.0332	+/-0.0965	0.122	+/-0.0965	0.324	pCi/g						
Liquid Scint Pu241, Solid-ALL FSS													
Plutonium-241	U	2.61	+/-6.70	5.54	+/-6.70	11.4	pCi/g		JAS1	06/11/04	0316	338563	3
Rad Gamma Spec Analysis													
GammaSpec, Gamma, Solid-FSS GAM & ALL FSS													
Actinium-228		0.535	+/-0.119	0.0344	+/-0.117	0.0725	pCi/g		SRB	06/08/04	1203	335643	4
Americium-241	U	-0.0168	+/-0.0755	0.061	+/-0.074	0.125	pCi/g						
Bismuth-212		0.306	+/-0.167	0.0787	+/-0.163	0.165	pCi/g						
Bismuth-214		0.442	+/-0.062	0.0195	+/-0.0608	0.0406	pCi/g						
Cesium-134	U	0.0198	+/-0.0246	0.0138	+/-0.0241	0.0286	pCi/g						
Cesium-137		0.0544	+/-0.0266	0.0109	+/-0.0261	0.0227	pCi/g						
Cobalt-60	U	0.0057	+/-0.0118	0.0104	+/-0.0116	0.0222	pCi/g						
Europium-152	U	-0.00602	+/-0.0319	0.0274	+/-0.0312	0.0569	pCi/g						
Europium-154	U	-0.0185	+/-0.0348	0.0282	+/-0.0341	0.0604	pCi/g						
Europium-155	U	0.0536	+/-0.0418	0.0384	+/-0.0409	0.0787	pCi/g						
Lead-212		0.538	+/-0.0562	0.0172	+/-0.055	0.0353	pCi/g						
Lead-214		0.569	+/-0.0702	0.018	+/-0.0688	0.0375	pCi/g						
Manganese-54	U	0.00357	+/-0.0131	0.0112	+/-0.0128	0.0235	pCi/g						
Niobium-94	U	-0.00122	+/-0.0111	0.00948	+/-0.0109	0.0198	pCi/g						
Potassium-40		11.3	+/-0.987	0.0814	+/-0.967	0.177	pCi/g						
Radium-226		0.442	+/-0.062	0.0195	+/-0.0608	0.0406	pCi/g						
Silver-108m	U	-0.000399	+/-0.0112	0.00954	+/-0.011	0.0198	pCi/g						
Thallium-208		0.155	+/-0.0282	0.0102	+/-0.0276	0.0213	pCi/g						
Rad Gas Flow Proportional Counting													
GFPC, Sr90, solid-ALL FSS													
Strontium-90	U	0.0257	+/-0.0159	0.0138	+/-0.0169	0.0297	pCi/g		HOB1	06/03/04	1843	335956	5
Rad Liquid Scintillation Analysis													
LSC, Tritium Dist, Solid-HTD2, ALL FSS													
Tritium	U	-2.28	+/-3.80	3.35	+/-3.80	6.70	pCi/g		JLB1	06/11/04	2206	339628	6
Liquid Scint C14, Solid FSS													

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Project: Soils PO# 002332

Report Date: June 24, 2004

Page 2 of 3

Client Sample ID: 9535-0001-016F  
Sample ID: 113282021

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

Parameter	Qualifier	Result	Uncertainty	LC	TPU	MDA	Units	DF	Analyst	Date	Time	Batch	Mtd.
<b>Rad Liquid Scintillation Analysis</b>													
<i>Liquid Scint C14, Solid FSS</i>													
Carbon-14	U	-0.0695	+/-0.103	0.0895	+/-0.103	0.186	pCi/g		MWX	06/20/04	1003	342387	7
<i>Liquid Scint Fe55, Solid-ALL FSS</i>													
Iron-55	U	-63	+/-42.4	17.5	+/-42.5	36.5	pCi/g		JLB1	06/23/04	1502	342541	9
<i>Liquid Scint Ni63, Solid-ALL FSS</i>													
Nickel-63	U	14.1	+/-14.0	11.6	+/-14.0	23.5	pCi/g		JLB1	06/12/04	0703	339689	12
<i>Liquid Scint Tc99, Solid-ALL FSS</i>													
Technetium-99	U	0.383	+/-0.254	0.208	+/-0.254	0.422	pCi/g		DAJ1	06/19/04	0046	339685	13

### The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
Ash Soil Prep	Ash Soil Prep, GL-RAD-A-021B	AF1	05/21/04	1445	334895
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	MJM1	05/20/04	1441	334885

### The following Analytical Methods were performed

Method	Description
1	DOE EML HASL-300, Am-05-RC Modified
2	DOE EML HASL-300, Pu-11-RC Modified
3	DOE EML HASL-300, Pu-11-RC Modified
4	EML HASL 300, 4.5.2.3
5	EPA 905.0 Modified
6	EPA 906.0 Modified
7	EPA EERF C-01 Modified
8	EPA EERF C-01 Modified
9	DOE RESL Fe-1, Modified
10	DOE RESL Fe-1, Modified
11	DOE RESL Fe-1, Modified
12	DOE RESL Ni-1, Modified
13	DOE EML HASL-300, Tc-02-RC Modified

Surrogate/Tracer recovery	Test	Recovery%	Acceptable Limits
Americium-243	Alphaspec Am241, Cm, Solid ALL	79	(25%-125%)
Plutonium-242	Alphaspec Pu, Solid-ALL FSS	80	



# GENERAL ENGINEERING LABORATORIES, LLC

2040 Savage Road Charleston SC 29407 - (843) 558-8171 - 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 24, 2004

Page 3 of 3

Client Sample ID: 9535-0001-016F  
Sample ID: 113282021

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

Parameter	Qualifier	Result	Uncertainty	LC	TPU	MDA	Units	DF	Analyst	Date	Time	Batch	Mtd.
Carrier/Tracer Recovery		Liquid Scint Pu241, Solid-ALL FS			90								
Carrier/Tracer Recovery		GFPC, Sr90, solid-ALL FSS			100		(25%-125%)						
Carrier/Tracer Recovery		Liquid Scint Fe55, Solid-ALL FS			82								
Carrier/Tracer Recovery		Liquid Scint Ni63, Solid-ALL FS			49								
Carrier/Tracer Recovery		Liquid Scint Tc99, Solid-ALL FS			49								

### 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.
- I 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.

Heidi R. C. C. C.

Reviewed by

SOUTHEAST LANDFILL  
SURVEY UNIT 9535-0001

RELEASE RECORD

---

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

**Survey Release Record Scan Area Results**  
**Survey Unit 9535-0001**

**Survey Unit 9535-0001**

Survey Location	Background (cpm)	Action Level (cpm)	Reading (gross cpm)	Log Date	Log Time	E-600 S/N	Probe S/N
9535-01-001-BC-001	6,890	12,000	6,890	4/21/2004	8:17	1109	1009
9535-01-001-BC-001			5460	4/22/2004	9:53	1112	1005
9535-01-001-BC-002	8,540	12,000	8,540	4/21/2004	8:26	1110	1007
9535-01-001-BC-002			7160	4/22/2004	8:53	1109	1009
9535-01-001-BC-003	7,910	12,000	7,910	4/21/2004	12:53	1109	1009
9535-01-001-BC-003			7210	4/22/2004	14:03	1112	1005
9535-01-001-SC-001	6,890	12,000	6,790	4/21/2004	8:37	1109	1009
9535-01-001-SC-002	6,890	12,000	6,420	4/21/2004	8:43	1109	1009
9535-01-001-SC-003	6,890	12,000	7,210	4/21/2004	8:52	1109	1009
9535-01-001-SC-004	6,890	12,000	7,230	4/21/2004	8:58	1109	1009
9535-01-001-SC-005	6,890	12,000	6,360	4/21/2004	9:03	1109	1009
9535-01-001-SC-006	6,890	12,000	6,390	4/21/2004	9:08	1109	1009
9535-01-001-SC-007	6,890	12,000	7,160	4/21/2004	9:16	1109	1009
9535-01-001-SC-008	6,890	12,000	6,800	4/21/2004	9:21	1109	1009
9535-01-001-SC-009	6,890	12,000	7,100	4/21/2004	9:27	1109	1009
9535-01-001-SC-010	6,890	12,000	8,060	4/21/2004	9:32	1109	1009
9535-01-001-SC-011	6,890	12,000	6,180	4/21/2004	9:37	1109	1009
9535-01-001-SC-012	6,890	12,000	7,120	4/21/2004	9:44	1109	1009
9535-01-001-SC-013	6,890	12,000	7,230	4/21/2004	9:50	1109	1009
9535-01-001-SC-014	6,890	12,000	6,070	4/21/2004	9:56	1109	1009
9535-01-001-SC-015	6,890	12,000	6,970	4/21/2004	10:01	1109	1009
9535-01-001-SC-016	6,890	12,000	6,790	4/21/2004	10:06	1109	1009
9535-01-001-SC-017	6,890	12,000	7,420	4/21/2004	10:12	1109	1009
9535-01-001-SC-018	6,890	12,000	7,670	4/21/2004	13:00	1109	1009
9535-01-001-SC-019	6,890	12,000	7,330	4/21/2004	13:06	1109	1009
9535-01-001-SC-020	6,890	12,000	7,670	4/21/2004	13:10	1109	1009
9535-01-001-SC-021	7210	12000	7040	4/22/2004	14:09	1112	1005
9535-01-001-SC-022	7210	12000	6380	4/22/2004	14:12	1112	1005
9535-01-001-SC-023	7210	12000	6590	4/22/2004	14:16	1112	1005
9535-01-001-SC-024	7210	12000	6860	4/22/2004	14:21	1112	1005
9535-01-001-SC-025	8,540	12,000	8,120	4/21/2004	10:07	1110	1007
9535-01-001-SC-026	8,540	12,000	8,590	4/21/2004	10:02	1110	1007
9535-01-001-SC-027	8,540	12,000	7,340	4/21/2004	9:56	1110	1007
9535-01-001-SC-028	8,540	12,000	6,980	4/21/2004	9:48	1110	1007
9535-01-001-SC-029	8,540	12,000	7,710	4/21/2004	9:40	1110	1007
9535-01-001-SC-030	8,540	12,000	7,830	4/21/2004	9:34	1110	1007
9535-01-001-SC-031	8,540	12,000	7,100	4/21/2004	9:27	1110	1007
9535-01-001-SC-032	8,540	12,000	7,290	4/21/2004	9:20	1110	1007
9535-01-001-SC-033	8,540	12,000	7,380	4/21/2004	9:13	1110	1007
9535-01-001-SC-034	8,540	12,000	7,440	4/21/2004	9:06	1110	1007
9535-01-001-SC-035	8,540	12,000	8,370	4/21/2004	9:00	1110	1007
9535-01-001-SC-036	8,540	12,000	6,700	4/21/2004	8:53	1110	1007
9535-01-001-SC-037	8,540	12,000	8,470	4/21/2004	8:46	1110	1007

**Survey Release Record Scan Area Results**  
**Survey Unit 9535-0001**

**Survey Unit 9535-0001 cont'**

Survey Location	Background (cpm)	Action Level (cpm)	Reading (gross cpm)	Log Date	Log Time	E-600 S/N	Probe S/N
9535-01-001-SC-038	8,540	12,000	8,930	4/21/2004	8:38	1110	1007
9535-01-001-SC-039	7,910	12,000	7,240	4/21/2004	13:24	1109	1009
9535-01-001-SC-040	7,910	12,000	8,010	4/21/2004	13:32	1109	1009
9535-01-001-SC-041	7,910	12,000	7,550	4/21/2004	13:38	1109	1009
9535-01-001-SC-042	7,910	12,000	7,500	4/21/2004	13:43	1109	1009
9535-01-001-SC-043	7,910	12,000	7,780	4/21/2004	13:47	1109	1009
9535-01-001-SC-044	7,910	12,000	7,360	4/21/2004	13:51	1109	1009
9535-01-001-SC-045	7,910	12,000	8,010	4/21/2004	13:55	1109	1009
9535-01-001-SC-046	7,910	12,000	7,580	4/21/2004	14:00	1109	1009
9535-01-001-SC-046	7,910	12,000	7,610	4/21/2004	14:01	1109	1009
9535-01-001-SC-047	7,910	12,000	7,910	4/21/2004	14:04	1109	1009
9535-01-001-SC-048	7,910	12,000	7,270	4/21/2004	14:07	1109	1009
9535-01-001-SC-049	7,910	12,000	7,940	4/21/2004	14:12	1109	1009
9535-01-001-SC-050	7,910	12,000	7,350	4/21/2004	14:15	1109	1009
9535-01-001-SC-051	7,910	12,000	7,380	4/21/2004	14:18	1109	1009
9535-01-001-SC-052	7,910	12,000	7,290	4/21/2004	14:22	1109	1009
9535-01-001-SC-053	5460	12000	6910	4/22/2004	10:06	1112	1005
9535-01-001-SC-054	7160	12000	6960	4/22/2004	9:07	1109	1009
9535-01-001-SC-055	5460	12000	6780	4/22/2004	10:14	1112	1005
9535-01-001-SC-056	7160	12000	7450	4/22/2004	9:14	1109	1009
9535-01-001-SC-057	5460	12000	6900	4/22/2004	10:25	1112	1005
9535-01-001-SC-057	5460	12000	6280	4/22/2004	10:33	1112	1005
9535-01-001-SC-058	7160	12000	7690	4/22/2004	9:26	1109	1009
9535-01-001-SC-059	5460	12000	6880	4/22/2004	11:06	1112	1005
9535-01-001-SC-060	7160	12000	6850	4/22/2004	9:34	1109	1009
9535-01-001-SC-061	5460	12000	6980	4/22/2004	10:43	1112	1005
9535-01-001-SC-062	7160	12000	7970	4/22/2004	9:44	1109	1009
9535-01-001-SC-063	5460	12000	6470	4/22/2004	10:49	1112	1005
9535-01-001-SC-064	7160	12000	6760	4/22/2004	9:49	1109	1009
9535-01-001-SC-065	5460	12000	7630	4/22/2004	10:54	1112	1005
9535-01-001-SC-066	7160	12000	8330	4/22/2004	9:54	1109	1009
9535-01-001-SC-067	5460	12000	7320	4/22/2004	10:59	1112	1005
9535-01-001-SC-068	7160	12000	6770	4/22/2004	9:59	1109	1009
9535-01-001-SC-069	5460	12000	7380	4/22/2004	11:03	1112	1005
9535-01-001-SC-070	7160	12000	6660	4/22/2004	10:03	1109	1009
9535-01-001-SC-071	7160	12000	6090	4/22/2004	10:09	1109	1009

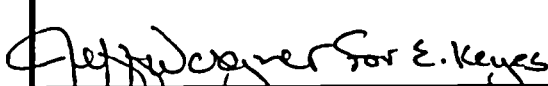
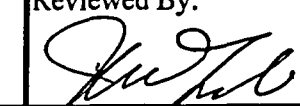
SOUTHEAST LANDFILL  
SURVEY UNIT 9535-0001

RELEASE RECORD

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Attachment 2d  
Split Sample Assessment Forms  
(2 Pages)



### Split Sample Assessment Form

Survey Area#:	9535	Survey Unit #:	0001	Survey Unit Name:	Southeast Landfill			
Sample Plan or WPIR#:					24265-000-GEN-9535-01017-000			
					SML #: 9535-0001-008			
<p>Sample Description: Comparison of split samples collected from sample measurement location #08 and analyzed using gamma spectroscopy by an off-site vendor laboratory. The standard sample was <u>9535-0001-008F</u>, the comparison sample was <u>9535-0001-008FS</u>.</p>								
STANDARD					COMPARISON			
Radionuclide	Activity Value	Standard Error	Resolution	Agreement Range	Activity Value	Standard Error	Comparison Ratio	Acceptable (Y/N)
Cs-137	8.49E-02	9.40E-03	9	0.6 1.66	1.72E-01	1.11E-02	2.03	N
K-40	1.22E+01	4.86E-01	25	0.75 1.33	1.10E+01	4.12E-01	0.90	Y
Ra-226	4.66E-01	2.96E-02	16	0.75 1.33	4.46E-01	3.06E-02	0.96	Y
<p>Comments/Corrective Actions: Reported cesium-137 concentrations were too low to effectively perform comparison. Performed split sample comparison using potassium-40 (K-40) and radium-226 (Ra-226). Potassium-40 and radium-226 comparisons satisfactory.</p>					<p>Table is provided to show acceptance criteria used to assess split samples.</p>			
					Resolution		Agreement Range	
					4	7	0.50	2.00
					8	15	0.60	1.66
					16	50	0.75	1.33
					51	200	0.80	1.25
> 200		0.85	1.18					
Performed By:			Date:		Reviewed By:			Date:
			2/17/03					2/17/03

WPIR – Work Plan and Inspection Record

SML – Sample Measurement Location designation

### Split Sample Assessment Form

Survey Area#:	9535	Survey Unit #:	0001	Survey Unit Name:	Southeast Landfill			
Sample Plan or WPIR#:					24265-000-GEN-9535-01017-000			
					SML #: 9535-0001-004			
<p>Sample Description: Comparison of split samples collected from sample measurement location #04 and analyzed using gamma spectroscopy by an off-site vendor laboratory. The standard sample was <u>9535-0001-004F</u>, the comparison sample was <u>9535-0001-004FS</u>.</p>								
STANDARD					COMPARISON			
Radionuclide	Activity Value	Standard Error	Resolution	Agreement Range	Activity Value	Standard Error	Comparison Ratio	Acceptable (Y/N)
Cs-137	9.73E-02	9.65E-03	10	0.6 1.66	9.71E-02	8.70E-03	1.00	Y
Comments/Corrective Actions: N/A					Table is provided to show acceptance criteria used to assess split samples.			
					Resolution		Agreement Range	
					4	7	0.50	2.00
					8	15	0.60	1.66
16	50	0.75	1.33					
51	200	0.80	1.25					
> 200		0.85	1.18					
Performed By:					Date:		Reviewed By:	
					2/17/05			
							2/17/05	

WPIR – Work Plan and Inspection Record

SML – Sample Measurement Location designation

SOUTHEAST LANDFILL  
SURVEY UNIT 9535-0001

RELEASE RECORD

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Attachment 2e  
Preliminary Data Review Form  
(1 Page)



## Preliminary Data Review Form - Samples for the Sign Test

Survey Unit: 9535- 0001  
 Survey Unit Name: Southeast Landfill  
 Classification: 1  
 Survey Media: Soil  
 Type of Survey: Final Status Survey  
 Type of Measurement: Radionuclide Specific  
 Number of Measurements: 15  
 Operational DCGL: 1

## BASIC STATISTICAL QUANTITIES

	Cs-137	Co-60
Minimum Value:	3.91E-02	-9.43E-03
Maximum Value:	3.13E-01	8.52E-03
Mean:	9.92E-02	-2.60E-04
Median:	8.94E-02	-6.93E-04
Standard Deviation:	6.54E-02	5.19E-03

Measurement standard deviation  
 of the weighted sum<sup>(1)</sup>: 2.35E-02

## RADIONUCLIDE CONCENTRATION (pCi/g)

NUMBER	Cs-137	Identified?	Co-60	Identified?
9535-0001-001F	7.05E-02	Y	7.00E-03	N
9535-0001-002F	9.89E-02	Y	-6.53E-03	N
9535-0001-003F	1.03E-01	Y	-6.93E-04	N
9535-0001-004F	9.73E-02	Y	-4.65E-03	N
9535-0001-005F	3.13E-01	Y	3.79E-03	N
9535-0001-006F	1.27E-01	Y	-2.47E-03	N
9535-0001-007F	8.94E-02	Y	-9.43E-03	N
9535-0001-008F	8.49E-02	Y	3.29E-03	N
9535-0001-009F	6.20E-02	Y	3.15E-03	N
9535-0001-010F	9.29E-02	Y	-2.22E-03	N
9535-0001-011F	1.38E-01	Y	8.52E-03	N
9535-0001-012F	4.12E-02	Y	-6.68E-03	N
9535-0001-013F	5.79E-02	Y	-1.51E-03	N
9535-0001-014F	7.26E-02	Y	2.30E-03	N
9535-0001-015F	3.91E-02	Y	2.23E-03	N

(1) MARSSIM Section I.11.3 eq. (I-17) describes the use of the measurement standard deviation of the weighted sum when measured concentrations of the various radionuclides are assumed to be uncorrelated (i.e., there is not a fixed ratio between the concentrations)

Performed By:

Date:

2-7-05

Independent Review:

Date:

2/17/05

SOUTHEAST LANDFILL  
SURVEY UNIT 9535-0001

RELEASE RECORD

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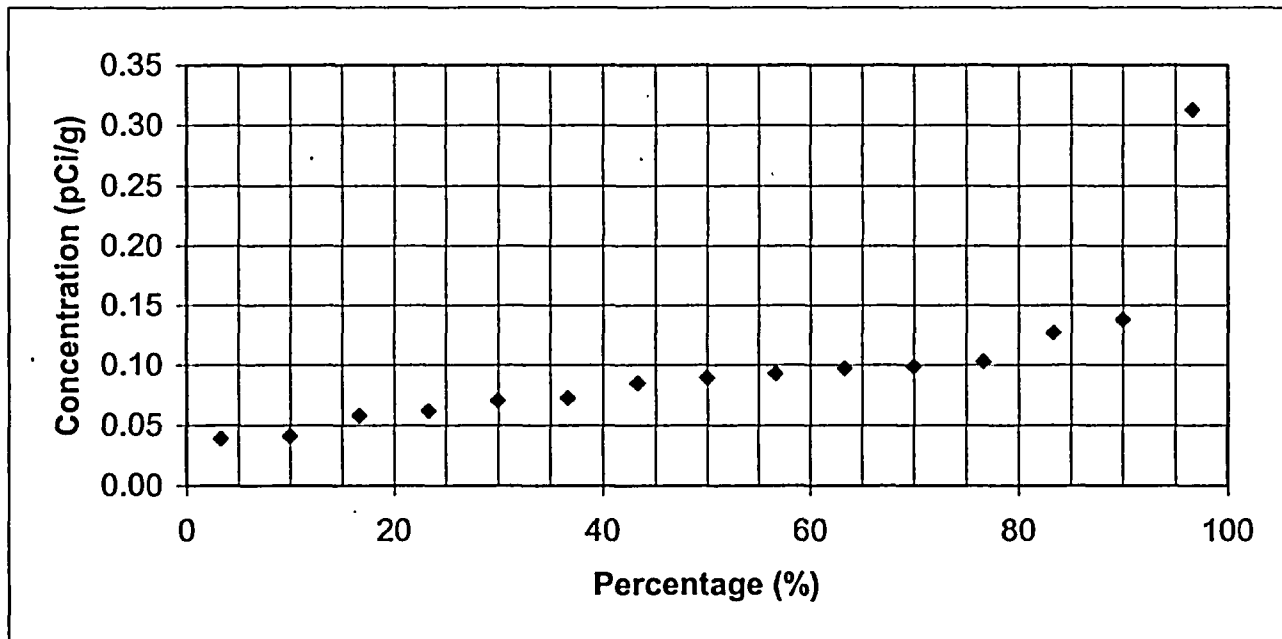
Attachment 2f  
Graphical Representation of Data  
(4 Pages)

## Quantile Plot For Cesium - 137

Survey Unit: 9535-0001

Survey Unit Name: Southeast Landfill

Mean: 9.92E-02 pCi/g



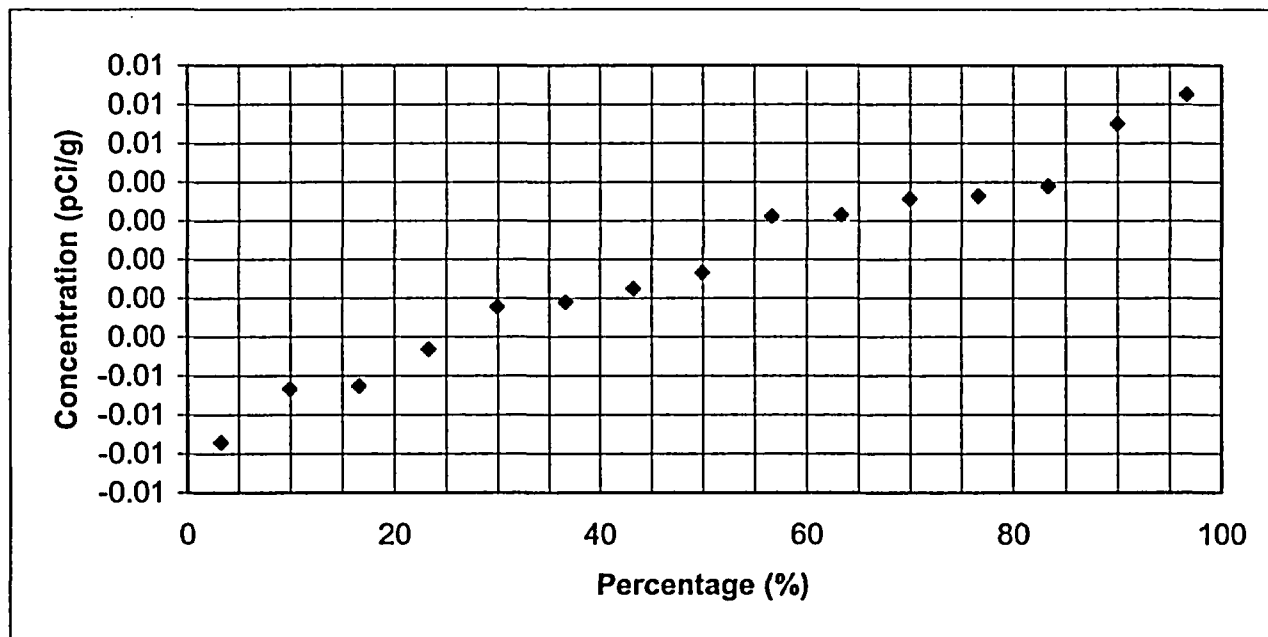
Cs-137	Rank	Percentage
3.91E-02	1	3 %
4.12E-02	2	10 %
5.79E-02	3	17 %
6.20E-02	4	23 %
7.05E-02	5	30 %
7.26E-02	6	37 %
8.49E-02	7	43 %
8.94E-02	8	50 %
9.29E-02	9	57 %
9.73E-02	10	63 %
9.89E-02	11	70 %
1.03E-01	12	77 %
1.27E-01	13	83 %
1.38E-01	14	90 %
3.13E-01	15	97 %

Prepared By: [Signature]Date: 2-7-05Reviewed By: [Signature]Date: 2/14/05

## Quantile Plot For Cobalt - 60

Survey Unit: 9535-0001

Survey Unit Name: Southeast Landfill

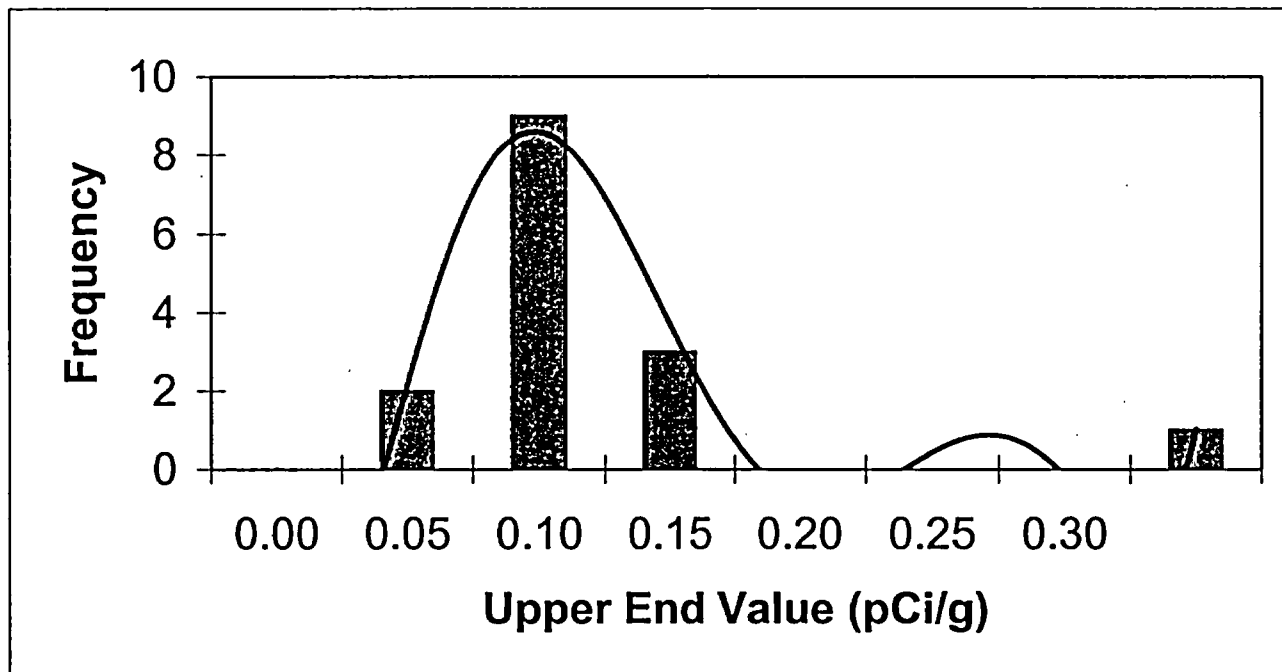
Mean:  $-2.60\text{E-}04$  pCi/g

Co-60	Rank	Percentage
-9.43E-03	1	3 %
-6.68E-03	2	10 %
-6.53E-03	3	17 %
-4.65E-03	4	23 %
-2.47E-03	5	30 %
-2.22E-03	6	37 %
-1.51E-03	7	43 %
-6.93E-04	8	50 %
2.23E-03	9	57 %
2.30E-03	10	63 %
3.15E-03	11	70 %
3.29E-03	12	77 %
3.79E-03	13	83 %
7.00E-03	14	90 %
8.52E-03	15	97 %

Prepared By: [Signature]Date: 2-5-05Reviewed By: [Signature]Date: 2/17/05

## Frequency Plot For Cesium - 137

Survey Unit: 9535-0001  
Survey Unit Name: Southeast Landfill  
Mean: 9.918E-02 pCi/g



Upper End Value	Observation Frequency	Observation Frequency
0.00	0	0%
0.05	2	13%
0.10	9	60%
0.15	3	20%
0.20	0	0%
0.25	0	0%
0.30	0	0%
0.35	1	7%
Total	15	100%

Prepared By: \_\_\_\_\_

Date: \_\_\_\_\_

2-7-05

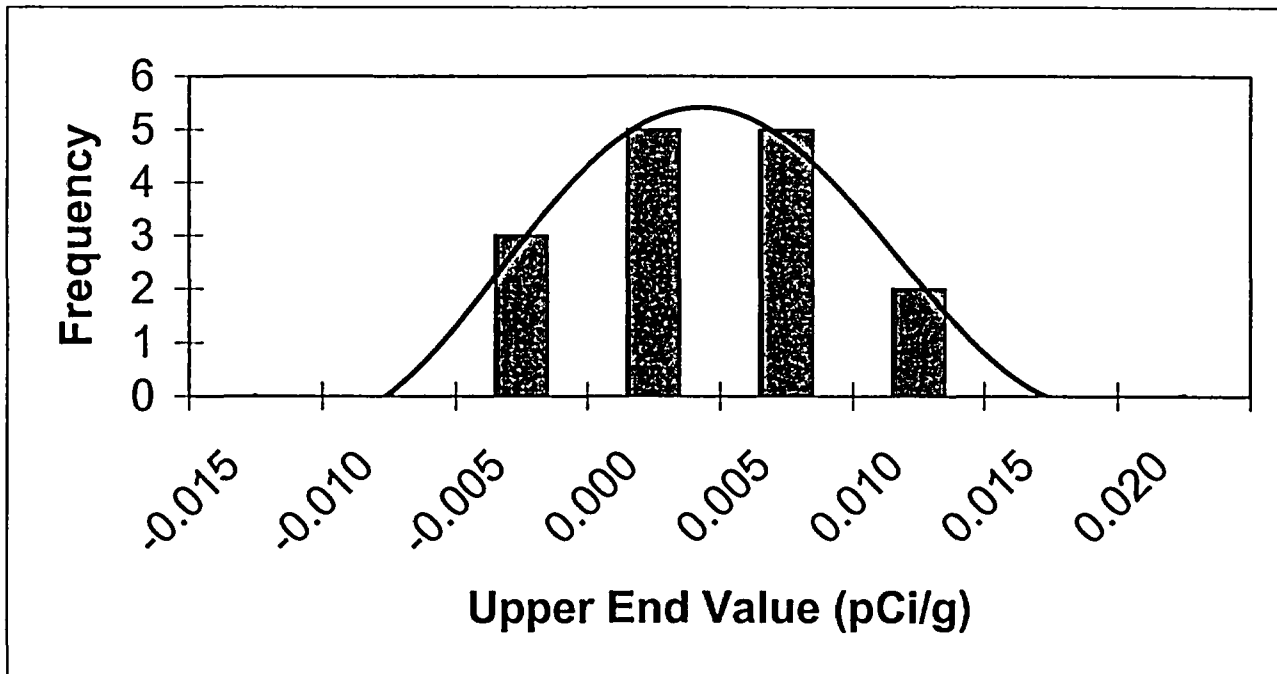
Reviewed By: \_\_\_\_\_

Date: \_\_\_\_\_

2/17/05

## Frequency Plot For Cobalt - 60

Survey Unit: 9535-0001  
Survey Unit Name: Southeast Landfill  
Mean: -2.602E-04 pCi/g



Upper End Value	Observation Frequency	Observation Frequency
-0.015	0	0%
-0.010	0	0%
-0.005	3	20%
0.000	5	33%
0.005	5	33%
0.010	2	13%
0.015	0	0%
0.020	0	0%
Total	15	100%

Prepared By: *Sam S. Kye*Date: 2-7-05Reviewed By: *John W. [Signature]*Date: 2/17/05

SOUTHEAST LANDFILL  
SURVEY UNIT 9535-0001

RELEASE RECORD

---

Attachment 2g  
Sign Test Calculation  
(1 Page)

## Sign Test Calculation Sheet For Multiple Radionuclides

Survey Unit Number: 9535-0001												
Survey Unit Name: Southeast Landfill												
WP&IR#: 24265-000-GEN-9535-01017-000												
Classification :	1	TYPE I ( $\alpha$ error):0.05	TYPE I ( $\beta$ error):0.05									
<table border="1"> <thead> <tr> <th>Radionuclides:</th> <th>Cs-137</th> <th>Co-60</th> <th>Unity</th> </tr> </thead> <tbody> <tr> <td>Survey Design DCGL (pCi/g):</td> <td>2.82</td> <td>1.52</td> <td>" 1 "</td> </tr> </tbody> </table>					Radionuclides:	Cs-137	Co-60	Unity	Survey Design DCGL (pCi/g):	2.82	1.52	" 1 "
Radionuclides:	Cs-137	Co-60	Unity									
Survey Design DCGL (pCi/g):	2.82	1.52	" 1 "									
Results Cs-137	Results Co-60	Ws	1-Ws	Sign								
7.05E-02	7.00E-03	2.96E-02	9.70E-01	1								
9.89E-02	-6.53E-03	3.08E-02	9.69E-01	1								
1.03E-01	-6.93E-04	3.61E-02	9.64E-01	1								
9.73E-02	-4.65E-03	3.14E-02	9.69E-01	1								
3.13E-01	3.79E-03	1.13E-01	8.87E-01	1								
1.27E-01	-2.47E-03	4.34E-02	9.57E-01	1								
8.94E-02	-9.43E-03	2.55E-02	9.75E-01	1								
8.49E-02	3.29E-03	3.23E-02	9.68E-01	1								
6.20E-02	3.15E-03	2.41E-02	9.76E-01	1								
9.29E-02	-2.22E-03	3.15E-02	9.69E-01	1								
1.38E-01	8.52E-03	5.45E-02	9.45E-01	1								
4.12E-02	-6.68E-03	1.02E-02	9.90E-01	1								
5.79E-02	-1.51E-03	1.95E-02	9.80E-01	1								
7.26E-02	2.30E-03	2.73E-02	9.73E-01	1								
3.91E-02	2.23E-03	1.53E-02	9.85E-01	1								
Number of Positive Differences (S+):				15								

Critical Value: 11

Survey Unit: Meets Acceptance Criterion

Performed By: 

Date: 2-7-05

Independent Review: 

Date: 2/17/05



SOUTHEAST LANDFILL  
SURVEY UNIT 9535-0001

RELEASE RECORD

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Attachment 2h  
COMPASS DQA Surface Soil Report With  
Retrospective Power Curve  
(3 Pages)

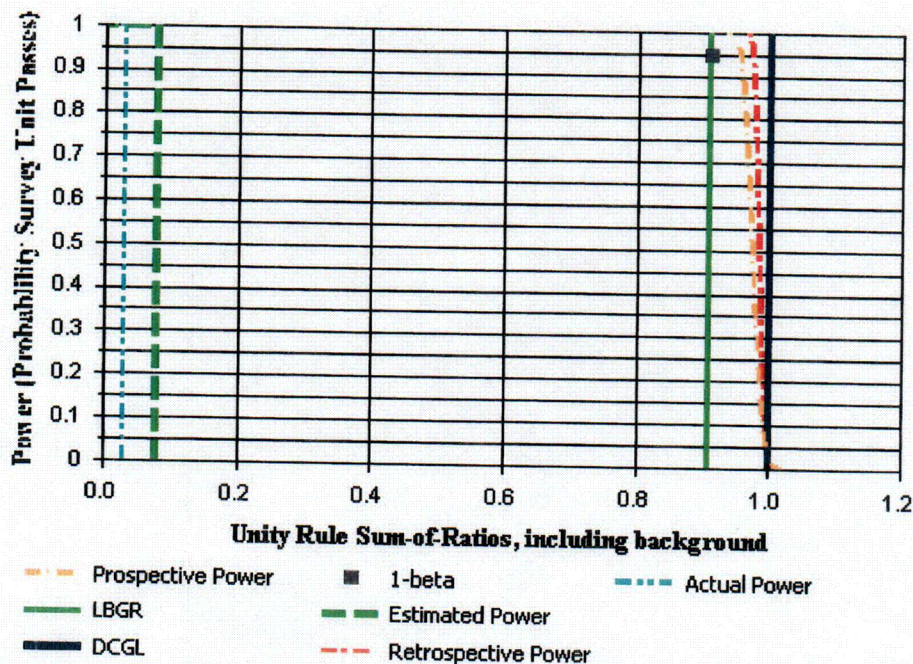


# DQA Surface Soil Report

## Assessment Summary

Site: 050207 FSS Cs 2.82 Co 1.52  
Planner(s): Eric S Keyes  
Survey Unit Name: SU 9535-0001  
Report Number: 1  
Survey Unit Samples: 15  
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)
9535-0001-001F	S	0.01	0.07
9535-0001-002F	S	-0.01	0.1
9535-0001-003F	S	0	0.1
9535-0001-004F	S	0	0.1
9535-0001-005F	S	0	0.31
9535-0001-006F	S	0	0.13
9535-0001-007F	S	-0.01	0.09
9535-0001-008F	S	0	0.08
9535-0001-009F	S	0	0.06
9535-0001-010F	S	0	0.09
9535-0001-011F	S	0.01	0.14
9535-0001-012F	S	-0.01	0.04
9535-0001-013F	S	0	0.06
9535-0001-014F	S	0	0.07
9535-0001-015F	S	0	0.04

## 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)
9535-0001-001F	S	0.03
9535-0001-002F	S	0.03
9535-0001-003F	S	0.04
9535-0001-004F	S	0.03
9535-0001-005F	S	0.11
9535-0001-006F	S	0.04
9535-0001-007F	S	0.03
9535-0001-008F	S	0.03
9535-0001-009F	S	0.02
9535-0001-010F	S	0.03
9535-0001-011F	S	0.05
9535-0001-012F	S	0.01
9535-0001-013F	S	0.02
9535-0001-014F	S	0.03
9535-0001-015F	S	0.02



# DQA Surface Soil Report

## Basic Statistical Quantities Summary

Statistic	Survey Unit	Background	DQO Results
Sample Number	15	N/A	N=15
Mean (SOR)	0.03	N/A	0.08
Median (SOR)	0.03	N/A	N/A
Std Dev (SOR)	0.02	N/A	0.04
High Value (SOR)	0.11	N/A	N/A
Low Value (SOR)	0.01	N/A	N/A