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Abstract
This document provides results of the MARSSIM Final Status Survey of Building 4020, and Building 4468 at the Santa Susana Field Laboratory. All measurements confirm that the area meets the release limits approved by the Department of Energy and the State of California, Department of Health Services. Accordingly, the area is suitable for release for unrestricted use.

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EXECUTIVE SUMMARY

Building 4020 (Hot Laboratory) was utilized for decladding and inspection of spent, nuclear fuel from 1959 until 1988. Demolition of the building was completed in from 1997 through 1998. Surveys conducted during that time proved soil areas beneath the building foundations, and surrounding yard areas were non-contaminated. After backfilling was completed, a comprehensive MARSSIM Final Status Survey of the facility was completed in September 1999.

This report presents of information regarding the MARSSIM Final Status Survey. The former Building 4020 site and surrounding areas were surveyed including a direct qualitative scan (100%) for surface gamma exposure, ambient gamma exposure rates at 1 meter above the ground, and soil sampling. All measurements were tested statistically for compliance with the regulatory approved derived concentration guideline limits (DCGLs) for mixed fission products, fuel materials, and ambient exposure rates.

As a result of the MARSSIM Final Status Survey, the highest ambient gamma measurement found was 3909 cpm (18.1 μR/hr)gross. The highest Cs-137 activity in soil was 0.24 pCi/g (gross), or less than 1% of the cleanup standard of 9.2 pCi/g (net). All radioisotope soil concentrations confirmed that Area 4020 is suitable for release without radiological restrictions.

1.0 INTRODUCTION

The Final Status Survey for Area 4020 followed the protocols of the Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM), Reference 6.1. The format of the plan followed closely the format suggested in Appendix A of Reference 6.1. The objective of the Final Status Survey was to demonstrate that no residual contamination remained that could result in any exposure or risk to current or future occupants.

2.0 HISTORY

2.1 Background

The Hot Laboratory (HL), also identified as Building 4020, was built in 1959 as the Component Development Hot Cell (CDHC) to conduct examinations of highly radioactive components and materials from the Sodium Reactor Experiment (SRE). Later, it was used in the disassembly and inspection of SNAP reactor cores, and the de-cladding of irradiated reactor fuel elements. It provided laboratory facilities for a variety of projects with low-level radioactive materials. Its last productive work was completed in May 1987 when the final package of de-clad fuel left the facility (see Figure 1).

The facility sat near the western end of Burro Flats in the Santa Susana Field Laboratory, directly west of Building T055, and somewhat southeast of Buildings T009 and T100. A paved area approximately 300 ft by 140 ft was fenced to establish the facility work area. Adjacent roadways and a parking lot were associated with the facility. The Hot Cell facility itself included a large monolithic structure with four hot cells, four connected decontamination rooms (one for each cell), and an underlying basement. Offices, change rooms, a machine shop, laboratories, and other support areas were provided in the building. Ventilation air was passed through HEPA filters and exhausted from a tall stack at the north end of the building. Potentially contaminated water was collected in a holdup tank that was originally located in the basement. An outbuilding, Building 4468, was added about1970 to contain a new radioactive liquid waste holdup tank, in a pit at the East Side of the facility. Sanitary sewage drained into a septic tank and leach field when the building was constructed, but the facility was connected to the Area III-IV sewage treatment plant about 1960.

Shielded radioactive items were usually brought into the building by use of the dock at the north end of the building, and transferred into the northernmost hot cell by way of rails that led to a shield port. During the fuel de-cladding projects, de-clad fuel and waste was transferred out in the same manner. These transfers were contained in sealed canisters. Radioactive materials were stored in a variety of casks and containers inside the building and in the adjacent Holdup Yard on the West Side of the facility.

Minor spills resulted in low levels of contamination in the soil along the West Side of the building. Spills occurring during the transfer of radioactively contaminated water from the Liquid Waste Holdup Tank contaminated some soil near the northwest corner of that building. Possible leaks from the piping, and through the building floor, may have contaminated extensive areas of soil around and under the building. Contamination from casks stored in the Holdup Yard potentially could have contaminated the soil in that area.

2.2 Decontamination and Decommissioning

Following termination of fuel decladding operations in 1987, initial and more intensive decontamination operations were started. Upon completion of the clean up of the hot cells and the decontamination rooms, all equipment (manipulators, periscopes, electrical supplies, etc.) was stripped from the central monolith. The concrete shielding was saw cut into discrete, removable blocks. Blocks that were found to have residual contamination were transferred to another facility (Building 4024) for more complete decontamination, while clean blocks were set aside for DHS approval to dispose of them as conventional waste. In 1996, the above grade portion of the facility was demolished.

The building foundations and basement were excavated in 1997. Rocketdyne, ORISE (Reference 6.2) and the State of California DHS sampled the remaining soil in the excavated hole and verified no contamination remained. The hole was then back-filled prior to the 1997-1998 rainy season.

In 1998, an ancillary building called the Radioactive Liquid Waste Storage (Building 4468) was demolished and excavated in addition to excavation of two leach pits. Although Building 4468 was found contaminated inside, the leach pits were not contaminated, and the soil surrounding all of these areas was not contaminated. Once again, Rocketdyne (Reference 6.3), ORISE (Reference 6.4), and the State of California DHS sampled soil from the excavation and verified no contamination remained. The excavated hole was back-filled prior to the 1998-1999 rainy season.

The remaining land was gridded, surveyed, and sampled as part of the final status survey following the Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM, Reference 6.1) protocols in the summer of 1999. Document RS-00006 (Reference 6.7) describes the survey design and procedures required that conducted that survey.

Figure 1, depicts the former buildings 4020, and 4468 relative to the Area IV grid map.

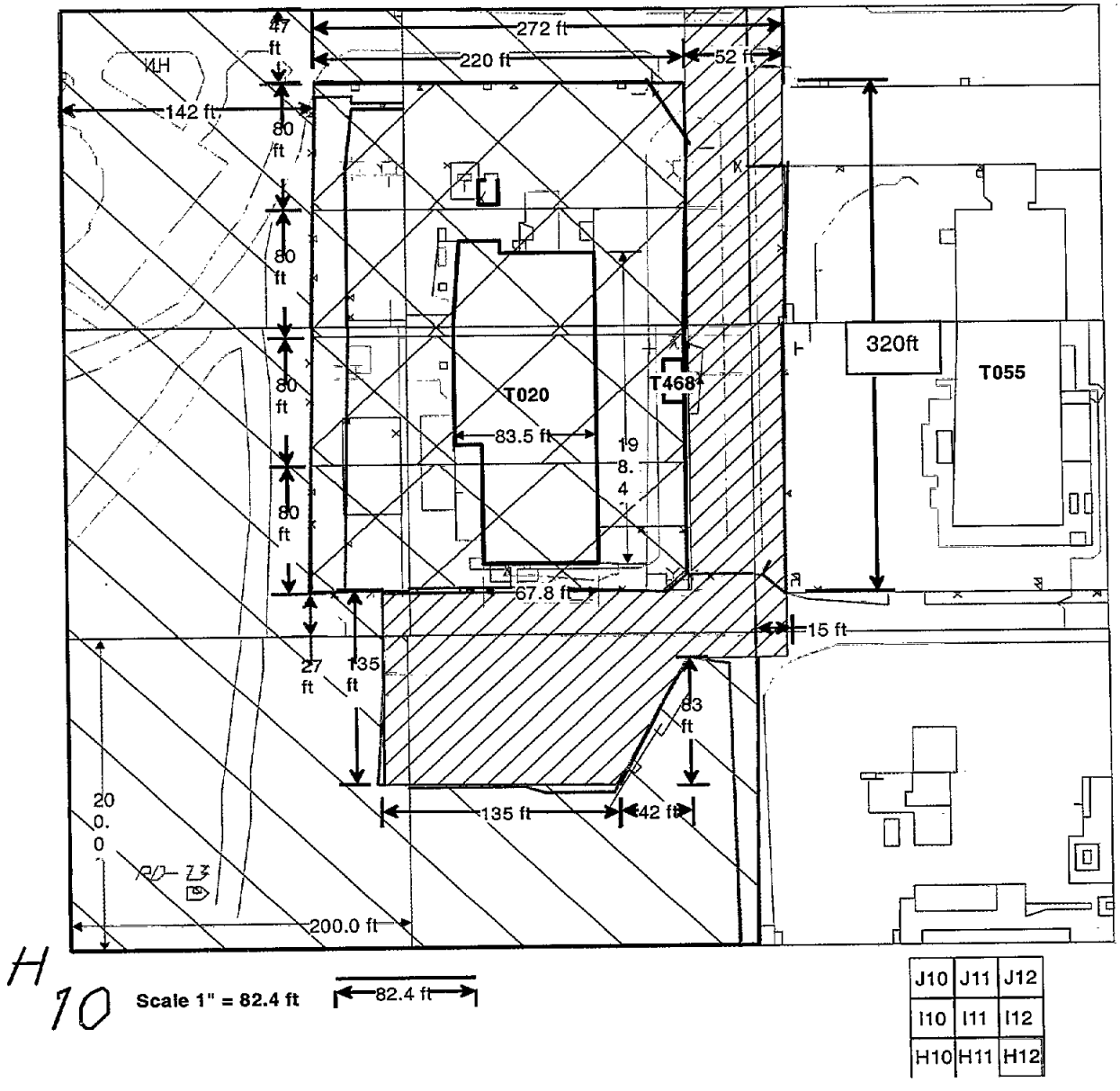


FIGURE 1: DIAGRAM OF FORMER BUILDING 4020 and 4468

3.0 SURVEY DESIGN

3.1 Identification of Radionuclides of Concern

The principle contaminant of concern at the Area 4020 was Cs-137. No other significant isotopes were found in the environment or soil without the adjoining presence of Cs-137. Cesium was therefore used as a tracer for all potential contaminants for the scanning portion of the survey (*refer to Section 3.9*) based on the Cs-137 delectability. Soil sample analysis was performed for all potential radionuclides of concern, including gamma emitting radionuclides, Sr-90, Am-241, and isotopic Plutonium, Thorium, and Uranium.

3.2 Derived Concentration Guideline Limits ($DCGL_w$)

The objective of this survey was to demonstrate that residual contamination in excess of the derived concentration guideline limits (DCGLs) was not present at the site. The $DCGL_w$ for Cs-137 in soil is 9.2 pCi/g above background. Soil radioisotope concentrations were compared to the soil clean-up standards ($DCGL_w$) as specified in Reference 6.5.

3.3 Classification of Areas

3.3.1 Impacted Areas

The impacted area was considered to be the area within geodetic land blocks **J10, J11, J12, I10, I11, I12, H10, H11**, and **H12** (*see Figure 2*).

3.3.2 Non-Impacted Area

Areas surrounding the impacted area were surveyed in earlier projects (Reference 6.6) and demonstrated to be non-contaminated. These surrounding areas were not part of the survey.

3.4 Identification of Survey Units

Table 1 of the MARSSIM Manual limits Survey Unit areas as follows:

CLASSIFICATION	MAX SURVEY UNIT AREA
Class I	2,000 m^2
Class II	2,000 m^2 to 10,000 m^2
Class III	No limit

TABLE 1: AREA CLASSIFICATION

Four Class I Survey Units were established within the original fenced area of the Hot Laboratory facility. Refer to Appendix A, Figure A1. The Class I, Survey Unit boundaries were located as follows, measuring from the southwest corner of the grid blocks listed:

Survey Unit	Block	Southwest Corner (ft)	Block	Northwest Corner (ft)	Block	Northeast Corner (ft)	Block	Southeast Corner (ft)
SU1	**J-10**	N72/E142	**J-10**	N152/E142	**J-11**	N152/E162	**J-11**	N72/E162
SU2	**I-10**	N187/E142	**J-10**	N72/E142	**J-11**	N72/E162	**I-11**	N187/E162
SU3	**I-10**	N107/E142	**I-10**	N187/E142	**I-11**	N187/E162	**I-11**	N107/E162
SU4	**I-10**	N27/E142	**I-10**	N107/E142	**I-11**	N107/E162	**I-11**	N27/E162

TABLE 2: CLASS I AREAS

One Class II Area Survey Unit was established to cover the parking lot to the south of the facility, plus the location of the original road (23rd St.) separating the Hot Lab from Building 4055. Refer to Appendix A, Figure A1. The Class II, consisted of two separate areas A and B, individual Survey Unit boundaries were located as follows, measuring from the southwest corner of the grid blocks listed:

Survey Unit	Block	Southwest Corner (ft)	Block	Northwest Corner (ft)	Block	Northeast Corner (ft)	Block	Southeast Corner (ft)
SU5A	**H-10**	N92/E180	**I-10**	N27/E180	**I-11**	N27/E162	**H-11**	N174/E162
SU5B	**H-11**	N174/E163	**J-11**	N177/E162	**J-12**	N177/E15	**H-12**	N175/E15

TABLE 3: CLASS II AREAS

The Class III Survey Unit comprised the remainder of the land within the Area IV grid blocks H-10, I-10, J-10, H-11, and J-11. Refer to Appendix A, Figure A1. The Class III, Survey Unit boundaries were located as follows, measuring from the southwest corner of the grid blocks listed:

Survey Unit 6 (SU6)
• Beginning at the southwest corner of grid survey grid **H-10**, from N0/E0 to N200/E180, the entire grid to the east boundary line where the Class II area begins. The additional area surrounding the Class II area within the **H-10** boundary. • Beginning at the southwest corner of grid survey grid **H-11**, from N0/E0 to N200/E200 around the Class II area boundaries. • Beginning at the southwest corner of grid survey grid **I-10**, from N0/E0 to N200/E142, the entire grid to the east boundary where the Class I area begins. The additional area surrounding the Class I area within the **I-10** boundary. • Beginning at the southwest corner of grid survey grid **J-10**, from N0/E0 to N200/E142 the entire grid to the east boundary line where the Class I area begins. *Refer to Figure 2.*

TABLE 4: CLASS III AREA

Figure 2 depicts all Survey Unit areas and measurements within the 200-ft by 200-ft grid block.

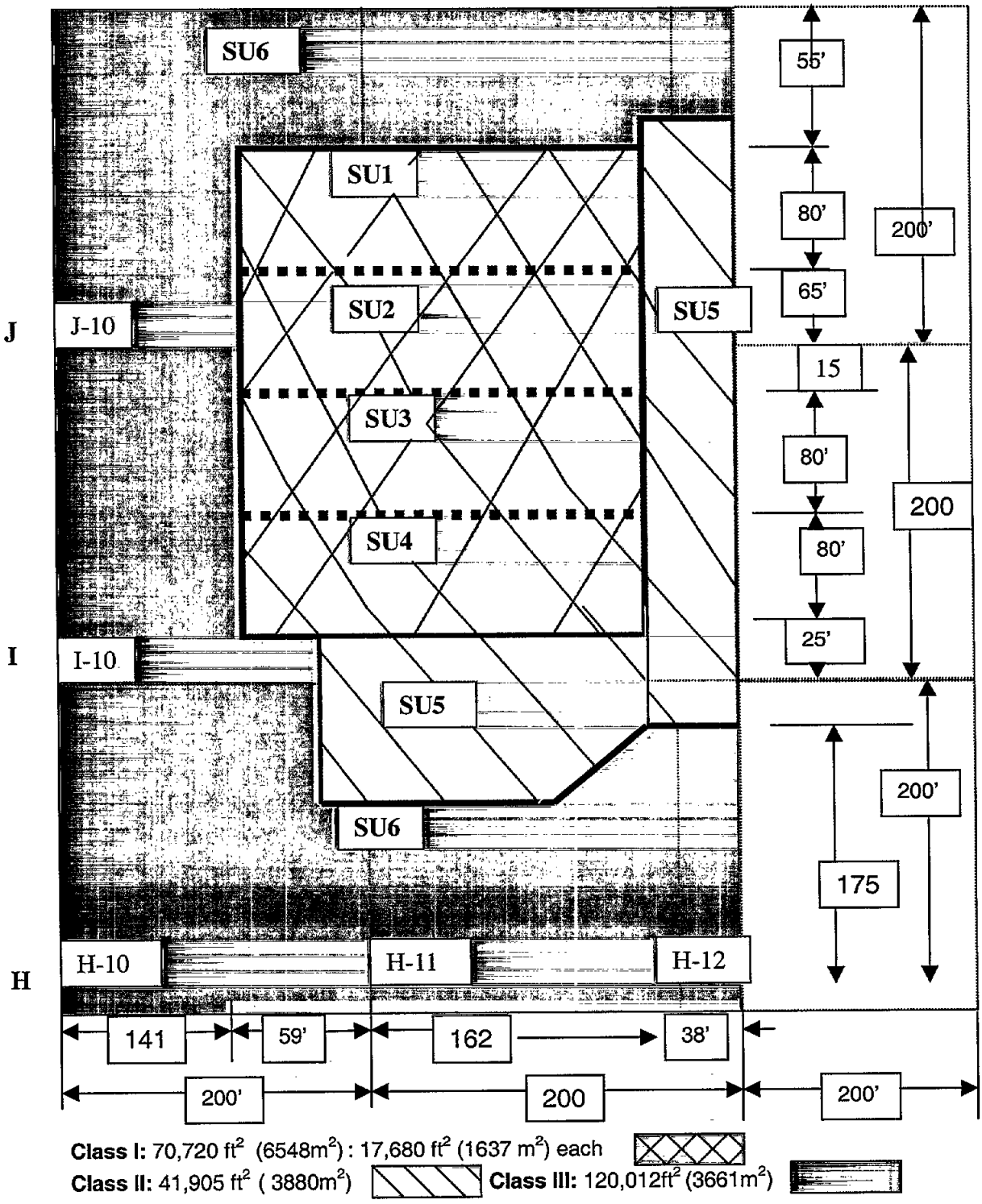


FIGURE 2: LOCATION OF THE SURVEY UNITS

3.5 Decision Objectives

- The objective of this survey was to achieve release of the area for unrestricted use.

- The null hypothesis (H_0) for the Survey Unit was that the residual radioactivity concentrations exceed the release criterion. The null hypothesis must be rejected for the site to be released for unrestricted use.

- Acceptable decision error probabilities shall be α (regulatory risk) = 0.05 and β (users risk) = 0.05. Alpha (α) is defined as the probability that the known hypothesis will be rejected when in fact it is true (e.g. *a contaminated site is declared clean*). Beta (β) is defined as the probability that the null hypothesis will be accepted when in fact it is false (e.g. *a clean site is declared contaminated*).

- The Derived Concentration Guideline Limits (DCGLw) for the primary contaminant of concern (Cs-137) shall be 9.2 pCi/g, equivalent to an annual dose to a residential user of 15 mrem/year.

- The Lower Bound of the Gray Area (LBGR) *shall be one half of the DCGLw* or 4.6 pCi/g of Cs-137.

- The regulator's risk (α) *shall be established* for the DCGLw.

- The user's (Rocketdyne) risk (β) *shall be established* at the LBGR.

3.5.1 Power Curve

The desired power curve indicated the gray region extended from 4.6 pCi/g to 9.2 pCi/g of Cs-137. The survey was designed for the statistical test to have a 95% power to decide the Survey Unit containing less than 4.2 pCi/g of Cs-137, met the release criterion. For the same test, a Survey Unit containing over 9.2 pCi/g of Cs-137 had less than 5% probability of being released.

3.6 Area Preparation

3.6.1 Number of Survey Units

There is a total of four (4), Class I, Survey Units, one (1) Class II Survey Unit, and one (1) Class III Survey Unit. The number of surface soil samples that were taken was derived in Section 3.7.

SURVEY UNIT	LENGTH x WIDTH	TOTAL AREA
SU1	221-ft x 80-ft (67.36-m x 24.38-m)	17680-ft^2 (1642.5-m^2)
SU2	221-ft x 80-ft (67.36-m x 24.38-m)	17680-ft^2 (1642.5-m^2)
SU3	221-ft x 80-ft (67.36-m x 24.38-m)	17680-ft^2 (1642.5-m^2)
SU4	221-ft x 80-ft (67.36-m x 24.38-m)	17680-ft^2 (1642.5-m^2)
SU5	**SU5A:** (135-ft x 135-ft) + (50-ft x 48-ft) + (85-ft x 48-ft) **SU5B:** (370-ft x 51-ft)	**SU5A:** 24,840-ft^2 (2307.7-m^2) **SU5B:** 18, 870-ft (1753.1-m^2) **TOTAL:** 43,710-ft (4060.8-m^2)
SU6	(25-ft x 273-ft) + (141-ft x 455-ft) + (39-ft x 135-ft) + (200-ft x 90-ft) + (215-ft x 90-ft) + (49-ft x 85-ft) + (51-ft x 85-ft)	120,012ft^2 (3661m^2)

TABLE 5: DIMENSIONS

3.7 Analysis Procedures

3.7.1 Statistical Test

Gross, concentrations for individual isotopes (non-background subtracted) were compared to the net $DCGL_W$s. In addition, for each Survey Unit, the multi-isotope Wilcoxon Rank Sum Test was performed. These tests are shown in Appendix D.

3.7.2 Relative Shift

The shift Δ is the $DCGL_w$ minus the LBGR ($\Delta = DCGL_w - LBGR$). In other words, the shift was the width of the gray region. σ is the expected standard deviation of the measurements of the Survey Unit. Based on prior sampling of the land and excavations at Area 4020, the σ for Cs-137 was 0.082 pCi/g.

The **relative shift** Δ/σ was therefore (9.2 - 4.6)/0.082 = 56

3.7.3 Number of Data Points (Soil Samples)

From Table 5.5 of Reference 1, the number of samples required for a relative shift of 56 and $\alpha = \beta = 0.05$ was 14.

Total number of sample points required per Survey Unit was 14.

3.8 Reference Coordinate System

3.8.1 Sample Point Spacing

For each Survey Unit, the grid spacing and scan area between sample points (for a square grid) were calculated as follows:
Scan Area = A, and $L = \sqrt{A}$ *= Distance between sample points.*

CLASS	SURVEY UNIT	TOTAL AREA per Survey Unit	SAMPLE GRID AREA [A/14]	GRID SPACING [√A/14]
Class I	SU1	17680-ft^2 (1642.5-m^2)	1262-ft^2 (117.3-m^2)	**35.5-ft (10.8-m)**
Class I	SU2	17680-ft^2 (1642.5-m^2)	1262-ft^2 (117.3-m^2)	**35.5-ft (10.8-m)**
Class I	SU3	17680-ft^2 (1642.5-m^2)	1262-ft^2 (117.3-m^2)	**35.5-ft (10.8-m)**
Class I	SU4	17680-ft^2 (1642.5-m^2)	1262-ft^2 (117.3-m^2)	**35.5-ft (10.8-m)**
Class II	SU5A	24, 840-ft^2 (2307.7-m^2)	1774.3-ft^2 (164.2-m^2)	**42.1-ft (12.84-m)**
Class II	SU5B	18,870-ft^2 (1753.1-m^2)	1347.8-ft2 (125.2-m^2)	**36.7-ft (11.1-m)**

TABLE 6: SAMPLE POINT SPACING

3.8.2 Starting Point Coordinates

In order to designate the starting point of soil sample locations, pair of random numbers was generated from Table 1.6 of the MARSSIM Manual, Reference 6.1. Rectangular coordinates from each Survey Unit were then calculated by multiplying by the dimensions of each Survey Unit.

Coordinate (length) X = 0.163601
Coordinate (width) Y = 0.140520

CLASS	SURVEY UNIT	X * LENGTH	Y * WIDTH OR HEIGHT	STARTING POINT COORDINATES
I	1	221-ft * 0.163601	80-ft * 0.140520	**X = 36-ft, Y = 11.3-ft (10.9-m, 3.4-m)**
I	2	221-ft * 0.163601	80-ft * 0.140520	**X = 36-ft, Y = 11.3-ft (10.9-m, 3.4-m)**
I	3	221-ft * 0.163601	80-ft * 0.140520	**X = 36-ft, Y = 11.3-ft (10.9-m, 3.4-m)**
I	4	221-ft * 0.163601	80-ft * 0.140520	**X = 36-ft, Y = 11.3-ft (10.9-m, 3.4-m)**
II	5A	183-ft * 0.163601	135-ft * 0.140520	**X = 30-ft, Y = 19-ft (9.1-m, 5.8-m)**
II	5B	52-ft * 0.163601	373-ft * 0.140520	**X = 25.5-ft, Y = 96.3-ft (7.7-m, 29.3-m)[1]**
III	6	180-ft * 0.163601	200-ft * 0.140520	**X = 29-ft, Y = 28-ft (7.7-m, 5-m)**

[1]Refer to Appendix A for starting point configuration with inaccessible area

TABLE 7: RANDOM STARTING POINT COORDINATES

3.8.3 Spacing

In summary, a minimum of 14 soil samples was taken at distances apart described in Table 6. The starting coordinates described in Table 7, were measured from the southwest corner of each Survey Unit.

3.9 Instrumentation and Techniques

3.9.1 Required Scan MDC

Scanning of soil sample grids will be performed to ensure small areas of contamination did not remain undetected. The $DCGL_w$ was calculated in RESRAD 5.6 using default of 10,000 m^2. Running RESRAD with smaller areas to a relatively higher release criteria. From Table 5.6 of Reference 6.1, the Area Dose Factor for 117 m^2 for Cs-137 is 1.4. Therefore the elevated measurement concentration $DCGL_{EMC}$ is: $DCGL_{EMC} = DCGL_W$ x Area Factor = 9.2 x 1.4 = 12.9 pCi/g

Required Scan MDC = 12.9 pCi/g

3.9.2 Actual Scan MDC

Surface scans were performed with a 1 in. x 1 in. NaI detector moving at 1 ft/sec. Actual scan MDC for this technique was calculated below following the procedure outlined in page 6-45 of MARSSIM, Reference 6.1.

Background = B = 3000 counts/min
Assumed hot spot dimensions = 1.5 ft x 1.5 ft
Assumed hot spot depth = 0.5 ft
Scan speed = 1 ft/sec
Observation interval = 1.5 sec
Delectability index 1.38
Surveyor efficiency 0.5
CPM/Exposure ratio = 215 cpm per µR/h

Minimum Detectable Count Rate (MDCR) =
$1.38 \times (3000 \times 1.5/60)^{0.5} / ((1.5/60) \times 0.5^{0.5}) = 676$ counts/min

Minimum Detectable Exposure Rate (MDE) = 676/215 = 3.1 µR/h

A microshield analysis was performed for the hot spot size defined above, for cesium-137 and its progeny barium-137 at a 1 pCi/g concentration and soil density of 1.4 g/cm3. The exposure rate at 2 in. from the surface was 0.3 µR/h.

Actual Scan MDC = 3.1/0.3 = **10.3 pCi/g**

Since the actual scan MDC of 10.3 pCi/g is less than the required scan MDC (or $DCGL_{EMC}$) of 12.9 pCi/g, the scanning technique is adequate for detecting hot spots above $DCGL_{EMC}$ between the soil sample locations. Therefore no adjustment to the number of soil samples to account for elevated activity is necessary.

3.9.3 Instrument Performance Check

Measurement integrity of the instruments was monitored throughout all parts of gamma surveys by periodic checks of the instrument's response to normal background radiation, and to a *Field Check Source.* A record of these instrument checks was maintained by the daily completion of Instrument Qualification Reports.

3.9.4 Environmental Calibration Site

The location where the instrument calibration and efficiency checks were conducted became across the street from Area 4020. The detector was source checked at the 1-meter height, and remained the daily source check area throughout the Area 4020 survey.

3.9.5 Representative Reference Background Areas for Soil Radioisotopes

3.9.5.1 Soil

When performing the WRS Test, samples from a "reference" background area to the immediate south of the Santa Susana Field Lab (SSFL) were used. These samples taken in 1998 are judged as representative since the geology and terrain are similar to the SSFL.

3.9.5.2 Exposure level

Background exposure levels were obtained at locations surrounding the Class I and Class II areas. The average background ambient dose rate was 13.3 µR/hr as shown in Table 8.

		AMBIENT		SURFACE WALK-ABOUT	
SECTOR	LOCATION	GROSS CPM	µR/hr	GROSS CPM	µR/hr
K-11	N50E200	3017	14	3280	15.3
K-10	N50E200	2622	12.2	3332	15.5
K-9	N50E150	2705	12.6	3305	15.4
J-9	N175E125	2436	11.3	3187	14.8
I-9	N200E150	2547	11.8	3237	15.1
H-9	N200E160	2641	12.3	3240	15.1
G-9	N200E175	3283	15.3	3451	16.1
G-9	N175E200	3301	15.4	3430	16.0
G-10	N175E200	3150	14.7	3279	15.3
G-11	N150E185	2804	13	3369	15.7
AVERAGE		**2850.6**	**13.3**	**3311**	**15.4**

TABLE 8: BACKGROUND EXPOSURE LEVELS

3.9.6 Ambient Survey Detector Fixtures

To accurately obtain a 1-meter ambient gamma measurement at each sample point location, the sodium iodide detector was mounted on a lightweight PVC fixture. This fixture held the detector oriented towards the ground at a 1-meter height. Its use facilitated quick placement at each measurement location, while eliminating errors due to detector distance or orientation.

3.9.7 Walk-about Survey Detector Fixtures

During the walk-about survey, a sodium iodide detector probe was mounted at the end of a balanced boom, so the surveyor could sweep the probe over a large area while walking along the survey path. The fixture for this survey had a length of stainless steel tubing for the boom, with a bracket at one end to hold the detector upright to the ground, and a counterbalance weight at the other end. A shoulder strap was attached to the balance point of the fixture. The arrangement allowed the surveyor to sweep the detector over an area about 5 feet wide while walking a straight line.

3.9.8 Pre-survey Preparation

Brush was cleared from the survey unit prior to conducting the Final Status Survey.

4.0 SURVEY RESULTS

4.1 Surface Exposure Rate Results

4.1.1 Class I, Survey Units 1 through 4

The average, gross surface walk-about exposure level observed for all four Class I Survey Units was 3125 cpm (14.5 μR/hr). The maximum surface walk-about exposure level observed for all four Class I Survey Units was 3800 cpm (17.7 μR/hr). When the average surface background level of 3311 cpm (15.4 μR/hr) was subtracted from the maximum surface exposure level, the result was 489 cpm (2.3 μR/hr), well below the $DCGL_w$ criteria.

4.1.2 Class II, Survey Units 5A and5B

The average, gross surface walk-about exposure level observed for both Survey Units 5A and B Was 3250 cpm (15.1 μR/hr). The maximum surface walk-about exposure level observed for both Survey Units 5A and B was 4000 cpm (18.6 μR/hr). When the average surface background level of 3311 cpm (15.4 μR/hr) was subtracted from the maximum surface exposure level, the result was 689 cpm (3.2 μR/hr), again well below the $DCGL_w$ criteria.

4.1.3 Class III, Survey Unit 6

The average, gross surface walk-about exposure level observed was 3300 cpm (15.3 μR/hr). The maximum surface walk-about exposure level observed was 3800 cpm (17.7 μR/hr). When the average surface background level of 3311 cpm (15.4 μR/hr) was subtracted from the maximum surface exposure level, the result was 489 cpm (2.3 μR/hr), below the $DCGL_w$ criteria.

4.2 Ambient Exposure Rates

Background
Nominal background exposure rates were measured at locations surrounding the Class I and Class II areas. The average background was 2851 cpm (13.3 μR/hr). See Table 8.

Survey Unit 1
The average, gross, 1-meter ambient exposure level observed was 3150 cpm (14.7 μR/hr). The maximum 1-meter ambient exposure level was 3565 cpm (16.6 μR/hr). When the average ambient background level of 2851 cpm (13.3 μR/hr) was subtracted from these numbers, the net average and maximum 1-meter ambient exposure levels were 299 cpm (1.4 μR/hr), and 714 cpm (3.3 μR/hr) respectively. Both these numbers are below the approved $DCGL_W$ of 5 μR/hr above background (see Appendix B).

Survey Unit 2
The average, gross, 1-meter ambient exposure level observed was 3066 cpm (14.3 μR/hr).
The maximum 1-meter ambient exposure level was 3454 cpm (16 μR/hr). When the average ambient background level of 2851 cpm (13.3 μR/hr) was subtracted from these numbers, the net average and maximum 1-meter ambient exposure levels were 215 cpm (1 μR/hr), and 603 cpm (2.8 μR/hr) respectively. Both these numbers are below the approved $DCGL_W$ of 5 μR/hr above background (see Appendix B).

Survey Unit 3
The average, gross, 1-meter ambient exposure level observed was 3007 cpm (14 μR/hr).
The maximum 1-meter ambient exposure level was 3219 cpm (15 μR/hr). When the average ambient background level of 2851 cpm (13.3 μR/hr) was subtracted from these numbers, the net average and maximum 1-meter ambient exposure levels were 156 cpm (0.7 μR/hr), and 368 cpm (1.7 μR/hr) respectively. Both these numbers are below the approved $DCGL_W$ of 5 μR/hr above background (see Appendix B).

Survey Unit 4
The average, gross, 1-meter ambient exposure level observed was 3030 cpm (14.1 μR/hr).
The maximum 1-meter ambient exposure level was 3210 cpm (14.9 μR/hr). When the average ambient background level of 2851 cpm (13.3 μR/hr) was subtracted from these numbers, the net average and maximum 1-meter ambient exposure levels were 179 cpm (0.8 μR/hr), and 359 cpm (1.7 μR/hr) respectively. Both these numbers are below the approved $DCGL_W$ of 5 μR/hr above background (see Appendix B).

Survey Unit 5
The average, gross, 1-meter ambient exposure level observed was 3028 cpm (14.1 μR/hr).
The maximum 1-meter ambient exposure level was 3909 cpm (18.2 μR/hr). When the average ambient background level of 2851 cpm (13.3 μR/hr) was subtracted from these numbers, the net average and maximum 1-meter ambient exposure levels were 177 cpm (0.8 μR/hr), and 1058 cpm (4.9 μR/hr) respectively. Both these numbers are below the approved $DCGL_W$ of 5 μR/hr above background (see Appendix B).

Survey Unit 6
The average, gross, 1-meter ambient exposure level observed was 3139 cpm (14.6 μR/hr).
The maximum 1-meter ambient exposure level was 3399 cpm (15.8 μR/hr). When the average ambient background level of 2851 cpm (13.3 μR/hr) was subtracted from these numbers, the net average and maximum 1-meter ambient exposure levels were 288 cpm (1.3 μR/hr), and 548 cpm (2.5 μR/hr) respectively. Both these numbers are below the approved $DCGL_W$ of 5 μR/hr above background (see Appendix B).

4.3 Soil Radioisotope Concentrations

Soil radioisotope concentrations are shown in Appendix C, and the WRS Tests are shown in Appendix D for each Survey Unit. A set of 24 background soil samples for a mountainous area immediately to the south of the SSFL were used for the reference background (see Reference 6.8). These data were used in the WRS Test for each Survey Unit.

4.3.1 Cesium Re-analysis

All samples required re-analysis. The radiochemistry laboratory initially performed gamma spectroscopy using small volume aliquots and low count times. This action resulted in minimum detectable activities (MDA)'s for Cs-137 at 0.2 to 0.4 pCi/gm. This exceeded the contractually required 0.02 pCi/gm MDA for Cs-137. Subsequently, all except 1 of the samples of the Cs-137 results were non-detects. As a result, a re-analysis was requested for all samples for gamma spectroscopy. The re-analyses results achieved the required MDA range of approximately 0.02 pCi/gm. The gamma spectroscopy re-analyses for Cs-137 are utilized in the balance of Section 4.3, and in Appendices C and D of this report.

4.3.2 Plutonium, Uranium, and Strontium Re-analysis

Thirteen Pu-238 analyses, four Pu-239 analyses, one U-238 analyses, and one strontium analyses appeared anomalous when viewed in the light of the remaining data set. Although much less than the clean-up standards, some of the plutonium results appeared somewhat elevated in comparison to the expected background levels. The Sr-90 sample at 22 pCi/gm was significantly higher than background. Although re-analysis of this sample indicated 0.54 pCi/gm, the area was remediated for ALARA reasons.

The radiochemistry laboratory was requested to re-analyze the 18 samples for these analytes. The resulting re-analysis showed most samples to be either non-detects, or significantly less than the original set of results. Both the original and re-analyses results are shown and compared in Table D1 of Appendix D. The re-analyzed results, including any re-analyzed results Quanterra added for the same sample are reported in the remainder of this Section, in the data Tables found in Appendix C, and in the WRS tests in Appendix D. The re-analyzed samples are indicated by the bolding type found in the tables. The relatively minor difference in the two sets of results did not affect the conclusion of the of the WRS test.

4.3.3 Survey Unit 1 Wilcoxon Rank Sum Test (see Tables C1 through C11for sample results)

The original sum of the reference area ranks was 623. After the re-analysis, the sum of the reference ranks was 632. Both sums exceeded the critical value for 14 samples and 24 reference samples of 522. Therefore, the Null Hypothesis is rejected for survey Unit 1. The survey unit meets the requirements for unrestricted use.

4.3.4 Survey Unit 2 Wilcoxon Rank Sum Test (see Tables C12 through C22 for sample results)

The original sum of the reference area ranks was 636. After the re-analysis, the sum of the ranks remained 636. Both sums are identical, and exceeded the critical value for 14 samples and 24 reference samples of 522. Therefore, the Null Hypothesis is rejected for Survey Unit 2. The survey unit meets the requirements for unrestricted use.

4.3.5 Survey Unit 3 Wilcoxon Rank Sum Test (see Tables C23 through C33 for sample results)

The original sum of the reference area ranks was 632. After the re-analysis, the sum of the ranks was 630. Both sums exceeded the critical value for 14 samples and 24 reference samples of 522. Therefore, the Null Hypothesis is rejected for Survey Unit 3. The survey unit meets the requirements for unrestricted use.

4.3.6 Survey Unit 4 Wilcoxon Rank Sum Test (see Tables C34 through C44 for sample results)

The sum of the reference area ranks was 578. After the re-analysis, the sum of the ranks was 586. These sums exceeded the critical value for 14 samples and 24 reference samples of 522. Therefore, the Null Hypothesis is rejected for Survey Unit 4. The survey unit meets the requirements for unrestricted use.

4.3.7 Survey Unit 5 Wilcoxon Rank Sum Test (see Tables C45 through C55 for sample results)

The sum of the reference area ranks was 624. After the re-analysis, the sum of the ranks was 621. These sums exceeded the critical value for 14 samples and 24 reference samples of 522. Therefore, the Null Hypothesis is rejected for Survey Unit 5. The survey unit meets the requirements for unrestricted use.

4.3.8 Survey Unit 6 Wilcoxon Rank Sum Test (see Tables C56 through C66 for sample results)

The sum of the reference area ranks was 602. After the re-analysis, the sum of the ranks was 603. These sums exceeded the critical value for 14 samples and 24 reference samples of 522. Therefore, the Null Hypothesis is rejected for Survey Unit 6. The survey unit meets the requirements for unrestricted use.

4.4 Soil Sampling During Facility Demolition (1997-1998)

During the 1996-1997 excavation of Area 4020 and surrounding asphalt and concrete, soil samples were taken to verify that any soil left in place and used as backfill met the release limits. Gamma spectroscopy was performed on these soil samples. Appendix E shows the results. The only man-made isotope detected was Cs-137. All samples were well below the clean-up standard of 9.2 pCi/gm. Subsequently, ORISE performed verification sampling and reported results in Reference 6.2. All sample results met release limits and the excavation was determined suitable for unrestricted use and backfilling.

During the 1998 excavation of Building 4468, soil samples were screened for contamination. Results of the sampling were reported in Reference 6.3 that is attached in Appendix F. Subsequently, ORISE performed verification sampling and reported results in Reference 6.4. All sample results met release limits and the excavation was determined suitable for unrestricted use and backfilling.

In addition to the ORISE verification sampling, the California Department of Health Services (DHS) and Radiological Health Services (RHS) also performed verification soil sampling of both the excavations. They did not detect any anomalous results.

5.0 CONCLUSION

All radiation exposure measurements and soil radioisotope concentrations were below the Department of Energy and the State of California Department of Health Services (DHS) approved $DCGL_W$s. Soil concentrations passed the multi-isotopic WRS Test for each survey unit. Based on the results of the investigations reported here, Area 4020 meets the Department of Energy and State of California Department of Health Services approved acceptance criteria. The area is therefore suitable for release for "unrestricted use" with no radiological restrictions.

6.0 REFERENCES

6.1 Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM), December 1997.

6.2 ORISE Letter from T.J. Vitkus to D. Williams, "Interim Letter Report for the Verification Survey of the Land Area Formerly Supporting the Hot Laboratory, Santa Susana Field Laboratory, Canoga Park, California", January 29, 1998, 002261RC.

6.3 Rocketdyne Internal Letter from John Shao to Phil Rutherford, "Soil Sampling Results for Buildings 4468 and 4020 at SSFL", August 3, 1998, SHEA 015873.

6.4 ORISE Letter from T.J. Vitkus to A. Gupta, "Interim Letter Report for the Phase II Verification Survey of the Land Area Formerly Supporting the Hot Laboratory, Santa Susana Field Laboratory, Canoga Park, California", January 25, 1999, 000991RC.

6.5 Rocketdyne Report N001SRR140131, "Approved Sitewide Release Criteria for Remediation of Radiological Facilities at SSFL", February 18, 1999.

6.6 Rocketdyne Report A4CM-2R-0011, "Area IV Radiological Characterization Survey", August 15, 1996.

6.7 Rocketdyne Procedure (R21-RF)RS-00006, "Area 4020, MARSSIM Final Status Survey Procedure", P. Liddy, August 6, 1999

6.8 "Bell Canyon Area Soil Sampling Report, Ventura County, California, Volume 1", Ogden Environmental and Energy Services, Dixie A. Hambrick, October 1998.

APPENDIX A

FIGURE A1: SOUTHWEST CORNERS OF THE SURVEY UNITS

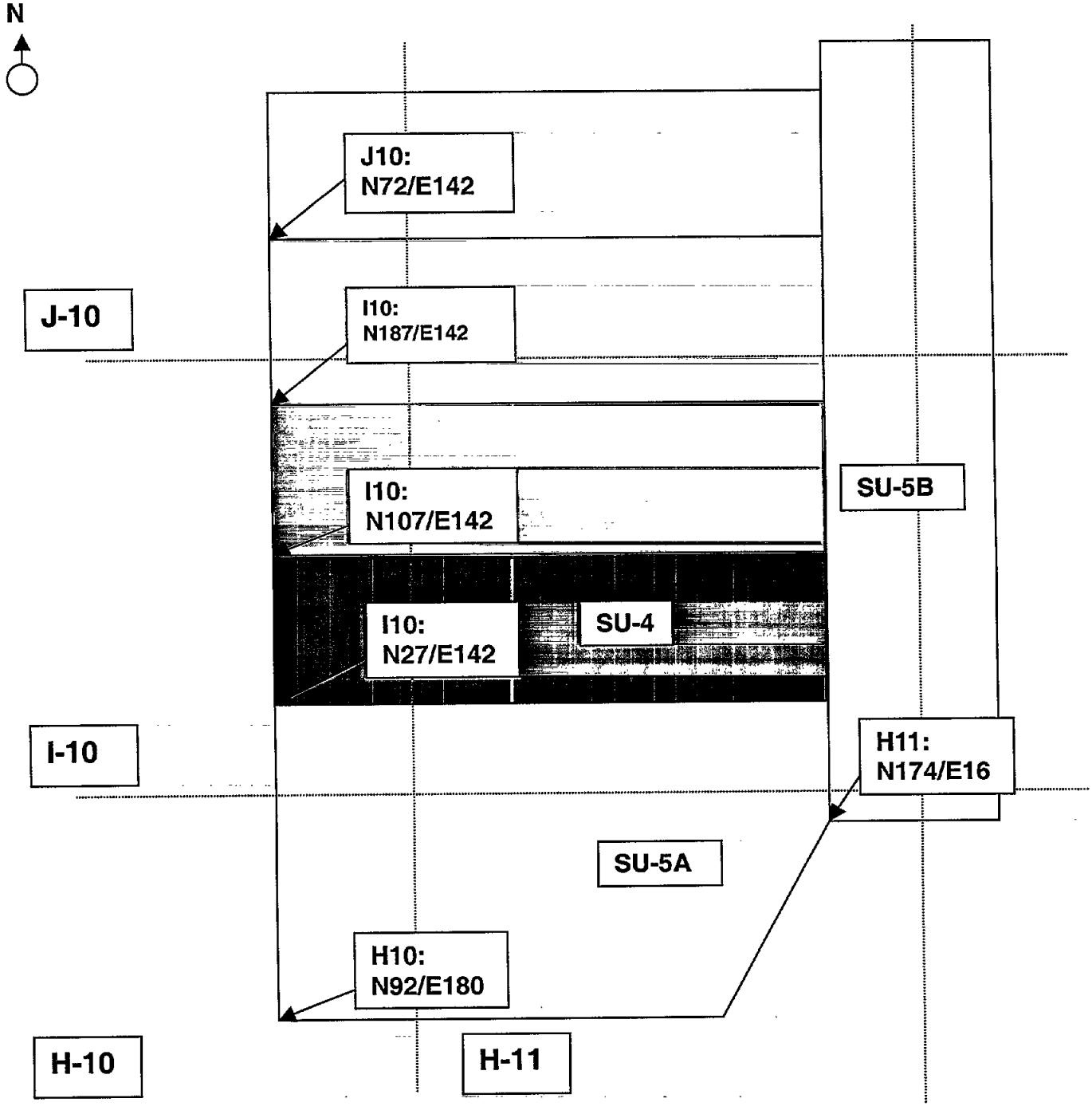
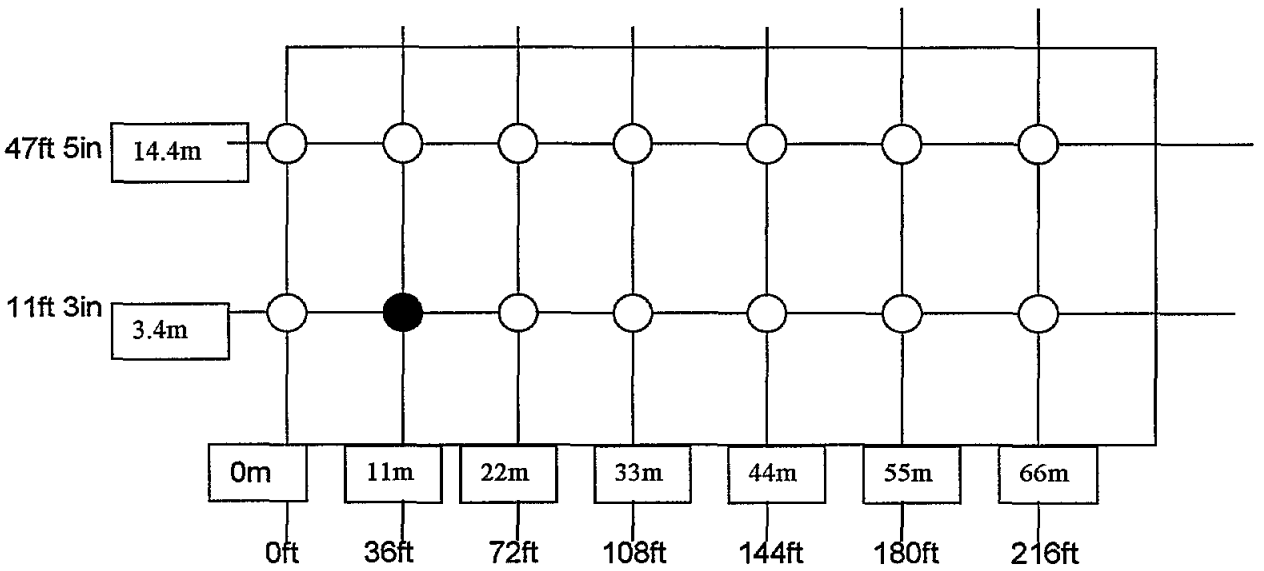


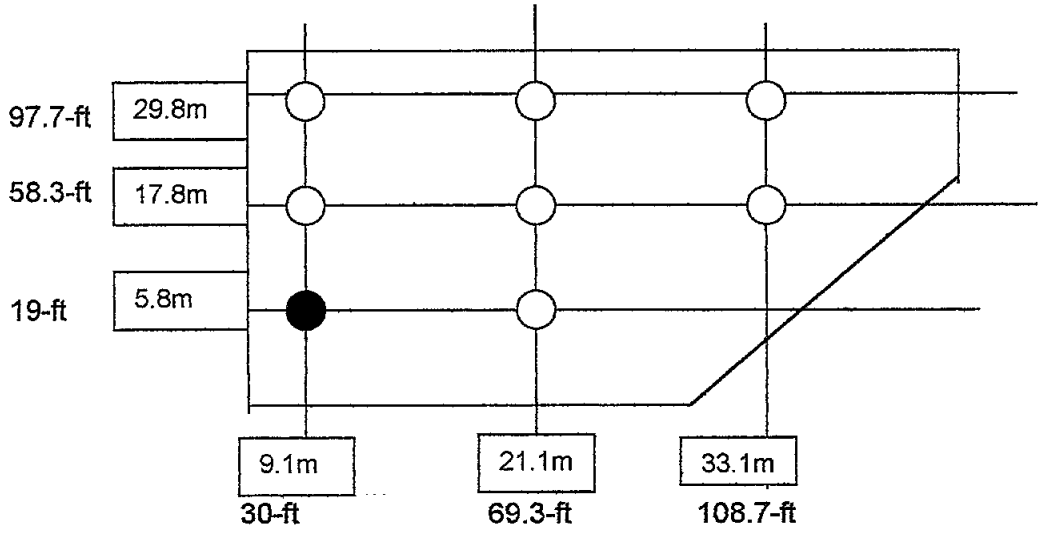
FIGURE A2: SURVEY UNIT 1, 2, 3, and 4 SAMPLE POINT LOCATIONS*



*Sample points are 36-ft (11 meters) distance apart. Starting point is 36-ft, 11-ft 3-in (11-m, 3.4-m). The dimensions are 221-ft by 80-ft (67.36-m by 24.3-m)

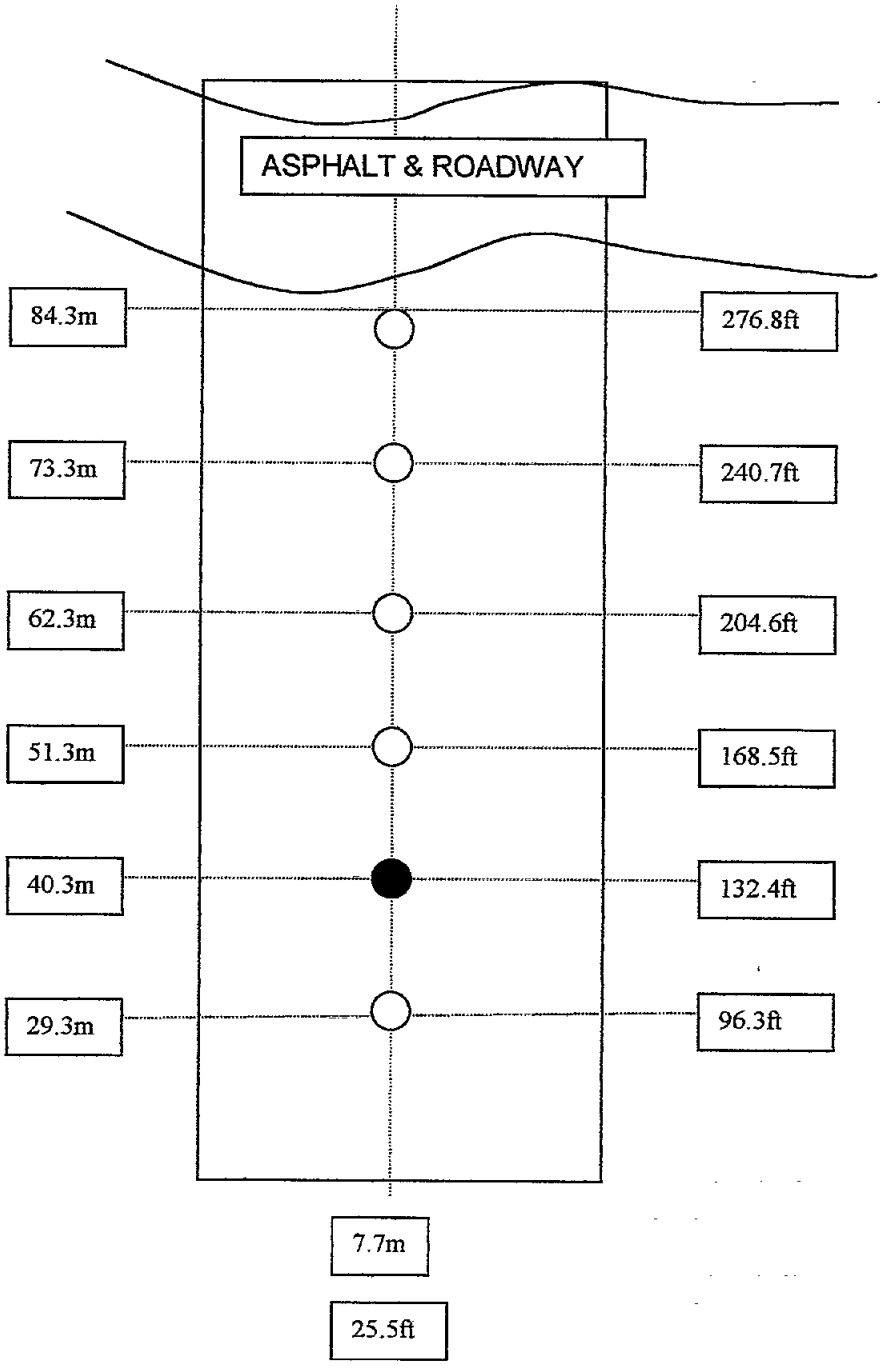
● Denotes Starting Point

FIGURE A3: SURVEY UNIT 5A SAMPLE POINT LOCATIONS**



**Sample points are 39.4-ft (12-m) distance apart. The starting point is 30-ft, 19-ft (9.1m, 5.8m) and the Survey Unit dimensions are 184-ft by 135-ft (56-m by 41.1-m)
● Denotes Starting Point

FIGURE A4: SURVEY UNIT 5B SAMPLE POINT LOCATIONS***



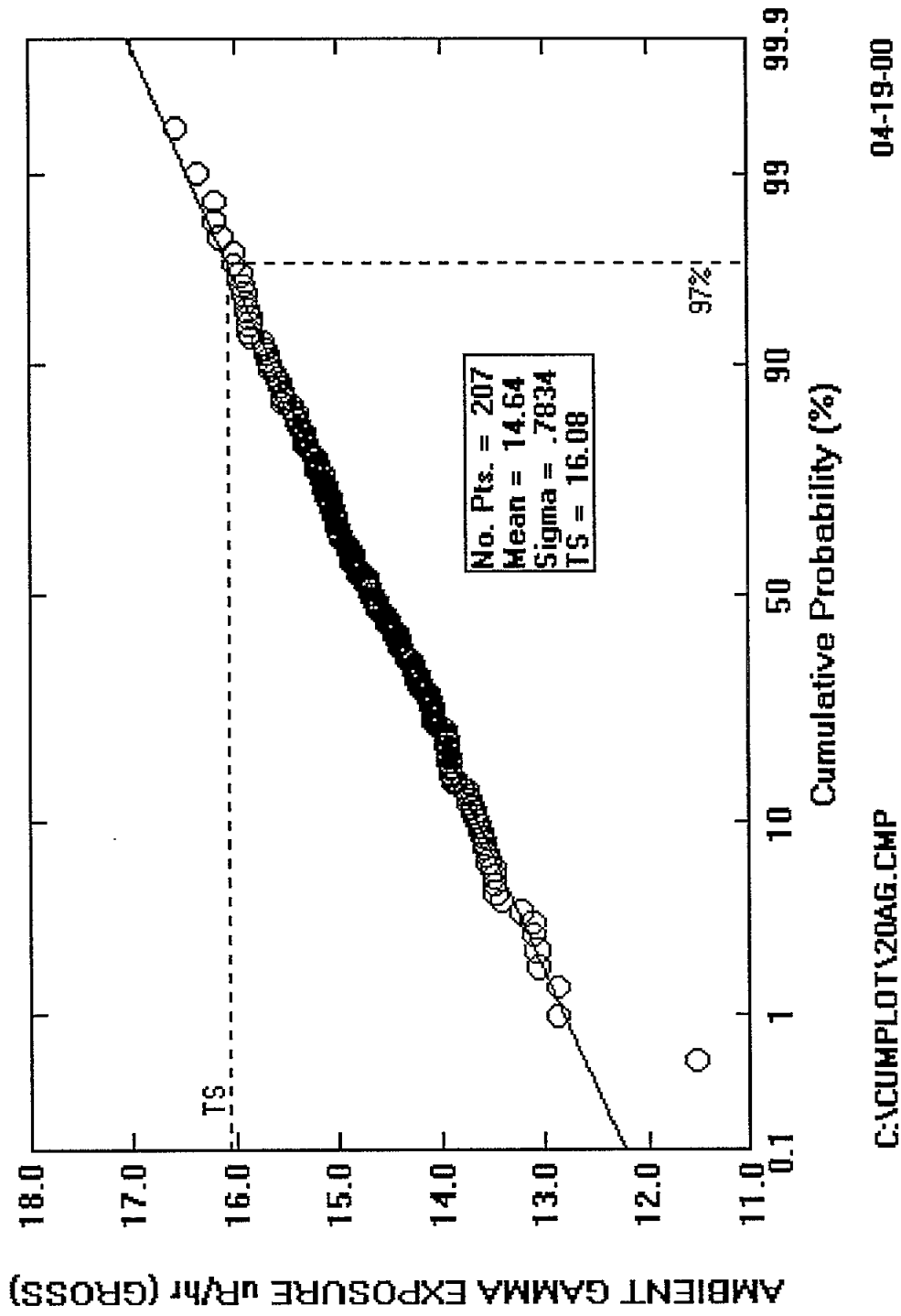
***Sample points are 36.7-ft (11-m) distance apart. Starting point is 25-ft, 132.4-ft (7.7-m, 40.3-m). The Survey Unit dimensions are 51-ft by 370-ft of accessible area. Note, the random starting point was calculated for the area that was accessible.

● Denotes starting point.

APPENDIX B

AMBIENT GAMMA MEASUREMENTS

FIGURE B1: AREA 4020 AMBIENT GAMMA, SU-1



LOCATION (FT)		AMBIENT GAMMA (1 METER)			LOCATION (FT)		AMBIENT GAMMA (1 METER)		
NORTH	EAST	DATE	CPM	µR/hr	NORTH	EAST	DATE	CPM	µR/hr
0	0	7/6/99	2985	13.88	10	0	7/6/99	3024	14.07
0	10	7/6/99	2767	12.87	10	10	7/6/99	3006	13.98
0	20	7/6/99	3060	14.23	10	20	7/6/99	3094	14.39
0	30	7/6/99	3068	14.27	10	30	7/6/99	3072	14.29
0	40	7/6/99	2997	13.94	10	40	7/6/99	3057	14.22
0	50	7/6/99	3001	13.96	10	50	7/6/99	2966	13.80
0	60	7/6/99	2930	13.63	10	60	7/6/99	2916	13.56
0	70	7/6/99	2900	13.49	10	70	7/6/99	3015	14.02
0	80	7/6/99	2953	13.73	10	80	7/6/99	3048	14.18
0	90	7/6/99	3042	14.15	10	90	7/6/99	3051	14.19
0	100	7/6/99	2920	13.58	10	100	7/6/99	3000	13.95
0	110	7/6/99	2993	13.92	10	110	7/6/99	3029	14.09
0	120	7/6/99	3032	14.10	10	120	7/6/99	3165	14.72
0	130	7/6/99	2992	13.92	10	130	7/6/99	2942	13.68
0	140	7/6/99	2991	13.91	10	140	7/6/99	3066	14.26
0	150	7/6/99	2984	13.88	10	150	7/6/99	3102	14.43
0	160	7/6/99	2911	13.54	10	160	7/6/99	2996	13.93
0	170	7/6/99	2902	13.50	10	170	7/6/99	3055	14.21
0	180	7/6/99	2895	13.47	10	180	7/6/99	3026	14.07
0	190	7/6/99	2935	13.65	10	190	7/6/99	2945	13.70
0	200	7/6/99	2883	13.41	10	200	7/6/99	2990	13.91
0	210	7/6/99	3023	14.06	10	210	7/6/99	3003	13.97
0	220	7/6/99	2951	13.73	10	220	7/6/99	3040	14.14
20	0	7/6/99	3167	14.73	30	0	7/6/99	3275	15.23
20	10	7/6/99	3258	15.15	30	10	7/6/99	3425	15.93
20	20	7/6/99	3197	14.87	30	20	7/6/99	3471	16.14
20	30	7/6/99	3218	14.97	30	30	7/6/99	3409	15.86
20	40	7/6/99	3289	15.30	30	40	7/6/99	3345	15.56
20	50	7/6/99	2943	13.69	30	50	7/6/99	3300	15.35
20	60	7/6/99	3032	14.10	30	60	7/6/99	3258	15.15
20	70	7/6/99	3111	14.47	30	70	7/6/99	3197	14.87
20	80	7/6/99	3088	14.36	30	80	7/6/99	3204	14.90
20	90	7/6/99	2480	11.53	30	90	7/6/99	3207	14.92
20	100	7/6/99	3128	14.55	30	100	7/6/99	3297	15.33
20	110	7/6/99	2999	13.95	30	110	7/6/99	3092	14.38
20	120	7/6/99	2923	13.60	30	120	7/6/99	3119	14.51
20	130	7/6/99	2929	13.62	30	130	7/6/99	3222	14.99
20	140	7/6/99	3000	13.95	30	140	7/6/99	3217	14.96
20	150	7/6/99	3097	14.40	30	150	7/6/99	3201	14.89
20	160	7/6/99	3027	14.08	30	160	7/6/99	3271	15.21
20	170	7/6/99	2955	13.74	30	170	7/6/99	3150	14.65
20	180	7/6/99	3148	14.64	30	180	7/6/99	3196	14.87
20	190	7/6/99	3033	14.11	30	190	7/6/99	3081	14.33
20	200	7/6/99	3144	14.62	30	200	7/6/99	3198	14.87
20	210	7/6/99	3105	14.44	30	210	7/6/99	3095	14.40
20	220	7/6/99	2998	13.94	30	220	7/6/99	3152	14.66

LOCATION (FT)		AMBIENT GAMMA (1 METER)			LOCATION (FT)		AMBIENT GAMMA (1 METER)		
NORTH	EAST	DATE	CPM	µR/hr	NORTH	EAST	DATE	CPM	µR/hr
40	0	7/6/99	3349	15.58	50	0	7/6/99	3211	14.93
40	10	7/6/99	3380	15.72	50	10	7/6/99	3409	15.86
40	20	7/6/99	3565	16.58	50	20	7/6/99	3443	16.01
40	30	7/6/99	3258	15.15	50	30	7/6/99	3409	15.86
40	40	7/6/99	3144	14.62	50	40	7/6/99	3345	15.56
40	50	7/6/99	3366	15.66	50	50	7/6/99	3203	14.90
40	60	7/6/99	3266	15.19	50	60	7/6/99	3252	15.13
40	70	7/6/99	3418	15.90	50	70	7/6/99	3371	15.68
40	80	7/6/99	3375	15.70	50	80	7/6/99	3415	15.88
40	90	7/6/99	3299	15.34	50	90	7/6/99	3417	15.89
40	100	7/6/99	3429	15.95	50	100	7/6/99	3319	15.44
40	110	7/6/99	3293	15.32	50	110	7/6/99	3374	15.69
40	120	7/6/99	3310	15.40	50	120	7/6/99	3364	15.65
40	130	7/6/99	3314	15.41	50	130	7/6/99	3285	15.28
40	140	7/6/99	3266	15.19	50	140	7/6/99	3309	15.39
40	150	7/6/99	3229	15.02	50	150	7/6/99	3240	15.07
40	160	7/6/99	3296	15.33	50	160	7/6/99	3240	15.07
40	170	7/6/99	3234	15.04	50	170	7/6/99	3233	15.04
40	180	7/6/99	3159	14.69	50	180	7/6/99	3243	15.08
40	190	7/6/99	3229	15.02	50	190	7/6/99	3291	15.31
40	200	7/6/99	3218	14.97	50	200	7/6/99	3230	15.02
40	210	7/6/99	3185	14.81	50	210	7/6/99	3264	15.18
40	220	7/6/99	3188	14.83	50	220	7/6/99	3250	15.12
60	0	7/7/99	3337	15.52	70	0	7/7/99	3160	14.70
60	10	7/7/99	3482	16.20	70	10	7/7/99	3270	15.21
60	20	7/7/99	3404	15.83	70	20	7/7/99	3341	15.54
60	30	7/7/99	3517	16.36	70	30	7/7/99	3225	15.00
60	40	7/7/99	3339	15.53	70	40	7/7/99	3356	15.61
60	50	7/7/99	3252	15.13	70	50	7/7/99	3269	15.20
60	60	7/7/99	3279	15.25	70	60	7/7/99	3188	14.83
60	70	7/7/99	3443	16.01	70	70	7/7/99	3255	15.14
60	80	7/7/99	3100	14.42	70	80	7/7/99	3164	14.72
60	90	7/7/99	3248	15.11	70	90	7/7/99	3146	14.63
60	100	7/7/99	3081	14.33	70	100	7/7/99	3230	15.02
60	110	7/7/99	3233	15.04	70	110	7/7/99	3022	14.06
60	120	7/7/99	3185	14.81	70	120	7/7/99	3195	14.86
60	130	7/7/99	3154	14.67	70	130	7/7/99	3120	14.51
60	140	7/7/99	3165	14.72	70	140	7/7/99	3136	14.59
60	150	7/7/99	3127	14.54	70	150	7/7/99	3200	14.88
60	160	7/7/99	3238	15.06	70	160	7/7/99	3181	14.80
60	170	7/7/99	3027	14.08	70	170	7/7/99	3158	14.69
60	180	7/7/99	3163	14.71	70	180	7/7/99	3106	14.45
60	190	7/7/99	3002	13.96	70	190	7/7/99	3115	14.49
60	200	7/7/99	3035	14.12	70	200	7/7/99	2919	13.58
60	210	7/7/99	2819	13.11	70	210	7/7/99	3141	14.61
60	220	7/7/99	3060	14.23	70	220	7/7/99	2820	13.12

LOCATION (FT)		AMBIENT GAMMA (1 METER)		
NORTH	EAST	DATE	CPM	µR/hr
80	0	7/7/99	2845	13.23
80	10	7/7/99	2768	12.87
80	20	7/7/99	2810	13.07
80	30	7/7/99	3248	15.11
80	40	7/7/99	3342	15.54
80	50	7/7/99	3322	15.45
80	60	7/7/99	3305	15.37
80	70	7/7/99	3484	16.20
80	80	7/7/99	3242	15.08
80	90	7/7/99	3222	14.99
80	100	7/7/99	3061	14.24
80	110	7/7/99	2807	13.06
80	120	7/7/99	3067	14.27
80	130	7/7/99	3083	14.34
80	140	7/7/99	3120	14.51
80	150	7/7/99	3060	14.23
80	160	7/7/99	2958	13.76
80	170	7/7/99	2989	13.90
80	180	7/7/99	2991	13.91
80	190	7/7/99	2900	13.49
80	200	7/7/99	3096	14.40
80	210	7/7/99	3130	14.56
80	220	7/7/99	3104	14.44

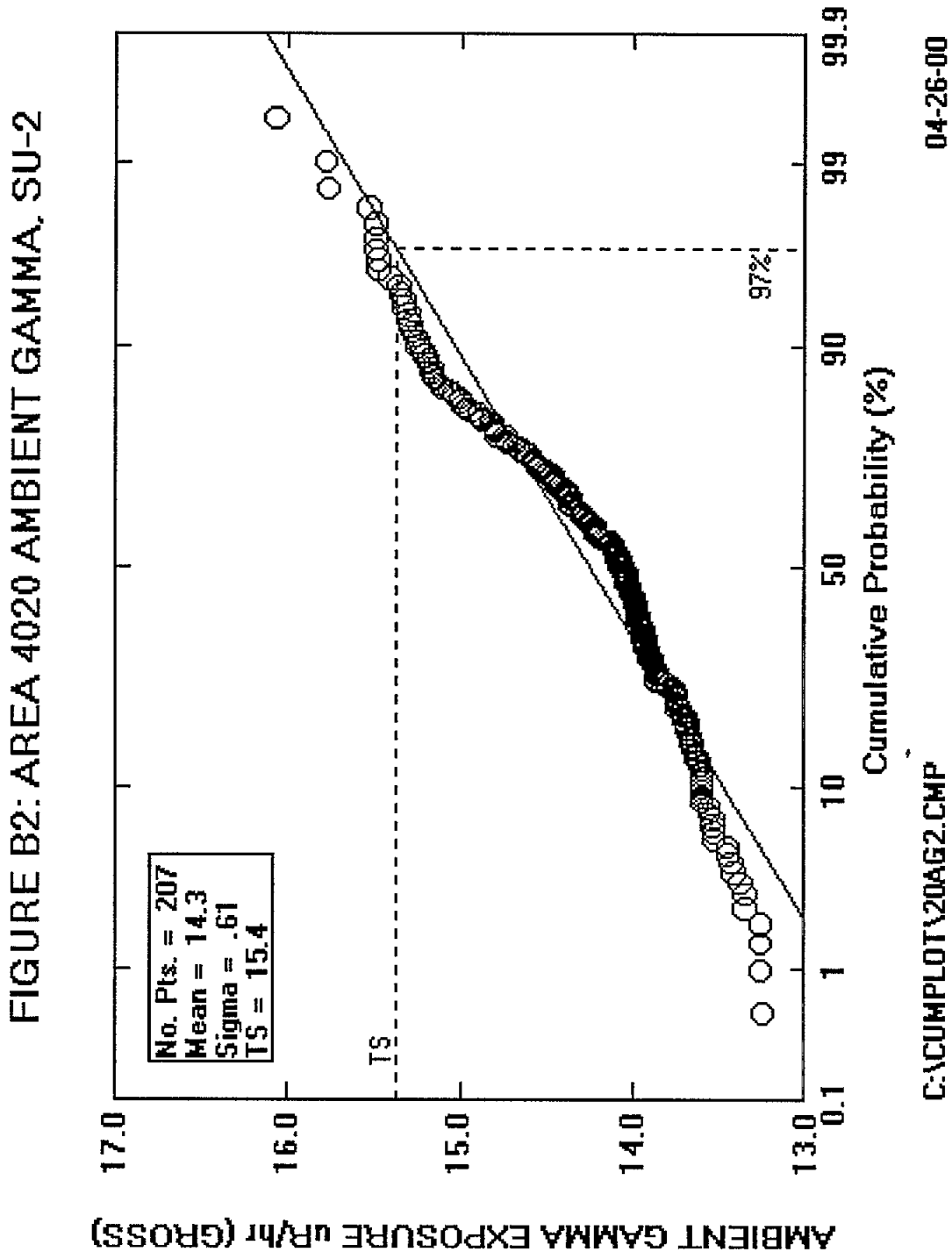


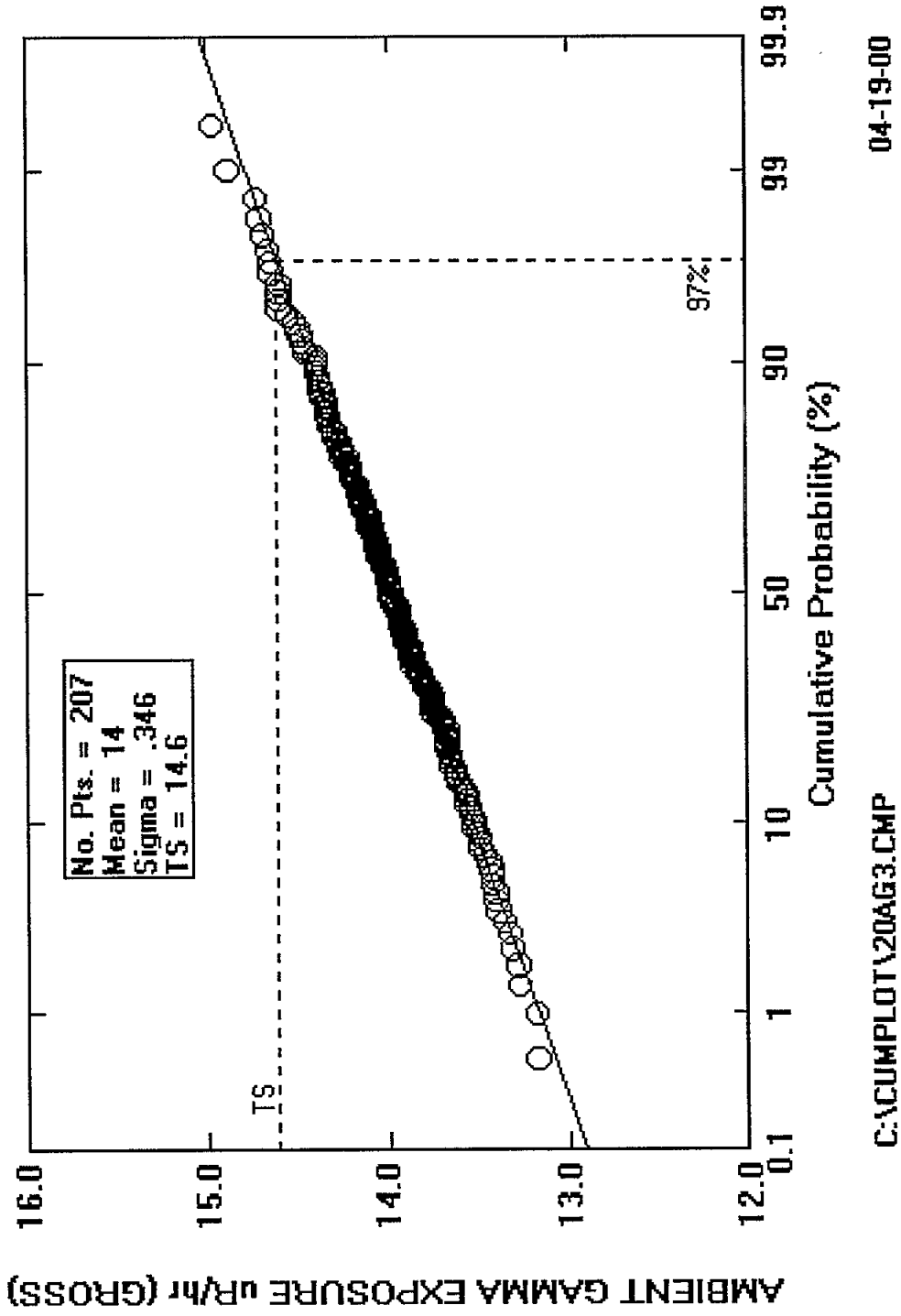
FIGURE B2: AREA 4020 AMBIENT GAMMA, SU-2
No. Pts. = 207
Mean = 14.3
Sigma = .61
TS = 15.4
TS
97%
AMBIENT GAMMA EXPOSURE uR/hr (GROSS)
17.0
16.0
15.0
14.0
13.0
0.1
1
10
50
90
99
99.9
Cumulative Probability (%)
C:\CUMPLOT\20AG2.CMP
04-26-00

LOCATION (FT)		AMBIENT GAMMA (1 METER)			LOCATION (FT)		AMBIENT GAMMA (1 METER)		
NORTH	EAST	DATE	CPM	µR/hr	NORTH	EAST	DATE	CPM	µR/hr
0	0	7/7/99	3262	15.17	10	0	7/7/99	3266	15.19
0	10	7/7/99	3180	14.79	10	10	7/7/99	3393	15.78
0	20	7/7/99	3281	15.26	10	20	7/7/99	3221	14.98
0	30	7/7/99	3314	15.41	10	30	7/7/99	3278	15.25
0	40	7/7/99	3454	16.07	10	40	7/7/99	3279	15.25
0	50	7/7/99	3240	15.07	10	50	7/7/99	3265	15.19
0	60	7/7/99	3331	15.49	10	60	7/7/99	3272	15.22
0	70	7/7/99	3233	15.04	10	70	7/7/99	3328	15.48
0	80	7/7/99	3331	15.49	10	80	7/7/99	3290	15.30
0	90	7/7/99	3250	15.12	10	90	7/7/99	3328	15.48
0	100	7/7/99	3302	15.36	10	100	7/7/99	3331	15.49
0	110	7/7/99	3202	14.89	10	110	7/7/99	3297	15.33
0	120	7/7/99	3187	14.82	10	120	7/7/99	3182	14.80
0	130	7/7/99	3248	15.11	10	130	7/7/99	3260	15.16
0	140	7/7/99	3301	15.35	10	140	7/7/99	3184	14.81
0	150	7/7/99	3297	15.33	10	150	7/7/99	3287	15.29
0	160	7/7/99	3225	15.00	10	160	7/7/99	3213	14.94
0	170	7/7/99	3262	15.17	10	170	7/7/99	3102	14.43
0	180	7/7/99	3270	15.21	10	180	7/7/99	3285	15.28
0	190	7/7/99	3170	14.74	10	190	7/7/99	3181	14.80
0	200	7/7/99	3390	15.77	10	200	7/7/99	3225	15.00
0	210	7/7/99	3340	15.53	10	210	7/7/99	3159	14.69
0	220	7/7/99	3133	14.57	10	220	7/7/99	3085	14.35
20	0	7/7/99	2998	13.94	30	0	7/7/99	3106	14.45
20	10	7/7/99	3105	14.44	30	10	7/7/99	3068	14.27
20	20	7/7/99	3144	14.62	30	20	7/7/99	3057	14.22
20	30	7/7/99	3033	14.11	30	30	7/7/99	3135	14.58
20	40	7/7/99	3148	14.64	30	40	7/7/99	3001	13.96
20	50	7/7/99	2955	13.74	30	50	7/7/99	3087	14.36
20	60	7/7/99	3027	14.08	30	60	7/7/99	3016	14.03
20	70	7/7/99	3097	14.40	30	70	7/7/99	3019	14.04
20	80	7/7/99	3000	13.95	30	80	7/7/99	3029	14.09
20	90	7/7/99	2929	13.62	30	90	7/7/99	2959	13.76
20	100	7/7/99	2923	13.60	30	100	7/7/99	2851	13.26
20	110	7/7/99	2999	13.95	30	110	7/7/99	2998	13.94
20	120	7/7/99	3128	14.55	30	120	7/7/99	2983	13.87
20	130	7/7/99	2980	13.86	30	130	7/7/99	2908	13.53
20	140	7/7/99	3088	14.36	30	140	7/7/99	2925	13.60
20	150	7/7/99	3111	14.47	30	150	7/7/99	2943	13.69
20	160	7/7/99	3032	14.10	30	160	7/7/99	3034	14.11
20	170	7/7/99	2943	13.69	30	170	7/7/99	2984	13.88
20	180	7/7/99	3289	15.30	30	180	7/7/99	2957	13.75
20	190	7/7/99	3218	14.97	30	190	7/7/99	3018	14.04
20	200	7/7/99	3197	14.87	30	200	7/7/99	2994	13.93
20	210	7/7/99	3258	15.15	30	210	7/7/99	2891	13.45
20	220	7/7/99	3167	14.73	30	220	7/7/99	2987	13.89

LOCATION (FT)		AMBIENT GAMMA (1 METER)			LOCATION (FT)		AMBIENT GAMMA (1 METER)		
NORTH	EAST	DATE	CPM	µR/hr	NORTH	EAST	DATE	CPM	µR/hr
40	0	7/8/99	2912	13.54	50	0	7/7/99	2849	13.25
40	10	7/8/99	3089	14.37	50	10	7/8/99	3005	13.98
40	20	7/8/99	2984	13.88	50	20	7/8/99	2990	13.91
40	30	7/8/99	2990	13.91	50	30	7/8/99	3082	14.33
40	40	7/8/99	2942	13.68	50	40	7/8/99	2887	13.43
40	50	7/8/99	2958	13.76	50	50	7/8/99	3005	13.98
40	60	7/8/99	3018	14.04	50	60	7/8/99	2891	13.45
40	70	7/8/99	2949	13.72	50	70	7/8/99	3029	14.09
40	80	7/8/99	3135	14.58	50	80	7/8/99	2850	13.26
40	90	7/8/99	2945	13.70	50	90	7/8/99	3039	14.13
40	100	7/8/99	2937	13.66	50	100	7/8/99	3014	14.02
40	110	7/8/99	3015	14.02	50	110	7/8/99	2885	13.42
40	120	7/8/99	2871	13.35	50	120	7/8/99	2877	13.38
40	130	7/8/99	2932	13.64	50	130	7/8/99	2939	13.67
40	140	7/8/99	3007	13.99	50	140	7/8/99	3031	14.10
40	150	7/8/99	3004	13.97	50	150	7/8/99	3058	14.22
40	160	7/8/99	3014	14.02	50	160	7/8/99	2923	13.60
40	170	7/8/99	2916	13.56	50	170	7/8/99	2926	13.61
40	180	7/8/99	2923	13.60	50	180	7/8/99	2924	13.60
40	190	7/8/99	2911	13.54	50	190	7/8/99	2850	13.26
40	200	7/8/99	2930	13.63	50	200	7/8/99	3061	14.24
40	210	7/8/99	2925	13.60	50	210	7/8/99	3018	14.04
40	220	7/8/99	2924	13.60	50	220	7/8/99	3021	14.05
60	0	7/9/99	3087	14.36	70	0	7/9/99	3033	14.11
60	10	7/9/99	3064	14.25	70	10	7/9/99	3110	14.47
60	20	7/9/99	3200	14.88	70	20	7/9/99	3128	14.55
60	30	7/9/99	3003	13.97	70	30	7/9/99	3166	14.73
60	40	7/9/99	3093	14.39	70	40	7/9/99	3025	14.07
60	50	7/9/99	2991	13.91	70	50	7/9/99	3008	13.99
60	60	7/9/99	2971	13.82	70	60	7/9/99	3116	14.49
60	70	7/9/99	3011	14.00	70	70	7/9/99	3071	14.28
60	80	7/9/99	3052	14.20	70	80	7/9/99	2968	13.80
60	90	7/9/99	3005	13.98	70	90	7/9/99	2989	13.90
60	100	7/9/99	3073	14.29	70	100	7/9/99	2940	13.67
60	110	7/9/99	3015	14.02	70	110	7/9/99	2995	13.93
60	120	7/9/99	2979	13.86	70	120	7/9/99	2979	13.86
60	130	7/9/99	2995	13.93	70	130	7/9/99	3008	13.99
60	140	7/9/99	3027	14.08	70	140	7/9/99	2908	13.53
60	150	7/9/99	2955	13.74	70	150	7/9/99	2957	13.75
60	160	7/9/99	3049	14.18	70	160	7/9/99	2993	13.92
60	170	7/9/99	3007	13.99	70	170	7/9/99	2916	13.56
60	180	7/9/99	2923	13.60	70	180	7/9/99	3006	13.98
60	190	7/9/99	2935	13.65	70	190	7/9/99	3057	14.22
60	200	7/9/99	3003	13.97	70	200	7/9/99	2934	13.65
60	210	7/9/99	3078	14.32	70	210	7/9/99	2870	13.35
60	220	7/9/99	3022	14.06	70	220	7/9/99	2948	13.71

LOCATION (FT)		AMBIENT GAMMA (1 METER)		
NORTH	EAST	DATE	CPM	µR/hr
80	0	7/9/99	2980	13.86
80	10	7/9/99	2994	13.93
80	20	7/9/99	3151	14.66
80	30	7/9/99	3120	14.51
80	40	7/9/99	3022	14.06
80	50	7/9/99	2946	13.70
80	60	7/9/99	3005	13.98
80	70	7/9/99	3074	14.30
80	80	7/9/99	3072	14.29
80	90	7/9/99	3140	14.60
80	100	7/9/99	2956	13.75
80	110	7/9/99	3055	14.21
80	120	7/9/99	2981	13.87
80	130	7/9/99	3000	13.95
80	140	7/9/99	3028	14.08
80	150	7/9/99	3036	14.12
80	160	7/9/99	3109	14.46
80	170	7/9/99	3093	14.39
80	180	7/9/99	2998	13.94
80	190	7/9/99	3057	14.22
80	200	7/9/99	3018	14.04
80	210	7/9/99	2943	13.69
80	220	7/9/99	2957	13.75

FIGURE B3: AREA 4020 AMBIENT GAMMA, SU-3

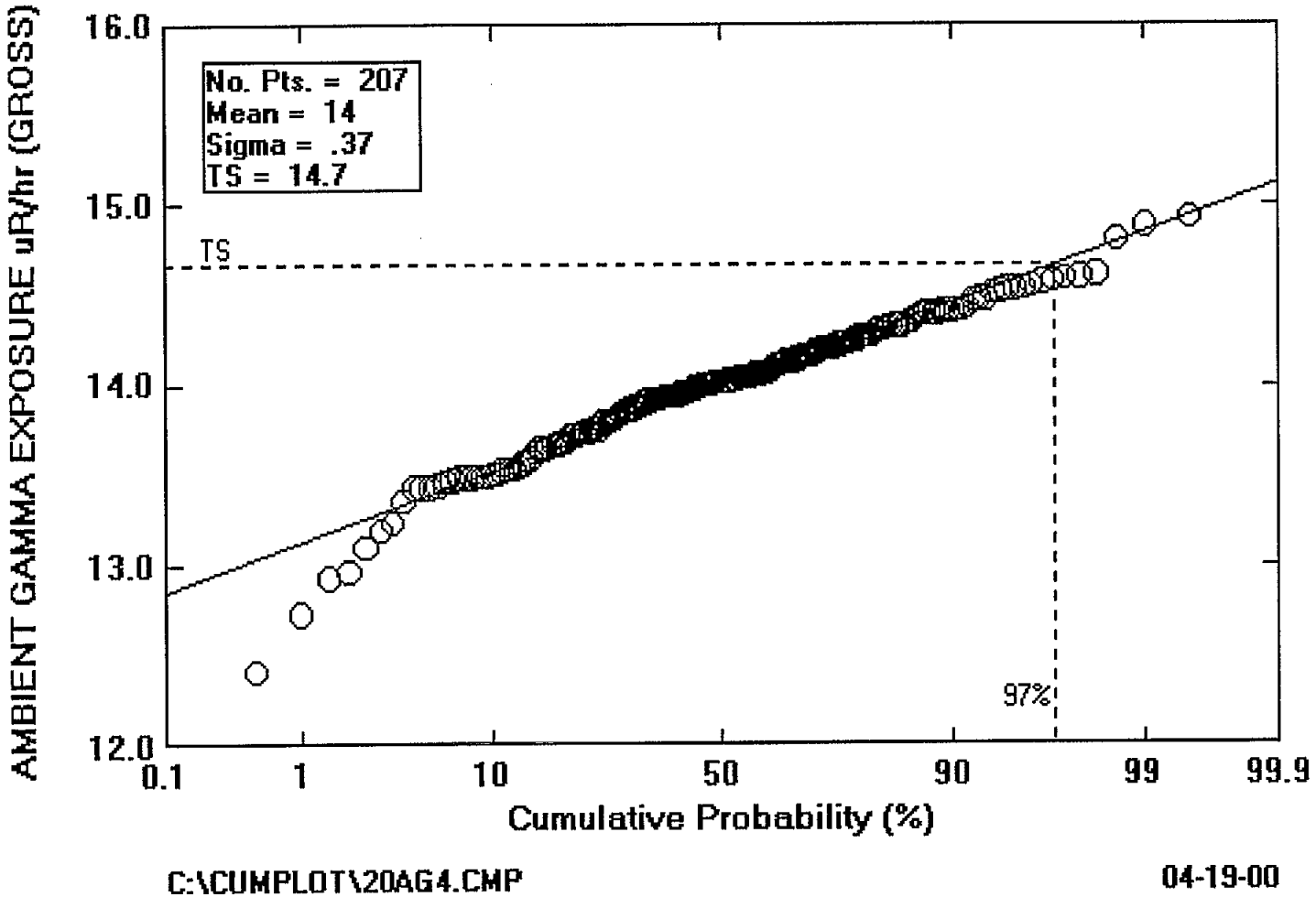


LOCATION (FT)		AMBIENT GAMMA (1 METER)			LOCATION (FT)		AMBIENT GAMMA (1 METER)		
NORTH	EAST	DATE	CPM	µR/hr	NORTH	EAST	DATE	CPM	µR/hr
0	0	7/8/99	2957	13.75	10	0	7/8/99	2900	13.49
0	10	7/8/99	3091	14.38	10	10	7/8/99	3113	14.48
0	20	7/8/99	3106	14.45	10	20	7/8/99	3064	14.25
0	30	7/8/99	3138	14.60	10	30	7/8/99	3066	14.26
0	40	7/8/99	3009	14.00	10	40	7/8/99	2970	13.81
0	50	7/8/99	3031	14.10	10	50	7/8/99	3087	14.36
0	60	7/8/99	3054	14.20	10	60	7/8/99	3039	14.13
0	70	7/8/99	3050	14.19	10	70	7/8/99	3139	14.60
0	80	7/8/99	2983	13.87	10	80	7/8/99	3026	14.07
0	90	7/8/99	3007	13.99	10	90	7/8/99	3009	14.00
0	100	7/8/99	2911	13.54	10	100	7/8/99	2928	13.62
0	110	7/8/99	2834	13.18	10	110	7/8/99	2882	13.40
0	120	7/8/99	2938	13.67	10	120	7/8/99	2852	13.27
0	130	7/8/99	2928	13.62	10	130	7/8/99	2861	13.31
0	140	7/8/99	2856	13.28	10	140	7/8/99	2916	13.56
0	150	7/8/99	2900	13.49	10	150	7/8/99	2880	13.40
0	160	7/8/99	2961	13.77	10	160	7/8/99	2983	13.87
0	170	7/8/99	2958	13.76	10	170	7/8/99	2934	13.65
0	180	7/8/99	2985	13.88	10	180	7/8/99	2899	13.48
0	190	7/8/99	3053	14.20	10	190	7/8/99	2902	13.50
0	200	7/8/99	2831	13.17	10	200	7/8/99	2916	13.56
0	210	7/8/99	3013	14.01	10	210	7/8/99	2885	13.42
0	220	7/8/99	2893	13.46	10	220	7/8/99	2887	13.43
20	0	7/8/99	2928	13.62	30	0	7/8/99	2912	13.54
20	10	7/8/99	3042	14.15	30	10	7/8/99	3139	14.60
20	20	7/8/99	3092	14.38	30	20	7/8/99	3011	14.00
20	30	7/8/99	3089	14.37	30	30	7/8/99	3147	14.64
20	40	7/8/99	3022	14.06	30	40	7/8/99	3083	14.34
20	50	7/8/99	3039	14.13	30	50	7/8/99	3089	14.37
20	60	7/8/99	3017	14.03	30	60	7/8/99	3083	14.34
20	70	7/8/99	2975	13.84	30	70	7/8/99	2939	13.67
20	80	7/8/99	3006	13.98	30	80	7/8/99	3031	14.10
20	90	7/8/99	2970	13.81	30	90	7/8/99	2878	13.39
20	100	7/8/99	2939	13.67	30	100	7/8/99	2865	13.33
20	110	7/8/99	3030	14.09	30	110	7/8/99	2940	13.67
20	120	7/8/99	2932	13.64	30	120	7/8/99	2889	13.44
20	130	7/8/99	2938	13.67	30	130	7/8/99	3219	14.97
20	140	7/8/99	3021	14.05	30	140	7/8/99	3040	14.14
20	150	7/8/99	2976	13.84	30	150	7/8/99	2907	13.52
20	160	7/8/99	2998	13.94	30	160	7/8/99	2968	13.80
20	170	7/8/99	2919	13.58	30	170	7/8/99	2965	13.79
20	180	7/8/99	2957	13.75	30	180	7/8/99	2975	13.84
20	190	7/8/99	2886	13.42	30	190	7/8/99	2940	13.67
20	200	7/8/99	3020	14.05	30	200	7/8/99	3045	14.16
20	210	7/8/99	2960	13.77	30	210	7/8/99	2996	13.93
20	220	7/8/99	3084	14.34	30	220	7/8/99	2990	13.91

LOCATION (FT)		AMBIENT GAMMA (1 METER)			LOCATION (FT)		AMBIENT GAMMA (1 METER)		
NORTH	EAST	DATE	CPM	µR/hr	NORTH	EAST	DATE	CPM	µR/hr
40	0	7/8/99	3162	14.71	50	0	7/8/99	2907	13.52
40	10	7/8/99	3082	14.33	50	10	7/8/99	3078	14.32
40	20	7/8/99	3044	14.16	50	20	7/8/99	3043	14.15
40	30	7/8/99	3040	14.14	50	30	7/8/99	3011	14.00
40	40	7/8/99	3058	14.22	50	40	7/8/99	3065	14.26
40	50	7/8/99	3046	14.17	50	50	7/8/99	3032	14.10
40	60	7/8/99	3097	14.40	50	60	7/8/99	2987	13.89
40	70	7/8/99	3072	14.29	50	70	7/8/99	2936	13.66
40	80	7/8/99	3150	14.65	50	80	7/8/99	3032	14.10
40	90	7/8/99	3037	14.13	50	90	7/8/99	3020	14.05
40	100	7/8/99	3159	14.69	50	100	7/8/99	2981	13.87
40	110	7/8/99	3004	13.97	50	110	7/8/99	3028	14.08
40	120	7/8/99	3021	14.05	50	120	7/8/99	2918	13.57
40	130	7/8/99	2955	13.74	50	130	7/8/99	3023	14.06
40	140	7/8/99	2989	13.90	50	140	7/8/99	3094	14.39
40	150	7/8/99	3000	13.95	50	150	7/8/99	2995	13.93
40	160	7/8/99	2944	13.69	50	160	7/8/99	2926	13.61
40	170	7/8/99	2988	13.90	50	170	7/8/99	3015	14.02
40	180	7/8/99	3064	14.25	50	180	7/8/99	3044	14.16
40	190	7/8/99	2982	13.87	50	190	7/8/99	2943	13.69
40	200	7/8/99	2989	13.90	50	200	7/8/99	2994	13.93
40	210	7/8/99	3020	14.05	50	210	7/8/99	3084	14.34
40	220	7/8/99	2956	13.75	50	220	7/8/99	3053	14.20
60	0	7/9/99	3087	14.36	70	0	7/9/99	3033	14.11
60	10	7/9/99	3064	14.25	70	10	7/9/99	3110	14.47
60	20	7/9/99	3200	14.88	70	20	7/9/99	3128	14.55
60	30	7/9/99	3003	13.97	70	30	7/9/99	3166	14.73
60	40	7/9/99	3093	14.39	70	40	7/9/99	3025	14.07
60	50	7/9/99	2991	13.91	70	50	7/9/99	3008	13.99
60	60	7/9/99	2971	13.82	70	60	7/9/99	3116	14.49
60	70	7/9/99	3011	14.00	70	70	7/9/99	3071	14.28
60	80	7/9/99	3052	14.20	70	80	7/9/99	2968	13.80
60	90	7/9/99	3005	13.98	70	90	7/9/99	2989	13.90
60	100	7/9/99	3073	14.29	70	100	7/9/99	2940	13.67
60	110	7/9/99	3015	14.02	70	110	7/9/99	2995	13.93
60	120	7/9/99	2979	13.86	70	120	7/9/99	2979	13.86
60	130	7/9/99	2995	13.93	70	130	7/9/99	3008	13.99
60	140	7/9/99	3027	14.08	70	140	7/9/99	2908	13.53
60	150	7/9/99	2955	13.74	70	150	7/9/99	2957	13.75
60	160	7/9/99	3049	14.18	70	160	7/9/99	2993	13.92
60	170	7/9/99	3007	13.99	70	170	7/9/99	2916	13.56
60	180	7/9/99	2923	13.60	70	180	7/9/99	3006	13.98
60	190	7/9/99	2935	13.65	70	190	7/9/99	3057	14.22
60	200	7/9/99	3003	13.97	70	200	7/9/99	2934	13.65
60	210	7/9/99	3078	14.32	70	210	7/9/99	2870	13.35
60	220	7/9/99	3022	14.06	70	220	7/9/99	2948	13.71

LOCATION (FT)		AMBIENT GAMMA (1 METER)		
NORTH	EAST	DATE	CPM	µR/hr
80	0	7/9/99	2980	13.86
80	10	7/9/99	2994	13.93
80	20	7/9/99	3151	14.66
80	30	7/9/99	3120	14.51
80	40	7/9/99	3022	14.06
80	50	7/9/99	2946	13.70
80	60	7/9/99	3005	13.98
80	70	7/9/99	3074	14.30
80	80	7/9/99	3072	14.29
80	90	7/9/99	3140	14.60
80	100	7/9/99	2956	13.75
80	110	7/9/99	3055	14.21
80	120	7/9/99	2981	13.87
80	130	7/9/99	3000	13.95
80	140	7/9/99	3028	14.08
80	150	7/9/99	3036	14.12
80	160	7/9/99	3109	14.46
80	170	7/9/99	3093	14.39
80	180	7/9/99	2998	13.94
80	190	7/9/99	3057	14.22
80	200	7/9/99	3018	14.04
80	210	7/9/99	2943	13.69
80	220	7/9/99	2957	13.75

FIGURE B4: AREA 4020 AMBIENT GAMMA, SU-4

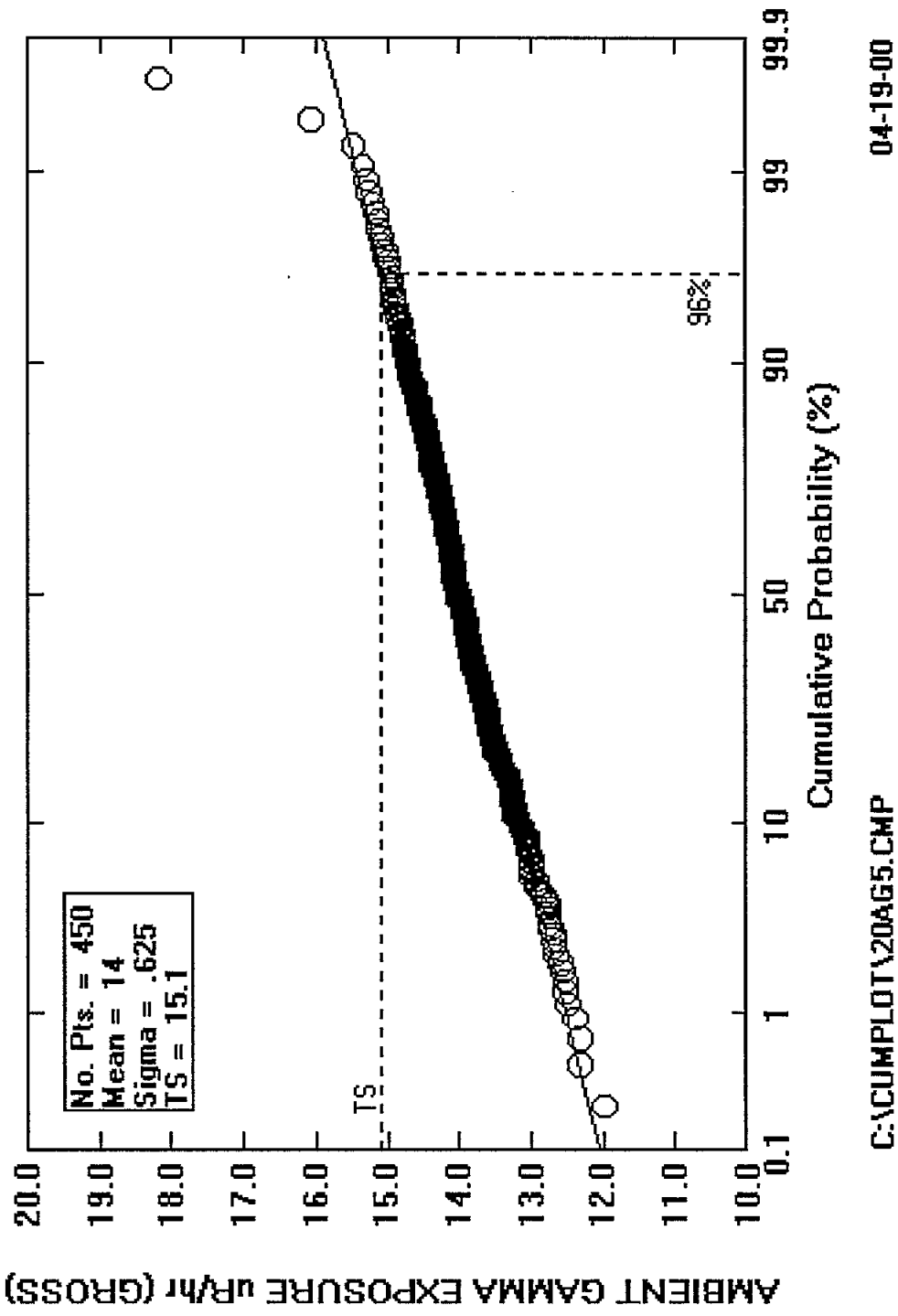


LOCATION (FT)		AMBIENT GAMMA (1 METER)			LOCATION (FT)		AMBIENT GAMMA (1 METER)		
NORTH	EAST	DATE	CPM	µR/hr	NORTH	EAST	DATE	CPM	µR/hr
0	0	7/16/99	2779	12.93	10	0	7/16/99	2836	13.19
0	10	7/16/99	2669	12.41	10	10	7/16/99	3012	14.01
0	20	7/16/99	2995	13.93	10	20	7/16/99	3114	14.48
0	30	7/16/99	2786	12.96	10	30	7/16/99	3044	14.16
0	40	7/16/99	3018	14.04	10	40	7/16/99	2899	13.48
0	50	7/16/99	3009	14.00	10	50	7/16/99	3012	14.01
0	60	7/16/99	3053	14.20	10	60	7/16/99	2901	13.49
0	70	7/16/99	3009	14.00	10	70	7/16/99	3030	14.09
0	80	7/16/99	2921	13.59	10	80	7/16/99	2901	13.49
0	90	7/16/99	2920	13.58	10	90	7/16/99	3012	14.01
0	100	7/16/99	3010	14.00	10	100	7/16/99	2890	13.44
0	110	7/9/99	3014	14.02	10	110	7/9/99	3095	14.40
0	120	7/9/99	3064	14.25	10	120	7/9/99	3054	14.20
0	130	7/9/99	3125	14.53	10	130	7/9/99	3013	14.01
0	140	7/9/99	3092	14.38	10	140	7/9/99	2999	13.95
0	150	7/9/99	3018	14.04	10	150	7/9/99	3101	14.42
0	160	7/9/99	3040	14.14	10	160	7/9/99	3029	14.09
0	170	7/9/99	2994	13.93	10	170	7/9/99	2976	13.84
0	180	7/9/99	3040	14.14	10	180	7/9/99	3142	14.61
0	190	7/9/99	3068	14.27	10	190	7/9/99	3097	14.40
0	200	7/9/99	2992	13.92	10	200	7/9/99	3022	14.06
0	210	7/9/99	2989	13.90	10	210	7/9/99	2941	13.68
0	220	7/9/99	2899	13.48	10	220	7/9/99	2906	13.52
20	0	7/16/99	2956	13.75	30	0	7/16/99	2951	13.73
20	10	7/16/99	2996	13.93	30	10	7/16/99	3069	14.27
20	20	7/16/99	3011	14.00	30	20	7/16/99	3011	14.00
20	30	7/16/99	3210	14.93	30	30	7/16/99	3001	13.96
20	40	7/16/99	3037	14.13	30	40	7/16/99	2939	13.67
20	50	7/16/99	2980	13.86	30	50	7/16/99	3095	14.40
20	60	7/16/99	3028	14.08	30	60	7/16/99	3022	14.06
20	70	7/16/99	2816	13.10	30	70	7/16/99	3026	14.07
20	80	7/16/99	2966	13.80	30	80	7/16/99	2985	13.88
20	90	7/16/99	2903	13.50	30	90	7/16/99	2977	13.85
20	100	7/16/99	2909	13.53	30	100	7/16/99	2887	13.43
20	110	7/9/99	3076	14.31	30	110	7/9/99	3079	14.32
20	120	7/9/99	3096	14.40	30	120	7/9/99	3016	14.03
20	130	7/9/99	2994	13.93	30	130	7/9/99	3073	14.29
20	140	7/9/99	2991	13.91	30	140	7/9/99	3023	14.06
20	150	7/9/99	3023	14.06	30	150	7/9/99	3013	14.01
20	160	7/9/99	3037	14.13	30	160	7/9/99	3114	14.48
20	170	7/9/99	3019	14.04	30	170	7/9/99	3081	14.33
20	180	7/9/99	3017	14.03	30	180	7/9/99	3063	14.25
20	190	7/9/99	3056	14.21	30	190	7/9/99	3134	14.58
20	200	7/9/99	2963	13.78	30	200	7/9/99	2998	13.94
20	210	7/9/99	3056	14.21	30	210	7/9/99	3045	14.16
20	220	7/9/99	2994	13.93	30	220	7/9/99	3098	14.41

LOCATION (FT)		AMBIENT GAMMA (1 METER)			LOCATION (FT)		AMBIENT GAMMA (1 METER)		
NORTH	EAST	DATE	CPM	µR/hr	NORTH	EAST	DATE	CPM	µR/hr
40	0	7/16/99	2887	13.43	50	0	7/16/99	2929	13.62
40	10	7/16/99	3111	14.47	50	10	7/16/99	2845	13.23
40	20	7/16/99	3081	14.33	50	20	7/16/99	3184	14.81
40	30	7/16/99	3138	14.60	50	30	7/16/99	3132	14.57
40	40	7/16/99	3026	14.07	50	40	7/16/99	3067	14.27
40	50	7/16/99	3099	14.41	50	50	7/16/99	3119	14.51
40	60	7/16/99	3033	14.11	50	60	7/16/99	3005	13.98
40	70	7/16/99	2955	13.74	50	70	7/16/99	2950	13.72
40	80	7/16/99	3061	14.24	50	80	7/16/99	2900	13.49
40	90	7/16/99	2894	13.46	50	90	7/16/99	2951	13.73
40	100	7/16/99	2887	13.43	50	100	7/16/99	3034	14.11
40	110	7/9/99	3025	14.07	50	110	7/9/99	3122	14.52
40	120	7/9/99	3100	14.42	50	120	7/9/99	3019	14.04
40	130	7/9/99	3082	14.33	50	130	7/9/99	3060	14.23
40	140	7/9/99	3060	14.23	50	140	7/9/99	2937	13.66
40	150	7/9/99	2965	13.79	50	150	7/9/99	3057	14.22
40	160	7/9/99	3074	14.30	50	160	7/9/99	3068	14.27
40	170	7/9/99	3124	14.53	50	170	7/9/99	3046	14.17
40	180	7/9/99	2996	13.93	50	180	7/9/99	3036	14.12
40	190	7/9/99	2993	13.92	50	190	7/9/99	3031	14.10
40	200	7/9/99	2736	12.73	50	200	7/9/99	3042	14.15
40	210	7/9/99	3002	13.96	50	210	7/9/99	3013	14.01
40	220	7/9/99	3126	14.54	50	220	7/9/99	3039	14.13
60	0	7/16/99	2965	13.79	70	0	7/16/99	2942	13.68
60	10	7/16/99	3087	14.36	70	10	7/16/99	2950	13.72
60	20	7/16/99	3007	13.99	70	20	7/16/99	2895	13.47
60	30	7/16/99	3128	14.55	70	30	7/16/99	3136	14.59
60	40	7/16/99	3099	14.41	70	40	7/16/99	3054	14.20
60	50	7/16/99	3094	14.39	70	50	7/16/99	3050	14.19
60	60	7/16/99	3004	13.97	70	60	7/16/99	2899	13.48
60	70	7/16/99	2971	13.82	70	70	7/16/99	2932	13.64
60	80	7/16/99	3049	14.18	70	80	7/16/99	3065	14.26
60	90	7/16/99	3035	14.12	70	90	7/16/99	2956	13.75
60	100	7/16/99	3020	14.05	70	100	7/16/99	2932	13.64
60	110	7/12/99	2940	13.67	70	110	7/12/99	2982	13.87
60	120	7/12/99	2975	13.84	70	120	7/12/99	2979	13.86
60	130	7/12/99	2932	13.64	70	130	7/12/99	3008	13.99
60	140	7/12/99	2911	13.54	70	140	7/12/99	2908	13.53
60	150	7/12/99	3001	13.96	70	150	7/12/99	2957	13.75
60	160	7/12/99	2966	13.80	70	160	7/12/99	2993	13.92
60	170	7/12/99	3018	14.04	70	170	7/12/99	2916	13.56
60	180	7/12/99	2993	13.92	70	180	7/12/99	3006	13.98
60	190	7/12/99	3059	14.23	70	190	7/12/99	3057	14.22
60	200	7/12/99	2954	13.74	70	200	7/12/99	2934	13.65
60	210	7/12/99	2950	13.72	70	210	7/12/99	2870	13.35
60	220	7/12/99	2985	13.88	70	220	7/12/99	2948	13.71

LOCATION (FT)		AMBIENT GAMMA (1 METER)		
NORTH	EAST	DATE	CPM	µR/hr
80	0	7/16/99	2910	13.53
80	10	7/16/99	3200	14.88
80	20	7/16/99	3077	14.31
80	30	7/16/99	3085	14.35
80	40	7/16/99	3049	14.18
80	50	7/16/99	3084	14.34
80	60	7/16/99	3017	14.03
80	70	7/16/99	2994	13.93
80	80	7/16/99	2992	13.92
80	90	7/16/99	2977	13.85
80	100	7/16/99	3000	13.95
80	110	7/12/99	2981	13.87
80	120	7/12/99	3054	14.20
80	130	7/12/99	3015	14.02
80	140	7/12/99	3014	14.02
80	150	7/12/99	3044	14.16
80	160	7/12/99	3045	14.16
80	170	7/12/99	2988	13.90
80	180	7/12/99	2970	13.81
80	190	7/12/99	3103	14.43
80	200	7/12/99	3079	14.32
80	210	7/12/99	3018	14.04
80	220	7/12/99	2903	13.50

FIGURE B5: AREA 4020 AMBIENT GAMMA, SU-5



LOCATION (FT)		AMBIENT GAMMA (1 METER)			LOCATION (FT)		AMBIENT GAMMA (1 METER)		
NORTH	EAST	DATE	CPM	µR/hr	NORTH	EAST	DATE	CPM	µR/hr
0	0	7/14/99	3067	14.27	10	0	7/14/99	3453	16.06
0	10	7/14/99	3101	14.42	10	10	7/14/99	3243	15.08
0	20	7/14/99	3208	14.92	10	20	7/14/99	3255	15.14
0	30	7/14/99	3267	15.20	10	30	7/14/99	3198	14.87
0	40	7/14/99	3227	15.01	10	40	7/14/99	3174	14.76
0	50	7/14/99	3295	15.33	10	50	7/14/99	3205	14.91
0	60	7/14/99	3170	14.74	10	60	7/14/99	2996	13.93
0	70	7/14/99	3195	14.86	10	70	7/14/99	3113	14.48
0	80	7/14/99	3216	14.96	10	80	7/14/99	3068	14.27
0	90	7/14/99	3049	14.18	10	90	7/14/99	3177	14.78
0	100	7/14/99	3136	14.59	10	100	7/14/99	3113	14.48
0	110	7/14/99	3116	14.49	10	110	7/14/99	3035	14.12
0	120	7/14/99	3112	14.47	10	120	7/14/99	3186	14.82
0	130	7/14/99	3045	14.16	10	130	7/14/99	2739	12.74
0	0	7/13/99	2954	13.74	10	140	7/14/99	2875	13.37
0	10	7/13/99	2844	13.23	10	0	7/13/99	2878	13.39
0	20	7/13/99	2988	13.90	10	10	7/13/99	3015	14.02
0	30	7/13/99	2902	13.50	10	20	7/13/99	2916	13.56
0	40	7/13/99	2943	13.69	10	30	7/13/99	2929	13.62
0	50	7/13/99	2792	12.99	10	40	7/13/99	2835	13.19
20	0	7/14/99	3151	14.66	10	50	7/13/99	2792	12.99
20	10	7/14/99	3176	14.77	30	0	7/14/99	3325	15.47
20	20	7/14/99	3238	15.06	30	10	7/14/99	3229	15.02
20	30	7/14/99	3139	14.60	30	20	7/14/99	3045	14.16
20	40	7/14/99	3074	14.30	30	30	7/14/99	3218	14.97
20	50	7/14/99	3076	14.31	30	40	7/14/99	3111	14.47
20	60	7/14/99	3049	14.18	30	50	7/14/99	3096	14.40
20	70	7/14/99	3089	14.37	30	60	7/14/99	3249	15.11
20	80	7/14/99	3070	14.28	30	70	7/14/99	3128	14.55
20	90	7/14/99	3135	14.58	30	80	7/14/99	2975	13.84
20	100	7/14/99	3187	14.82	30	90	7/14/99	3092	14.38
20	110	7/14/99	3062	14.24	30	100	7/14/99	3143	14.62
20	120	7/14/99	3073	14.29	30	110	7/14/99	3078	14.32
20	130	7/14/99	3104	14.44	30	120	7/14/99	3026	14.07
20	140	7/14/99	2985	13.88	30	130	7/14/99	3076	14.31
20	0	7/13/99	2999	13.95	30	140	7/14/99	3170	14.74
20	10	7/13/99	2938	13.67	30	150	7/14/99	3280	15.26
20	20	7/13/99	3029	14.09	30	0	7/13/99	3025	14.07
20	30	7/13/99	2964	13.79	30	10	7/13/99	3000	13.95
20	40	7/13/99	2920	13.58	30	20	7/13/99	2979	13.86
20	50	7/13/99	2700	12.56	30	30	7/13/99	3065	14.26
40	0	7/14/99	3287	15.29	30	40	7/13/99	2863	13.32
40	10	7/14/99	3210	14.93	30	50	7/13/99	2744	12.76
40	20	7/14/99	3138	14.60	40	70	7/14/99	2982	13.87
40	30	7/14/99	3090	14.37	40	80	7/14/99	3093	14.39
40	40	7/14/99	3088	14.36	40	90	7/14/99	3028	14.08
40	50	7/14/99	3054	14.20	40	100	7/14/99	3084	14.34
40	60	7/14/99	3160	14.70	40	110	7/14/99	3151	14.66

LOCATION (FT)		AMBIENT GAMMA (1 METER)			LOCATION (FT)		AMBIENT GAMMA (1 METER)		
NORTH	EAST	DATE	CPM	µR/hr	NORTH	EAST	DATE	CPM	µR/hr
40	120	7/14/99	3122	14.52	50	0	7/15/99	3223	14.99
40	130	7/14/99	3145	14.63	50	10	7/15/99	3030	14.09
40	140	7/14/99	3211	14.93	50	20	7/15/99	2985	13.88
40	150	7/14/99	3181	14.80	50	30	7/15/99	3032	14.10
40	160	7/14/99	3205	14.91	50	40	7/15/99	3094	14.39
40	0	7/13/99	2921	13.59	50	50	7/15/99	2988	13.90
40	10	7/13/99	2856	13.28	50	60	7/15/99	3040	14.14
40	20	7/13/99	2982	13.87	50	70	7/15/99	3078	14.32
40	30	7/13/99	2928	13.62	50	80	7/15/99	3151	14.66
40	40	7/13/99	2903	13.50	50	90	7/15/99	2988	13.90
40	50	7/13/99	2986	13.89	50	100	7/15/99	2999	13.95
60	0	7/15/99	3126	14.54	50	110	7/15/99	3108	14.46
60	10	7/15/99	3147	14.64	50	120	7/15/99	3065	14.26
60	20	7/15/99	3079	14.32	50	130	7/15/99	3000	13.95
60	30	7/15/99	3029	14.09	50	140	7/15/99	3010	14.00
60	40	7/15/99	2973	13.83	50	150	7/15/99	2973	13.83
60	50	7/15/99	3032	14.10	50	160	7/15/99	2848	13.25
60	60	7/15/99	3128	14.55	50	0	7/13/99	3026	14.07
60	70	7/15/99	3014	14.02	50	10	7/13/99	2988	13.90
60	80	7/15/99	2988	13.90	50	20	7/13/99	3037	14.13
60	90	7/15/99	2919	13.58	50	30	7/13/99	2960	13.77
60	100	7/15/99	2975	13.84	50	40	7/13/99	2967	13.80
60	110	7/15/99	3063	14.25	50	50	7/13/99	2923	13.60
60	120	7/15/99	3014	14.02	70	0	7/15/99	3131	14.56
60	130	7/15/99	3021	14.05	70	10	7/15/99	3161	14.70
60	140	7/15/99	3125	14.53	70	20	7/15/99	3160	14.70
60	150	7/15/99	2918	13.57	70	30	7/15/99	3028	14.08
60	160	7/15/99	2735	12.72	70	40	7/15/99	3095	14.40
60	0	7/12/99	2855	13.28	70	50	7/15/99	3179	14.79
60	10	7/12/99	2957	13.75	70	60	7/15/99	3028	14.08
60	20	7/12/99	2941	13.68	70	70	7/15/99	3021	14.05
60	30	7/12/99	3011	14.00	70	80	7/15/99	3049	14.18
60	40	7/12/99	2867	13.33	70	90	7/15/99	2922	13.59
60	50	7/12/99	2855	13.28	70	100	7/15/99	3052	14.20
80	0	7/15/99	3210	14.93	70	110	7/15/99	3024	14.07
80	10	7/15/99	3095	14.40	70	120	7/15/99	3029	14.09
80	20	7/15/99	3061	14.24	70	130	7/15/99	3014	14.02
80	30	7/15/99	3038	14.13	70	140	7/15/99	3010	14.00
80	40	7/15/99	3019	14.04	70	150	7/15/99	2906	13.52
80	50	7/15/99	3031	14.10	70	160	7/15/99	2931	13.63
80	60	7/15/99	3128	14.55	70	170	7/15/99	2804	13.04
80	70	7/15/99	2978	13.85	70	0	7/12/99	2954	13.74
80	80	7/15/99	3138	14.60	70	10	7/12/99	2844	13.23
80	90	7/15/99	2923	13.60	70	20	7/12/99	2988	13.90
80	100	7/15/99	3062	14.24	70	30	7/12/99	2902	13.50
80	110	7/15/99	2923	13.60	70	40	7/12/99	2943	13.69
80	120	7/15/99	3060	14.23	70	50	7/12/99	2792	12.99
80	130	7/15/99	2941	13.68					
80	140	7/15/99	2947	13.71					

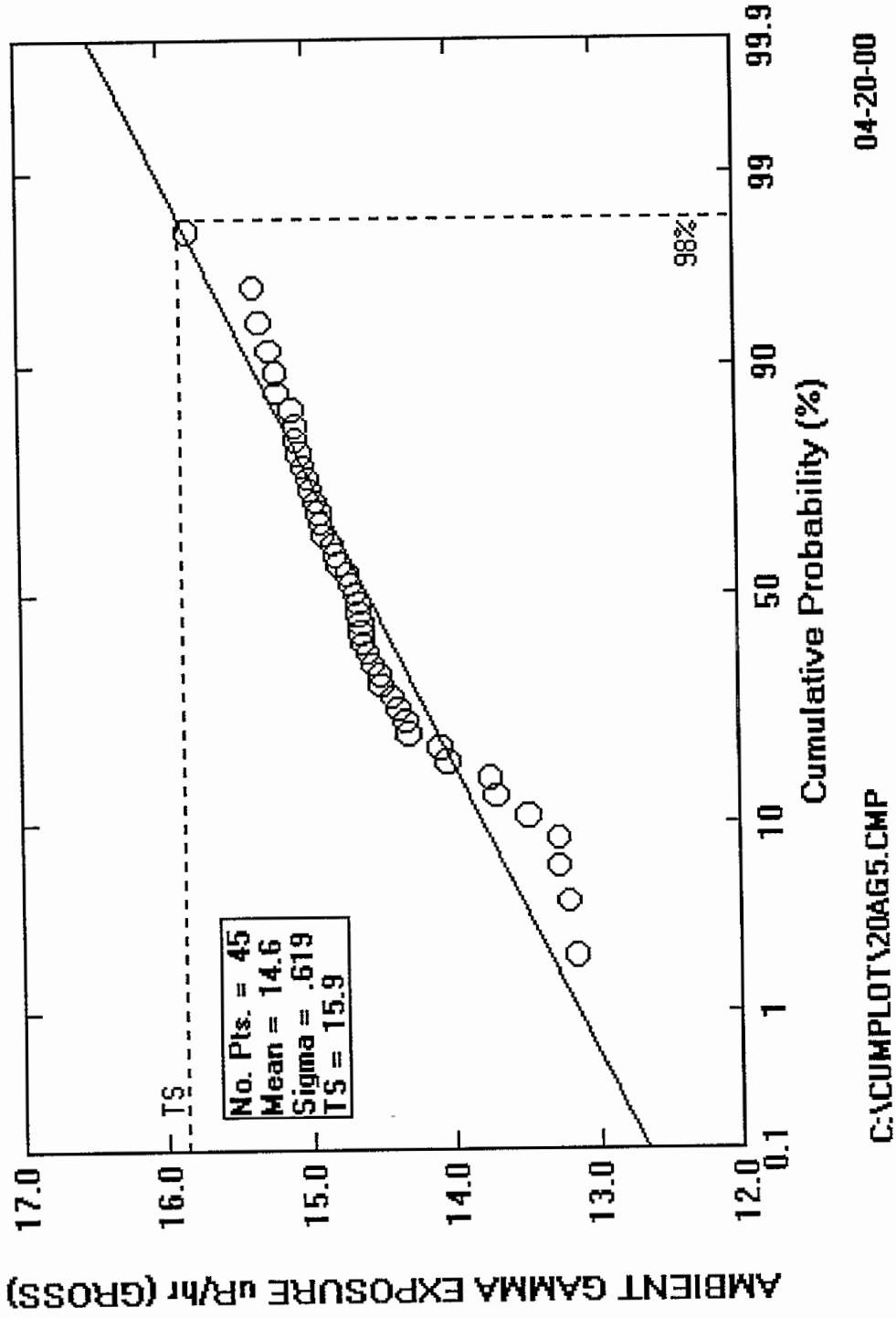
LOCATION (FT)		AMBIENT GAMMA (1 METER)			LOCATION (FT)		AMBIENT GAMMA (1 METER)		
NORTH	EAST	DATE	CPM	µR/hr	NORTH	EAST	DATE	CPM	µR/hr
80	150	7/15/99	3042	14.15	90	0	7/15/99	3199	14.88
80	160	7/15/99	2949	13.72	90	10	7/15/99	3193	14.85
80	170	7/15/99	2926	13.61	90	20	7/15/99	3120	14.51
80	0	7/12/99	2878	13.39	90	30	7/15/99	3065	14.26
80	10	7/12/99	3015	14.02	90	40	7/15/99	3158	14.69
80	20	7/12/99	2916	13.56	90	50	7/15/99	3104	14.44
80	30	7/12/99	2929	13.62	90	60	7/15/99	3027	14.08
80	40	7/12/99	2835	13.19	90	70	7/15/99	3089	14.37
80	50	7/12/99	2792	12.99	90	80	7/15/99	3046	14.17
100	0	7/27/99	3168	14.73	90	90	7/15/99	3050	14.19
100	10	7/27/99	3143	14.62	90	100	7/15/99	3025	14.07
100	20	7/27/99	3104	14.44	90	110	7/15/99	2953	13.73
100	30	7/27/99	3161	14.70	90	120	7/15/99	3036	14.12
100	40	7/27/99	3102	14.43	90	130	7/15/99	2993	13.92
100	50	7/27/99	3076	14.31	90	140	7/15/99	3075	14.30
100	60	7/27/99	3104	14.44	90	150	7/15/99	3074	14.30
100	70	7/27/99	2974	13.83	90	160	7/15/99	2991	13.91
100	80	7/27/99	3086	14.35	90	170	7/15/99	3038	14.13
100	90	7/27/99	3100	14.42	90	180	7/15/99	2991	13.91
100	100	7/27/99	3103	14.43	90	0	7/12/99	2999	14.53
100	110	7/27/99	2993	13.92	90	10	7/12/99	2938	14.73
100	120	7/27/99	3010	14.00	90	20	7/12/99	3029	14.62
100	130	7/27/99	2997	13.94	90	30	7/12/99	2964	14.90
100	140	7/27/99	3053	14.20	90	40	7/12/99	2920	14.78
100	150	7/27/99	2973	13.83	90	50	7/12/99	2700	13.53
100	160	7/27/99	2977	13.85	110	0	7/12/99	2921	13.59
100	170	7/27/99	2845	13.23	110	10	7/12/99	2856	13.28
100	180	7/27/99	2799	13.02	110	20	7/12/99	2982	13.87
100	0	7/12/99	3025	14.07	110	30	7/12/99	2928	13.62
100	10	7/12/99	3000	13.95	110	40	7/12/99	2903	13.50
100	20	7/12/99	2979	13.86	110	50	7/12/99	2986	13.89
100	30	7/12/99	3065	14.26	110	0	7/27/99	3124	13.63
100	40	7/12/99	2863	13.32	110	10	7/27/99	3168	14.41
100	50	7/12/99	2744	12.76	110	20	7/27/99	3144	14.20
110	100	7/27/99	3211	13.87	110	30	7/27/99	3204	14.46
110	110	7/27/99	3034	13.55	110	40	7/27/99	3177	14.93
110	120	7/27/99	3089	13.52	110	50	7/27/99	2908	14.11
110	130	7/27/99	3168	14.38	110	60	7/27/99	2931	14.37
110	140	7/27/99	3021	13.80	110	70	7/27/99	3098	14.73
110	150	7/27/99	3032	14.48	110	80	7/27/99	3052	14.05
110	160	7/27/99	2981	14.20	110	90	7/27/99	3109	14.10
110	170	7/27/99	2914	13.79	110	180	7/27/99	2906	13.54
120	0	7/12/99	3026	14.07	130	0	7/12/99	2855	13.28
120	10	7/12/99	2988	13.90	130	10	7/12/99	2957	13.75
120	20	7/12/99	3037	14.13	130	20	7/12/99	2941	13.68
120	30	7/12/99	2960	13.77	130	30	7/12/99	3011	14.00
120	40	7/12/99	2967	13.80	130	40	7/12/99	2867	13.33
120	50	7/12/99	2923	13.60	130	50	7/12/99	2855	13.28

TABLE B5: AMBIENT GAMMA MEASUREMENTS FOR AREA 4020
SURVEY UNIT 5A+B

LOCATION (FT)		AMBIENT GAMMA (1 METER)			LOCATION (FT)		AMBIENT GAMMA (1 METER)		
NORTH	EAST	DATE	CPM	µR/hr	NORTH	EAST	DATE	CPM	µR/hr
140	0	7/12/99	3091	14.11	150	0	7/12/99	3033	14.10
140	10	7/12/99	2966	13.96	150	10	7/12/99	3001	14.22
140	20	7/12/99	3113	14.05	150	20	7/12/99	3020	14.30
140	30	7/12/99	3053	13.50	150	30	7/12/99	2902	13.87
140	40	7/12/99	2964	13.46	150	40	7/12/99	2894	13.85
140	50	7/12/99	2912	13.31	150	50	7/12/99	2862	13.77
160	0	7/12/99	3032	13.80	170	0	7/12/99	2967	14.09
160	10	7/12/99	3058	14.08	170	10	7/12/99	3028	13.66
160	20	7/12/99	3075	14.51	170	20	7/12/99	3119	14.12
160	30	7/12/99	2983	14.16	170	30	7/12/99	3044	14.03
160	40	7/12/99	2978	13.72	170	40	7/12/99	2950	13.66
160	50	7/12/99	2961	13.15	170	50	7/12/99	2828	13.93
180	0	7/12/99	2749	12.79	190	0	7/12/99	3074	14.30
180	10	7/12/99	3034	14.11	190	10	7/12/99	3029	14.09
180	20	7/12/99	3052	14.20	190	20	7/12/99	3070	14.28
180	30	7/12/99	3090	14.37	190	30	7/12/99	2980	13.86
180	40	7/12/99	3005	13.98	190	40	7/12/99	2990	13.91
180	50	7/12/99	2977	13.85	190	50	7/12/99	2895	13.47
200	0	7/12/99	3170	14.74	210	0	7/12/99	3027	14.08
200	10	7/12/99	3077	14.31	210	10	7/12/99	2945	13.70
200	20	7/12/99	3022	14.06	210	20	7/12/99	3000	13.95
200	30	7/12/99	3097	14.40	210	30	7/12/99	3061	14.24
200	40	7/12/99	3044	14.16	210	40	7/12/99	3065	14.26
200	50	7/12/99	2852	13.27	210	50	7/12/99	2967	13.80
220	0	7/12/99	2914	13.55	230	0	7/12/99	3001	13.96
220	10	7/12/99	3086	14.35	230	10	7/12/99	2999	13.95
220	20	7/12/99	3128	14.55	230	20	7/12/99	3071	14.28
220	30	7/12/99	3063	14.25	230	30	7/12/99	3173	14.76
220	40	7/12/99	3055	14.21	230	40	7/12/99	2998	13.94
220	50	7/12/99	3044	14.16	230	50	7/12/99	2862	13.31
240	0	7/12/99	3092	14.38	250	0	7/12/99	2925	13.60
240	10	7/12/99	3042	14.15	250	10	7/12/99	2971	13.82
240	20	7/12/99	3023	14.06	250	20	7/12/99	3052	14.20
240	30	7/12/99	3015	14.02	250	30	7/12/99	3001	13.96
240	40	7/12/99	2931	13.63	250	40	7/12/99	2951	13.73
240	50	7/12/99	2973	13.83	250	50	7/12/99	2940	13.67
260	0	7/12/99	3030	14.09	270	0	7/12/99	2951	13.73
260	10	7/12/99	2936	13.66	270	10	7/12/99	3029	14.09
260	20	7/12/99	3036	14.12	270	20	7/12/99	3007	13.99
260	30	7/12/99	3016	14.03	270	30	7/12/99	2897	13.47
260	40	7/12/99	2937	13.66	270	40	7/12/99	2917	13.57
260	50	7/12/99	2995	13.93	270	50	7/12/99	2958	13.76
280	0	7/12/99	3258	15.15	290	0	7/12/99	3162	14.71
280	10	7/12/99	3044	14.16	290	10	7/12/99	3909	18.18
280	20	7/12/99	2985	13.88	290	20	7/12/99	3127	14.54
280	30	7/12/99	3059	14.23	290	30	7/12/99	3059	14.23
280	40	7/12/99	3062	14.24	290	40	7/12/99	3046	14.17
280	50	7/12/99	2803	13.04	290	50	7/12/99	2858	13.29

LOCATION (FT)		AMBIENT GAMMA (1 METER)			LOCATION (FT)		AMBIENT GAMMA (1 METER)		
NORTH	EAST	DATE	CPM	µR/hr	NORTH	EAST	DATE	CPM	µR/hr
300	0	7/12/99	3080	14.33	310	0	7/13/99	2845	13.23
300	10	7/12/99	3097	14.40	310	10	7/13/99	2984	13.88
300	20	7/12/99	3162	14.71	310	20	7/13/99	2997	13.94
300	30	7/12/99	3113	14.48	310	30	7/13/99	3047	14.17
300	40	7/12/99	3025	14.07	310	40	7/13/99	2885	13.42
300	50	7/12/99	2983	13.87	310	50	7/13/99	2849	13.25
320	0	7/13/99	3051	14.19	330	0	7/13/99	2949	13.72
320	10	7/13/99	2996	13.93	330	10	7/13/99	2846	13.24
320	20	7/13/99	2941	13.68	330	20	7/13/99	2693	12.53
320	30	7/13/99	2950	13.72	330	30	7/13/99	2743	12.76
320	40	7/13/99	2880	13.40	330	40	7/13/99	2886	13.42
320	50	7/13/99	2686	12.49	330	50	7/13/99	2793	12.99
340	0	7/13/99	2854	13.27	350	0	7/13/99	2664	12.39
340	10	7/13/99	2795	13.00	350	10	7/13/99	2838	13.20
340	20	7/13/99	2850	13.26	350	20	7/13/99	2759	12.83
340	30	7/13/99	2804	13.04	350	30	7/13/99	2997	13.94
340	40	7/13/99	2781	12.93	350	40	7/13/99	2900	13.49
340	50	7/13/99	2907	13.52	350	50	7/13/99	2797	13.01
360	0	7/13/99	2976	13.84	370	0	7/13/99	2921	13.59
360	10	7/13/99	2944	13.69	370	10	7/13/99	2886	13.42
360	20	7/13/99	2722	12.66	370	20	7/13/99	2824	13.13
360	30	7/13/99	2820	13.12	370	30	7/13/99	2807	13.06
360	40	7/13/99	2781	12.93	370	40	7/13/99	2731	12.70
360	50	7/13/99	2725	12.67	370	50	7/13/99	2650	12.33
380	0	7/13/99	2921	13.59	390	0	7/13/99	2884	13.41
380	10	7/13/99	2886	13.42	390	10	7/13/99	2706	12.59
380	20	7/13/99	2824	13.13	390	20	7/13/99	2806	13.05
380	30	7/13/99	2807	13.06	390	30	7/13/99	2770	12.88
380	40	7/13/99	2731	12.70	390	40	7/13/99	2810	13.07
380	50	7/13/99	2650	12.33	390	50	7/13/99	2575	11.98
400	0	7/30/99	2947	13.71					
400	10	7/30/99	2929	13.62					
400	20	7/30/99	2815	13.09					
400	30	7/30/99	2741	12.75					
400	40	7/30/99	2779	12.93					
400	50	7/30/99	2692	12.52					

FIGURE B6: AREA 4020 AMBIENT GAMMA, SU-6



LOCATION (FT)		AMBIENT GAMMA (1 METER)			LOCATION (FT)		AMBIENT GAMMA (1 METER)		
NORTH	EAST	DATE	CPM	µR/hr	NORTH	EAST	DATE	CPM	µR/hr
0	0	7/20/99	3222	14.99	150	0	7/20/99	NM	NM
0	25	7/20/99	3230	15.02	150	25	7/20/99	NM	NM
0	50	7/20/99	3079	14.32	150	50	7/20/99	NM	NM
0	75	7/20/99	3089	14.37	150	75	7/20/99	NM	NM
0	100	7/20/99	3164	14.72	150	100	7/20/99	NM	NM
0	125	7/20/99	3399	15.81	150	125	7/20/99	NM	NM
0	150	7/20/99	3271	15.21	150	150	7/20/99	NM	NM
0	175	7/20/99	3268	15.20	150	175	7/20/99	3148	14.64
0	200	7/20/99	2828	13.15	150	200	7/20/99	2954	13.74
25	0	7/20/99	3117	14.50	175	0	7/20/99	NM	NM
25	25	7/20/99	3201	14.89	175	25	7/20/99	NM	NM
25	50	7/20/99	3204	14.90	175	50	7/20/99	NM	NM
25	75	7/20/99	3018	14.04	175	75	7/20/99	NM	NM
25	100	7/20/99	3293	15.32	175	100	7/20/99	NM	NM
25	125	7/20/99	3029	14.09	175	125	7/20/99	NM	NM
25	150	7/20/99	3134	14.58	175	150	7/20/99	NM	NM
25	175	7/20/99	3148	14.64	175	175	7/20/99	NM	NM
25	200	7/20/99	2898	13.48	175	200	7/20/99	NM	NM
50	0	7/20/99	3213	14.94	200	0	7/20/99	NM	NM
50	25	7/20/99	3279	15.25	200	25	7/20/99	NM	NM
50	50	7/20/99	3178	14.78	200	50	7/20/99	NM	NM
50	75	7/20/99	3115	14.49	200	75	7/20/99	NM	NM
50	100	7/20/99	3247	15.10	200	100	7/20/99	NM	NM
50	125	7/20/99	3236	15.05	200	125	7/20/99	NM	NM
50	150	7/20/99	3160	14.70	200	150	7/20/99	NM	NM
50	175	7/20/99	3186	14.82	200	175	7/20/99	NM	NM
50	200	7/20/99	2946	13.70	200	200	7/20/99	NM	NM
75	0	7/20/99	3303	15.36	125	0	7/20/99	NM	NM
75	25	7/20/99	3240	15.07	125	25	7/20/99	NM	NM
75	50	7/20/99	3241	15.07	125	50	7/20/99	NM	NM
75	75	7/20/99	3218	14.97	125	75	7/20/99	NM	NM
75	100	7/20/99	3128	14.55	125	100	7/20/99	NM	NM
75	125	7/20/99	3182	14.80	125	125	7/20/99	NM	NM
75	150	7/20/99	3146	14.63	125	150	7/20/99	3145	14.63
75	175	7/20/99	3100	14.42	125	175	7/20/99	3143	14.62
75	200	7/20/99	2854	13.27	125	200	7/20/99	2837	13.20
100	0	7/20/99	NM	NM					
100	25	7/20/99	NM	NM					
100	50	7/20/99	NM	NM					
100	75	7/20/99	NM	NM					
100	100	7/20/99	NM	NM					
100	125	7/20/99	3153	14.67					
100	150	7/20/99	3206	14.91					
100	175	7/20/99	3077	14.31					
100	200	7/20/99	2854	13.27					

NM=not measured

APPENDIX C

SOIL SAMPLE RESULTS

SURVEY UNIT 1

FIGURE C1: CS-137 SOIL SAMPLE, SU-1

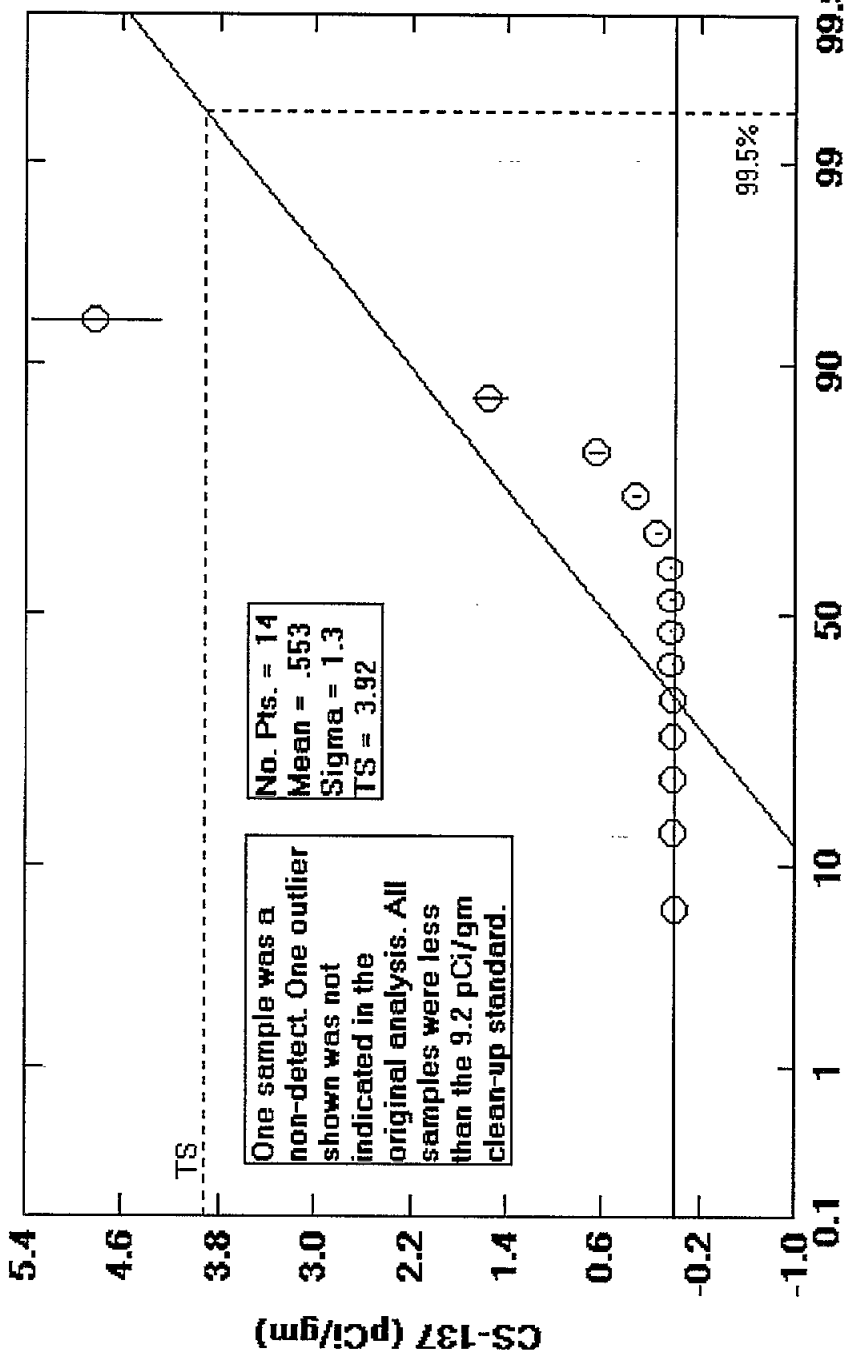


Table C1. Cesium-137 (pCi/g) Survey Unit 1

Soil ID	Result	+/- 1 sigma error	Non-Detect ?	MDA
020-99-0001R	**0.007**		ND	0.013
020-99-0002R	**0.018**	0.008	-	0.011
020-99-0003R	**0.017**	0.007	-	0.012
020-99-0004R	**0.650**	0.070	-	0.013
020-99-0005R	**0.037**	0.009	-	0.010
020-99-0006R	**0.040**	0.014	-	0.016
020-99-0007R	**0.045**	0.011	-	0.012
020-99-0008R	**0.021**	0.007	-	0.015
020-99-0009R	**0.014**	0.007	-	0.009
020-99-0010R	**0.034**	0.010	-	0.011
020-99-0011R	**1.550**	0.150	-	0.012
020-99-0012R	**0.330**	0.040	-	0.011
020-99-0013R	**0.150**	0.020	-	0.012
020-99-0014R	**4.830**	0.530	-	0.015

MDA = Minimum Detectable Activity
$DCGL_W$ = Derived Concentratration Guideline = 9.2 pCi/gm
ND = Non-detect. Gamma spec. results reported as <MDA. For the purposes of statistical analysis, non-detects are quantified as MDA/2.
R = Re-analyzed Samples

Table C.2. Thorium-228 (pCi/g) Survey Unit 1

Soil ID	Result	+/- 1 sigma error	Non-Detect ?	MDA
020-99-0001	1.50	0.47	-	0.140
020-99-0002	1.57	0.48	-	0.140
020-99-0003	1.66	0.57	-	0.190
020-99-0004	1.45	0.17	-	0.130
020-99-0005	1.86	0.56	-	0.110
020-99-0006	1.59	0.47	-	0.076
020-99-0007	1.06	0.39	-	0.180
020-99-0008	2.71	1.05	-	0.470
020-99-0009	2.86	1.01	-	0.230
020-99-0010	1.60	0.57	-	0.210
020-99-0011	1.82	0.64	-	0.250
020-99-0012	0.98	0.36	-	0.150
020-99-0013	1.20	0.39	-	0.120
020-99-0014	1.11	0.42	-	0.110

MDA = Minimum Detectable Activity
$DCGL_W$ = Derived Concentratration Guideline = 5 pCi/gm
ND = If result is less than MDA then result is non-detect.

Table C3: Thorium-230 (pCi/g). Survey Unit 1

Soil ID	Result	+/- 1 sigma error	Non-Detect ?	MDA
020-99-0001	0.90	0.32	-	0.110
020-99-0002	1.11	0.36	-	0.080
020-99-0003	0.80	0.34	-	0.150
020-99-0004	0.92	0.33	-	0.100
020-99-0005	0.59	0.24	-	0.120
020-99-0006	0.96	0.32	-	0.065
020-99-0007	1.06	0.38	-	0.051
020-99-0008	1.05	0.52	-	0.280
020-99-0009	0.77	0.39	-	0.091
020-99-0010	1.14	0.44	-	0.150
020-99-0011	1.30	0.49	-	0.140
020-99-0012	0.84	0.32	-	0.120
020-99-0013	0.93	0.32	-	0.094
020-99-0014	1.38	0.43	-	0.120

MDA = Minimum Detectable Activity
$DCGL_W$ = Derived Concentratration Guideline = 5 pCi/gm
ND = If result is less than MDA then result is non-detect.

Table C4: Thorium-232 (pCi/g). Survey Unit 1

Soil ID	Result	+/- 1 sigma error	Non-Detect ?	MDA
020-99-0001	1.48	0.46	-	0.042
020-99-0002	1.14	0.37	-	0.068
020-99-0003	1.43	0.50	-	0.110
020-99-0004	1.24	0.41	-	0.120
020-99-0005	1.54	0.48	-	0.130
020-99-0006	1.18	0.37	-	0.036
020-99-0007	1.16	0.41	-	0.090
020-99-0008	2.25	0.89	-	0.110
020-99-0009	2.68	0.95	-	0.091
020-99-0010	1.38	0.50	-	0.062
020-99-0011	1.18	0.45	-	0.120
020-99-0012	1.12	0.39	-	0.085
020-99-0013	1.16	0.38	-	0.100
020-99-0014	1.43	0.44	-	0.130

MDA = Minimum Detectable Activity
$DCGL_W$ = Derived Concentratration Guideline = 5 pCi/gm
ND = If result is less than MDA then result is non-detect.

Table C5: Uranium-234 (pCi/g). Survey Unit 1

Soil ID	Result	+/- 1 sigma error	Non-Detect ?	MDA
020-99-0001	0.69	0.32	-	0.150
020-99-0002	0.78	0.33	-	0.110
020-99-0003	0.49	0.26	-	0.130
020-99-0004	0.50	0.26	-	0.180
020-99-0005	0.59	0.30	-	0.140
020-99-0006	0.53	0.31	-	0.220
020-99-0007	0.49	0.25	-	0.120
020-99-0008	0.45	0.27	-	0.160
020-99-0009	0.34	0.18	-	0.088
020-99-0010	0.47	0.25	-	0.160
020-99-0011	0.29	0.23	-	0.210
020-99-0012	0.52	0.33	-	0.220
020-99-0013	0.93	0.40	-	0.190
020-99-0014	0.58	0.37	-	0.220

MDA = Minimum Detectable Activity
$DCGL_W$ = Derived Concentratration Guideline = 30 pCi/gm
ND = If result is less than MDA then result is non-detect.

Table C6: Uranium-235/236 (pCi/g). Survey Unit 1

Soil ID	Result	+/- 1 sigma error	Non-Detect ?	MDA
020-99-0001	0.058	0.093	ND	0.150
020-99-0002	0.100	0.120	ND	0.180
020-99-0003	0.100	0.120	-	0.092
020-99-0004	0.019	0.067	ND	0.180
020-99-0005	0.000	0.000	ND	0.095
020-99-0006	-0.008	0.017	ND	0.200
020-99-0007	0.012	0.065	ND	0.190
020-99-0008	0.020	0.120	ND	0.340
020-99-0009	0.081	0.093	ND	0.130
020-99-0010	0.006	0.013	ND	0.150
020-99-0011	-0.009	0.019	ND	0.220
020-99-0012	0.150	0.180	-	0.140
020-99-0013	0.050	0.100	ND	0.220
020-99-0014	0.110	0.160	ND	0.150

MDA = Minimum Detectable Activity
$DCGL_W$ = Derived Concentratration Guideline = 30 pCi/gm
ND = If result is less than MDA then result is non-detect.

Table C7: Uranium-238 (pCi/g). Survey Unit 1

Soil ID	Result	+/- 1 sigma error	Non-Detect ?	MDA
020-99-0001	1.240	0.470	-	0.150
020-99-0002	0.760	0.320	-	0.064
020-99-0003	0.520	0.270	-	0.074
020-99-0004	0.740	0.330	-	0.150
020-99-0005	0.540	0.280	-	0.077
020-99-0006	0.500	0.290	-	0.190
020-99-0007	0.890	0.360	-	0.067
020-99-0008	0.380	0.240	-	0.150
020-99-0009	0.420	0.200	-	0.049
020-99-0010	0.420	0.230	-	0.120
020-99-0011	0.480	0.300	-	0.180
020-99-0012	0.490	0.310	-	0.110
020-99-0013	1.100	0.440	-	0.160
020-99-0014	0.860	0.460	-	0.120

MDA = Minimum Detectable Activity
$DCGL_W$ = Derived Concentratration Guideline = 35 pCi/gm
ND = If result is less than MDA then result is non-detect.

Table C7.1: U-234/U-238 RATIOS, SURVEY UNIT 1

Sample Numbers	U-234 pCi/gm	U-238 pCi/gm	Ratio U-234/238
020-99-0001	0.69	1.24	0.56
020-99-0002	0.78	0.76	1.03
020-99-0003	0.49	0.52	0.94
020-99-0004	0.5	0.74	0.68
020-99-0005	0.59	0.54	1.09
020-99-0006	0.53	0.5	1.06
020-99-0007	0.49	0.89	0.55
020-99-0008	0.45	0.38	1.18
020-99-0009	0.34	0.42	0.81
020-99-0010	0.47	0.42	1.12
020-99-0011	0.29	0.48	0.60
020-99-0012	0.52	0.49	1.06
020-99-0013	0.93	1.1	0.85
020-99-0014	0.58	0.86	0.67
AVERAGE	0.55	0.67	0.87
MAXIMUM	0.93	1.24	1.18
MINIMUM	0.29	0.38	0.55

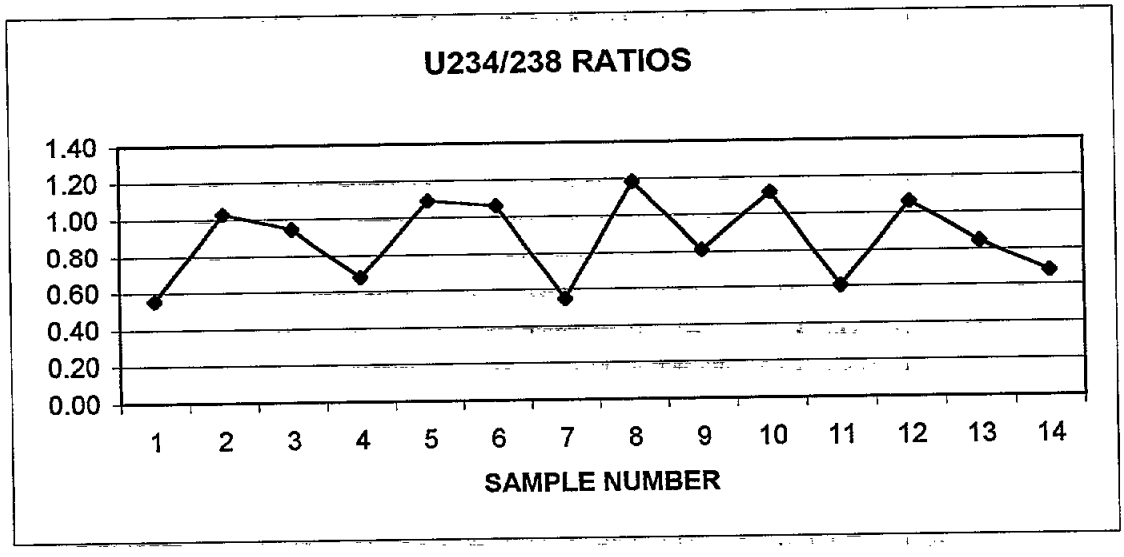


Table C8: Plutonium-238 (pCi/g). Survey Unit 1

Soil ID	Result	+/- 1 sigma error	Non-Detect ?	MDA
020-99-0001	0.053	0.062	ND	0.098
020-99-0002	0.071	0.089	ND	0.160
020-99-0003	0.110	0.100	ND	0.140
020-99-0004	0.013	0.038	ND	0.150
020-99-0005	0.034	0.047	ND	0.083
020-99-0006	0.042	0.079	ND	0.170
020-99-0007	0.007	0.051	ND	0.140
020-99-0008R	**0.007**	**0.017**	**ND**	**0.031**
020-99-0009	0.093	0.078	ND	0.110
020-99-0010	0.030	0.056	ND	0.120
020-99-0011	0.063	0.064	ND	0.093
020-99-0012	0.070	0.072	ND	0.120
020-99-0013	0.026	0.068	ND	0.160
020-99-0014	-0.012	0.048	ND	0.180

MDA = Minimum Detectable Activity
$DCGL_W$ = Derived Concentratration Guideline = 37.2 pCi/gm
ND = If result is less than MDA then result is non-detect.
R = Re-analyzed Samples

Table C9: Plutonium-239/240 (pCi/g). Survey Unit 1

Soil ID	Result	+/- 1 sigma error	Non-Detect ?	MDA
020-99-0001	0.011	0.027	ND	0.064
020-99-0002	0.009	0.055	ND	0.150
020-99-0003	0.016	0.032	ND	0.042
020-99-0004	0.003	0.015	ND	0.110
020-99-0005	0.020	0.032	ND	0.054
020-99-0006	-0.006	0.048	ND	0.150
020-99-0007	0.000	0.000	ND	0.046
020-99-0008R	**0.022**	**0.015**	-	**0.006**
020-99-0009	0.030	0.060	ND	0.130
020-99-0010	0.056	0.062	ND	0.092
020-99-0011	0.048	0.052	ND	0.061
020-99-0012	0.010	0.036	ND	0.094
020-99-0013	0.006	0.045	ND	0.140
020-99-0014	0.000	0.000	ND	0.056

MDA = Minimum Detectable Activity
$DCGL_W$ = Derived Concentratration Guideline = 33.9 pCi/gm
ND = If result is less than MDA then result is non-detect.
R = Re-analyzed Samples

Table C10: Americium-241 (pCi/g). Survey Unit 1

Soil ID	Result	+/- 1 sigma error	Non-Detect ?	MDA
020-99-0001	0.021	0.066	ND	0.220
020-99-0002	0.059	0.076	ND	0.130
020-99-0003	0.051	0.062	ND	0.095
020-99-0004	0.026	0.081	ND	0.200
020-99-0005	0.080	0.120	ND	0.240
020-99-0006	0.011	0.056	ND	0.150
020-99-0007	0.019	0.052	ND	0.170
020-99-0008	0.052	0.091	ND	0.190
020-99-0009	-0.017	0.055	ND	0.180
020-99-0010	0.064	0.095	ND	0.180
020-99-0011	0.054	0.086	ND	0.170
020-99-0012	0.006	0.031	ND	0.093
020-99-0013	0.090	0.100	ND	0.140
020-99-0014	0.030	0.100	ND	0.260

MDA = Minimum Detectable Activity
$DCGL_W$ = Derived Concentratration Guideline = 5.44 pCi/gm
ND = If result is less than MDA then result is non-detect.

FIGURE C2: SR-90 SOIL RESULTS, SU-1

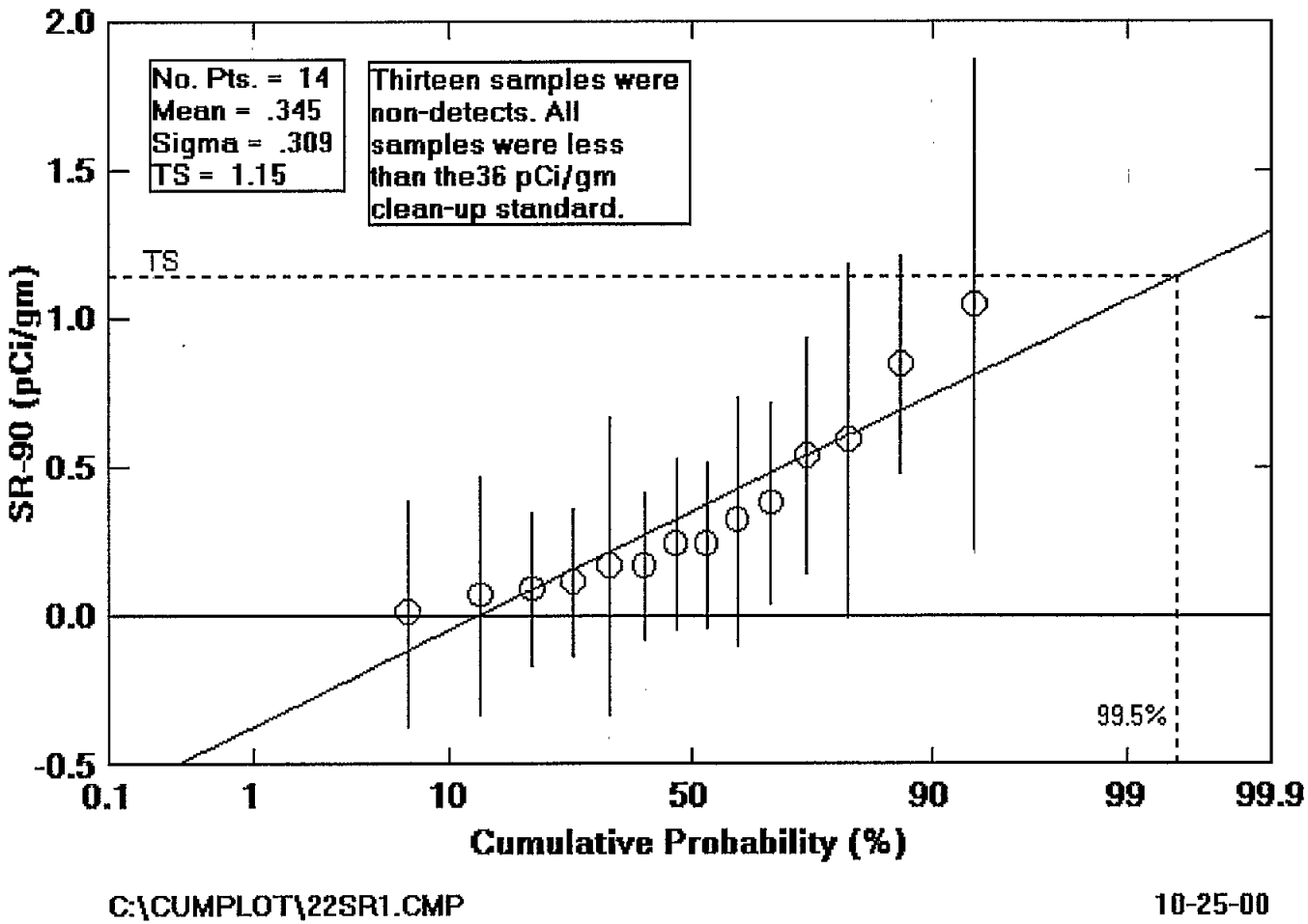


Table C11: Strontium-90 (pCi/g). Survey Unit 1

Soil ID	Result	+/- 1 sigma error	Non-Detect ?	MDA
020-99-0001	1.050	0.830	ND	1.320
020-99-0002	0.380	0.340	ND	0.550
020-99-0003	0.070	0.400	ND	0.690
020-99-0004	0.590	0.600	ND	0.990
020-99-0005	0.170	0.250	ND	0.430
020-99-0006	0.240	0.290	ND	0.480
020-99-0007	0.320	0.420	ND	0.710
020-99-0008	0.170	0.500	ND	0.860
020-99-0009	0.090	0.260	ND	0.440
020-99-0010	0.240	0.280	ND	0.460
020-99-0011R	**0.540**	0.400	**ND**	**0.630**
020-99-0012	0.112	0.250	ND	0.430
020-99-0013	0.010	0.380	ND	0.670
020-99-0014	0.850	0.370	-	0.520

MDA = Minimum Detectable Activity
$DCGL_W$ = Derived Concentratration Guideline = 36 pCi/gm
ND = If result is less than MDA then result is non-detect.
R = Re-analyzed Samples

SURVEY UNIT 2

FIGURE C3: CS-137 SOIL RESULTS, SU-2

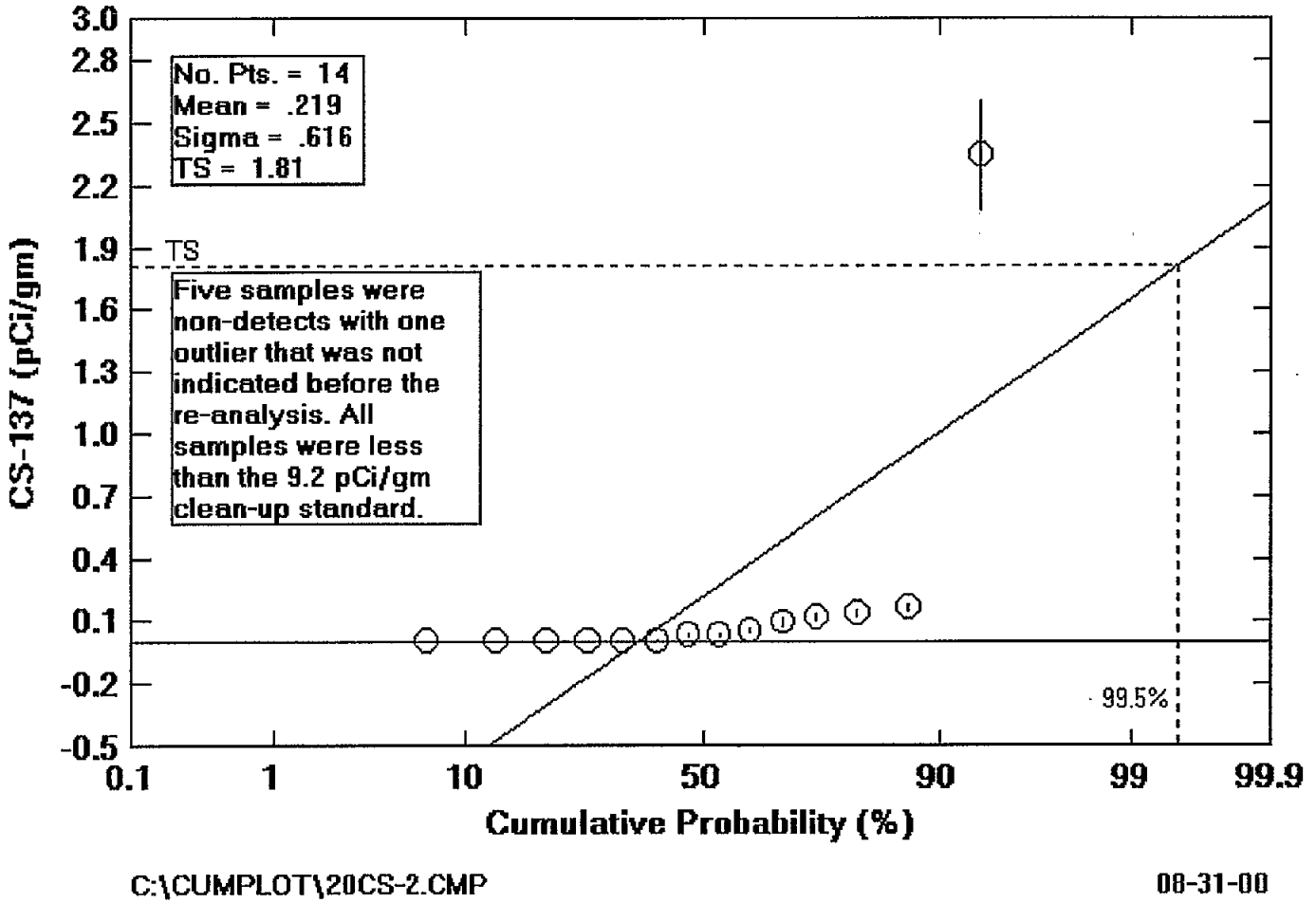


Table C12: Cesium-137 (pCi/g). Survey Unit 2

Soil ID	Result	+/- 1 sigma error	Non-Detect ?	MDA
020-99-0015R	**0.170**	0.02	-	0.013
020-99-0016R	**2.350**	0.26	-	0.016
020-99-0017R	**0.037**	0.01	-	0.011
020-99-0018R	**0.012**	0.007	-	0.011
020-99-0019R	**0.140**	0.02	-	0.014
020-99-0020R	**0.008**		ND	0.016
020-99-0021R	**0.041**	0.01	-	0.011
020-99-0022R	**0.007**		ND	0.013
020-99-0023R	**0.007**		ND	0.013
020-99-0024R	**0.007**		ND	0.014
020-99-0025R	**0.007**		ND	0.013
020-99-0026R	**0.060**	0.012	-	0.012
020-99-0027R	**0.100**	0.02	-	0.017
020-99-0028R	**0.120**	0.02	-	0.013

MDA = Minimum Detectable Activity
$DCGL_W$ = Derived Concentratration Guideline = 9.2 pCi/gm
ND = Non-detect. Gamma spec. results reported as <MDA. For the purposes of statistical analysis, non-detects are quantified as MDA/2.
R = Re-analyzed Samples

Table C13: Thorium-228 (pCi/g). Survey Unit 2

Soil ID	Result	+/- 1 sigma error	Non-Detect ?	MDA
020-99-0015	1.19	0.36	-	0.065
020-99-0016	1.47	0.48	-	0.170
020-99-0017	1.50	0.49	-	0.200
020-99-0018	1.57	0.49	-	0.120
020-99-0019	1.34	0.51	-	0.260
020-99-0020	1.58	0.53	-	0.190
020-99-0021	1.94	0.82	-	0.370
020-99-0022	2.55	1.12	-	0.450
020-99-0023	2.27	0.90	-	0.310
020-99-0024	1.15	0.44	-	0.170
020-99-0025	1.99	0.70	-	0.240
020-99-0026	1.89	0.90	-	0.310
020-99-0027	1.47	0.85	-	0.640
020-99-0028	1.39	0.64	-	0.450

MDA = Minimum Detectable Activity
$DCGL_W$ = Derived Concentratration Guideline = 5 pCi/gm
ND = If result is less than MDA then result is non-detect.

Table C14: Thorium-230 (pCi/g). Survey Unit 2

Soil ID	Result	+/- 1 sigma error	Non-Detect ?	MDA
020-99-0015	1.19	0.36	-	0.055
020-99-0016	1.11	0.48	-	0.047
020-99-0017	0.91	0.33	-	0.110
020-99-0018	1.43	0.45	-	0.043
020-99-0019	0.65	0.33	-	0.180
020-99-0020	1.28	0.44	-	0.110
020-99-0021	1.17	0.57	-	0.300
020-99-0022	1.30	0.68	-	0.310
020-99-0023	1.18	0.55	-	0.310
020-99-0024	1.13	0.42	-	0.140
020-99-0025	1.68	0.61	-	0.210
020-99-0026	1.47	0.74	-	0.260
020-99-0027	1.20	0.70	-	0.180
020-99-0028	1.12	0.53	-	0.260

MDA = Minimum Detectable Activity
$DCGL_W$ = Derived Concentratration Guideline = 5 pCi/gm
ND = If result is less than MDA then result is non-detect.

Table C15: Thorium-232 (pCi/g). Survey Unit 2

Soil ID	Result	+/- 1 sigma error	Non-Detect ?	MDA
020-99-0015	1.19	0.36	-	0.031
020-99-0016	1.11	0.44	-	0.083
020-99-0017	1.18	0.40	-	0.044
020-99-0018	1.81	0.54	-	0.043
020-99-0019	0.78	0.36	-	0.078
020-99-0020	1.79	0.57	-	0.091
020-99-0021	1.62	0.70	-	0.210
020-99-0022	2.26	1.01	-	0.380
020-99-0023	1.87	0.77	-	0.340
020-99-0024	1.54	0.53	-	0.150
020-99-0025	1.46	0.55	-	0.230
020-99-0026	1.48	0.74	-	0.150
020-99-0027	1.19	0.70	-	0.320
020-99-0028	1.71	0.71	-	0.100

MDA = Minimum Detectable Activity
$DCGL_W$ = Derived Concentratration Guideline = 5 pCi/gm
ND = If result is less than MDA then result is non-detect.

Table C16: Uranium-234 (pCi/g). Survey Unit 2

Soil ID	Result	+/- 1 sigma error	Non-Detect ?	MDA
020-99-0015	1.00	0.49	-	0.230
020-99-0016	0.57	0.22	-	0.068
020-99-0017	0.62	0.29	-	0.067
020-99-0018	0.70	0.29	-	0.100
020-99-0019	0.66	0.26	-	0.094
020-99-0020	0.68	0.30	-	0.110
020-99-0021	0.80	0.37	-	0.220
020-99-0022	0.48	0.24	-	0.120
020-99-0023	0.63	0.27	-	0.120
020-99-0024	0.60	0.29	-	0.120
020-99-0025	0.69	0.38	-	0.110
020-99-0026	0.65	0.26	-	0.083
020-99-0027	0.63	0.31	-	0.190
020-99-0028	0.79	0.40	-	0.180

MDA = Minimum Detectable Activity
$DCGL_W$ = Derived Concentratration Guideline = 30 pCi/gm
ND = If result is less than MDA then result is non-detect.

Table C17: Uranium-235/236 (pCi/g). Survey Unit 2

Soil ID	Result	+/- 1 sigma error	Non-Detect ?	MDA
020-99-0015	0.090	0.150	ND	0.240
020-99-0016	0.018	0.035	ND	0.048
020-99-0017	-0.006	0.068	ND	0.240
020-99-0018	0.041	0.075	ND	0.150
020-99-0019	0.078	0.084	ND	0.099
020-99-0020	0.022	0.056	ND	0.130
020-99-0021	0.040	0.110	ND	0.250
020-99-0022	0.000	0.000	ND	0.081
020-99-0023	0.074	0.093	ND	0.130
020-99-0024	0.045	0.094	ND	0.200
020-99-0025	-0.010	0.110	ND	0.390
020-99-0026	0.043	0.061	ND	0.058
020-99-0027	-0.013	0.019	ND	0.190
020-99-0028	0.000	0.000	ND	0.130

MDA = Minimum Detectable Activity
$DCGL_W$ = Derived Concentratration Guideline = 30 pCi/gm
ND = If result is less than MDA then result is non-detect.

Table C18: Uranium-238 (pCi/g). Survey Unit 2

Soil ID	Result	+/- 1 sigma error	Non-Detect ?	MDA
020-99-0015	1.160	0.540	-	0.230
020-99-0016	0.590	0.220	-	0.038
020-99-0017	0.620	0.290	-	0.067
020-99-0018	0.750	0.300	-	0.056
020-99-0019	0.690	0.270	-	0.094
020-99-0020	0.730	0.310	-	0.110
020-99-0021	0.580	0.480	-	0.170
020-99-0022	0.820	0.340	-	0.065
020-99-0023	0.520	0.250	-	0.120
020-99-0024	0.730	0.330	-	0.070
020-99-0025	0.600	0.350	-	0.110
020-99-0026	0.760	0.290	-	0.047
020-99-0027	0.550	0.280	-	0.150
020-99-0028	0.640	0.350	-	0.100

MDA = Minimum Detectable Activity
$DCGL_W$ = Derived Concentratration Guideline = 35 pCi/gm
ND = If result is less than MDA then result is non-detect.

Table C18.1: U-234/U-238 RATIOS, SURVEY UNIT 2

Sample Numbers	U-234 pCi/gm	U-238 pCi/gm	Ratio U-234/238
020-99-0015	1.00	1.16	0.86
020-99-0016	0.57	0.59	0.97
020-99-0017	0.62	0.62	1.00
020-99-0018	0.70	0.75	0.93
020-99-0019	0.66	0.69	0.96
020-99-0020	0.68	0.73	0.93
020-99-0021	0.80	0.58	1.38
020-99-0022	0.48	0.82	0.59
020-99-0023	0.63	0.52	1.21
020-99-0024	0.60	0.73	0.82
020-99-0025	0.69	0.60	1.15
020-99-0026	0.65	0.76	0.86
020-99-0027	0.63	0.55	1.15
020-99-0028	0.79	0.64	1.23
AVERAGE	0.68	0.70	1.00
MAXIMUM	1	1.16	1.38
MINIMUM	0.48	0.52	0.59

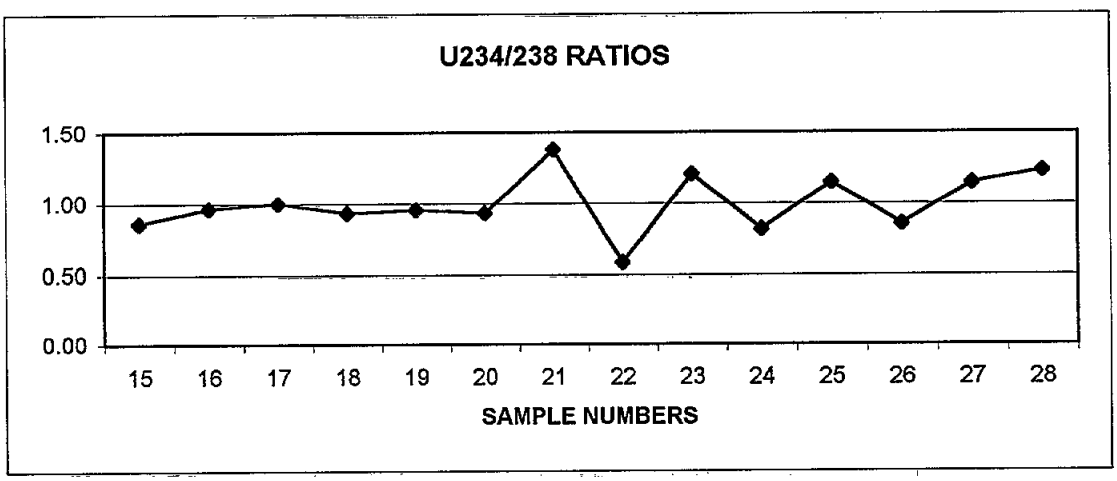


Table C19: Plutonium-238 (pCi/g). Survey Unit 2

Soil ID	Result	+/- 1 sigma error	Non-Detect ?	MDA
020-99-0015	0.078	0.091	ND	0.160
020-99-0016R	**0.007**	**0.015**	-	**0.026**
020-99-0017R	**0.003**	**0.009**	-	**0.019**
020-99-0018	0.066	0.068	ND	0.098
020-99-0019	0.080	0.100	ND	0.190
020-99-0020	0.047	0.054	ND	0.074
020-99-0021	0.021	0.042	ND	0.091
020-99-0022	0.002	0.026	ND	0.074
020-99-0023	-0.026	0.060	ND	0.210
020-99-0024	0.037	0.064	ND	0.130
020-99-0025	0.041	0.053	ND	0.089
020-99-0026R	**0.026**	**0.028**	**ND**	**0.053**
020-99-0027	0.075	0.062	-	0.064
020-99-0028	0.012	0.058	ND	0.150

MDA = Minimum Detectable Activity
$DCGL_W$ = Derived Concentratration Guideline = 37.2 pCi/gm
ND = If result is less than MDA then result is non-detect.
R = Re-analyzed Samples

Table C20: Plutonium-239/240 (pCi/g). Survey Unit 2

Soil ID	Result	+/- 1 sigma error	Non-Detect ?	MDA
020-99-0015	0.018	0.036	ND	0.048
020-99-0016R	**0.009**	**0.007**	**ND**	**0.018**
020-99-0017R	**0.099**	**0.037**	**-**	**0.019**
020-99-0018	0.024	0.048	ND	0.064
020-99-0019	0.100	0.100	ND	0.160
020-99-0020	0.060	0.040	ND	0.120
020-99-0021	0.005	0.025	ND	0.073
020-99-0022	0.005	0.025	ND	0.062
020-99-0023	0.015	0.068	ND	0.180
020-99-0024	0.000	0.000	ND	0.041
020-99-0025	0.010	0.026	ND	0.062
020-99-0026R	**0.020**	**0.019**	**ND**	**0.026**
020-99-0027	0.050	0.035	ND	0.100
020-99-0028	-0.003	0.006	ND	0.075

MDA = Minimum Detectable Activity
$DCGL_W$ = Derived Concentratration Guideline = 33.9 pCi/gm
ND = If result is less than MDA then result is non-detect.
R = Re-analyzed Samples

Table C21: Americium-241 (pCi/g). Survey Unit 2

Soil ID	Result	+/- 1 sigma error	Non-Detect ?	MDA
020-99-0015	0.080	0.130	ND	0.280
020-99-0016	0.004	0.046	ND	0.160
020-99-0017	0.016	0.061	ND	0.210
020-99-0018	0.007	0.053	ND	0.150
020-99-0019	0.057	0.099	ND	0.210
020-99-0020	0.049	0.073	ND	0.140
020-99-0021	-0.003	0.060	ND	0.170
020-99-0022	0.033	0.070	ND	0.150
020-99-0023	0.072	0.058	-	0.062
020-99-0024	0.012	0.067	ND	0.170
020-99-0025	-0.023	0.030	ND	0.120
020-99-0026	0.011	0.040	ND	0.110
020-99-0027	0.049	0.061	ND	0.110
020-99-0028	0.035	0.015	ND	0.075

MDA = Minimum Detectable Activity
$DCGL_W$ = Derived Concentratration Guideline = 5.44 pCi/gm
ND = If result is less than MDA then result is non-detect.

FIGURE C2: AREA 4020 SR-90 SOIL RESULTS, SU-2

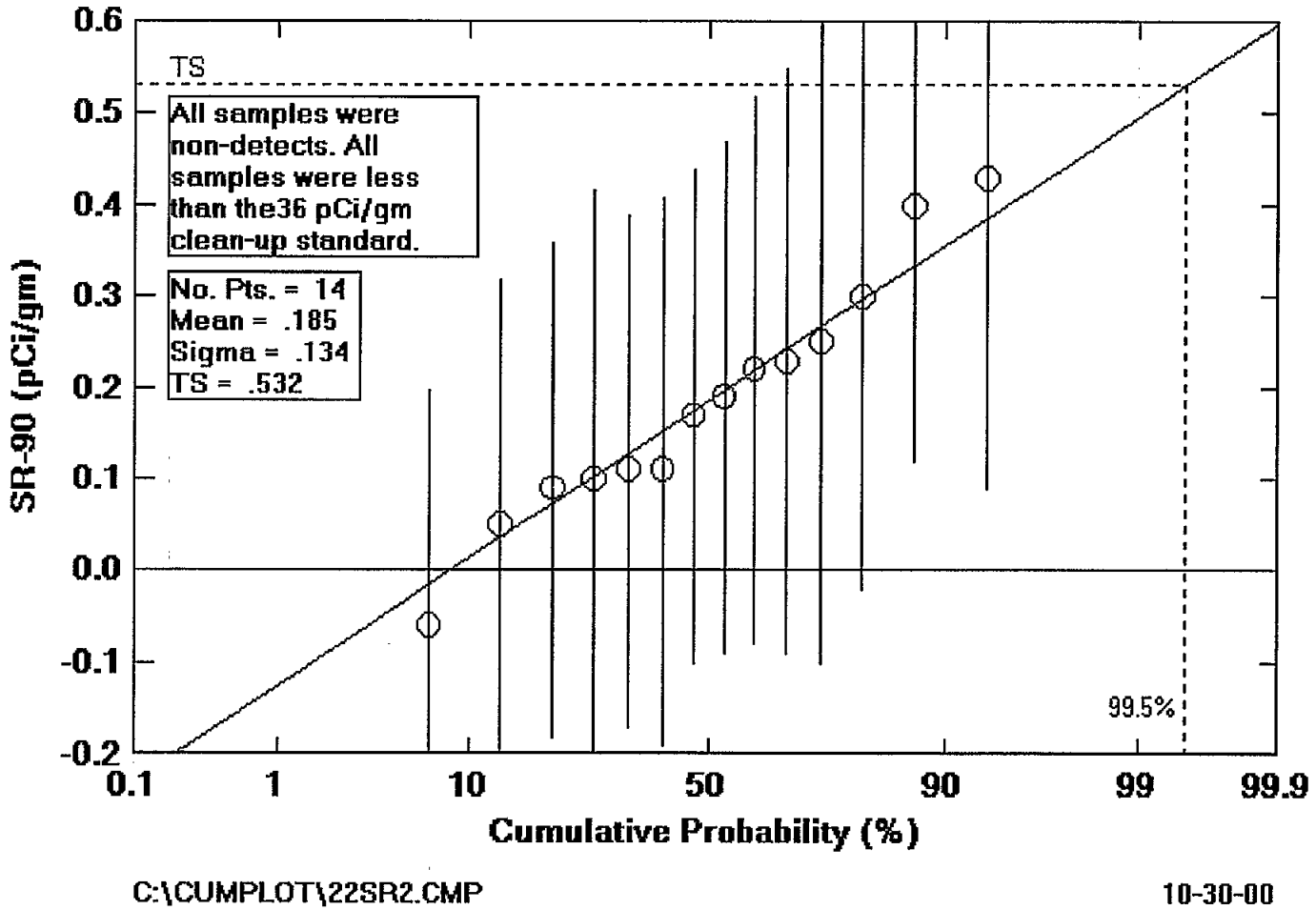


Table C22: Strontium-90 (pCi/g). Survey Unit 2

Soil ID	Result	+/- 1 sigma error	Non-Detect ?	MDA
020-99-0015	0.430	0.340	ND	0.530
020-99-0016	0.230	0.320	ND	0.540
020-99-0017	0.170	0.270	ND	0.460
020-99-0018	0.090	0.270	ND	0.460
020-99-0019	0.190	0.280	ND	0.470
020-99-0020	0.400	0.280	ND	0.430
020-99-0021	0.250	0.350	ND	0.580
020-99-0022	0.050	0.270	ND	0.480
020-99-0023	0.220	0.300	ND	0.500
020-99-0024	-0.060	0.260	ND	0.450
020-99-0025	0.110	0.280	ND	0.470
020-99-0026	0.110	0.300	ND	0.510
020-99-0027	0.300	0.320	ND	0.530
020-99-0028	0.100	0.320	ND	0.560

MDA = Minimum Detectable Activity
$DCGL_W$ = Derived Concentratration Guideline = 36 pCi/gm
ND = If result is less than MDA then result is non-detect.

SURVEY UNIT 3

FIGURE C5: AREA 4020 CS-137 SOIL RESULTS, SU-3

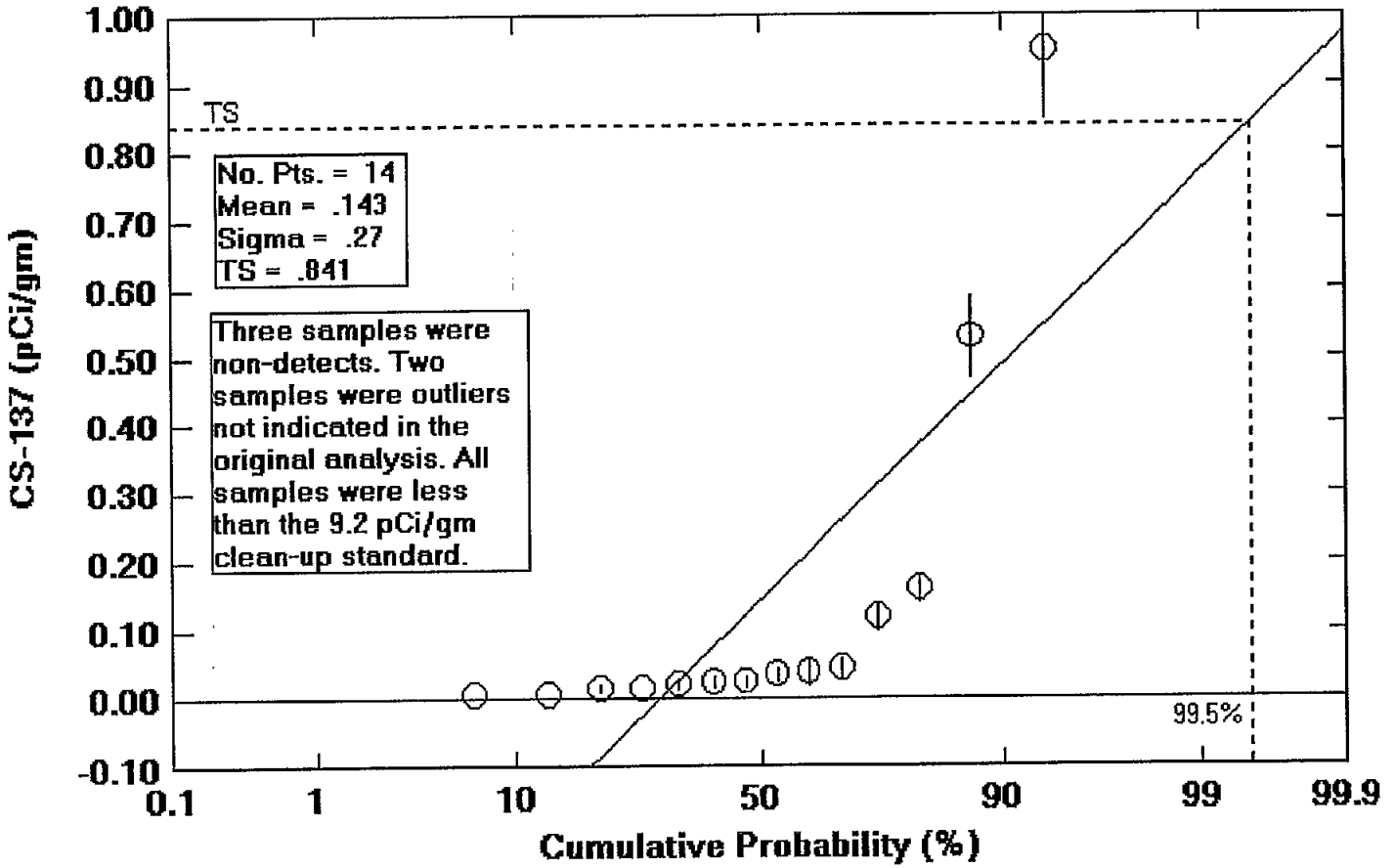


Table C23: Cesium-137 (pCi/g). Survey Unit 3

Soil ID	Result	+/- 1 sigma error	Non-Detect ?	MDA
020-99-0029R	**0.045**	0.014	-	0.014
020-99-0030R	**0.008**		ND	0.015
020-99-0031R	**0.016**	0.007	-	0.011
020-99-0032R	**0.008**		ND	0.016
020-99-0033R	**0.021**	0.008	-	0.011
020-99-0034R	**0.024**	0.009	-	0.012
020-99-0035R	**0.039**	0.019	-	0.013
020-99-0036R	**0.036**	0.01	-	0.013
020-99-0037R	**0.026**	0.009	-	0.012
020-99-0038R	**0.950**	0.1	-	0.014
020-99-0039R	**0.530**	0.06	-	0.013
020-99-0040R	**0.016**		ND	0.016
020-99-0041R	**0.160**	0.02	-	0.014
020-99-0042R	**0.120**	0.02	-	0.013

MDA = Minimum Detectable Activity
$DCGL_W$ = Derived Concentratration Guideline = 9.2 pCi/gm
ND = Non-detect. Gamma spec. results reported as <MDA. For the purposes of statistical analysis, non-detects are quantified as MDA/2.
R = Re-analyzed Samples

Table C24: Thorium-228 (pCi/g). Survey Unit 3

Soil ID	Result	+/- 1 sigma error	Non-Detect ?	MDA
020-99-0029	1.96	0.86	-	0.220
020-99-0030	2.34	1.24	-	0.730
020-99-0031	1.21	0.51	-	0.290
020-99-0032	1.47	0.65	-	0.330
020-99-0033	1.87	0.72	-	0.250
020-99-0034	2.00	0.83	-	0.230
020-99-0035	1.77	0.85	-	0.490
020-99-0036	1.54	0.78	-	0.590
020-99-0037	1.29	0.88	-	0.940
020-99-0038	2.31	0.94	-	0.320
020-99-0039	1.38	0.68	-	0.440
020-99-0040	1.47	0.58	-	0.250
020-99-0041	2.07	0.80	-	0.270
020-99-0042	2.25	0.72	-	0.290

MDA = Minimum Detectable Activity
$DCGL_W$ = Derived Concentratration Guideline = 5 pCi/gm
ND = If result is less than MDA then result is non-detect.

Table C25: Thorium-230 (pCi/g). Survey Unit 3

Soil ID	Result	+/- 1 sigma error	Non-Detect ?	MDA
020-99-0029	1.16	0.58	-	0.200
020-99-0030	1.50	0.87	-	0.210
020-99-0031	1.09	0.46	-	0.160
020-99-0032	0.83	0.43	-	0.220
020-99-0033	1.02	0.46	-	0.210
020-99-0034	1.09	0.53	-	0.200
020-99-0035	1.23	0.63	-	0.140
020-99-0036	0.74	0.46	-	0.330
020-99-0037	1.30	0.81	-	0.550
020-99-0038	1.18	0.57	-	0.120
020-99-0039	1.78	0.77	-	0.120
020-99-0040	1.37	0.53	-	0.180
020-99-0041	2.00	0.76	-	0.095
020-99-0042	1.94	0.63	-	0.057

MDA = Minimum Detectable Activity
$DCGL_W$ = Derived Concentratration Guideline = 5 pCi/gm
ND = If result is less than MDA then result is non-detect.

Table C26: Thorium-232 (pCi/g). Survey Unit 3

Soil ID	Result	+/- 1 sigma error	Non-Detect ?	MDA
020-99-0029	2.15	0.90	-	0.130
020-99-0030	1.89	1.02	-	0.210
020-99-0031	1.15	0.48	-	0.140
020-99-0032	1.56	0.66	-	0.180
020-99-0033	1.92	0.73	-	0.220
020-99-0034	1.83	0.76	-	0.110
020-99-0035	2.19	0.96	-	0.250
020-99-0036	1.49	0.72	-	0.140
020-99-0037	1.20	0.75	-	0.220
020-99-0038	2.44	0.96	-	0.120
020-99-0039	1.94	0.83	-	0.210
020-99-0040	1.55	0.58	-	0.076
020-99-0041	1.93	0.74	-	0.095
020-99-0042	2.65	0.80	-	0.056

MDA = Minimum Detectable Activity
$DCGL_W$ = Derived Concentratration Guideline = 5 pCi/gm
ND = If result is less than MDA then result is non-detect.

Table C27: Uranium-234 (pCi/g). Survey Unit 3

Soil ID	Result	+/- 1 sigma error	Non-Detect ?	MDA
020-99-0029	0.67	0.34	-	0.220
020-99-0030	0.50	0.27	-	0.130
020-99-0031	0.65	0.27	-	0.092
020-99-0032	0.56	0.24	-	0.084
020-99-0033	0.65	2.34	ND	6.120
020-99-0034	0.57	0.25	-	0.091
020-99-0035	0.69	0.38	-	0.250
020-99-0036	0.60	0.24	-	0.044
020-99-0037	0.97	0.45	-	0.170
020-99-0038	0.82	0.44	-	0.290
020-99-0039	0.66	0.35	-	0.170
020-99-0040	0.53	0.28	-	0.180
020-99-0041	0.72	0.39	-	0.220
020-99-0042	0.02	0.03	ND	0.053

MDA = Minimum Detectable Activity
$DCGL_W$ = Derived Concentratration Guideline = 30 pCi/gm
ND = If result is less than MDA then result is non-detect.

Table C28: Uranium-235/236 (pCi/g). Survey Unit 3

Soil ID	Result	+/- 1 sigma error	Non-Detect ?	MDA
020-99-0029	0.024	0.082	ND	0.220
020-99-0030	0.035	0.070	ND	0.094
020-99-0031	0.000	0.000	ND	0.064
020-99-0032	0.074	0.090	ND	0.140
020-99-0033	0.270	0.600	ND	6.390
020-99-0034	0.033	0.069	ND	0.150
020-99-0035	0.040	0.100	ND	0.240
020-99-0036	0.040	0.072	ND	0.150
020-99-0037	0.043	0.087	ND	0.120
020-99-0038	-0.021	0.030	ND	0.300
020-99-0039	0.130	0.150	-	0.120
020-99-0040	0.130	0.140	ND	0.170
020-99-0041	0.010	0.019	ND	0.230
020-99-0042	-0.008	0.010	ND	0.086

MDA = Minimum Detectable Activity
$DCGL_W$ = Derived Concentratration Guideline = 30 pCi/gm
ND = If result is less than MDA then result is non-detect.

Table C29: Uranium-238 (pCi/g). Survey Unit 3

Soil ID	Result	+/- 1 sigma error	Non-Detect ?	MDA
020-99-0029	0.750	0.360	-	0.180
020-99-0030	0.670	0.320	-	0.076
020-99-0031	0.480	0.220	-	0.052
020-99-0032	0.870	0.320	-	0.047
020-99-0033	0.650	2.330	ND	6.090
020-99-0034	0.550	0.240	-	0.051
020-99-0035	0.590	0.340	-	0.190
020-99-0036	0.550	0.220	-	0.044
020-99-0037	0.560	0.310	-	0.094
020-99-0038	0.580	0.360	-	0.240
020-99-0039	0.520	0.300	-	0.094
020-99-0040	0.760	0.350	-	0.160
020-99-0041	0.910	0.450	-	0.220
020-99-0042	0.000	0.000	ND	0.030

MDA = Minimum Detectable Activity
$DCGL_W$ = Derived Concentratration Guideline = 35 pCi/gm
ND = If result is less than MDA then result is non-detect.

Table C29.1: U-234/U-238 RATIOS, SURVEY UNIT 3

Sample Numbers	U-234 pCi/gm	U-238 pCi/gm	Ratio U-234/238
020-99-0029	0.67	0.750	0.89
020-99-0030	0.50	0.670	0.75
020-99-0031	0.65	0.480	1.35
020-99-0032	0.56	0.870	0.64
020-99-0033	0.65	0.650	1.00
020-99-0034	0.57	0.550	1.04
020-99-0035	0.69	0.590	1.17
020-99-0036	0.60	0.550	1.09
020-99-0037	0.97	0.560	1.73
020-99-0038	0.82	0.580	1.41
020-99-0039	0.66	0.520	1.27
020-99-0040	0.53	0.760	0.70
020-99-0041	0.72	0.910	0.79
020-99-0042	0.02	0.000	indeterminate
AVERAGE	0.62	0.60	1.06
MAXIMUM	0.97	0.91	1.73
MINIMUM	0.02	0	0.64

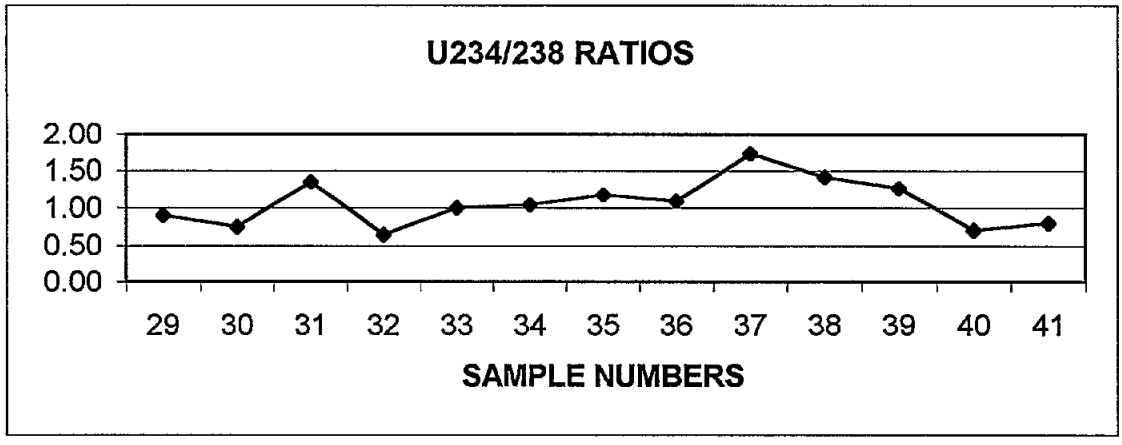


Table C30: Plutonium-238 (pCi/g). Survey Unit 3

Soil ID	Result	+/- 1 sigma error	Non-Detect ?	MDA
020-99-0029	0.074	0.076	ND	0.120
020-99-0030	0.036	0.043	ND	0.180
020-99-0031R	**0.028**	**0.019**	**ND**	**0.040**
020-99-0032	0.014	0.050	ND	0.120
020-99-0033R	**0.017**	**0.014**	**ND**	**0.037**
020-99-0034	0.006	0.044	ND	0.120
020-99-0035R	**0.010**	**0.023**	**ND**	**0.041**
020-99-0036	0.009	0.032	ND	0.084
020-99-0037	0.002	0.026	ND	0.082
020-99-0038R	**0.027**	**0.027**	**ND**	**0.042**
020-99-0039R	**0.016**	**0.017**	**ND**	**0.025**
020-99-0040	0.045	0.055	ND	0.092
020-99-0041	0.052	0.066	ND	0.120
020-99-0042R	**0.010**	**0.023**	**ND**	**0.041**

MDA = Minimum Detectable Activity
$DCGL_W$ = Derived Concentratration Guideline = 37.2 pCi/gm
ND = If result is less than MDA then result is non-detect.
R = Re-analyzed Samples

Table C31: Plutonium-239/240 (pCi/g). Survey Unit 3

Soil ID	Result	+/- 1 sigma error	Non-Detect ?	MDA
020-99-0029	0.014	0.028	ND	0.037
020-99-0030	0.020	0.040	ND	0.160
020-99-0031R	**0.034**	**0.021**	**-**	**0.028**
020-99-0032	-0.002	0.005	ND	0.056
020-99-0033R	**0.008**	**0.010**	**ND**	**0.045**
020-99-0034	0.015	0.029	ND	0.040
020-99-0035R	**0.022**	**0.018**	**ND**	**0.023**
020-99-0036	0.015	0.031	ND	0.068
020-99-0037	0.013	0.042	ND	0.057
020-99-0038R	**0.370**	**0.090**	**-**	**0.030**
020-99-0039R	**0.003**	**0.005**	**ND**	**0.007**
020-99-0040	0.005	0.025	ND	0.074
020-99-0041	0.046	0.072	ND	0.150
020-99-0042R	**-0.005**	**0.014**	**ND**	**0.032**

MDA = Minimum Detectable Activity
$DCGL_W$ = Derived Concentratration Guideline = 33.9 pCi/gm
ND = If result is less than MDA then result is non-detect.
R = Re-analyzed Samples

Table C32: Americium-241 (pCi/g). Survey Unit 3

Soil ID	Result	+/- 1 sigma error	Non-Detect ?	MDA
020-99-0029	0.029	0.039	ND	0.053
020-99-0030	0.003	0.053	ND	0.150
020-99-0031	0.032	0.070	ND	0.150
020-99-0032	0.020	0.046	ND	0.100
020-99-0033	0.025	0.066	ND	0.150
020-99-0034	0.039	0.068	ND	0.140
020-99-0035	-0.031	0.039	ND	0.160
020-99-0036	0.026	0.052	ND	0.110
020-99-0037	0.058	0.076	ND	0.130
020-99-0038	0.055	0.061	ND	0.090
020-99-0039	0.069	0.062	ND	0.069
020-99-0040	0.044	0.051	ND	0.070
020-99-0041	0.049	0.052	ND	0.071
020-99-0042	0.003	0.060	ND	0.170

MDA = Minimum Detectable Activity
$DCGL_W$ = Derived Concentratration Guideline = 5.44 pCi/gm
ND = If result is less than MDA then result is non-detect.

FIGURE C2: AREA 4020 SR-90 SOIL RESULTS, SU-3

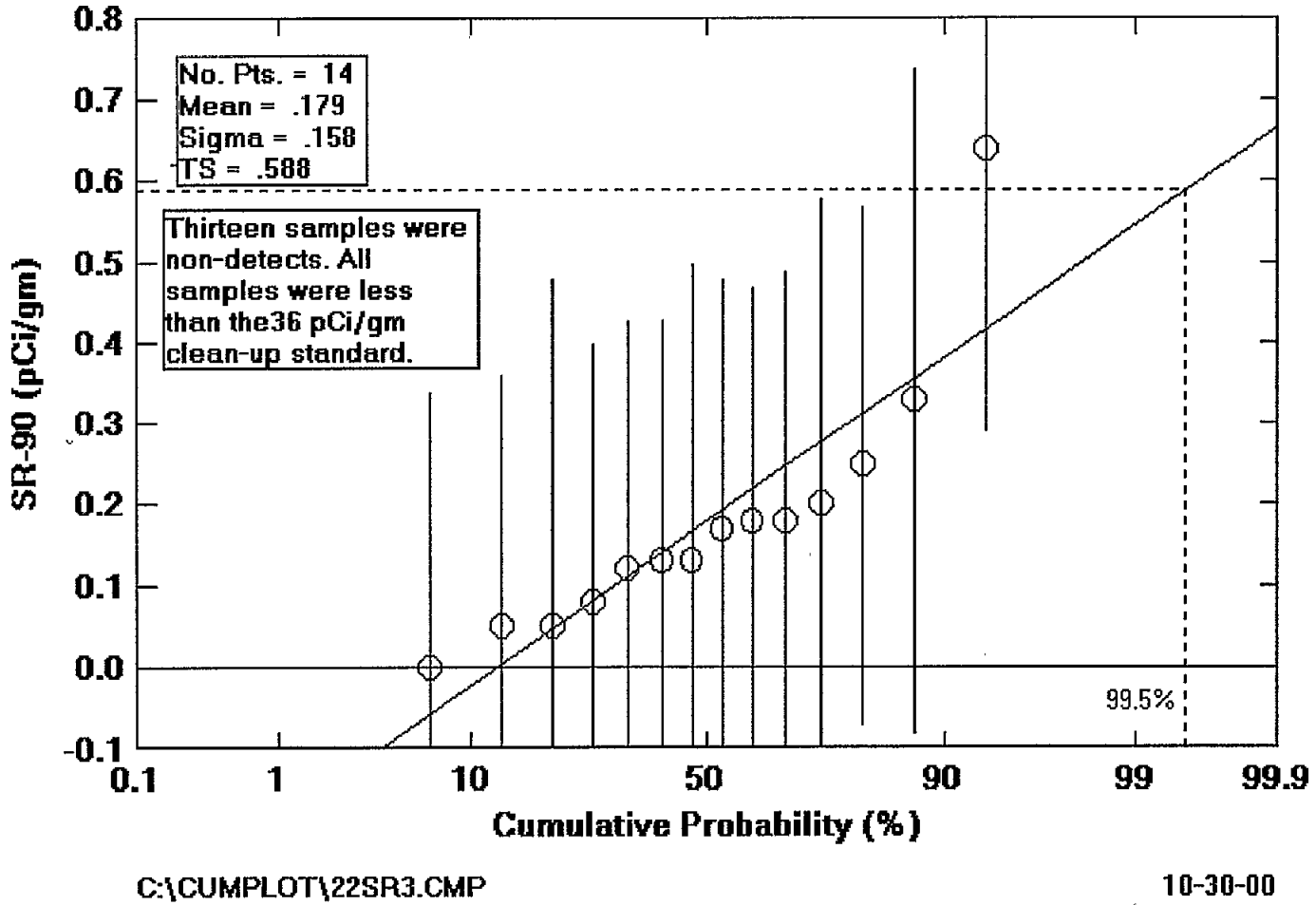


Table C33: Strontium-90 (pCi/g). Survey Unit 3

Soil ID	Result	+/- 1 sigma error	Non-Detect ?	MDA
020-99-0029	0.050	0.310	ND	0.540
020-99-0030	0.250	0.320	ND	0.530
020-99-0031	0.000	0.340	ND	0.590
020-99-0032	0.120	0.310	ND	0.540
020-99-0033	0.130	0.300	ND	0.510
020-99-0034	0.200	0.380	ND	0.650
020-99-0035	0.080	0.320	ND	0.560
020-99-0036	0.180	0.290	ND	0.490
020-99-0037	0.170	0.310	ND	0.530
020-99-0038	0.180	0.310	ND	0.530
020-99-0039	0.640	0.350	-	0.530
020-99-0040	0.330	0.410	ND	0.670
020-99-0041	0.130	0.370	ND	0.630
020-99-0042	0.050	0.430	ND	0.750

MDA = Minimum Detectable Activity
$DCGL_W$ = *Derived Concentratration Guideline* = 36 *pCi/gm*
ND = If result is less than MDA then result is non-detect.

SURVEY UNIT 4

FIGURE C7: AREA 4020 CS-137 SOIL RESULTS, SU-4

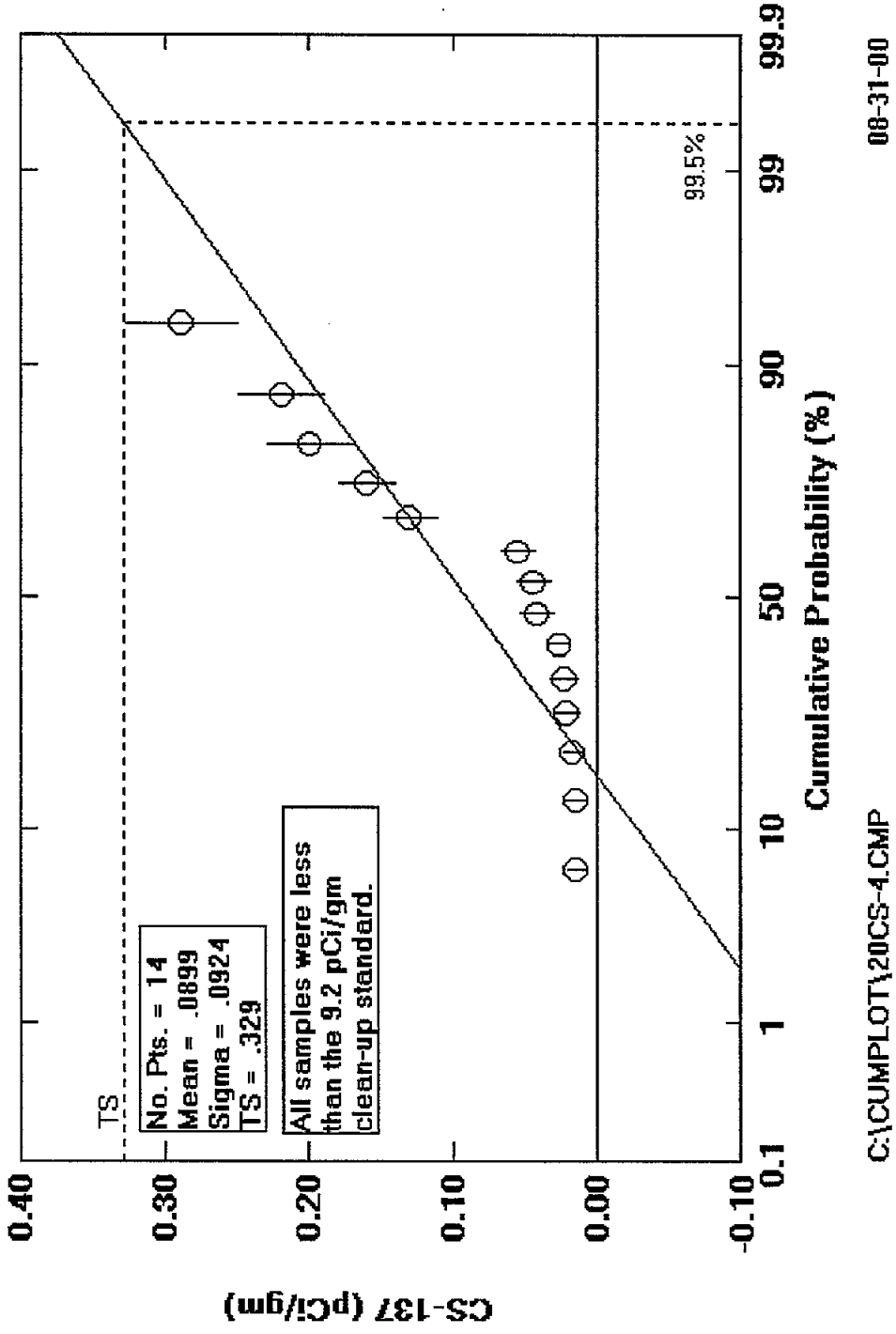


Table C34: Cesium-137 (pCi/g). Survey Unit 4

Soil ID	Result	+/- 1 sigma error	Non-Detect ?	MDA
020-99-0043R	**0.017**	0.007	-	0.013
020-99-0044R	**0.023**	0.01	-	0.014
020-99-0045R	**0.042**	0.012	-	0.014
020-99-0046R	**0.021**	0.009	-	0.012
020-99-0047R	**0.026**	0.008	-	0.012
020-99-0048R	**0.044**	0.012	-	0.014
020-99-0049R	**0.015**	0.008	-	0.013
020-99-0050R	**0.290**	0.039	-	0.012
020-99-0051R	**0.055**	0.012	-	0.013
020-99-0052R	**0.220**	0.03	-	0.015
020-99-0053R	**0.015**	0.007	-	0.012
020-99-0054R	**0.160**	0.02	-	0.012
020-99-0055R	**0.130**	0.02	-	0.014
020-99-0056R	**0.200**	0.03	-	0.016

MDA = Minimum Detectable Activity
$DCGL_W$ = Derived Concentratration Guideline = 9.2 pCi/gm
ND = Non-detect. Gamma spec. results reported as <MDA. For the purposes of statistical analysis, non-detects are quantified as MDA/2.
R = Re-analyzed Samples

Table C35: Thorium-228 (pCi/g). Survey Unit 4

Soil ID	Result	+/- 1 sigma error	Non-Detect ?	MDA
020-99-0043	2.55	0.98	-	0.390
020-99-0044	1.87	0.86	-	0.440
020-99-0045	3.52	1.11	-	0.480
020-99-0046	1.97	0.81	-	0.330
020-99-0047	2.54	1.03	-	0.260
020-99-0048	2.52	1.25	-	0.670
020-99-0049	3.22	1.03	-	0.290
020-99-0050	2.12	0.67	-	0.240
020-99-0051	1.72	0.88	-	0.530
020-99-0052	2.00	0.64	-	0.200
020-99-0053	1.84	0.94	-	0.530
020-99-0054	2.13	0.87	-	0.320
020-99-0055	1.79	0.62	-	0.190
020-99-0056	1.49	0.64	-	0.210

MDA = Minimum Detectable Activity
$DCGL_W$ = Derived Concentratration Guideline = 5 pCi/gm
ND = If result is less than MDA then result is non-detect.

Table C36: Thorium-230 (pCi/g). Survey Unit 4

Soil ID	Result	+/- 1 sigma error	Non-Detect ?	MDA
020-99-0043	2.53	0.96	-	0.220
020-99-0044	1.43	0.70	-	0.350
020-99-0045	1.91	0.66	-	0.250
020-99-0046	1.83	0.76	-	0.310
020-99-0047	1.73	0.76	-	0.220
020-99-0048	1.52	0.84	-	0.200
020-99-0049	1.59	0.58	-	0.073
020-99-0050	1.46	0.49	-	0.190
020-99-0051	1.04	0.61	-	0.380
020-99-0052	1.38	0.47	-	0.110
020-99-0053	1.55	0.82	-	0.440
020-99-0054	2.08	0.84	-	0.260
020-99-0055	1.79	0.62	-	0.190
020-99-0056	2.40	0.90	-	0.180

MDA = Minimum Detectable Activity
$DCGL_W$ = Derived Concentratration Guideline = 5 *pCi/gm*
ND = If result is less than MDA then result is non-detect.

Table C37: Thorium-232 (pCi/g). Survey Unit 4

Soil ID	Result	+/- 1 sigma error	Non-Detect ?	MDA
020-99-0043	1.91	0.77	-	0.190
020-99-0044	1.66	0.77	-	0.240
020-99-0045	2.85	0.90	-	0.068
020-99-0046	2.21	0.87	-	0.340
020-99-0047	2.19	0.91	-	0.120
020-99-0048	2.02	1.03	-	0.200
020-99-0049	2.67	0.87	-	0.073
020-99-0050	2.22	0.68	-	0.051
020-99-0051	2.03	0.95	-	0.160
020-99-0052	2.00	0.63	-	0.095
020-99-0053	2.04	0.98	-	0.310
020-99-0054	2.44	0.95	-	0.280
020-99-0055	1.99	0.67	-	0.210
020-99-0056	1.90	0.75	-	0.099

MDA = Minimum Detectable Activity
$DCGL_W$ = Derived Concentratration Guideline = 5 pCi/gm
ND = If result is less than MDA then result is non-detect.

Table C38: Uranium-234 (pCi/g). Survey Unit 4

Soil ID	Result	+/- 1 sigma error	Non-Detect ?	MDA
020-99-0043	0.66	0.30	-	0.069
020-99-0044	0.38	0.20	-	0.100
020-99-0045	0.58	0.28	-	0.170
020-99-0046	1.30	0.49	-	0.130
020-99-0047R	**0.66**	**0.23**	**-**	**0.063**
020-99-0048	0.66	0.29	-	0.110
020-99-0049	0.74	0.32	-	0.130
020-99-0050	0.54	0.24	-	0.054
020-99-0051	1.00	0.43	-	0.180
020-99-0052	0.64	0.31	-	0.150
020-99-0053	0.66	0.35	-	0.240
020-99-0054	1.50	0.54	-	0.130
020-99-0055	0.66	0.33	-	0.170
020-99-0056	0.68	0.28	-	0.097

MDA = Minimum Detectable Activity
$DCGL_W$ = Derived Concentratration Guideline = 30 pCi/gm
ND = If result is less than MDA then result is non-detect.
R = Re-analyzed Samples.

Table C39: Uranium-235/236 (pCi/g). Survey Unit 4

Soil ID	Result	+/- 1 sigma error	Non-Detect ?	MDA
020-99-0043	-0.038	0.320	ND	0.250
020-99-0044	0.016	0.055	ND	0.150
020-99-0045	0.049	0.090	ND	0.170
020-99-0046	0.033	0.066	ND	0.089
020-99-0047R	**0.065**	**0.066**	-	**0.044**
020-99-0048	-0.017	0.020	ND	0.180
020-99-0049	0.023	0.086	ND	0.220
020-99-0050	0.040	0.072	ND	0.140
020-99-0051	0.029	0.074	ND	0.170
020-99-0052	0.027	0.068	ND	0.160
020-99-0053	0.060	0.120	ND	0.260
020-99-0054	0.067	0.097	ND	0.091
020-99-0055	0.070	0.100	ND	0.098
020-99-0056	0.010	0.053	ND	0.160

MDA = Minimum Detectable Activity
$DCGL_W$ = Derived Concentratration Guideline = 30 pCi/gm
ND = If result is less than MDA then result is non-detect.
R = Re-analyzed Samples

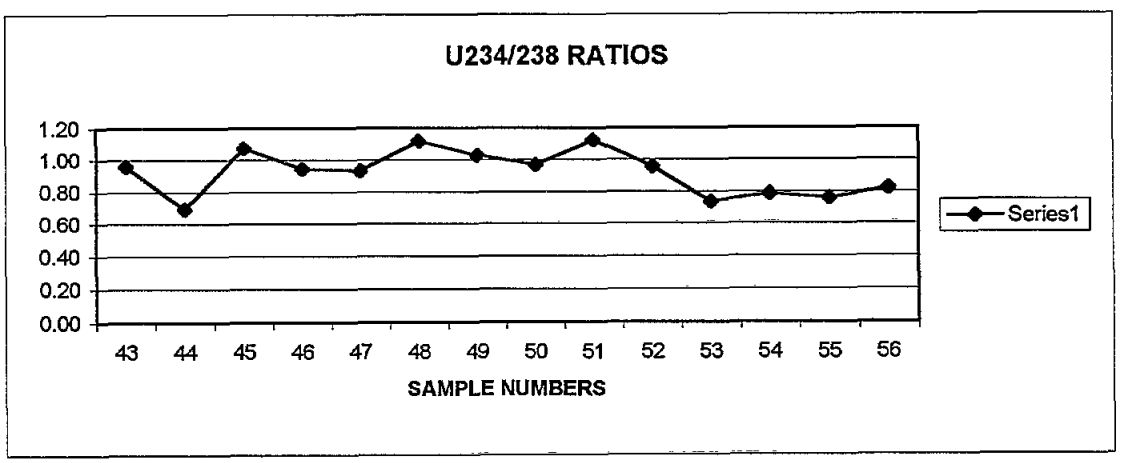
Table C40: Uranium-238 (pCi/g). Survey Unit 4

Soil ID	Result	+/- 1 sigma error	Non-Detect ?	MDA
020-99-0043	0.69	0.31	-	0.069
020-99-0044	0.55	0.25	-	0.058
020-99-0045	0.54	0.27	-	0.140
020-99-0046	1.38	0.51	-	0.072
020-99-0047R	**0.71**	**0.24**	**-**	**0.035**
020-99-0048	0.59	0.27	-	0.061
020-99-0049	0.72	0.31	-	0.063
020-99-0050	0.56	0.25	-	0.054
020-99-0051	0.89	0.39	-	0.140
020-99-0052	0.67	0.31	-	0.140
020-99-0053	0.90	0.42	-	0.180
020-99-0054	1.91	0.65	-	0.074
020-99-0055	0.87	0.39	-	0.170
020-99-0056	0.83	0.32	-	0.055

MDA = Minimum Detectable Activity
$DCGL_W$ = Derived Concentratration Guideline = 35 pCi/gm
ND = If result is less than MDA then result is non-detect.
R = Re-analyzed Samples

Table C40.1: U-234/U-238 RATIOS, SURVEY UNIT 4

Sample Numbers	U-234 pCi/gm	U-238 pCi/gm	Ratio U-234/238
020-99-0043	0.66	0.69	0.96
020-99-0044	0.38	0.55	0.69
020-99-0045	0.58	0.54	1.07
020-99-0046	1.30	1.38	0.94
020-99-0047R	**0.66**	**0.71**	0.93
020-99-0048	0.66	0.59	1.12
020-99-0049	0.74	0.72	1.03
020-99-0050	0.54	0.56	0.96
020-99-0051	1.00	0.89	1.12
020-99-0052	0.64	0.67	0.96
020-99-0053	0.66	0.90	0.73
020-99-0054	1.50	1.91	0.79
020-99-0055	0.66	0.87	0.76
020-99-0056	0.68	0.83	0.82
AVERAGE	0.76	0.84	0.92
MAXIMUM	1.5	1.91	1.12
MINIMUM	0.38	0.54	0.69



R = Re-analyzed samples

Table C41: Plutonium-238 (pCi/g). Survey Unit 4

Soil ID	Result	+/- 1 sigma error	Non-Detect ?	MDA
020-99-0043	0.040	0.068	ND	0.140
020-99-0044	0.022	0.046	ND	0.100
020-99-0045	-0.015	0.012	ND	0.095
020-99-0046R	**0.024**	**0.018**	-	**0.020**
020-99-0047	0.090	0.110	ND	0.190
020-99-0048	0.049	0.071	ND	0.140
020-99-0049	0.034	0.050	ND	0.094
020-99-0050	-0.004	0.067	ND	0.190
020-99-0051	0.055	0.081	ND	0.150
020-99-0052	0.009	0.034	ND	0.089
020-99-0053	0.070	0.120	ND	0.220
020-99-0054	0.060	0.069	ND	0.120
020-99-0055	0.042	0.048	ND	0.065
020-99-0056	-0.004	0.058	ND	0.170

MDA = Minimum Detectable Activity
$DCGL_W$ = Derived Concentratration Guideline = 37.2 pCi/gm
ND = If result is less than MDA then result is non-detect.
R = Re-analyzed Samples

Table C42: Plutonium-239/240 (pCi/g). Survey Unit 4

Soil ID	Result	+/- 1 sigma error	Non-Detect ?	MDA
020-99-0043	0.003	0.032	ND	0.110
020-99-0044	0.039	0.060	ND	0.120
020-99-0045	0.017	0.035	ND	0.077
020-99-0046R	**0.027**	**0.018**	-	**0.007**
020-99-0047	0.020	0.041	ND	0.160
020-99-0048	0.015	0.031	ND	0.041
020-99-0049	0.017	0.035	ND	0.076
020-99-0050	-0.004	0.054	ND	0.170
020-99-0051	0.000	0.000	ND	0.047
020-99-0052	0.016	0.033	ND	0.072
020-99-0053	0.058	0.092	ND	0.150
020-99-0054	0.010	0.037	ND	0.097
020-99-0055	0.012	0.027	ND	0.110
020-99-0056	0.040	0.072	ND	0.150

MDA = Minimum Detectable Activity
$DCGL_W$ = Derived Concentratration Guideline = 33.9 pCi/gm
ND = If result is less than MDA then result is non-detect.
R = Re-analyzed Samples

Table C43: Americium-241 (pCi/g). Survey Unit 4

Soil ID	Result	+/- 1 sigma error	Non-Detect ?	MDA
020-99-0043	0.010	0.050	ND	0.140
020-99-0044	0.005	0.028	ND	0.084
020-99-0045	0.081	0.086	ND	0.140
020-99-0046	0.053	0.088	ND	0.180
020-99-0047	0.030	0.059	ND	0.130
020-99-0048	0.018	0.048	ND	0.160
020-99-0049	0.047	0.065	ND	0.095
020-99-0050	0.052	0.073	ND	0.140
020-99-0051	-0.003	0.033	ND	0.120
020-99-0052	0.022	0.017	ND	0.130
020-99-0053	0.069	0.072	ND	0.099
020-99-0054	0.047	0.054	ND	0.074
020-99-0055	0.054	0.079	ND	0.120
020-99-0056	0.094	0.098	ND	0.170

MDA = Minimum Detectable Activity
$DCGL_W$ = Derived Concentratration Guideline = 5.44 pCi/gm
ND = If result is less than MDA then result is non-detect.

FIGURE C2: AREA 4020 SR-90 SOIL RESULTS, SU-4

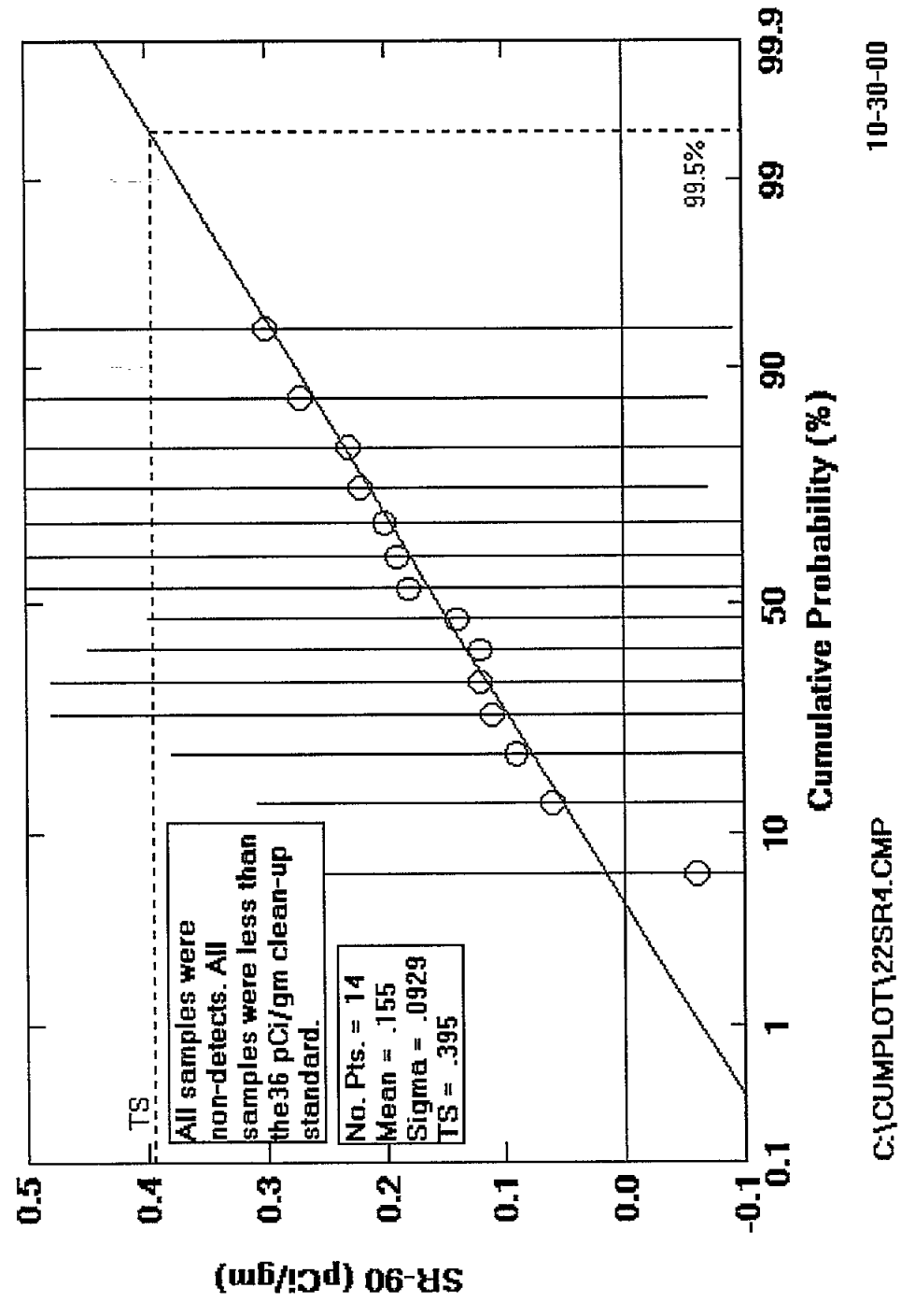


Table C44: Strontium-90 (pCi/g). Survey Unit 4

Soil ID	Result	+/- 1 sigma error	Non-Detect ?	MDA
020-99-0043	0.110	0.370	ND	0.640
020-99-0044	0.200	0.330	ND	0.550
020-99-0045	0.120	0.330	ND	0.570
020-99-0046	0.190	0.310	ND	0.520
020-99-0047	0.300	0.390	ND	0.650
020-99-0048	0.230	0.330	ND	0.550
020-99-0049	0.120	0.360	ND	0.620
020-99-0050	-0.060	0.360	ND	0.640
020-99-0051	0.060	0.250	ND	0.430
020-99-0052	0.270	0.340	ND	0.570
020-99-0053	0.090	0.290	ND	0.490
020-99-0054	0.180	0.330	ND	0.550
020-99-0055	0.220	0.290	ND	0.480
020-99-0056	0.140	0.260	ND	0.440

MDA = Minimum Detectable Activity
$DCGL_W$ = Derived Concentratration Guideline = 36 pCi/gm
ND = If result is less than MDA then result is non-detect.

SURVEY UNIT 5

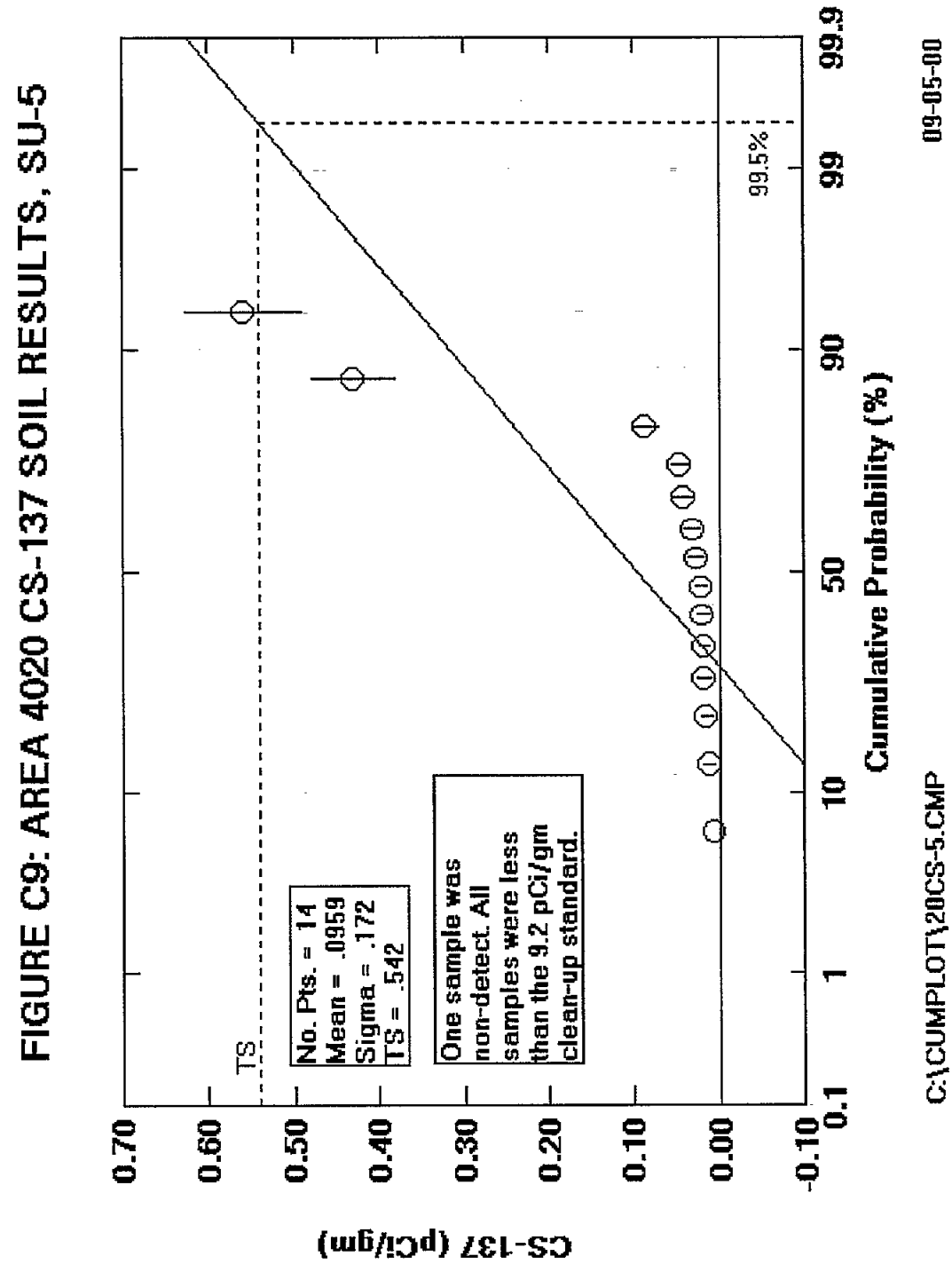


FIGURE C9: AREA 4020 CS-137 SOIL RESULTS, SU-5
Cs-137 (pCi/gm)
0.70
0.60
0.50
0.40
0.30
0.20
0.10
0.00
-0.10
TS
No. Pts. = 14
Mean = .0959
Sigma = .172
TS = .542
One sample was non-detect. All samples were less than the 9.2 pCi/gm clean-up standard.
0.1
1
10
50
90
99
99.9
99.5%
Cumulative Probability (%)
C:\CUMPLOT\20CS-5.CMP
09-05-00

Table C45: Cesium-137 (pCi/g). Survey Unit 5

Soil ID	Result	+/- 1 sigma error	Non-Detect ?	MDA
020-99-0057R	**0.022**	0.008	-	0.013
020-99-0058R	**0.032**	0.010	-	0.011
020-99-0059R	**0.430**	0.050	-	0.013
020-99-0060R	**0.043**	0.013	-	0.015
020-99-0061R	**0.016**	0.008	-	0.012
020-99-0062R	**0.007**		ND	0.013
020-99-0063R	**0.560**	0.070	-	0.011
020-99-0064R	**0.018**	0.009	-	0.012
020-99-0065R	**0.028**	0.010	-	0.013
020-99-0066R	**0.013**	0.007	-	0.011
020-99-0067R	**0.020**	0.007	-	0.011
020-99-0086R	**0.019**	0.007	-	0.012
020-99-0087R	**0.087**	0.016	-	0.013
020-99-0088R	**0.047**	0.011	-	0.012

MDA = Minimum Detectable Activity
$DCGL_W$ = Derived Concentratration Guideline = 9.2 pCi/gm
ND = Non-detect. Gamma spec. results reported as <MDA. For the purposes of statistical analysis, non-detects are quantified as MDA/2.
R = Re-analyzed Samples

Table C46: Thorium-228 (pCi/g). Survey Unit 5

Soil ID	Result	+/- 1 sigma error	Non-Detect ?	MDA
020-99-0057	1.70	0.70	-	0.33
020-99-0058	2.80	1.29	-	0.74
020-99-0059	2.15	0.92	-	0.36
020-99-0060	1.78	0.46	-	0.36
020-99-0061	1.28	0.42	-	0.12
020-99-0062	1.47	0.46	-	0.11
020-99-0063	1.56	0.51	-	0.12
020-99-0064	1.00	0.42	-	0.23
020-99-0065	0.85	0.38	-	0.29
020-99-0066	1.60	0.66	-	0.27
020-99-0067	1.16	0.46	-	0.21
020-99-0086	1.50	0.99	-	0.91
020-99-0087	1.99	0.70	-	0.23
020-99-0088	2.11	1.04	-	0.61

MDA = Minimum Detectable Activity
$DCGL_W$ = Derived Concentratration Guideline = 5 pCi/gm
ND = If result is less than MDA then result is non-detect.

Table C47: Thorium-230 (pCi/g). Survey Unit 5

Soil ID	Result	+/- 1 sigma error	Non-Detect ?	MDA
020-99-0057	1.82	0.71	-	0.095
020-99-0058	1.64	0.85	-	0.430
020-99-0059	2.09	0.88	-	0.130
020-99-0060	1.42	0.63	-	0.250
020-99-0061	1.17	0.38	-	0.097
020-99-0062	1.52	0.47	-	0.120
020-99-0063	0.71	0.30	-	0.098
020-99-0064	0.79	0.35	-	0.067
020-99-0065	1.04	0.42	-	0.170
020-99-0066	1.32	0.56	-	0.200
020-99-0067	0.89	0.37	-	0.150
020-99-0086	1.06	0.75	-	0.520
020-99-0087	1.82	0.64	-	0.180
020-99-0088	1.27	0.71	-	0.170

MDA = Minimum Detectable Activity
$DCGL_W$ = Derived Concentratration Guideline = 5 pCi/gm
ND = If result is less than MDA then result is non-detect.

Table C48: Thorium-232 (pCi/g). Survey Unit 5

Soil ID	Result	+/- 1 sigma error	Non-Detect ?	MDA
020-99-0057	2.31	0.85	-	0.095
020-99-0058	2.76	1.22	-	0.170
020-99-0059	2.37	0.96	-	0.130
020-99-0060	1.08	0.52	-	0.110
020-99-0061	1.52	0.47	-	0.110
020-99-0062	1.31	0.42	-	0.130
020-99-0063	1.35	0.47	-	0.055
020-99-0064	1.18	0.46	-	0.120
020-99-0065	1.28	0.48	-	0.065
020-99-0066	1.50	0.61	-	0.170
020-99-0067	1.19	0.45	-	0.064
020-99-0086	2.18	1.21	-	0.440
020-99-0087	1.46	0.54	-	0.130
020-99-0088	1.46	0.77	-	0.170

MDA = Minimum Detectable Activity
$DCGL_W$ = Derived Concentratration Guideline = 5 pCi/gm
ND = If result is less than MDA then result is non-detect.

Table C49: Uranium-234 (pCi/g). Survey Unit 5

Soil ID	Result	+/- 1 sigma error	Non-Detect ?	MDA
020-99-0057	0.41	0.21	-	0.074
020-99-0058	0.81	0.32	-	0.097
020-99-0059	0.58	0.38	-	0.350
020-99-0060	0.42	0.24	-	0.150
020-99-0061	0.57	0.26	-	0.110
020-99-0062	0.79	0.32	-	0.100
020-99-0063	0.79	0.37	-	0.130
020-99-0064	0.64	0.31	-	0.160
020-99-0065	0.64	0.28	-	0.092
020-99-0066	0.79	0.36	-	0.140
020-99-0067	0.61	0.29	-	0.100
020-99-0086	0.36	0.22	-	0.130
020-99-0087	0.79	0.54	-	0.350
020-99-0088	0.68	0.35	-	0.220

MDA = Minimum Detectable Activity
$DCGL_W$ = Derived Concentratration Guideline = 30 pCi/gm
ND = If result is less than MDA then result is non-detect.

Table C50: Uranium-235/236 (pCi/g). Survey Unit 5

Soil ID	Result	+/- 1 sigma error	Non-Detect ?	MDA
020-99-0057	0.040	0.034	ND	0.260
020-99-0058	0.090	0.100	ND	0.140
020-99-0059	0.110	0.170	ND	0.280
020-99-0060	0.026	0.068	ND	0.160
020-99-0061	0.023	0.053	ND	0.110
020-99-0062	0.021	0.054	ND	0.110
020-99-0063	0.000	0.000	ND	0.100
020-99-0064	0.020	0.071	ND	0.160
020-99-0065	0.027	0.055	ND	0.074
020-99-0066	-0.007	0.014	ND	0.150
020-99-0067	0.012	0.064	ND	0.160
020-99-0086	0.013	0.069	ND	0.210
020-99-0087	0.090	0.180	ND	0.240
020-99-0088	0.100	0.140	ND	0.220

MDA = Minimum Detectable Activity
$DCGL_W$ = Derived Concentratration Guideline = 30 pCi/gm
ND = If result is less than MDA then result is non-detect.

Table C51: Uranium-238 (pCi/g). Survey Unit 5

Soil ID	Result	+/- 1 sigma error	Non-Detect ?	MDA
020-99-0057	0.73	0.33	-	0.074
020-99-0058	0.81	0.32	-	0.055
020-99-0059	0.80	0.45	-	0.230
020-99-0060	0.69	0.32	-	0.130
020-99-0061	0.64	0.28	-	0.087
020-99-0062	0.92	0.35	-	0.089
020-99-0063	0.58	0.30	-	0.082
020-99-0064	0.57	0.29	-	0.130
020-99-0065	0.53	0.25	-	0.060
020-99-0066	0.59	0.30	-	0.140
020-99-0067	0.66	0.30	-	0.066
020-99-0086	0.53	0.27	-	0.071
020-99-0087	0.94	0.60	-	0.200
020-99-0088	0.72	0.36	-	0.180

MDA = Minimum Detectable Activity
$DCGL_W$ = Derived Concentratration Guideline = 35 pCi/gm
ND = If result is less than MDA then result is non-detect.

Table C51.1: U-234/U-238 RATIOS, SURVEY UNIT 5

Sample Numbers	U-234 pCi/gm	U-238 pCi/gm	Ratio U-234/238
020-99-0057	0.41	0.73	0.56
020-99-0058	0.81	0.81	1.00
020-99-0059	0.58	0.80	0.73
020-99-0060	0.42	0.69	0.61
020-99-0061	0.57	0.64	0.89
020-99-0062	0.79	0.92	0.86
020-99-0063	0.79	0.58	1.36
020-99-0064	0.64	0.57	1.12
020-99-0065	0.64	0.53	1.21
020-99-0066	0.79	0.59	1.34
020-99-0067	0.61	0.66	0.92
020-99-0086	0.36	0.53	0.68
020-99-0087	0.79	0.94	0.84
020-99-0088	0.68	0.72	0.94
AVERAGE	0.63	0.69	0.93
MAXIMUM	0.81	0.94	1.36
MINIMUM	0.36	0.53	0.56

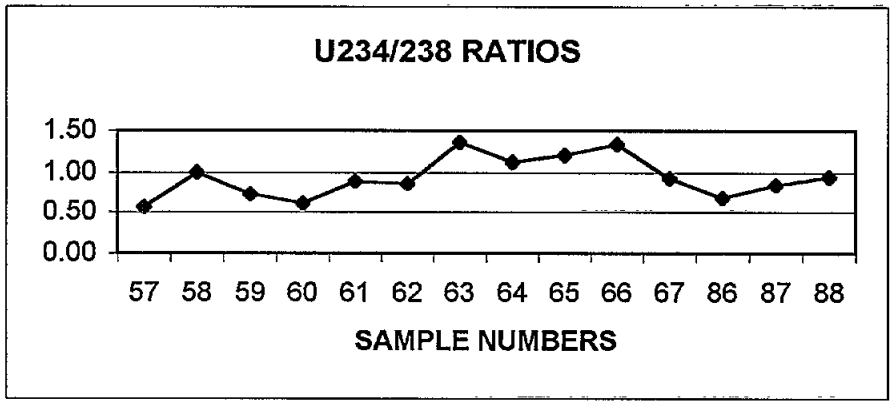


Table C52: Plutonium-238 (pCi/g). Survey Unit 5

Soil ID	Result	+/- 1 sigma error	Non-Detect ?	MDA
020-99-0057	0.086	0.092	ND	0.150
020-99-0058	0.030	0.057	ND	0.120
020-99-0059	0.073	0.071	ND	0.096
020-99-0060	0.014	0.064	ND	0.160
020-99-0061	0.016	0.039	ND	0.075
020-99-0062	0.011	0.083	ND	0.170
020-99-0063	0.055	0.080	ND	0.120
020-99-0064	0.045	0.061	ND	0.090
020-99-0065R	**0.034**	**0.033**	**ND**	**0.051**
020-99-0066	0.077	0.070	-	0.066
020-99-0067R	**0.003**	**0.035**	**ND**	**0.066**
020-99-0086R	**0.036**	**0.023**	**-**	**0.022**
020-99-0087R	**0.013**	**0.028**	**ND**	**0.050**
020-99-0088	0.050	0.100	ND	0.230

MDA = Minimum Detectable Activity
$DCGL_W$ = Derived Concentratration Guideline = 37.2 pCi/gm
ND = If result is less than MDA then result is non-detect.
R = Re-analyzed Samples

Table C53: Plutonium-239/240 (pCi/g). Survey Unit 5

Soil ID	Result	+/- 1 sigma error	Non-Detect ?	MDA
020-99-0057	0.050	0.058	-	0.045
020-99-0058	-0.011	0.011	ND	0.093
020-99-0059	0.011	0.029	ND	0.067
020-99-0060	0.031	0.062	ND	0.130
020-99-0061	0.008	0.027	ND	0.063
020-99-0062	0.011	0.071	ND	0.150
020-99-0063	0.000	0.000	ND	0.046
020-99-0064	0.016	0.039	ND	0.074
020-99-0065R	**0.220**	**0.070**	-	**0.022**
020-99-0066	-0.027	0.018	ND	0.100
020-99-0067R	**0.010**	**0.011**	-	**0.009**
020-99-0086R	**0.018**	**0.017**	**ND**	**0.022**
020-99-0087R	**0.009**	**0.019**	**ND**	**0.034**
020-99-0088	0.005	0.010	ND	0.120

MDA = Minimum Detectable Activity
$DCGL_W$ = Derived Concentratration Guideline = 33.9 pCi/gm
ND = If result is less than MDA then result is non-detect.
R = Re-analyzed Samples

Table C54: Americium-241 (pCi/g). Survey Unit 5

Soil ID	Result	+/- 1 sigma error	Non-Detect ?	MDA
020-99-0057	0.042	0.067	ND	0.130
020-99-0058	-0.004	0.067	ND	0.200
020-99-0059	0.032	0.083	ND	0.190
020-99-0060	0.014	0.089	ND	0.240
020-99-0061	0.042	0.063	ND	0.120
020-99-0062	0.069	0.090	ND	0.160
020-99-0063	0.011	0.056	ND	0.094
020-99-0064	0.068	0.072	ND	0.082
020-99-0065	0.080	0.100	ND	0.140
020-99-0066	-0.010	0.061	ND	0.140
020-99-0067	0.010	0.050	ND	0.110
020-99-0086	0.012	0.060	ND	0.160
020-99-0087	0.024	0.044	ND	0.085
020-99-0088	0.006	0.030	ND	0.089

MDA = Minimum Detectable Activity
$DCGL_W$ = Derived Concentratration Guideline = 5.44 pci/gm
ND = If result is less than MDA then result is non-detect.

FIGURE C2: AREA 4020 SR-90 SOIL RESULTS, SU-5

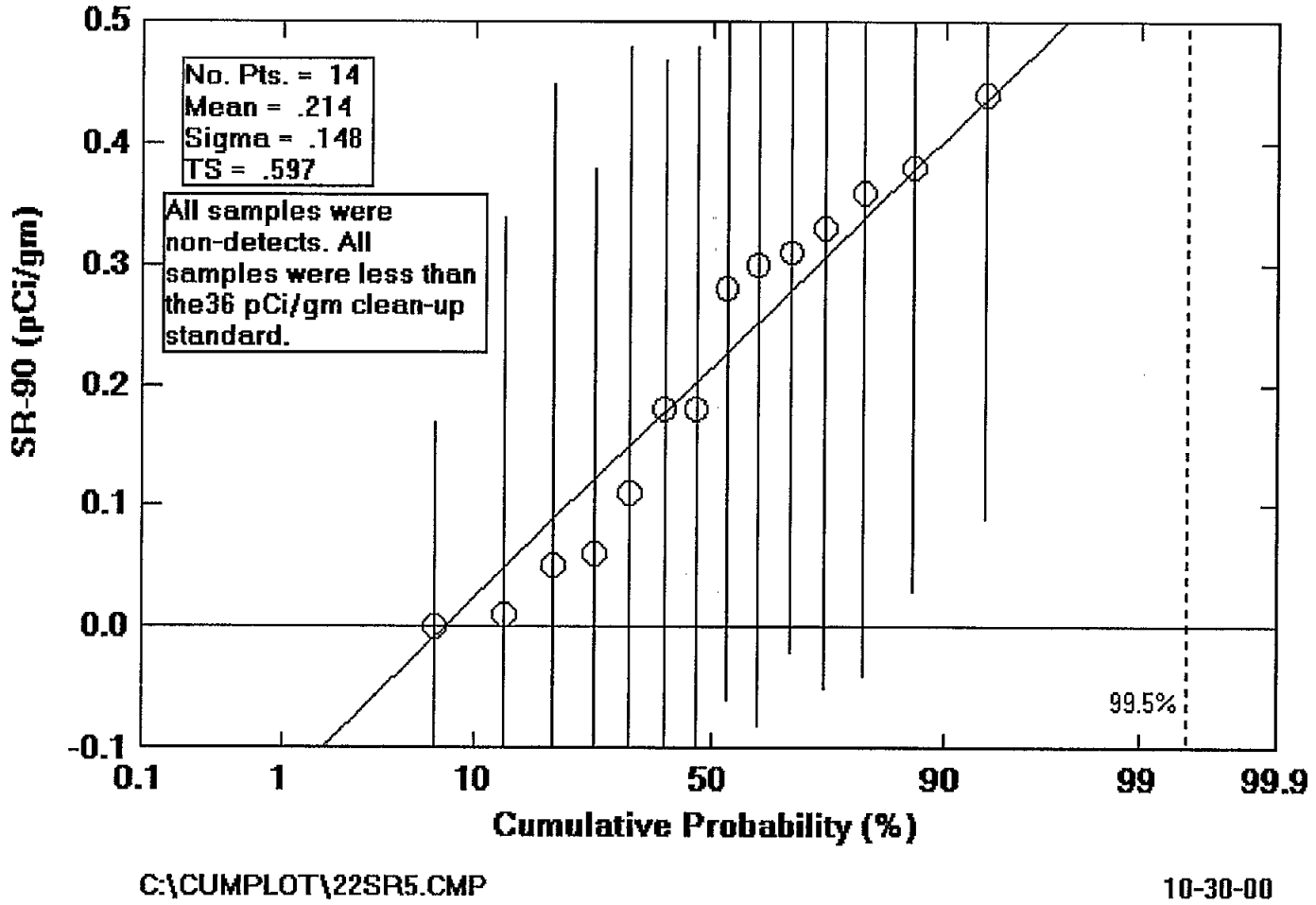


Table C55: Strontium-90 (pCi/g). Survey Unit 5

Soil ID	Result	+/- 1 sigma error	Non-Detect ?	MDA
020-99-0057	0.440	0.350	ND	0.560
020-99-0058	0.180	0.300	ND	0.510
020-99-0059	0.180	0.290	ND	0.500
020-99-0060	0.380	0.350	ND	0.570
020-99-0061	0.310	0.330	ND	0.530
020-99-0062	0.300	0.380	ND	0.640
020-99-0063	0.280	0.340	ND	0.560
020-99-0064	0.330	0.380	ND	0.610
020-99-0065	0.000	0.170	ND	0.640
020-99-0066	0.010	0.330	ND	0.580
020-99-0067	0.060	0.320	ND	0.560
020-99-0086	0.110	0.370	ND	0.630
020-99-0087	0.050	0.400	ND	0.690
020-99-0088	0.360	0.400	ND	0.670

MDA = Minimum Detectable Activity
$DCGL_W$ = Derived Concentratration Guideline = 36 pCi/gm
ND = If result is less than MDA then result is non-detect.

SURVEY UNIT 6

FIGURE C11: AREA 4020 CS-137 SOIL RESULTS, SU-6

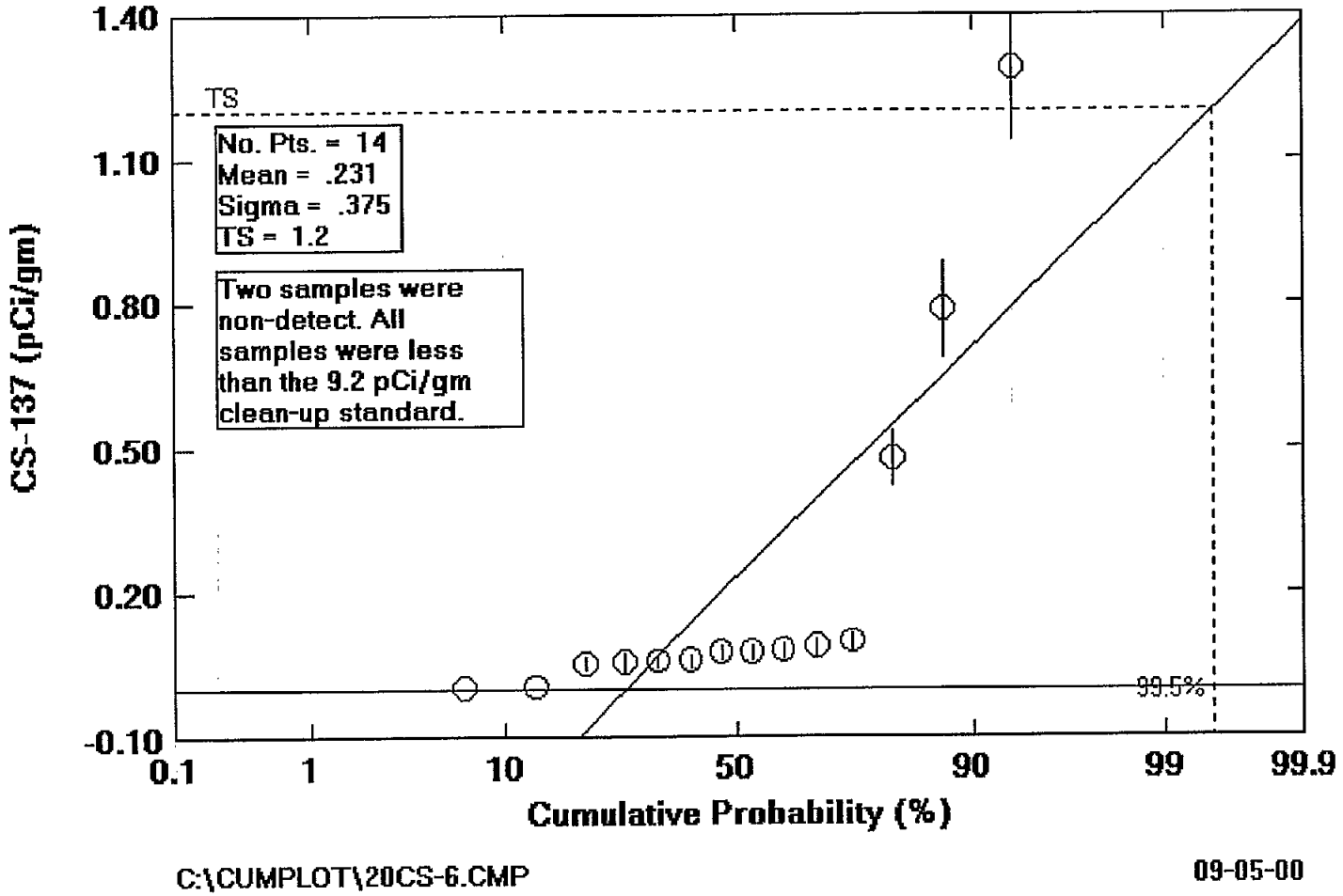


Table C56: Cesium-137 (pCi/g). Survey Unit 6

Soil ID	Result	+/- 1 sigma error	Non-Detect ?	MDA
020-99-0072R	**0.081**	0.016	-	0.015
020-99-0073R	**1.290**	0.150	-	0.016
020-99-0074R	**0.061**	0.014	-	0.013
020-99-0075R	**0.007**		ND	0.013
020-99-0076R	**0.057**	0.021	-	0.015
020-99-0077R	**0.077**	0.016	-	0.014
020-99-0078R	**0.089**	0.017	-	0.013
020-99-0079R	**0.054**	0.014	-	0.014
020-99-0080R	**0.060**	0.015	-	0.016
020-99-0081R	**0.078**	0.015	-	0.013
020-99-0082R	**0.790**	0.100	-	0.013
020-99-0083R	**0.006**		ND	0.011
020-99-0084R	**0.100**	0.020	-	0.014
020-99-0085R	**0.480**	0.060	-	0.012

MDA = Minimum Detectable Activity
$DCGL_W$ = Derived Concentratration Guideline = 9.2 pCi/gm
ND = Non-detect. Gamma spec. results reported as <MDA. For the purposes of statistical analysis, non-detects are quantified as MDA/2.
R = Re-analyzed Samples

Table C57: Thorium-228 (pCi/g). Survey Unit 6

Soil ID	Result	+/- 1 sigma error	Non-Detect ?	MDA
020-99-0072	2.17	1.02	-	0.42
020-99-0073	2.00	0.96	-	0.52
020-99-0074	1.56	0.82	-	0.58
020-99-0075	1.81	0.83	-	0.42
020-99-0076	1.62	0.68	-	0.34
020-99-0077	1.92	1.08	-	0.89
020-99-0078	2.84	1.55	-	0.74
020-99-0079	1.98	0.93	-	0.49
020-99-0080	2.55	0.92	-	0.33
020-99-0081	1.99	0.86	-	0.39
020-99-0082	1.78	0.70	-	0.30
020-99-0083	1.30	0.58	-	0.40
020-99-0084	2.39	0.93	-	0.33
020-99-0085	3.00	1.20	-	0.42

MDA = Minimum Detectable Activity
$DCGL_W$ = Derived Concentratration Guideline = 5 pCi/gm
ND = If result is less than MDA then result is non-detect.

Table C58: Thorium-230 (pCi/g). Survey Unit 6

Soil ID	Result	+/- 1 sigma error	Non-Detect ?	MDA
020-99-0072	1.27	0.69	-	0.160
020-99-0073	1.68	0.83	-	0.400
020-99-0074	1.96	0.92	-	0.330
020-99-0075	1.39	0.68	-	0.340
020-99-0076	1.45	0.61	-	0.096
020-99-0077	1.82	0.99	-	0.560
020-99-0078	1.91	1.14	-	0.270
020-99-0079	2.18	0.98	-	0.350
020-99-0080	2.11	0.78	-	0.390
020-99-0081	1.26	0.61	-	0.260
020-99-0082	1.67	0.65	-	0.089
020-99-0083	1.25	0.54	-	0.230
020-99-0084	2.10	0.83	-	0.110
020-99-0085	1.78	0.80	-	0.340

MDA = Minimum Detectable Activity
$DCGL_W$ = Derived Concentratration Guideline = 5 pCi/gm pCi/g net
ND = If result is less than MDA then result is non-detect.

Table C59: Thorium-232 (pCi/g). Survey Unit 6

Soil ID	Result	+/- 1 sigma error	Non-Detect ?	MDA
020-99-0072	1.70	0.84	-	0.160
020-99-0073	1.21	0.65	-	0.160
020-99-0074	2.03	0.95	-	0.280
020-99-0075	2.06	0.89	-	0.240
020-99-0076	1.37	0.58	-	0.170
020-99-0077	1.82	0.98	-	0.210
020-99-0078	1.81	1.91	-	0.270
020-99-0079	1.65	0.80	-	0.150
020-99-0080	2.84	0.99	-	0.160
020-99-0081	1.87	0.80	-	0.220
020-99-0082	1.54	0.61	-	0.089
020-99-0083	1.68	0.66	-	0.091
020-99-0084	2.34	0.90	-	0.110
020-99-0085	2.10	0.90	-	0.130

MDA = Minimum Detectable Activity
$DCGL_W$ = Derived Concentratration Guideline = 5 pCi/gm
ND = If result is less than MDA then result is non-detect.

Table C60: Uranium-234 (pCi/g). Survey Unit 6

Soil ID	Result	+/- 1 sigma error	Non-Detect ?	MDA
020-99-0072	1.08	0.53	-	0.19
020-99-0073	0.77	0.37	-	0.16
020-99-0074	0.79	0.37	-	0.13
020-99-0075	0.56	0.30	-	0.13
020-99-0076	0.80	0.39	-	0.18
020-99-0077	0.52	0.28	-	0.13
020-99-0078	0.75	0.38	-	0.15
020-99-0079	0.32	0.24	-	0.20
020-99-0080	0.91	0.37	-	0.11
020-99-0081	0.67	0.32	-	0.13
020-99-0082	0.65	0.29	-	0.10
020-99-0083	2.11	0.58	-	0.07
020-99-0084	1.04	0.45	-	0.19
020-99-0085	0.50	0.24	-	0.12

MDA = Minimum Detectable Activity
$DCGL_W$ = Derived Concentratration Guideline = 30 pCi/gm
ND = If result is less than MDA then result is non-detect.

Table C61: Uranium-235/236 (pCi/g). Survey Unit 6

Soil ID	Result	+/- 1 sigma error	Non-Detect ?	MDA
020-99-0072	0.060	0.110	ND	0.150
020-99-0073	0.040	0.081	ND	0.110
020-99-0074	0.015	0.080	ND	0.200
020-99-0075	0.060	0.110	ND	0.190
020-99-0076	-0.008	0.017	ND	0.180
020-99-0077	0.060	0.100	ND	0.140
020-99-0078	0.090	0.130	ND	0.120
020-99-0079	0.026	0.090	ND	0.210
020-99-0080	0.090	0.110	-	0.085
020-99-0081	0.068	0.097	ND	0.092
020-99-0082	0.070	0.100	ND	0.150
020-99-0083	0.200	0.130	-	0.049
020-99-0084	0.070	0.120	ND	0.190
020-99-0085	0.022	0.056	ND	0.110

MDA = Minimum Detectable Activity
$DCGL_W$ = Derived Concentratration Guideline = 30 pCi/gm
ND = If result is less than MDA then result is non-detect.

Table C62: Uranium-238 (pCi/g). Survey Unit 6

Soil ID	Result	+/- 1 sigma error	Non-Detect ?	MDA
020-99-0072	0.95	0.49	-	0.120
020-99-0073	0.47	0.28	-	0.160
020-99-0074	0.79	0.37	-	0.082
020-99-0075	0.50	0.28	-	0.085
020-99-0076	1.02	0.46	-	0.140
020-99-0077	0.58	0.29	-	0.120
020-99-0078	0.89	0.42	-	0.097
020-99-0079	0.65	0.35	-	0.170
020-99-0080	0.86	0.36	-	0.068
020-99-0081	0.78	0.35	-	0.130
020-99-0082	0.60	0.28	-	0.063
020-99-0083	2.06	0.57	-	0.040
020-99-0084	0.97	0.43	-	0.180
020-99-0085	0.59	0.27	-	0.093

MDA = Minimum Detectable Activity
$DCGL_W$ = Derived Concentratration Guideline = 35 pCi/gm
ND = If result is less than MDA then result is non-detect.

Table C62.1: U-234/U-238 RATIOS, SURVEY UNIT 6

Sample Numbers	U-234 pCi/gm	U-238 pCi/gm	Ratio U-234/238
020-99-0072	1.08	0.95	1.14
020-99-0073	0.77	0.47	1.64
020-99-0074	0.79	0.79	1.00
020-99-0075	0.56	0.50	1.12
020-99-0076	0.80	1.02	0.78
020-99-0077	0.52	0.58	0.90
020-99-0078	0.75	0.89	0.84
020-99-0079	0.32	0.65	0.49
020-99-0080	0.91	0.86	1.06
020-99-0081	0.67	0.78	0.86
020-99-0082	0.65	0.60	1.08
020-99-0083	2.11	2.06	1.02
020-99-0084	1.04	0.97	1.07
020-99-0085	0.50	0.59	0.85
AVERAGE	0.82	0.84	0.99
MAXIMUM	2.11	2.06	1.64
MINIMUM	0.32	0.47	0.49

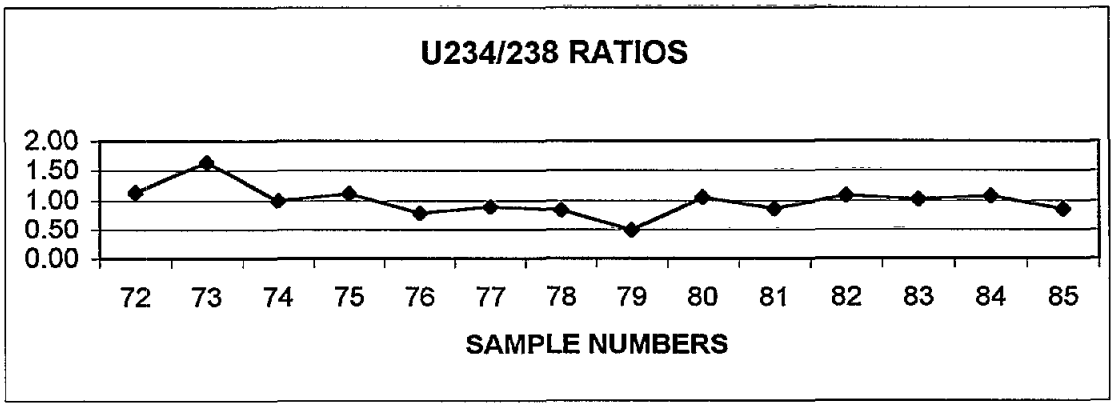


Table C63: Plutonium-238 (pCi/g). Survey Unit 6

Soil ID	Result	+/- 1 sigma error	Non-Detect ?	MDA
020-99-0072	0.026	0.049	ND	0.100
020-99-0073	0.037	0.052	ND	0.092
020-99-0074	0.024	0.056	ND	0.130
020-99-0075	0.025	0.046	ND	0.088
020-99-0076	0.090	0.100	ND	0.180
020-99-0077	0.025	0.066	ND	0.150
020-99-0078	-0.042	0.046	ND	0.200
020-99-0079	0.016	0.060	ND	0.150
020-99-0080	0.033	0.070	ND	0.160
020-99-0081	0.035	0.061	ND	0.130
020-99-0082	0.058	0.084	ND	0.160
020-99-0083R	**0.009**	**0.035**	**ND**	**0.063**
020-99-0084	0.140	0.240	ND	0.500
020-99-0085	0.026	0.048	ND	0.098

MDA = Minimum Detectable Activity
$DCGL_W$ = Derived Concentratration Guideline = 37.2 pCi/gm
ND = If result is less than MDA then result is non-detect.
R = Re-analyzed Samples

Table C64: Plutonium-239/240 (pCi/g). Survey Unit 6

Soil ID	Result	+/- 1 sigma error	Non-Detect ?	MDA
020-99-0072	-0.009	0.009	ND	0.080
020-99-0073	0.035	0.044	ND	0.060
020-99-0074	0.037	0.055	ND	0.100
020-99-0075	-0.016	0.037	ND	0.140
020-99-0076	0.015	0.038	ND	0.089
020-99-0077	0.054	0.063	-	0.048
020-99-0078	-0.021	0.042	ND	0.170
020-99-0079	0.036	0.059	ND	0.110
020-99-0080	-0.003	0.006	ND	0.071
020-99-0081	0.015	0.029	ND	0.040
020-99-0082	0.000	0.000	ND	0.049
020-99-0083R	**0.018**	**0.015**	-	**0.008**
020-99-0084	-0.035	0.041	ND	0.360
020-99-0085	-0.003	0.005	ND	0.061

MDA = Minimum Detectable Activity
$DCGL_W$ = Derived Concentratration Guideline = 33.9 pCi/gm
ND = If result is less than MDA then result is non-detect.
R = Re=analyzed Samples

Table C65: Americium-241 (pCi/g). Survey Unit 6

Soil ID	Result	+/- 1 sigma error	Non-Detect ?	MDA
020-99-0072	-0.004	0.075	ND	0.220
020-99-0073	0.008	0.063	ND	0.180
020-99-0074	0.019	0.082	ND	0.210
020-99-0075	0.100	0.100	ND	0.160
020-99-0076	0.150	0.150	ND	0.220
020-99-0077	0.072	0.068	ND	0.085
020-99-0078	0.009	0.031	ND	0.084
020-99-0079	0.025	0.092	ND	0.230
020-99-0080	-0.016	0.077	ND	0.230
020-99-0081	0.083	0.093	ND	0.150
020-99-0082	0.056	0.083	ND	0.160
020-99-0083	0.010	0.079	ND	0.190
020-99-0084	0.190	0.420	ND	0.930
020-99-0085	0.081	0.077	ND	0.110

MDA = Minimum Detectable Activity
$DCGL_W$ = Derived Concentratration Guideline = 5.44 pCi/gm
ND = If result is less than MDA then result is non-detect.

FIGURE C2: AREA 4020 SR-90 SOIL RESULTS, SU-6

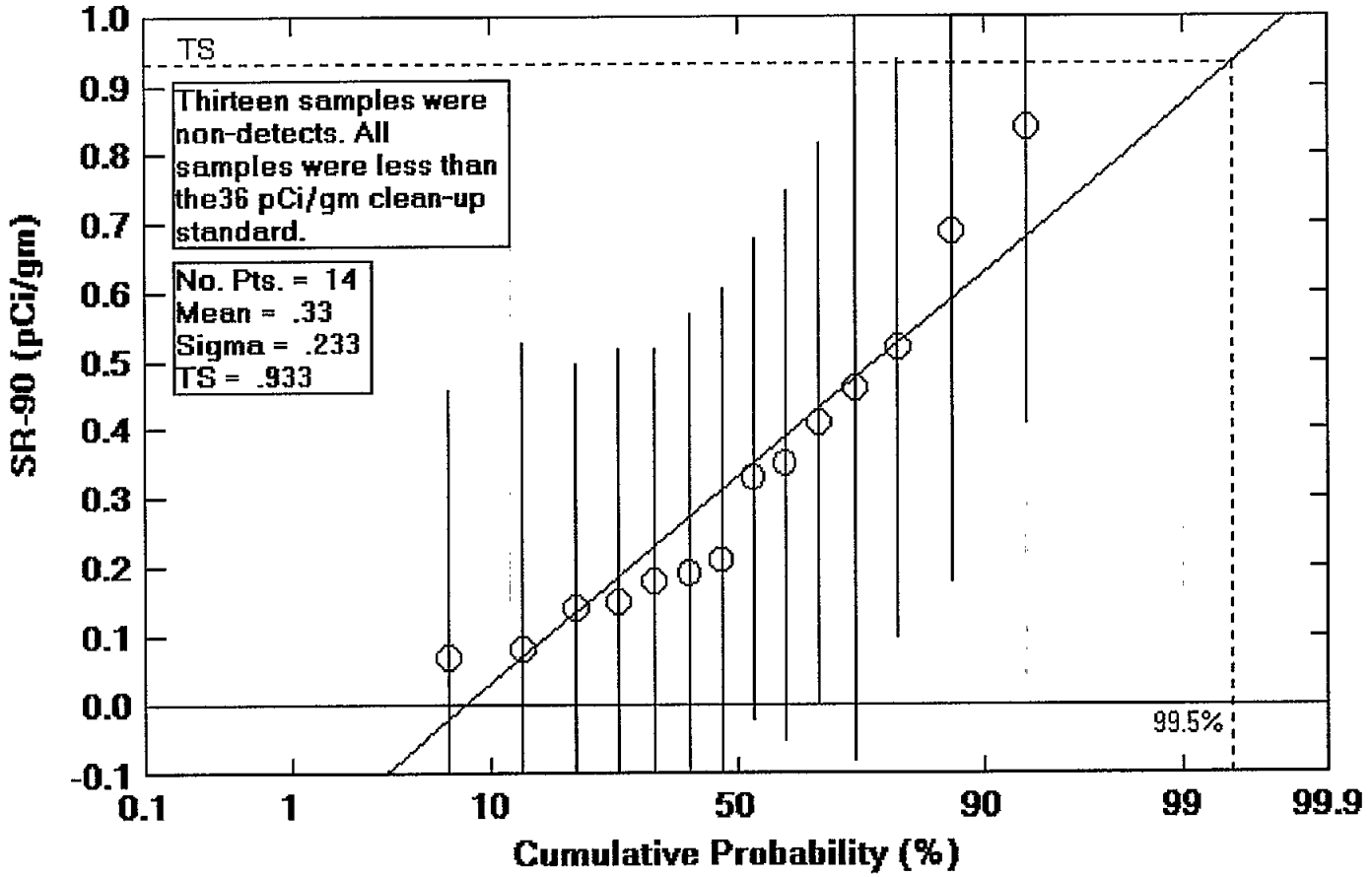


Table C66: Strontium-90 (pCi/g). Survey Unit 6

Soil ID	Result	+/- 1 sigma error	Non-Detect ?	MDA
020-99-0072	0.690	0.510	ND	0.810
020-99-0073	0.410	0.410	ND	0.670
020-99-0074	0.070	0.390	ND	0.660
020-99-0075	0.460	0.540	ND	0.900
020-99-0076	0.330	0.350	ND	0.570
020-99-0077	0.080	0.450	ND	0.780
020-99-0078	0.840	0.430	-	0.630
020-99-0079	0.180	0.340	ND	0.570
020-99-0080	0.190	0.380	ND	0.640
020-99-0081	0.520	0.420	ND	0.680
020-99-0082	0.350	0.400	ND	0.660
020-99-0083	0.140	0.360	ND	0.620
020-99-0084	0.210	0.400	ND	0.670
020-99-0085	0.150	0.370	ND	0.630

MDA = Minimum Detectable Activity
$DCGL_W$ = Derived Concentratration Guideline = 36 pCi/gm
ND = If result is less than MDA then result is non-detect.

APPENDIX D

INITIALLY ANALYZED AND RE-ANALYZED WILCOXON RANK SUM TESTS

TABLE D1: SOIL ANALYSIS/REANALYSIS COMPARISON FOR CESIUM 137

SURVEY			ORIGINAL ANALYSIS				REANALYSIS			
UNIT	SOIL I.D.	ISOTOPE	RESULT	ERROR +/-	NONDETECT	MDA	RESULT	ERROR +/-	NONDETECT	MDA
1	020-99-0001	Cs-137	0.120		ND	0.240	0.007		ND	0.013
1	020-99-0002	Cs-137	0.120		ND	0.240	0.018	0.008		0.011
1	020-99-0003	Cs-137	0.110		ND	0.220	0.017	0.007		0.012
1	020-99-0004	Cs-137	0.150		ND	0.300	0.650	0.070		0.013
1	020-99-0005	Cs-137	0.125		ND	0.250	0.037	0.009		0.010
1	020-99-0006	Cs-137	0.105		ND	0.210	0.040	0.014		0.016
1	020-99-0007	Cs-137	0.135		ND	0.270	0.045	0.011		0.012
1	020-99-0008	Cs-137	0.115		ND	0.230	0.021	0.007		0.015
1	020-99-0009	Cs-137	0.095		ND	0.190	0.014	0.007		0.009
1	020-99-0010	Cs-137	0.130		ND	0.260	0.034	0.010		0.011
1	020-99-0011	Cs-137	0.120		ND	0.240	1.550	0.150		0.012
1	020-99-0012	Cs-137	0.095		ND	0.190	0.330	0.040		0.011
1	020-99-0013	Cs-137	0.180		ND	0.360	0.150	0.020		0.012
1	020-99-0014	Cs-137	0.240	0.130		0.220	4.830	0.530		0.015
2	020-99-0015	Cs-137	0.095		ND	0.190	0.170	0.020		0.013
2	020-99-0016	Cs-137	0.145		ND	0.290	2.350	0.260		0.016
2	020-99-0017	Cs-137	0.125		ND	0.250	0.037	0.010		0.011
2	020-99-0018	Cs-137	0.140		ND	0.280	0.012	0.007		0.011
2	020-99-0019	Cs-137	0.120		ND	0.240	0.140	0.020		0.014
2	020-99-0020	Cs-137	0.120		ND	0.240	0.008		ND	0.016
2	020-99-0021	Cs-137	0.180		ND	0.360	0.041	0.010		0.011
2	020-99-0022	Cs-137	0.150		ND	0.300	0.007		ND	0.013
2	020-99-0023	Cs-137	0.145		ND	0.290	0.007		ND	0.013
2	020-99-0024	Cs-137	0.135		ND	0.270	0.007		ND	0.014
2	020-99-0025	Cs-137	0.100		ND	0.200	0.007		ND	0.013
2	020-99-0026	Cs-137	0.110		ND	0.220	0.060	0.012		0.012
2	020-99-0027	Cs-137	0.110		ND	0.210	0.100	0.020		0.017
2	020-99-0028	Cs-137	0.090		ND	0.180	0.120	0.020		0.013

TABLE D1: SOIL ANALYSIS/REANALYSIS COMPARISON FOR CESIUM 137

SURVEY			ORIGINAL ANALYSIS				REANALYSIS			
UNIT	SOIL I.D.	ISOTOPE	RESULT	ERROR +/-	NONDETECT	MDA	RESULT	ERROR +/-	NONDETECT	MDA
3	020-99-0029	Cs-137	0.130		ND	0.260	0.045	0.014		0.014
3	020-99-0030	Cs-137	0.120		ND	0.240	0.008		ND	0.015
3	020-99-0031	Cs-137	0.145		ND	0.290	0.016	0.007		0.011
3	020-99-0032	Cs-137	0.120		ND	0.240	0.008		ND	0.016
3	020-99-0033	Cs-137	0.135		ND	0.270	0.021	0.008		0.011
3	020-99-0034	Cs-137	0.125		ND	0.250	0.024	0.009		0.012
3	020-99-0035	Cs-137	0.155		ND	0.310	0.039	0.019		0.013
3	020-99-0036	Cs-137	0.155		ND	0.310	0.036	0.010		0.013
3	020-99-0037	Cs-137	0.160		ND	0.320	0.026	0.009		0.012
3	020-99-0038	Cs-137	0.140		ND	0.280	0.950	0.100		0.014
3	020-99-0039	Cs-137	0.160		ND	0.320	0.530	0.060		0.013
3	020-99-0040	Cs-137	0.110		ND	0.220	0.016	0.011		0.016
3	020-99-0041	Cs-137	0.155		ND	0.310	0.160	0.020		0.014
3	020-99-0042	Cs-137	0.115		ND	0.230	0.120	0.020		0.013
4	020-99-0043	Cs-137	0.125		ND	0.250	0.017	0.007		0.013
4	020-99-0044	Cs-137	0.090		ND	0.180	0.023	0.010		0.014
4	020-99-0045	Cs-137	0.090		ND	0.180	0.042	0.012		0.014
4	020-99-0046	Cs-137	0.125		ND	0.250	0.021	0.009		0.012
4	020-99-0047	Cs-137	0.125		ND	0.250	0.026	0.008		0.012
4	020-99-0048	Cs-137	0.090		ND	0.180	0.044	0.012		0.014
4	020-99-0049	Cs-137	0.120		ND	0.240	0.015	0.008		0.013
4	020-99-0050	Cs-137	0.115		ND	0.230	0.290	0.039		0.012
4	020-99-0051	Cs-137	0.145		ND	0.290	0.055	0.012		0.013
4	020-99-0052	Cs-137	0.120		ND	0.240	0.220	0.030		0.015
4	020-99-0053	Cs-137	0.130		ND	0.260	0.015	0.007		0.012
4	020-99-0054	Cs-137	0.115		ND	0.230	0.160	0.020		0.012
4	020-99-0055	Cs-137	0.200		ND	0.400	0.130	0.020		0.014
4	020-99-0056	Cs-137	0.190		ND	0.380	0.200	0.030		0.016

TABLE D1: SOIL ANALYSIS/REANALYSIS COMPARISON FOR CESIUM 137

SURVEY			ORIGINAL ANALYSIS				REANALYSIS			
UNIT	SOIL I.D.	ISOTOPE	RESULT	ERROR +/-	NONDETECT	MDA	RESULT	ERROR +/-	NONDETECT	MDA
5	020-99-0057	Cs-137	0.110		ND	0.220	0.022	0.008		0.013
5	020-99-0058	Cs-137	0.140		ND	0.280	0.032	0.010		0.011
5	020-99-0059	Cs-137	0.115		ND	0.230	0.430	0.050		0.013
5	020-99-0060	Cs-137	0.110		ND	0.220	0.043	0.013		0.015
5	020-99-0061	Cs-137	0.110		ND	0.220	0.016	0.008		0.012
5	020-99-0062	Cs-137	0.100		ND	0.200	0.007		ND	0.013
5	020-99-0063	Cs-137	0.125		ND	0.250	0.560	0.070		0.011
5	020-99-0064	Cs-137	0.105		ND	0.210	0.018	0.009		0.012
5	020-99-0065	Cs-137	0.110		ND	0.220	0.028	0.010		0.013
5	020-99-0066	Cs-137	0.085		ND	0.170	0.013	0.007		0.011
5	020-99-0067	Cs-137	0.105		ND	0.210	0.020	0.007		0.011
5	020-99-0086	Cs-137	0.140		ND	0.280	0.019	0.007		0.012
5	020-99-0087	Cs-137	0.135		ND	0.270	0.087	0.016		0.013
5	020-99-0088	Cs-137	0.150		ND	0.300	0.047	0.011		0.012
6	020-99-0072	Cs-137	0.185		ND	0.370	0.081	0.016		0.015
6	020-99-0073	Cs-137	0.190		ND	0.380	1.290	0.150		0.016
6	020-99-0074	Cs-137	0.165		ND	0.330	0.061	0.014		0.013
6	020-99-0075	Cs-137	0.155		ND	0.310	0.007		ND	0.013
6	020-99-0076	Cs-137	0.140		ND	0.280	0.057	0.021		0.015
6	020-99-0077	Cs-137	0.195		ND	0.390	0.077	0.016		0.014
6	020-99-0078	Cs-137	0.125		ND	0.250	0.089	0.017		0.013
6	020-99-0079	Cs-137	0.155		ND	0.310	0.054	0.014		0.014
6	020-99-0080	Cs-137	0.150		ND	0.300	0.060	0.015		0.016
6	020-99-0081	Cs-137	0.160		ND	0.320	0.078	0.015		0.013
6	020-99-0082	Cs-137	0.160		ND	0.320	0.790	0.100		0.013
6	020-99-0083	Cs-137	0.115		ND	0.230	0.006		ND	0.011
6	020-99-0084	Cs-137	0.145		ND	0.290	0.100	0.020		0.014
6	020-99-0085	Cs-137	0.120		ND	0.240	0.480	0.060		0.012

TABLE D1: SOIL ANALYSIS/REANALYSIS COMPARISON FOR PLUTONIUM 238 AND 239/240

SURVEY			ORIGINAL ANALYSIS				REANALYSIS			
UNIT	SOIL I.D.	ISOTOPE	RESULT	ERROR +/-	NONDETECT	MDA	RESULT	ERROR +/-	NONDETECT	MDA
1	020-99-0008	Pu-238	0.100	0.100		0.150	0.007	0.017	ND	0.031
1	020-99-0008	Pu-239/240	0.100	0.090		0.046	0.022	0.015		0.006
2	020-99-0016	Pu-238	0.100	0.200		0.180	0.007	0.015		0.026
2	020-99-0016	Pu-239/240	0.070	0.110		0.210	0.009	0.007	ND	0.018
2	020-99-0017	Pu-238	0.100	0.110		0.130	0.003	0.009		0.019
2	020-99-0017	Pu-239/240	0.033	0.054		0.100	0.099	0.037		0.019
2	020-99-0026	Pu-238	0.180	0.130		0.160	0.026	0.028	ND	0.053
2	020-99-0026	Pu-239/240	0.013	0.049		0.130	0.020	0.019	ND	0.026
3	020-99-0031	Pu-238	0.230	0.160		0.190	0.028	0.019	ND	0.040
3	020-99-0031	Pu-239/240	0.017	0.028		0.037	0.034	0.021		0.028
3	020-99-0033	Pu-238	0.180	0.120		0.140	0.017	0.014	ND	0.037
3	020-99-0033	Pu-239/240	0.016	0.032		0.044	0.008	0.010	ND	0.045
3	020-99-0035	Pu-238	0.130	0.089		0.100	0.010	0.023	ND	0.041
3	020-99-0035	Pu-239/240	0.007	0.050		0.130	0.022	0.018	ND	0.023
3	020-99-0038	Pu-238	0.180	0.110		0.120	0.027	0.027	ND	0.042
3	020-99-0038	Pu-239/240	-0.003	0.028		0.100	0.370	0.090		0.030
3	020-99-0039	Pu-238	0.110	0.080		0.073	0.016	0.017	ND	0.025
3	020-99-0039	Pu-239/240	0.060	0.040	ND	0.120	0.003	0.005	ND	0.007
3	020-99-0042	Pu-238	0.190	0.120		0.110	0.010	0.023	ND	0.041
3	020-99-0042	Pu-239/240	0.006	0.030		0.089	-0.005	0.014	ND	0.032
4	020-99-0046	Pu-238	0.360	0.160		0.120	0.024	0.018		0.020
4	020-99-0046	Pu-239/240	0.880	0.290		0.100	0.027	0.018		0.007
5	020-99-0065	Pu-238	0.025	0.046		0.076	0.034	0.033	ND	0.051
5	020-99-0065	Pu-239/240	0.200	0.110		0.051	0.220	0.07		0.022
5	020-99-0067	Pu-238	0.029	0.078		0.140	0.003	0.035	ND	0.066
5	020-99-0067	Pu-239/240	0.490	0.220		0.120	0.010	0.011		0.009
5	020-99-0086	Pu-238	0.210	0.160		0.200	0.036	0.023		0.022
5	020-99-0086	Pu-239/240	0.060	0.089		0.170	0.018	0.017	ND	0.022
5	020-99-0087	Pu-238	0.750	0.140		0.090	0.013	0.028	ND	0.050
5	020-99-0087	Pu-239/240	-0.016	0.038		0.150	0.009	0.019	ND	0.034
6	020-99-0083	Pu-238	0.170	0.110		0.123	0.009	0.035	ND	0.063
6	020-99-0083	Pu-239/240	0.041	0.070		0.150	0.018	0.015		0.008

TABLE D1: SOIL ANALYSIS/REANALYSIS COMPARISON FOR URANIUM AND STRONTIUM

SURVEY			ORIGINAL ANALYSIS				REANALYSIS			
UNIT	SOIL I.D.	ISOTOPE	RESULT	ERROR +/-	NONDETECT	MDA	RESULT	ERROR +/-	NONDETECT	MDA
4	020-99-0047	U-234	2.580	0.860		0.180	0.660	0.230		0.063
4	020-99-0047	U-235/236	0.200	0.180		0.110	0.065	0.066		0.044
4	020-99-0047	U-238	3.100	1.000		0.180	0.710	0.240		0.035

SURVEY			ORIGINAL ANALYSIS				REANALYSIS			
UNIT	SOIL I.D.	ISOTOPE	RESULT	ERROR +/-	NONDETECT	MDA	RESULT	ERROR +/-	NONDETECT	MDA
1	020-99-0011	Sr-90	22.600	4.500		0.500	0.540	0.400	ND	0.630

RE-ANALYZED WRS TESTS

Table D2: Area 4020 Re-analyzed Soil Sampling
Wilcoxon Rank Sum Test

Survey Unit 1

		Soil Concentrations (pCi/g)											Isotopic Fractions (concentration/DCGL)											Sum of Fractions	Adjusted Reference	Rank	Reference Area Rank
		Cs-137	Th-228	Th-230	Th-232	U-234	U-235	U-238	Pu-238	Pu-239	Am-241	Sr-90	Cs-137	Th-228	Th-230	Th-232	U-234	U-235	U-238	Pu-238	Pu-239	Am-241	Sr-90				
Sample Type	Soil I.D.	9.2	5	5	5	30	30	35	37.2	33.9	5.44	36															
S	020-99-0001	**0.007**	1.500	0.900	1.480	0.690	0.058	1.240	0.053	0.011	0.021	1.050	0.001	0.300	0.180	0.296	0.023	0.002	0.035	0.001	0.000	0.004	0.029	0.872	0.872	9	0
S	020-99-0002	**0.018**	1.570	1.110	1.140	0.780	0.100	0.760	0.071	0.009	0.059	0.360	0.002	0.314	0.222	0.228	0.026	0.003	0.022	0.002	0.000	0.011	0.011	0.841	0.841	6	0
S	020-99-0003	**0.017**	1.660	0.800	1.430	0.490	0.100	0.520	0.110	0.016	0.051	0.070	0.002	0.332	0.160	0.286	0.016	0.003	0.015	0.003	0.000	0.009	0.002	0.629	0.629	5	0
S	020-99-0004	**0.650**	1.450	0.920	1.240	0.500	0.019	0.740	0.013	0.003	0.026	0.590	0.071	0.290	0.184	0.248	0.017	0.001	0.021	0.000	0.000	0.005	0.016	0.853	0.853	7	0
S	020-99-0005	**0.037**	1.860	0.590	1.540	0.590	0.000	0.540	0.034	0.020	0.080	0.170	0.004	0.372	0.118	0.308	0.020	0.000	0.015	0.001	0.001	0.015	0.005	0.858	0.858	8	0
S	020-99-0006	**0.040**	1.590	0.960	1.180	0.530	0.022	0.500	0.042	-0.006	0.011	0.240	0.004	0.318	0.192	0.236	0.018	0.001	0.014	0.001	0.000	0.002	0.007	0.793	0.793	4	0
S	020-99-0007	**0.045**	1.060	1.060	1.160	0.490	0.012	0.890	0.007	0.000	0.019	0.320	0.005	0.212	0.212	0.232	0.016	0.000	0.025	0.000	0.000	0.003	0.009	0.716	0.716	2	0
S	020-99-0008	**0.021**	2.710	1.050	2.250	0.450	0.022	0.380	**0.007**	**0.022**	0.052	0.170	0.002	0.542	0.210	0.450	0.015	0.001	0.011	0.000	0.001	0.010	0.005	1.246	1.246	12	0
S	020-99-0009	**0.014**	2.860	0.770	2.680	0.340	0.081	0.420	0.093	0.030	-0.017	0.090	0.002	0.572	0.154	0.536	0.011	0.003	0.012	0.003	0.001	-0.003	0.003	1.292	1.292	13	0
S	020-99-0010	**0.034**	1.600	1.140	1.380	0.470	0.006	0.420	0.030	0.056	0.064	0.240	0.004	0.320	0.228	0.276	0.016	0.000	0.012	0.001	0.002	0.012	0.007	0.876	0.876	10	0
S	020-99-0011	**1.550**	1.820	1.300	1.180	0.290	-0.009	0.480	0.063	0.048	0.054	**0.540**	0.168	0.364	0.260	0.236	0.010	0.000	0.014	0.002	0.001	0.010	0.015	1.080	1.080	11	0
S	020-99-0012	**0.330**	0.980	0.840	1.120	0.520	0.150	0.490	0.070	0.010	0.006	0.112	0.036	0.196	0.168	0.224	0.017	0.005	0.014	0.002	0.000	0.001	0.003	0.667	0.667	1	0
S	020-99-0013	**0.150**	1.200	0.930	1.160	0.930	0.050	1.100	0.026	0.006	0.090	0.010	0.016	0.240	0.186	0.232	0.031	0.002	0.031	0.001	0.000	0.017	0.000	0.756	0.756	3	0
S	020-99-0014	**4.830**	1.110	1.380	1.430	0.580	0.110	0.860	-0.012	0.000	0.030	0.850	0.525	0.222	0.276	0.286	0.019	0.004	0.025	0.000	0.000	0.006	0.024	1.385	1.385	18	0
R	RH002	0.045	0.830	0.730	0.810	0.650	0.050	0.580	0.000	0.000	0.000	0.020	0.005	0.166	0.146	0.162	0.022	0.002	0.017	0.000	0.000	0.000	0.001	0.519	1.519	25	25
R	RH003	0.016	1.200	1.100	1.200	1.000	0.060	0.990	0.000	0.000	0.000	-0.010	0.002	0.240	0.220	0.240	0.033	0.002	0.028	0.000	0.000	0.000	0.000	0.765	1.765	37	37
R	RH004	0.010	0.670	0.470	0.670	1.000	0.050	0.940	0.000	0.000	0.000	-0.020	0.001	0.134	0.094	0.134	0.033	0.002	0.027	0.000	0.000	0.000	-0.001	0.424	1.424	21	21
R	RH005	0.009	1.100	1.400	0.890	0.410	0.030	0.460	0.000	0.000	0.000	0.010	0.001	0.220	0.280	0.178	0.014	0.001	0.013	0.000	0.000	0.000	0.000	0.707	1.707	35	35
R	RH006	0.150	1.100	0.970	0.960	1.000	0.067	0.980	0.000	0.010	0.000	0.030	0.016	0.220	0.194	0.192	0.033	0.002	0.028	0.000	0.000	0.000	0.001	0.687	1.687	34	34
R	RH007	0.089	1.000	0.920	1.100	1.000	0.070	1.100	0.000	0.010	0.000	-0.010	0.010	0.200	0.184	0.220	0.033	0.002	0.031	0.000	0.000	0.000	0.000	0.681	1.681	33	33
R	RH011	0.026	1.000	0.850	1.000	0.880	0.070	0.770	0.000	0.000	0.000	-0.090	0.003	0.200	0.170	0.200	0.029	0.002	0.022	0.000	0.000	0.000	-0.003	0.624	1.624	31	31
R	RH012	0.015	0.930	0.570	0.910	0.580	0.030	0.610	0.030	0.000	0.000	-0.060	0.002	0.186	0.114	0.182	0.019	0.001	0.017	0.001	0.000	0.000	-0.002	0.520	1.520	26	26
R	RH013	0.012	0.830	0.690	0.920	0.440	0.030	0.420	0.010	0.000	0.000	-0.080	0.001	0.166	0.138	0.184	0.015	0.001	0.012	0.000	0.000	0.000	-0.002	0.515	1.515	24	24
R	RH014	0.034	0.920	0.580	0.980	0.430	0.030	0.520	0.000	0.000	0.000	-0.030	0.004	0.184	0.116	0.196	0.014	0.001	0.015	0.000	0.000	0.000	-0.001	0.529	1.529	27	27
R	RH015	0.008	1.000	0.550	0.830	0.540	0.030	0.680	0.000	0.000	0.000	-0.040	0.001	0.200	0.110	0.166	0.018	0.001	0.019	0.000	0.000	0.000	-0.001	0.514	1.514	23	23
R	RH016	0.013	0.870	0.560	0.870	0.570	0.030	0.500	-0.010	0.000	0.000	-0.040	0.001	0.174	0.112	0.174	0.019	0.001	0.014	0.000	0.000	0.000	-0.001	0.494	1.494	22	22
R	RH021	0.008	0.880	0.830	1.000	0.570	0.030	0.550	0.000	0.000	0.000	-0.030	0.001	0.176	0.166	0.200	0.019	0.001	0.016	0.000	0.000	0.000	-0.001	0.578	1.578	29	29
R	RH025	0.007	0.700	0.590	0.540	0.490	0.030	0.510	0.000	0.000	0.000	0.000	0.001	0.140	0.118	0.108	0.016	0.001	0.015	0.000	0.000	0.000	0.000	0.399	1.399	20	20
R	RH026	0.007	0.870	0.700	0.980	0.790	0.060	0.880	0.000	0.000	0.000	-0.050	0.001	0.174	0.140	0.196	0.026	0.002	0.025	0.000	0.000	0.000	-0.001	0.563	1.563	28	28
R	RH030	0.014	1.200	0.710	1.000	0.730	0.040	0.680	0.000	0.000	0.000	-0.070	0.002	0.240	0.142	0.200	0.024	0.001	0.019	0.000	0.000	0.000	-0.002	0.627	1.627	32	32
R	RH031	0.013	1.300	1.000	1.500	0.720	0.050	0.670	0.010	0.010	0.000	-0.010	0.001	0.260	0.200	0.300	0.024	0.002	0.019	0.000	0.000	0.000	0.000	0.806	1.806	38	38
R	RH032	0.011	0.660	0.350	0.790	0.360	0.010	0.370	0.010	0.010	0.000	-0.090	0.001	0.132	0.070	0.158	0.012	0.000	0.011	0.000	0.000	0.000	-0.003	0.382	1.382	17	17
R	RH033	0.080	0.710	1.200	0.660	0.900	0.060	0.860	0.000	0.000	0.000	0.010	0.009	0.142	0.240	0.132	0.030	0.002	0.025	0.000	0.000	0.000	0.000	0.580	1.580	30	30
R	RH036	0.150	0.440	0.420	0.540	0.770	0.030	0.740	0.010	0.000	0.000	0.010	0.016	0.088	0.084	0.108	0.026	0.001	0.021	0.000	0.000	0.000	0.000	0.345	1.345	14	14
R	RH041	0.100	0.520	0.490	0.490	0.800	0.050	0.800	0.000	0.000	0.000	0.040	0.011	0.104	0.098	0.098	0.027	0.002	0.023	0.000	0.000	0.000	0.001	0.363	1.363	16	16
R	RH046	0.180	0.430	0.480	0.440	0.940	0.030	0.990	-0.010	0.020	0.000	0.040	0.020	0.086	0.096	0.088	0.031	0.001	0.028	0.000	0.001	0.000	0.001	0.352	1.352	15	15
R	RH047	0.036	0.500	0.490	0.660	0.930	0.060	0.900	-0.010	-0.010	0.000	0.040	0.004	0.100	0.098	0.132	0.031	0.002	0.026	0.000	0.000	0.000	0.001	0.394	1.394	19	19
R	RH048	0.100	1.200	1.100	1.100	0.900	0.050	0.910	0.000	0.010	0.000	0.000	0.011	0.240	0.220	0.220	0.030	0.002	0.026	0.000	0.000	0.000	0.000	0.749	1.749	36	36

Sum of Ranks = WRSR =	632
Survey unit sample number = n =	14
Reference area sample number = m =	24
α =	0.05
z =	1.645
WRSC =	522

Table D3: Area 4020 Re-Analyzed Soil Sampling
Wilcoxon Rank Sum Test

Survey Unit 2

		Soil Concentrations (pCi/g)											Isotopic Fractions (concentration/DCGL)											Sum of Fractions	Adjusted Reference	Rank	Reference Area Rank
		Cs-137	Th-228	Th-230	Th-232	U-234	U-235	U-238	Pu-238	Pu-239	Am-241	Sr-90	Cs-137	Th-228	Th-230	Th-232	U-234	U-235	U-238	Pu-238	Pu-239	Am-241	Sr-90				
Sample Type	Soil I.D.	9.2	5	5	5	30	30	35	37.2	33.9	5.44	36															
S	020-99-0015	**0.170**	1.190	1.190	1.190	1.000	0.090	1.160	0.078	0.018	0.080	0.430	0.018	0.238	0.238	0.238	0.033	0.003	0.033	0.002	0.001	0.015	0.012	0.831	0.831	4	0
S	020-99-0016	**2.350**	1.470	1.110	1.110	0.570	0.018	0.590	**0.007**	**0.009**	0.004	0.230	0.255	0.294	0.222	0.222	0.019	0.001	0.017	0.000	0.000	0.001	0.006	1.037	1.037	11	0
S	020-99-0017	**0.037**	1.500	0.910	1.180	0.620	-0.006	0.620	**0.003**	**0.099**	0.016	0.170	0.004	0.300	0.182	0.236	0.021	0.000	0.018	0.000	0.003	0.003	0.005	0.771	0.771	2	0
S	020-99-0018	**0.012**	1.570	1.430	1.810	0.700	0.041	0.750	0.066	0.024	0.007	0.090	0.001	0.314	0.286	0.362	0.023	0.001	0.021	0.002	0.001	0.001	0.003	1.016	1.016	9	0
S	020-99-0019	**0.140**	1.340	0.650	0.780	0.660	0.078	0.690	0.080	0.100	0.057	0.190	0.015	0.268	0.130	0.156	0.022	0.003	0.020	0.002	0.003	0.010	0.005	0.634	0.634	1	0
S	020-99-0020	**0.008**	1.580	1.280	1.790	0.680	0.022	0.730	0.047	0.060	0.049	0.400	0.001	0.316	0.256	0.358	0.023	0.001	0.021	0.001	0.002	0.009	0.011	0.998	0.998	7	0
S	020-99-0021	**0.041**	1.940	1.170	1.620	0.800	0.040	0.580	0.021	0.005	-0.003	0.250	0.004	0.388	0.234	0.324	0.027	0.001	0.017	0.001	0.000	-0.001	0.007	1.002	1.002	8	0
S	020-99-0022	**0.007**	2.550	1.300	2.260	0.480	0.000	0.820	0.002	0.005	0.033	0.050	0.001	0.510	0.260	0.452	0.016	0.000	0.023	0.000	0.000	0.006	0.001	1.270	1.270	14	0
S	020-99-0023	**0.007**	2.270	1.180	1.870	0.630	0.074	0.520	-0.026	0.015	0.072	0.220	0.001	0.454	0.236	0.374	0.021	0.002	0.015	-0.001	0.000	0.013	0.006	1.122	1.122	13	0
S	020-99-0024	**0.007**	1.150	1.130	1.540	0.600	0.045	0.730	0.037	0.000	0.012	-0.060	0.001	0.230	0.226	0.308	0.020	0.002	0.021	0.001	0.000	0.002	-0.002	0.809	0.809	3	0
S	020-99-0025	**0.007**	1.990	1.660	1.460	0.690	-0.010	0.600	0.041	0.010	-0.023	0.110	0.001	0.398	0.336	0.292	0.023	0.000	0.017	0.001	0.000	-0.004	0.003	1.067	1.067	12	0
S	020-99-0026	**0.060**	1.890	1.470	1.480	0.650	0.043	0.760	**0.026**	**0.020**	0.011	0.110	0.007	0.378	0.294	0.296	0.022	0.001	0.022	0.001	0.001	0.002	0.003	1.026	1.026	10	0
S	020-99-0027	**0.100**	1.470	1.200	1.190	0.630	-0.013	0.550	0.075	0.005	0.049	0.300	0.011	0.294	0.240	0.238	0.021	0.000	0.016	0.002	0.000	0.009	0.008	0.839	0.839	5	0
S	020-99-0028	**0.120**	1.390	1.120	1.710	0.790	0.000	0.640	0.012	-0.003	0.035	0.100	0.013	0.278	0.224	0.342	0.026	0.000	0.018	0.000	0.000	0.006	0.003	0.911	0.911	6	0
R	RH002	0.045	0.830	0.730	0.810	0.650	0.050	0.580	0.000	0.000	0.000	0.020	0.005	0.166	0.146	0.162	0.022	0.002	0.017	0.000	0.000	0.000	0.001	0.519	1.519	25	25
R	RH003	0.016	1.200	1.100	1.200	1.000	0.060	0.990	0.000	0.000	0.000	-0.010	0.002	0.240	0.220	0.240	0.033	0.002	0.028	0.000	0.000	0.000	0.000	0.765	1.765	37	37
R	RH004	0.010	0.670	0.470	0.670	1.000	0.050	0.940	0.000	0.000	0.000	-0.020	0.001	0.134	0.094	0.134	0.033	0.002	0.027	0.000	0.000	0.000	-0.001	0.424	1.424	21	21
R	RH005	0.009	1.100	1.400	0.890	0.410	0.030	0.460	0.000	0.000	0.000	0.010	0.001	0.220	0.280	0.178	0.014	0.001	0.013	0.000	0.000	0.000	0.000	0.707	1.707	35	35
R	RH006	0.150	1.100	0.970	0.960	1.000	0.067	0.980	0.000	0.010	0.000	0.030	0.016	0.220	0.194	0.192	0.033	0.002	0.028	0.000	0.000	0.000	0.001	0.687	1.687	34	34
R	RH007	0.089	1.000	0.920	1.100	1.000	0.070	1.100	0.000	0.010	0.000	-0.010	0.010	0.200	0.184	0.220	0.033	0.002	0.031	0.000	0.000	0.000	0.000	0.681	1.681	33	33
R	RH011	0.026	1.000	0.850	1.000	0.880	0.070	0.770	0.000	0.000	0.000	-0.090	0.003	0.200	0.170	0.200	0.029	0.002	0.022	0.000	0.000	0.000	-0.003	0.624	1.624	31	31
R	RH012	0.015	0.930	0.570	0.910	0.580	0.030	0.610	0.030	0.000	0.000	-0.060	0.002	0.186	0.114	0.182	0.019	0.001	0.017	0.001	0.000	0.000	-0.002	0.520	1.520	26	26
R	RH013	0.012	0.830	0.690	0.920	0.440	0.030	0.420	0.010	0.000	0.000	-0.080	0.001	0.166	0.138	0.184	0.015	0.001	0.012	0.000	0.000	0.000	-0.002	0.515	1.515	24	24
R	RH014	0.034	0.920	0.580	0.980	0.430	0.030	0.520	0.000	0.000	0.000	-0.030	0.004	0.184	0.116	0.196	0.014	0.001	0.015	0.000	0.000	0.000	-0.001	0.529	1.529	27	27
R	RH015	0.008	1.000	0.550	0.830	0.540	0.030	0.680	0.000	0.000	0.000	-0.040	0.001	0.200	0.110	0.166	0.018	0.001	0.019	0.000	0.000	0.000	-0.001	0.514	1.514	23	23
R	RH016	0.013	0.870	0.560	0.870	0.570	0.030	0.500	-0.010	0.000	0.000	-0.040	0.001	0.174	0.112	0.174	0.019	0.001	0.014	0.000	0.000	0.000	-0.001	0.494	1.494	22	22
R	RH021	0.008	0.880	0.830	1.000	0.570	0.030	0.550	0.000	0.000	0.000	-0.030	0.001	0.176	0.166	0.200	0.019	0.001	0.016	0.000	0.000	0.000	-0.001	0.578	1.578	29	29
R	RH025	0.007	0.700	0.590	0.540	0.490	0.030	0.510	0.000	0.000	0.000	0.000	0.001	0.140	0.118	0.108	0.016	0.001	0.015	0.000	0.000	0.000	0.000	0.399	1.399	20	20
R	RH026	0.007	0.870	0.700	0.980	0.790	0.060	0.880	0.000	0.000	0.000	-0.050	0.001	0.174	0.140	0.196	0.026	0.002	0.025	0.000	0.000	0.000	-0.001	0.563	1.563	28	28
R	RH030	0.014	1.200	0.710	1.000	0.730	0.040	0.680	0.000	0.000	0.000	-0.070	0.002	0.240	0.142	0.200	0.024	0.001	0.019	0.000	0.000	0.000	-0.002	0.627	1.627	32	32
R	RH031	0.013	1.300	1.000	1.500	0.720	0.050	0.670	0.010	0.010	0.000	-0.010	0.001	0.260	0.200	0.300	0.024	0.002	0.019	0.000	0.000	0.000	0.000	0.806	1.806	38	38
R	RH032	0.011	0.660	0.350	0.790	0.360	0.010	0.370	0.010	0.010	0.000	-0.090	0.001	0.132	0.070	0.158	0.012	0.000	0.011	0.000	0.000	0.000	-0.003	0.382	1.382	18	18
R	RH033	0.080	0.710	1.200	0.660	0.900	0.060	0.860	0.000	0.000	0.000	0.010	0.009	0.142	0.240	0.132	0.030	0.002	0.025	0.000	0.000	0.000	0.000	0.580	1.580	30	30
R	RH036	0.150	0.440	0.420	0.540	0.770	0.030	0.740	0.010	0.000	0.000	0.010	0.016	0.088	0.084	0.108	0.026	0.001	0.021	0.000	0.000	0.000	0.000	0.345	1.345	15	15
R	RH041	0.100	0.520	0.490	0.490	0.800	0.050	0.800	0.000	0.000	0.000	0.040	0.011	0.104	0.098	0.098	0.027	0.002	0.023	0.000	0.000	0.000	0.001	0.363	1.363	17	17
R	RH045	0.180	0.430	0.480	0.440	0.940	0.030	0.990	-0.010	0.020	0.000	0.040	0.020	0.086	0.096	0.088	0.031	0.001	0.028	0.000	0.001	0.000	0.001	0.352	1.352	16	16
R	RH047	0.036	0.500	0.490	0.660	0.930	0.060	0.900	-0.010	-0.010	0.000	0.040	0.004	0.100	0.098	0.132	0.031	0.002	0.026	0.000	0.000	0.000	0.001	0.394	1.394	19	19
R	RH048	0.100	1.200	1.100	1.100	0.900	0.050	0.910	0.000	0.010	0.000	0.000	0.011	0.240	0.220	0.220	0.030	0.002	0.026	0.000	0.000	0.000	0.000	0.749	1.749	36	36

Sum of Ranks = WRSR =	636
Survey unit sample number = n =	14
Reference area sample number = m =	24
α =	0.05
z =	1.645
WRSC =	522

Critical Value < Sum of Ranks

Table D4: Area 4020
Re-analyzed Soil Sampling
Wilcoxon Rank Sum Test

Survey Unit 3

		Soil Concentrations (pCi/g)											Isotopic Fractions (concentration/DCGL)											Sum of Fractions	Adjusted Reference	Rank	Reference Area Rank
		Cs-137	Th-228	Th-230	Th-232	U-234	U-235	U-238	Pu-238	Pu-239	Am-241	Sr-90	Cs-137	Th-228	Th-230	Th-232	U-234	U-235	U-238	Pu-238	Pu-239	Am-241	Sr-90				
Sample Type	Soil I.D.	9.2	5	5	5	30	30	35	37.2	33.9	5.44	36															
S	020-99-0029	**0.045**	1.960	1.160	2.150	0.670	0.024	0.750	0.074	0.014	0.029	0.050	0.005	0.392	0.232	0.430	0.022	0.001	0.021	0.002	0.000	0.005	0.001	1.113	1.113	9	0
S	020-99-0030	**0.008**	2.340	1.500	1.690	0.500	0.035	0.670	0.036	0.020	0.003	0.250	0.001	0.468	0.300	0.378	0.017	0.001	0.019	0.001	0.001	0.001	0.007	1.193	1.193	11	0
S	020-99-0031	**0.016**	1.210	1.090	1.150	0.650	0.000	0.480	**0.028**	**0.034**	0.032	0.000	0.002	0.242	0.218	0.230	0.022	0.000	0.014	0.001	0.001	0.006	0.000	0.735	0.735	1	0
S	020-99-0032	**0.008**	1.470	0.830	1.560	0.560	0.074	0.870	0.014	-0.002	0.020	0.120	0.001	0.294	0.166	0.312	0.019	0.002	0.025	0.000	0.000	0.004	0.003	0.826	0.826	3	0
S	020-99-0033	**0.021**	1.870	1.020	1.920	0.650	0.270	0.650	**0.017**	**0.008**	0.025	0.130	0.002	0.374	0.204	0.384	0.022	0.009	0.019	0.000	0.000	0.005	0.004	1.022	1.022	6	0
S	020-99-0034	**0.024**	2.000	1.090	1.830	0.570	0.033	0.550	0.006	0.015	0.039	0.200	0.003	0.400	0.218	0.366	0.019	0.001	0.016	0.000	0.000	0.007	0.006	1.036	1.036	7	0
S	020-99-0035	**0.039**	1.770	1.230	2.190	0.690	0.040	0.590	**0.010**	**0.022**	-0.031	0.080	0.004	0.354	0.246	0.438	0.023	0.001	0.017	0.000	0.001	-0.006	0.002	1.081	1.081	8	0
S	020-99-0036	**0.036**	1.540	0.740	1.490	0.600	0.040	0.550	0.009	0.015	0.026	0.180	0.004	0.308	0.148	0.298	0.020	0.001	0.016	0.000	0.000	0.005	0.005	0.805	0.805	2	0
S	020-99-0037	**0.026**	1.290	1.300	1.200	0.970	0.043	0.560	0.002	0.013	0.058	0.170	0.003	0.258	0.260	0.240	0.032	0.001	0.016	0.000	0.000	0.011	0.005	0.826	0.826	4	0
S	020-99-0038	**0.950**	2.310	1.180	2.440	0.820	-0.021	0.580	**0.027**	**0.370**	0.055	0.180	0.103	0.462	0.236	0.488	0.027	-0.001	0.017	0.001	0.011	0.010	0.005	1.359	1.359	15	0
S	020-99-0039	**0.530**	1.380	1.780	1.940	0.660	0.130	0.520	**0.016**	**0.003**	0.069	0.640	0.058	0.276	0.356	0.388	0.022	0.004	0.015	0.000	0.000	0.013	0.018	1.150	1.150	10	0
S	020-99-0040	**0.016**	1.470	1.370	1.550	0.530	0.130	0.760	0.045	0.005	0.044	0.330	0.002	0.294	0.274	0.310	0.018	0.004	0.022	0.001	0.000	0.008	0.009	0.942	0.942	5	0
S	020-99-0041	**0.160**	2.070	2.000	1.930	0.720	0.010	0.910	0.052	0.046	0.049	0.130	0.017	0.414	0.400	0.386	0.024	0.000	0.026	0.001	0.001	0.009	0.004	1.283	1.283	12	0
S	020-99-0042	**0.120**	2.250	1.940	2.650	0.020	-0.008	0.000	**0.010**	**-0.005**	0.003	0.050	0.013	0.450	0.388	0.530	0.001	0.000	0.000	0.000	0.000	0.001	0.001	1.384	1.384	18	0
R	RH002	0.045	0.830	0.730	0.810	0.650	0.050	0.580	0.000	0.000	0.000	0.020	0.005	0.166	0.146	0.162	0.022	0.002	0.017	0.000	0.000	0.000	0.001	0.519	1.519	25	25
R	RH003	0.016	1.200	1.100	1.200	1.000	0.060	0.990	0.000	0.000	0.000	-0.010	0.002	0.240	0.220	0.240	0.033	0.002	0.028	0.000	0.000	0.000	0.000	0.765	1.765	37	37
R	RH004	0.010	0.670	0.470	0.670	1.000	0.050	0.940	0.000	0.000	0.000	-0.020	0.001	0.134	0.094	0.134	0.033	0.002	0.027	0.000	0.000	0.000	-0.001	0.424	1.424	21	21
R	RH005	0.009	1.100	1.400	0.890	0.410	0.030	0.460	0.000	0.000	0.000	0.010	0.001	0.220	0.280	0.178	0.014	0.001	0.013	0.000	0.000	0.000	0.000	0.707	1.707	35	35
R	RH006	0.150	1.100	0.970	0.960	1.000	0.067	0.980	0.000	0.010	0.000	0.030	0.016	0.220	0.194	0.192	0.033	0.002	0.028	0.000	0.000	0.000	0.001	0.687	1.687	34	34
R	RH007	0.089	1.000	0.920	1.100	1.000	0.070	1.100	0.000	0.010	0.000	-0.010	0.010	0.200	0.184	0.220	0.033	0.002	0.031	0.000	0.000	0.000	0.000	0.681	1.681	33	33
R	RH011	0.026	1.000	0.850	1.000	0.880	0.070	0.770	0.000	0.000	0.000	-0.090	0.003	0.200	0.170	0.200	0.029	0.002	0.022	0.000	0.000	0.000	-0.003	0.624	1.624	31	31
R	RH012	0.015	0.930	0.570	0.910	0.580	0.030	0.610	0.030	0.000	0.000	-0.060	0.002	0.186	0.114	0.182	0.019	0.001	0.017	0.001	0.000	0.000	-0.002	0.520	1.520	26	26
R	RH013	0.012	0.830	0.690	0.920	0.440	0.030	0.420	0.010	0.000	0.000	-0.080	0.001	0.166	0.138	0.184	0.015	0.001	0.012	0.000	0.000	0.000	-0.002	0.515	1.515	24	24
R	RH014	0.034	0.920	0.580	0.980	0.430	0.030	0.520	0.000	0.000	0.000	-0.030	0.004	0.184	0.116	0.196	0.014	0.001	0.015	0.000	0.000	0.000	-0.001	0.529	1.529	27	27
R	RH015	0.008	1.000	0.550	0.830	0.540	0.030	0.680	0.000	0.000	0.000	-0.040	0.001	0.200	0.110	0.166	0.018	0.001	0.019	0.000	0.000	0.000	-0.001	0.514	1.514	23	23
R	RH016	0.013	0.870	0.560	0.870	0.570	0.030	0.500	-0.010	0.000	0.000	-0.040	0.001	0.174	0.112	0.174	0.019	0.001	0.014	0.000	0.000	0.000	-0.001	0.494	1.494	22	22
R	RH021	0.008	0.880	0.830	1.000	0.570	0.030	0.550	0.000	0.000	0.000	-0.030	0.001	0.176	0.166	0.200	0.019	0.001	0.016	0.000	0.000	0.000	-0.001	0.578	1.578	29	29
R	RH025	0.007	0.700	0.590	0.540	0.490	0.030	0.510	0.000	0.000	0.000	0.000	0.001	0.140	0.118	0.108	0.016	0.001	0.015	0.000	0.000	0.000	0.000	0.399	1.399	20	20
R	RH026	0.007	0.870	0.700	0.980	0.790	0.060	0.880	0.000	0.000	0.000	-0.050	0.001	0.174	0.140	0.196	0.026	0.002	0.025	0.000	0.000	0.000	-0.001	0.563	1.563	28	28
R	RH030	0.014	1.200	0.710	1.000	0.730	0.040	0.660	0.000	0.000	0.000	-0.070	0.002	0.240	0.142	0.200	0.024	0.001	0.019	0.000	0.000	0.000	-0.002	0.627	1.627	32	32
R	RH031	0.013	1.300	1.000	1.500	0.720	0.050	0.670	0.010	0.010	0.000	-0.010	0.001	0.260	0.200	0.300	0.024	0.002	0.019	0.000	0.000	0.000	0.000	0.806	1.806	38	38
R	RH032	0.011	0.660	0.350	0.790	0.360	0.010	0.370	0.010	0.010	0.000	-0.090	0.001	0.132	0.070	0.158	0.012	0.000	0.011	0.000	0.000	0.000	-0.003	0.382	1.382	17	17
R	RH033	0.080	0.710	1.200	0.680	0.900	0.060	0.860	0.000	0.000	0.000	0.010	0.009	0.142	0.240	0.132	0.030	0.002	0.025	0.000	0.000	0.000	0.000	0.580	1.580	30	30
R	RH036	0.150	0.440	0.420	0.540	0.770	0.030	0.740	0.010	0.000	0.000	0.010	0.016	0.088	0.084	0.108	0.026	0.001	0.021	0.000	0.000	0.000	0.000	0.345	1.345	13	13
R	RH041	0.100	0.520	0.490	0.490	0.800	0.050	0.800	0.000	0.000	0.000	0.040	0.011	0.104	0.098	0.098	0.027	0.002	0.023	0.000	0.000	0.000	0.001	0.363	1.363	16	16
R	RH046	0.180	0.430	0.480	0.440	0.940	0.030	0.990	-0.010	0.020	0.000	0.040	0.020	0.086	0.096	0.088	0.031	0.001	0.028	0.000	0.001	0.000	0.001	0.352	1.352	14	14
R	RH047	0.036	0.500	0.490	0.660	0.930	0.060	0.900	-0.010	-0.010	0.000	0.040	0.004	0.100	0.098	0.132	0.031	0.002	0.026	0.000	0.000	0.000	0.001	0.394	1.394	19	19
R	RH048	0.100	1.200	1.100	1.100	0.900	0.050	0.910	0.000	0.010	0.000	0.000	0.011	0.240	0.220	0.220	0.030	0.002	0.026	0.000	0.000	0.000	0.000	0.749	1.749	36	36

Sum of Ranks = WRSR = 630
Survey unit sample number = n = 14
Reference area sample number = m = 24
α = 0.05
z = 1.645
WRSC = 522
Critical Value < Sum of Ranks

Table D5: Area 4020 Re-analyzed Soil Sampling
Wilcoxon Rank Sum Test

Survey Unit 4

		Soil Concentrations (pCi/g)											Isotopic Fractions (concentration/DCGL)											Sum of Fractions	Adjusted Reference	Rank	Reference Area Rank
		Cs-137	Th-228	Th-230	Th-232	U-234	U-235	U-238	Pu-238	Pu-239	Am-241	Sr-90	Cs-137	Th-228	Th-230	Th-232	U-234	U-235	U-238	Pu-238	Pu-239	Am-241	Sr-90				
Sample Type	Soil I.D.	9.2	5	5	5	30	30	35	37.2	33.9	5.44	36															
S	020-99-0043	**0.017**	2.550	2.530	1.910	0.66	-0.038	0.690	0.040	0.003	0.010	0.110	0.002	0.510	0.506	0.382	0.022	-0.001	0.020	0.001	0.000	0.002	0.003	1.446	1.446	18	0
S	020-99-0044	**0.023**	1.870	1.430	1.660	0.38	0.016	0.550	0.022	0.039	0.005	0.200	0.003	0.374	0.286	0.332	0.013	0.001	0.016	0.001	0.001	0.001	0.006	1.032	1.032	2	0
S	020-99-0045	**0.042**	3.520	1.910	2.850	0.58	0.049	0.540	-0.015	0.017	0.081	0.120	0.005	0.704	0.382	0.570	0.019	0.002	0.015	0.000	0.001	0.015	0.003	1.715	1.715	35	0
S	020-99-0046	**0.021**	1.970	1.830	2.210	1.30	0.033	1.380	**0.024**	**0.027**	0.053	0.190	0.002	0.394	0.366	0.442	0.043	0.001	0.039	0.001	0.001	0.010	0.005	1.305	1.305	9	0
S	020-99-0047	**0.026**	2.540	1.730	2.190	**0.66**	**0.065**	**0.710**	0.090	0.020	0.030	0.300	0.003	0.508	0.346	0.438	0.022	0.002	0.020	0.002	0.001	0.006	0.008	1.356	1.356	12	0
S	020-99-0048	**0.044**	2.520	1.520	2.020	0.66	-0.017	0.590	0.049	0.015	0.018	0.230	0.005	0.504	0.304	0.404	0.022	-0.001	0.017	0.001	0.000	0.003	0.006	1.267	1.267	8	0
S	020-99-0049	**0.015**	3.220	1.590	2.670	0.74	0.023	0.720	0.034	0.017	0.047	0.120	0.002	0.644	0.318	0.534	0.025	0.001	0.021	0.001	0.001	0.009	0.003	1.557	1.557	26	0
S	020-99-0050	**0.290**	2.120	1.460	2.220	0.54	0.040	0.560	-0.004	-0.004	0.052	-0.060	0.032	0.424	0.292	0.444	0.018	0.001	0.016	0.000	0.000	0.010	-0.002	1.235	1.235	6	0
S	020-99-0051	**0.055**	1.720	1.040	2.030	1.00	0.029	0.890	0.055	0.000	-0.003	0.060	0.006	0.344	0.208	0.406	0.033	0.001	0.025	0.001	0.000	-0.001	0.002	1.026	1.026	1	0
S	020-99-0052	**0.220**	2.000	1.380	2.000	0.64	0.027	0.670	0.009	0.016	0.022	0.270	0.024	0.400	0.276	0.400	0.021	0.001	0.019	0.000	0.000	0.004	0.008	1.154	1.154	3	0
S	020-99-0053	**0.015**	1.840	1.550	2.040	0.66	0.060	0.900	0.070	0.058	0.069	0.090	0.002	0.368	0.310	0.408	0.022	0.002	0.026	0.002	0.002	0.013	0.003	1.156	1.156	4	0
S	020-99-0054	**0.160**	2.130	2.080	2.440	1.50	0.067	1.910	0.060	0.010	0.047	0.180	0.017	0.426	0.416	0.488	0.050	0.002	0.055	0.002	0.000	0.009	0.005	1.470	1.470	19	0
S	020-99-0055	**0.130**	1.790	1.780	1.990	0.66	0.070	0.870	0.042	0.012	0.054	0.220	0.014	0.358	0.358	0.398	0.022	0.002	0.025	0.001	0.000	0.010	0.006	1.195	1.195	5	0
S	020-99-0056	**0.200**	1.490	2.400	1.900	0.68	0.010	0.830	-0.004	0.040	0.094	0.140	0.022	0.298	0.480	0.380	0.023	0.000	0.024	0.000	0.001	0.017	0.004	1.249	1.249	7	0
R	RH002	0.045	0.830	0.730	0.810	0.650	0.050	0.580	0.000	0.000	0.000	0.020	0.005	0.166	0.146	0.162	0.022	0.002	0.017	0.000	0.000	0.000	0.001	0.519	1.519	23	23
R	RH003	0.016	1.200	1.100	1.200	1.000	0.060	0.990	0.000	0.000	0.000	-0.010	0.002	0.240	0.220	0.240	0.033	0.002	0.028	0.000	0.000	0.000	0.000	0.765	1.765	37	37
R	RH004	0.010	0.670	0.470	0.670	1.000	0.050	0.940	0.000	0.000	0.000	-0.020	0.001	0.134	0.094	0.134	0.033	0.002	0.027	0.000	0.000	0.000	-0.001	0.424	1.424	17	17
R	RH005	0.009	1.100	1.400	0.890	0.410	0.030	0.460	0.000	0.000	0.000	0.010	0.001	0.220	0.280	0.178	0.014	0.001	0.013	0.000	0.000	0.000	0.000	0.707	1.707	34	34
R	RH006	0.150	1.100	0.970	0.960	1.000	0.067	0.980	0.000	0.010	0.000	0.030	0.016	0.220	0.194	0.192	0.033	0.002	0.028	0.000	0.000	0.000	0.001	0.687	1.687	33	33
R	RH007	0.089	1.000	0.920	1.100	1.000	0.070	1.100	0.000	0.010	0.000	-0.010	0.010	0.200	0.184	0.220	0.033	0.002	0.031	0.000	0.000	0.000	0.000	0.681	1.681	32	32
R	RH011	0.026	1.000	0.850	1.000	0.880	0.070	0.770	0.000	0.000	0.000	-0.090	0.003	0.200	0.170	0.200	0.029	0.002	0.022	0.000	0.000	0.000	-0.003	0.624	1.624	30	30
R	RH012	0.015	0.930	0.570	0.910	0.580	0.030	0.610	0.030	0.000	0.000	-0.060	0.002	0.186	0.114	0.182	0.019	0.001	0.017	0.001	0.000	0.000	-0.002	0.520	1.520	24	24
R	RH013	0.012	0.830	0.690	0.920	0.440	0.030	0.420	0.010	0.000	0.000	-0.080	0.001	0.166	0.138	0.184	0.015	0.001	0.012	0.000	0.000	0.000	-0.002	0.515	1.515	22	22
R	RH014	0.034	0.920	0.580	0.980	0.430	0.030	0.520	0.000	0.000	0.000	-0.030	0.004	0.184	0.116	0.196	0.014	0.001	0.015	0.000	0.000	0.000	-0.001	0.529	1.529	25	25
R	RH015	0.008	1.000	0.550	0.830	0.540	0.030	0.660	0.000	0.000	0.000	-0.040	0.001	0.200	0.110	0.166	0.018	0.001	0.019	0.000	0.000	0.000	-0.001	0.514	1.514	21	21
R	RH016	0.013	0.870	0.560	0.870	0.570	0.030	0.500	-0.010	0.000	0.000	-0.040	0.001	0.174	0.112	0.174	0.019	0.001	0.014	0.000	0.000	0.000	-0.001	0.494	1.494	20	20
R	RH021	0.008	0.880	0.830	1.000	0.570	0.030	0.550	0.000	0.000	0.000	-0.030	0.001	0.176	0.166	0.200	0.019	0.001	0.016	0.000	0.000	0.000	-0.001	0.578	1.578	28	28
R	RH025	0.007	0.700	0.590	0.540	0.490	0.030	0.510	0.000	0.000	0.000	0.000	0.001	0.140	0.118	0.108	0.016	0.001	0.015	0.000	0.000	0.000	0.000	0.399	1.399	16	16
R	RH026	0.007	0.870	0.700	0.980	0.790	0.060	0.880	0.000	0.000	0.000	-0.050	0.001	0.174	0.140	0.196	0.026	0.002	0.025	0.000	0.000	0.000	-0.001	0.563	1.563	27	27
R	RH030	0.014	1.200	0.710	1.000	0.730	0.040	0.680	0.000	0.000	0.000	-0.070	0.002	0.240	0.142	0.200	0.024	0.001	0.019	0.000	0.000	0.000	-0.002	0.627	1.627	31	31
R	RH031	0.013	1.300	1.000	1.500	0.720	0.050	0.670	0.010	0.010	0.000	-0.010	0.001	0.260	0.200	0.300	0.024	0.002	0.019	0.000	0.000	0.000	0.000	0.806	1.806	38	38
R	RH032	0.011	0.660	0.350	0.790	0.360	0.010	0.370	0.010	0.010	0.000	-0.090	0.001	0.132	0.070	0.158	0.012	0.000	0.011	0.000	0.000	0.000	-0.003	0.382	1.382	14	14
R	RH033	0.080	0.710	1.200	0.660	0.900	0.060	0.860	0.000	0.000	0.000	0.010	0.009	0.142	0.240	0.132	0.030	0.002	0.025	0.000	0.000	0.000	0.000	0.580	1.580	29	29
R	RH036	0.150	0.440	0.420	0.540	0.770	0.030	0.740	0.010	0.000	0.000	0.010	0.016	0.088	0.084	0.108	0.026	0.001	0.021	0.000	0.000	0.000	0.000	0.345	1.345	10	10
R	RH041	0.100	0.520	0.490	0.490	0.800	0.050	0.800	0.000	0.000	0.000	0.040	0.011	0.104	0.098	0.098	0.027	0.002	0.023	0.000	0.000	0.000	0.001	0.363	1.363	13	13
R	RH046	0.180	0.430	0.480	0.440	0.940	0.030	0.990	-0.010	0.020	0.000	0.040	0.020	0.086	0.096	0.088	0.031	0.001	0.028	0.000	0.001	0.000	0.001	0.352	1.352	11	11
R	RH047	0.036	0.500	0.490	0.660	0.930	0.060	0.900	-0.010	-0.010	0.000	0.040	0.004	0.100	0.098	0.132	0.031	0.002	0.026	0.000	0.000	0.000	0.001	0.394	1.394	15	15
R	RH048	0.100	1.200	1.100	1.100	0.900	0.050	0.910	0.000	0.010	0.000	0.000	0.011	0.240	0.220	0.220	0.030	0.002	0.026	0.000	0.000	0.000	0.000	0.749	1.749	36	36

Sum of Ranks = WRSR = 586
Survey unit sample number = n = 14
Reference area sample number = m = 24
α = 0.05
z = 1.645
WRSC = 522
Critical Value < Sum of Ranks

Table D6: Area 4020
Re-analyzed Soil Sampling
Wilcoxon Rank Sum Test

Survey Unit 5

		Soil Concentrations (pCi/g)											Isotopic Fractions (concentration/DCGL)											Sum of Fractions	Adjusted Reference	Rank	Reference Area Rank
		Cs-137	Th-228	Th-230	Th-232	U-234	U-235	U-238	Pu-238	Pu-239	Am-241	Sr-90	Cs-137	Th-228	Th-230	Th-232	U-234	U-235	U-238	Pu-238	Pu-239	Am-241	Sr-90				
Sample Type	Soil I.D.	9.2	5	5	5	30	30	35	37.2	33.9	5.44	36															
S	020-99-0057	**0.022**	1.700	1.820	2.310	0.410	0.040	0.730	0.086	0.050	0.042	0.440	0.002	0.340	0.364	0.462	0.014	0.001	0.021	0.002	0.001	0.008	0.012	1.228	1.228	12	0
S	020-99-0058	**0.032**	2.800	1.640	2.760	0.810	0.090	0.810	0.030	-0.011	-0.004	0.180	0.003	0.560	0.328	0.552	0.027	0.003	0.023	0.001	0.000	-0.001	0.005	1.501	1.501	22	0
S	020-99-0059	**0.430**	2.150	2.090	2.370	0.580	0.110	0.800	0.073	0.011	0.032	0.180	0.047	0.430	0.418	0.474	0.019	0.004	0.023	0.002	0.000	0.006	0.005	1.428	1.428	20	0
S	020-99-0060	**0.043**	1.780	1.420	1.080	0.420	0.026	0.690	0.014	0.031	0.014	0.380	0.005	0.356	0.284	0.216	0.014	0.001	0.020	0.000	0.001	0.003	0.011	0.910	0.910	6	0
S	020-99-0061	**0.016**	1.280	1.170	1.520	0.570	0.023	0.640	0.016	0.008	0.042	0.310	0.002	0.256	0.234	0.304	0.019	0.001	0.018	0.000	0.000	0.008	0.009	0.851	0.851	5	0
S	020-99-0062	**0.007**	1.470	1.520	1.310	0.790	0.021	0.920	0.011	0.011	0.069	0.300	0.001	0.294	0.304	0.262	0.026	0.001	0.026	0.000	0.000	0.013	0.008	0.936	0.936	8	0
S	020-99-0063	**0.560**	1.560	0.710	1.350	0.790	0.000	0.580	0.055	0.000	0.011	0.280	0.061	0.312	0.142	0.270	0.026	0.000	0.017	0.001	0.000	0.002	0.008	0.839	0.839	4	0
S	020-99-0064	**0.018**	1.000	0.790	1.180	0.640	0.020	0.570	0.045	0.016	0.068	0.330	0.002	0.200	0.158	0.236	0.021	0.001	0.016	0.001	0.000	0.013	0.009	0.658	0.658	1	0
S	020-99-0065	**0.028**	0.850	1.040	1.280	0.640	0.027	0.530	**0.034**	**0.220**	0.080	0.000	0.003	0.170	0.208	0.256	0.021	0.001	0.015	0.001	0.006	0.015	0.000	0.697	0.697	3	0
S	020-99-0066	**0.013**	1.600	1.320	1.500	0.790	-0.007	0.590	0.077	-0.027	-0.010	0.010	0.001	0.320	0.264	0.300	0.026	0.000	0.017	0.002	-0.001	-0.002	0.000	0.928	0.928	7	0
S	020-99-0067	**0.020**	1.160	0.890	1.190	0.610	0.012	0.660	**0.003**	**0.010**	0.010	0.060	0.002	0.232	0.178	0.238	0.020	0.000	0.019	0.000	0.000	0.002	0.002	0.694	0.694	2	0
S	020-99-0086	**0.019**	1.500	1.060	2.180	0.360	0.013	0.530	**0.036**	**0.018**	0.012	0.110	0.002	0.300	0.212	0.436	0.012	0.000	0.015	0.001	0.001	0.002	0.003	0.984	0.984	9	0
S	020-99-0087	**0.087**	1.990	1.820	1.460	0.790	0.090	0.940	**0.013**	**0.009**	0.024	0.050	0.009	0.398	0.364	0.292	0.026	0.003	0.027	0.000	0.000	0.004	0.001	1.126	1.126	11	0
S	020-99-0088	**0.047**	2.110	1.270	1.460	0.680	0.100	0.720	0.050	0.005	0.006	0.360	0.005	0.422	0.254	0.292	0.023	0.003	0.021	0.001	0.000	0.001	0.010	1.032	1.032	10	0
R	RH002	0.045	0.830	0.730	0.810	0.650	0.050	0.580	0.000	0.000	0.000	0.020	0.005	0.166	0.146	0.162	0.022	0.002	0.017	0.000	0.000	0.000	0.001	0.519	1.519	25	25
R	RH003	0.016	1.200	1.100	1.200	1.000	0.060	0.990	0.000	0.000	0.000	-0.010	0.002	0.240	0.220	0.240	0.033	0.002	0.028	0.000	0.000	0.000	0.000	0.765	1.765	37	37
R	RH004	0.010	0.670	0.470	0.670	1.000	0.050	0.940	0.000	0.000	0.000	-0.020	0.001	0.134	0.094	0.134	0.033	0.002	0.027	0.000	0.000	0.000	-0.001	0.424	1.424	19	19
R	RH005	0.009	1.100	1.400	0.890	0.410	0.030	0.460	0.000	0.000	0.000	0.010	0.001	0.220	0.280	0.178	0.014	0.001	0.013	0.000	0.000	0.000	0.000	0.707	1.707	35	35
R	RH006	0.150	1.100	0.970	0.960	1.000	0.067	0.980	0.000	0.010	0.000	0.030	0.016	0.220	0.194	0.192	0.033	0.002	0.028	0.000	0.000	0.000	0.001	0.687	1.687	34	34
R	RH007	0.089	1.000	0.920	1.100	1.000	0.070	1.100	0.000	0.010	0.000	-0.010	0.010	0.200	0.184	0.220	0.033	0.002	0.031	0.000	0.000	0.000	0.000	0.681	1.681	33	33
R	RH011	0.026	1.000	0.850	1.000	0.880	0.070	0.770	0.000	0.000	0.000	-0.090	0.003	0.200	0.170	0.200	0.029	0.002	0.022	0.000	0.000	0.000	-0.003	0.624	1.624	31	31
R	RH012	0.015	0.930	0.570	0.910	0.580	0.030	0.610	0.030	0.000	0.000	-0.060	0.002	0.186	0.114	0.182	0.019	0.001	0.017	0.001	0.000	0.000	-0.002	0.520	1.520	26	26
R	RH013	0.012	0.830	0.690	0.920	0.440	0.030	0.420	0.010	0.000	0.000	-0.080	0.001	0.166	0.138	0.184	0.015	0.001	0.012	0.000	0.000	0.000	-0.002	0.515	1.515	24	24
R	RH014	0.034	0.920	0.580	0.980	0.430	0.030	0.520	0.000	0.000	0.000	-0.030	0.004	0.184	0.116	0.196	0.014	0.001	0.015	0.000	0.000	0.000	-0.001	0.529	1.529	27	27
R	RH015	0.008	1.000	0.550	0.830	0.540	0.030	0.680	0.000	0.000	0.000	-0.040	0.001	0.200	0.110	0.166	0.018	0.001	0.019	0.000	0.000	0.000	-0.001	0.514	1.514	23	23
R	RH016	0.013	0.870	0.560	0.870	0.570	0.030	0.500	-0.010	0.000	0.000	-0.040	0.001	0.174	0.112	0.174	0.019	0.001	0.014	0.000	0.000	0.000	-0.001	0.494	1.494	21	21
R	RH021	0.008	0.880	0.830	1.000	0.570	0.030	0.550	0.000	0.000	0.000	-0.030	0.001	0.176	0.166	0.200	0.019	0.001	0.016	0.000	0.000	0.000	-0.001	0.578	1.578	29	29
R	RH025	0.007	0.700	0.590	0.540	0.490	0.030	0.510	0.000	0.000	0.000	0.000	0.001	0.140	0.118	0.108	0.016	0.001	0.015	0.000	0.000	0.000	0.000	0.399	1.399	18	18
R	RH026	0.007	0.870	0.700	0.980	0.790	0.060	0.880	0.000	0.000	0.000	-0.050	0.001	0.174	0.140	0.196	0.026	0.002	0.025	0.000	0.000	0.000	-0.001	0.563	1.563	28	28
R	RH030	0.014	1.200	0.710	1.000	0.730	0.040	0.680	0.000	0.000	0.000	-0.070	0.002	0.240	0.142	0.200	0.024	0.001	0.019	0.000	0.000	0.000	-0.002	0.627	1.627	32	32
R	RH031	0.013	1.300	1.000	1.500	0.720	0.050	0.670	0.010	0.010	0.000	-0.010	0.001	0.260	0.200	0.300	0.024	0.002	0.019	0.000	0.000	0.000	0.000	0.806	1.806	38	38
R	RH032	0.011	0.660	0.350	0.790	0.360	0.010	0.370	0.010	0.010	0.000	-0.090	0.001	0.132	0.070	0.158	0.012	0.000	0.011	0.000	0.000	0.000	-0.003	0.382	1.382	16	16
R	RH033	0.080	0.710	1.200	0.660	0.900	0.060	0.860	0.000	0.000	0.000	0.010	0.009	0.142	0.240	0.132	0.030	0.002	0.025	0.000	0.000	0.000	0.000	0.580	1.580	30	30
R	RH036	0.150	0.440	0.420	0.540	0.770	0.030	0.740	0.010	0.000	0.000	0.010	0.016	0.088	0.084	0.108	0.026	0.001	0.021	0.000	0.000	0.000	0.000	0.345	1.345	13	13
R	RH041	0.100	0.520	0.490	0.490	0.800	0.050	0.800	0.000	0.000	0.000	0.040	0.011	0.104	0.098	0.098	0.027	0.002	0.023	0.000	0.000	0.000	0.001	0.363	1.363	15	15
R	RH046	0.180	0.430	0.480	0.440	0.940	0.030	0.990	-0.010	0.020	0.000	0.040	0.020	0.086	0.096	0.088	0.031	0.001	0.028	0.000	0.001	0.000	0.001	0.352	1.352	14	14
R	RH047	0.036	0.500	0.490	0.660	0.930	0.060	0.900	-0.010	-0.010	0.000	0.040	0.004	0.100	0.098	0.132	0.031	0.002	0.026	0.000	0.000	0.000	0.001	0.394	1.394	17	17
R	RH048	0.100	1.200	1.100	1.100	0.900	0.050	0.910	0.000	0.010	0.000	0.000	0.011	0.240	0.220	0.220	0.030	0.002	0.026	0.000	0.000	0.000	0.000	0.749	1.749	36	36

Sum of Ranks = WRSR = 621
Survey unit sample number = n = 14
Reference area sample number = m = 24
α = 0.05
z = 1.645
WRSC = 522
Critical Value < Sum of Ranks

Table D7: Area 4020
Re-analyzed Soil Sampling
Wilcoxon Rank Sum Test

Survey Unit 6

		Soil Concentrations (pCi/g)											Isotopic Fractions (concentration/DCGL)											Sum of Fractions	Adjusted Reference	Rank	Reference Area Rank
		Cs-137	Th-228	Th-230	Th-232	U-234	U-235	U-238	Pu-238	Pu-239	Am-241	Sr-90	Cs-137	Th-228	Th-230	Th-232	U-234	U-235	U-238	Pu-238	Pu-239	Am-241	Sr-90				
Sample Type	Soil I.D.	9.2	5	5	5	30	30	35	37.2	33.9	5.44	36															
S	020-99-0072	**0.081**	2.170	1.270	1.700	1.080	0.060	0.950	0.026	-0.009	-0.004	0.690	0.009	0.434	0.254	0.340	0.036	0.002	0.027	0.001	0.000	-0.001	0.019	1.121	1.121	5	0
S	020-99-0073	**1.290**	2.000	1.680	1.210	0.770	0.040	0.470	0.037	0.035	0.008	0.410	0.140	0.400	0.336	0.242	0.028	0.001	0.013	0.001	0.001	0.001	0.011	1.174	1.174	8	0
S	020-99-0074	**0.061**	1.560	1.960	2.030	0.790	0.015	0.790	0.024	0.037	0.019	0.070	0.007	0.312	0.392	0.406	0.026	0.001	0.023	0.001	0.001	0.003	0.002	1.173	1.173	7	0
S	020-99-0075	**0.007**	1.810	1.390	2.060	0.560	0.060	0.500	0.025	-0.016	0.100	0.460	0.001	0.362	0.278	0.412	0.019	0.002	0.014	0.001	0.000	0.018	0.013	1.119	1.119	4	0
S	020-99-0076	**0.057**	1.620	1.450	1.370	0.800	-0.008	1.020	0.090	0.015	0.150	0.330	0.006	0.324	0.290	0.274	0.027	0.000	0.029	0.002	0.000	0.028	0.009	0.989	0.989	2	0
S	020-99-0077	**0.077**	1.920	1.820	1.820	0.520	0.060	0.580	0.025	0.054	0.072	0.080	0.008	0.384	0.364	0.364	0.017	0.002	0.017	0.001	0.002	0.013	0.002	1.174	1.174	9	0
S	020-99-0078	**0.089**	2.840	1.910	1.810	0.750	0.090	0.890	-0.042	-0.021	0.009	0.840	0.010	0.568	0.382	0.362	0.025	0.003	0.025	-0.001	-0.001	0.002	0.023	1.398	1.398	16	0
S	020-99-0079	**0.054**	1.980	2.180	1.650	0.320	0.026	0.650	0.016	0.036	0.025	0.180	0.008	0.396	0.436	0.330	0.011	0.001	0.019	0.000	0.001	0.005	0.005	1.209	1.209	10	0
S	020-99-0080	**0.060**	2.550	2.110	2.840	0.910	0.090	0.860	0.033	-0.003	-0.016	0.190	0.007	0.510	0.422	0.568	0.030	0.003	0.025	0.001	0.000	-0.003	0.005	1.568	1.568	28	0
S	020-99-0081	**0.078**	1.990	1.260	1.870	0.670	0.068	0.780	0.035	0.015	0.083	0.520	0.008	0.398	0.252	0.374	0.022	0.002	0.022	0.001	0.000	0.015	0.014	1.110	1.110	3	0
S	020-99-0082	**0.790**	1.760	1.670	1.540	0.650	0.070	0.600	0.058	0.000	0.056	0.350	0.086	0.356	0.334	0.308	0.022	0.002	0.017	0.002	0.000	0.010	0.010	1.147	1.147	6	0
S	020-99-0083	**0.006**	1.300	1.250	1.680	2.110	0.200	2.060	**0.009**	**0.018**	0.010	0.140	0.001	0.260	0.250	0.336	0.070	0.007	0.059	0.000	0.001	0.002	0.004	0.989	0.989	1	0
S	020-99-0084	**0.100**	2.390	2.100	2.340	1.040	0.070	0.970	0.140	-0.035	0.190	0.210	0.011	0.478	0.420	0.468	0.035	0.002	0.028	0.004	-0.001	0.035	0.006	1.485	1.485	20	0
S	020-99-0085	**0.480**	3.000	1.780	2.100	0.500	0.022	0.590	0.026	-0.003	0.081	0.150	0.052	0.600	0.356	0.420	0.017	0.001	0.017	0.001	0.000	0.015	0.004	1.482	1.482	19	0
R	RH002	0.045	0.830	0.730	0.810	0.650	0.050	0.580	0.000	0.000	0.000	0.020	0.005	0.166	0.146	0.162	0.022	0.002	0.017	0.000	0.000	0.000	0.001	0.519	1.519	24	24
R	RH003	0.016	1.200	1.100	1.200	1.000	0.060	0.990	0.000	0.000	0.000	-0.010	0.002	0.240	0.220	0.240	0.033	0.002	0.028	0.000	0.000	0.000	0.000	0.765	1.765	37	37
R	RH004	0.010	0.670	0.470	0.670	1.000	0.050	0.940	0.000	0.000	0.000	-0.020	0.001	0.134	0.094	0.134	0.033	0.002	0.027	0.000	0.000	0.000	-0.001	0.424	1.424	18	18
R	RH005	0.009	1.100	1.400	0.890	0.410	0.030	0.460	0.000	0.000	0.000	0.010	0.001	0.220	0.280	0.178	0.014	0.001	0.013	0.000	0.000	0.000	0.000	0.707	1.707	35	35
R	RH006	0.150	1.100	0.970	0.960	1.000	0.067	0.980	0.000	0.010	0.000	0.030	0.016	0.220	0.194	0.192	0.033	0.002	0.028	0.000	0.000	0.000	0.001	0.687	1.687	34	34
R	RH007	0.089	1.000	0.920	1.100	1.000	0.070	1.100	0.000	0.010	0.000	-0.010	0.010	0.200	0.184	0.220	0.033	0.002	0.031	0.000	0.000	0.000	0.000	0.681	1.681	33	33
R	RH011	0.026	1.000	0.850	1.000	0.880	0.070	0.770	0.000	0.000	0.000	-0.090	0.003	0.200	0.170	0.200	0.029	0.002	0.022	0.000	0.000	0.000	-0.003	0.624	1.624	31	31
R	RH012	0.015	0.930	0.570	0.910	0.580	0.030	0.610	0.030	0.000	0.000	-0.060	0.002	0.186	0.114	0.182	0.019	0.001	0.017	0.001	0.000	0.000	-0.002	0.520	1.520	25	25
R	RH013	0.012	0.830	0.690	0.920	0.440	0.030	0.420	0.010	0.000	0.000	-0.080	0.001	0.166	0.138	0.184	0.015	0.001	0.012	0.000	0.000	0.000	-0.002	0.515	1.515	23	23
R	RH014	0.034	0.920	0.580	0.980	0.430	0.030	0.520	0.000	0.000	0.000	-0.030	0.004	0.184	0.116	0.196	0.014	0.001	0.015	0.000	0.000	0.000	-0.001	0.529	1.529	26	26
R	RH015	0.008	1.000	0.550	0.830	0.540	0.030	0.680	0.000	0.000	0.000	-0.040	0.001	0.200	0.110	0.166	0.018	0.001	0.019	0.000	0.000	0.000	-0.001	0.514	1.514	22	22
R	RH016	0.013	0.870	0.560	0.870	0.570	0.030	0.500	-0.010	0.000	0.000	-0.040	0.001	0.174	0.112	0.174	0.019	0.001	0.014	0.000	0.000	0.000	-0.001	0.494	1.494	21	21
R	RH021	0.008	0.880	0.830	1.000	0.570	0.030	0.550	0.000	0.000	0.000	-0.030	0.001	0.176	0.166	0.200	0.019	0.001	0.016	0.000	0.000	0.000	-0.001	0.578	1.578	29	29
R	RH025	0.007	0.700	0.590	0.540	0.490	0.030	0.510	0.000	0.000	0.000	0.000	0.001	0.140	0.118	0.108	0.016	0.001	0.015	0.000	0.000	0.000	0.000	0.399	1.399	17	17
R	RH026	0.007	0.870	0.700	0.980	0.790	0.060	0.880	0.000	0.000	0.000	-0.050	0.001	0.174	0.140	0.196	0.026	0.002	0.025	0.000	0.000	0.000	-0.001	0.563	1.563	27	27
R	RH030	0.014	1.200	0.710	1.000	0.730	0.040	0.660	0.000	0.000	0.000	-0.070	0.002	0.240	0.142	0.200	0.024	0.001	0.019	0.000	0.000	0.000	-0.002	0.627	1.627	32	32
R	RH031	0.013	1.300	1.000	1.500	0.720	0.050	0.670	0.010	0.010	0.000	-0.010	0.001	0.260	0.200	0.300	0.024	0.002	0.019	0.000	0.000	0.000	0.000	0.806	1.806	38	38
R	RH032	0.011	0.660	0.350	0.790	0.360	0.010	0.370	0.010	0.010	0.000	-0.090	0.001	0.132	0.070	0.158	0.012	0.000	0.011	0.000	0.000	0.000	-0.003	0.382	1.382	14	14
R	RH033	0.080	0.710	1.200	0.660	0.900	0.060	0.860	0.000	0.000	0.000	0.010	0.009	0.142	0.240	0.132	0.030	0.002	0.025	0.000	0.000	0.000	0.000	0.580	1.580	30	30
R	RH036	0.150	0.440	0.420	0.540	0.770	0.030	0.740	0.010	0.000	0.000	0.010	0.016	0.088	0.084	0.108	0.026	0.001	0.021	0.000	0.000	0.000	0.000	0.345	1.345	11	11
R	RH041	0.100	0.520	0.490	0.490	0.800	0.050	0.800	0.000	0.000	0.000	0.040	0.011	0.104	0.098	0.098	0.027	0.002	0.023	0.000	0.000	0.000	0.001	0.363	1.363	13	13
R	RH045	0.180	0.430	0.480	0.440	0.940	0.030	0.990	-0.010	0.020	0.000	0.040	0.020	0.086	0.096	0.088	0.031	0.001	0.028	0.000	0.001	0.000	0.001	0.352	1.352	12	12
R	RH047	0.036	0.500	0.490	0.660	0.930	0.060	0.900	-0.010	-0.010	0.000	0.040	0.004	0.100	0.098	0.132	0.031	0.002	0.026	0.000	0.000	0.000	0.001	0.394	1.394	15	15
R	RH048	0.100	1.200	1.100	1.100	0.900	0.050	0.910	0.000	0.010	0.000	0.000	0.011	0.240	0.220	0.220	0.030	0.002	0.026	0.000	0.000	0.000	0.000	0.749	1.749	36	36

Sum of Ranks = WRSR =	603
Survey unit sample number = n =	14
Reference area sample number = m =	24
α =	0.05
z =	1.645
Critical Value WRSC =	522

Critical Value < Sum of Ranks

Table D8: Area 4020 Soil Sampling
Wilcoxon Rank Sum Test

Survey Unit 1

		Soil Concentrations (pCi/g)											Isotopic Fractions (concentration/DCGL)										Sum of Fractions	Adjusted Reference	Rank	Reference Area Rank
		Cs-137	Th-228	Th-230	Th-232	U-234	U-235	U-238	Pu-238	Pu-239	Am-241	Sr-90	Cs-137	Th-228	Th-230	Th-232	U-234	U-235	U-238	Pu-238	Pu-239	Am-241	Sr-90				
Sample Type	Soil I.D.	9.2	5	5	5	30	30	35	37.2	33.9	5.44	35														
S	020-99-0001	0.120	1.500	0.900	1.480	0.690	0.058	1.240	0.053	0.011	0.021	1.050	0.013	0.300	0.180	0.296	0.023	0.002	0.035	0.001	0.000	0.004	0.029	0.884	0.884	9	0
S	020-99-0002	0.120	1.570	1.110	1.140	0.780	0.100	0.760	0.071	0.009	0.059	0.380	0.013	0.314	0.222	0.228	0.026	0.003	0.022	0.002	0.000	0.011	0.011	0.852	0.852	7	0
S	020-99-0003	0.110	1.660	0.800	1.430	0.490	0.100	0.620	0.110	0.016	0.051	0.070	0.012	0.332	0.160	0.286	0.016	0.003	0.015	0.003	0.000	0.009	0.002	0.839	0.839	6	0
S	020-99-0004	0.150	1.450	0.920	1.240	0.500	0.019	0.740	0.013	0.003	0.026	0.590	0.016	0.290	0.184	0.248	0.017	0.001	0.021	0.000	0.000	0.005	0.016	0.798	0.798	4	0
S	020-99-0005	0.125	1.860	0.590	1.540	0.590	0.000	0.540	0.034	0.020	0.080	0.170	0.014	0.372	0.118	0.308	0.020	0.000	0.015	0.001	0.001	0.015	0.005	0.868	0.868	8	0
S	020-99-0006	0.105	1.590	0.960	1.180	0.530	-0.008	0.500	0.042	-0.006	0.011	0.240	0.011	0.318	0.192	0.236	0.018	0.000	0.014	0.001	0.000	0.002	0.007	0.799	0.799	5	0
S	020-99-0007	0.135	1.060	1.060	1.160	0.490	0.012	0.690	0.007	0.000	0.019	0.320	0.015	0.212	0.212	0.232	0.016	0.000	0.025	0.000	0.000	0.003	0.009	0.725	0.725	2	0
S	020-99-0008	0.115	2.710	1.050	2.250	0.460	0.020	0.380	0.100	0.100	0.052	0.170	0.013	0.542	0.210	0.450	0.015	0.001	0.011	0.003	0.003	0.010	0.005	1.261	1.261	12	0
S	020-99-0009	0.095	2.860	0.770	2.680	0.340	0.081	0.420	0.093	0.030	-0.017	0.090	0.010	0.572	0.154	0.536	0.011	0.003	0.012	0.003	0.001	-0.003	0.003	1.301	1.301	13	0
S	020-99-0010	0.130	1.600	1.140	1.380	0.470	0.006	0.420	0.030	0.056	0.064	0.240	0.014	0.320	0.228	0.276	0.016	0.000	0.012	0.001	0.002	0.012	0.007	0.887	0.887	11	0
S	020-99-0011	0.120	1.820	1.300	1.180	0.290	-0.009	0.480	0.063	0.048	0.054	22.600	0.013	0.364	0.260	0.236	0.010	0.000	0.014	0.002	0.001	0.010	0.628	1.537	1.537	27	0
S	020-99-0012	0.095	0.980	0.840	1.120	0.520	0.150	0.490	0.070	0.010	0.006	0.112	0.010	0.196	0.168	0.224	0.017	0.005	0.014	0.002	0.000	0.001	0.003	0.641	0.641	1	0
S	020-99-0013	0.180	1.200	0.930	1.160	0.930	0.050	1.100	0.026	0.006	0.090	0.010	0.020	0.240	0.186	0.232	0.031	0.002	0.031	0.001	0.000	0.017	0.000	0.759	0.759	3	0
S	020-99-0014	0.240	1.110	1.380	1.430	0.580	0.110	0.860	-0.012	0.000	0.030	0.850	0.026	0.222	0.276	0.286	0.019	0.004	0.025	0.000	0.000	0.006	0.024	0.886	0.886	10	0
R	RH002	0.045	0.830	0.730	0.810	0.650	0.050	0.580	0.000	0.000	0.000	0.020	0.005	0.166	0.146	0.162	0.022	0.002	0.017	0.000	0.000	0.000	0.001	0.519	1.519	24	24
R	RH003	0.016	1.200	1.100	1.200	1.000	0.060	0.990	0.000	0.000	0.000	-0.010	0.002	0.240	0.220	0.240	0.033	0.002	0.028	0.000	0.000	0.000	0.000	0.765	1.765	37	37
R	RH004	0.010	0.670	0.470	0.670	1.000	0.050	0.940	0.000	0.000	0.000	-0.020	0.001	0.134	0.094	0.134	0.033	0.002	0.027	0.000	0.000	0.000	-0.001	0.424	1.424	20	20
R	RH005	0.009	1.100	1.400	0.890	0.410	0.030	0.460	0.000	0.000	0.000	0.010	0.001	0.220	0.280	0.178	0.014	0.001	0.013	0.000	0.000	0.000	0.000	0.707	1.707	35	35
R	RH006	0.150	1.100	0.970	0.960	1.000	0.067	0.980	0.000	0.010	0.000	0.030	0.016	0.220	0.194	0.192	0.033	0.002	0.028	0.000	0.000	0.000	0.001	0.687	1.687	34	34
R	RH007	0.089	1.000	0.920	1.100	1.000	0.070	1.100	0.000	0.010	0.000	-0.010	0.010	0.200	0.184	0.220	0.033	0.002	0.031	0.000	0.000	0.000	0.000	0.681	1.681	33	33
R	RH011	0.026	1.000	0.850	1.000	0.880	0.070	0.770	0.000	0.000	0.000	-0.090	0.003	0.200	0.170	0.200	0.029	0.002	0.022	0.000	0.000	0.000	-0.003	0.624	1.624	31	31
R	RH012	0.015	0.930	0.570	0.910	0.580	0.030	0.610	0.030	0.000	0.000	-0.060	0.002	0.186	0.114	0.182	0.019	0.001	0.017	0.001	0.000	0.000	-0.002	0.520	1.520	25	25
R	RH013	0.012	0.830	0.690	0.920	0.440	0.030	0.420	0.010	0.000	0.000	-0.080	0.001	0.166	0.138	0.184	0.015	0.001	0.012	0.000	0.000	0.000	-0.002	0.515	1.515	23	23
R	RH014	0.034	0.920	0.560	0.980	0.430	0.030	0.520	0.000	0.000	0.000	-0.030	0.004	0.184	0.116	0.196	0.014	0.001	0.015	0.000	0.000	0.000	-0.001	0.529	1.529	26	26
R	RH015	0.008	1.000	0.550	0.830	0.540	0.030	0.680	0.000	0.000	0.000	-0.040	0.001	0.200	0.110	0.166	0.018	0.001	0.019	0.000	0.000	0.000	-0.001	0.514	1.514	22	22
R	RH016	0.013	0.870	0.560	0.870	0.570	0.030	0.500	-0.010	0.000	0.000	-0.040	0.001	0.174	0.112	0.174	0.019	0.001	0.014	0.000	0.000	0.000	-0.001	0.494	1.494	21	21
R	RH021	0.008	0.880	0.830	1.000	0.570	0.030	0.550	0.000	0.000	0.000	-0.030	0.001	0.176	0.166	0.200	0.019	0.001	0.016	0.000	0.000	0.000	-0.001	0.578	1.578	29	29
R	RH025	0.007	0.700	0.590	0.540	0.490	0.030	0.510	0.000	0.000	0.000	0.000	0.001	0.140	0.118	0.108	0.016	0.001	0.015	0.000	0.000	0.000	0.000	0.399	1.399	19	19
R	RH026	0.007	0.870	0.700	0.980	0.790	0.060	0.880	0.000	0.000	0.000	-0.050	0.001	0.174	0.140	0.196	0.026	0.002	0.025	0.000	0.000	0.000	-0.001	0.563	1.563	28	28
R	RH030	0.014	1.200	0.710	1.000	0.730	0.040	0.680	0.000	0.000	0.000	-0.070	0.002	0.240	0.142	0.200	0.024	0.001	0.019	0.000	0.000	0.000	-0.002	0.627	1.627	32	32
R	RH031	0.013	1.300	1.000	1.500	0.720	0.050	0.670	0.010	0.010	0.000	-0.010	0.001	0.260	0.200	0.300	0.024	0.002	0.019	0.000	0.000	0.000	0.000	0.806	1.806	38	38
R	RH032	0.011	0.660	0.350	0.790	0.360	0.010	0.370	0.010	0.010	0.000	-0.090	0.001	0.132	0.070	0.158	0.012	0.000	0.011	0.000	0.000	0.000	-0.003	0.382	1.382	17	17
R	RH033	0.080	0.710	1.200	0.660	0.900	0.060	0.860	0.000	0.000	0.000	0.010	0.009	0.142	0.240	0.132	0.030	0.002	0.025	0.000	0.000	0.000	0.000	0.680	1.680	30	30
R	RH036	0.150	0.440	0.420	0.540	0.770	0.030	0.740	0.010	0.000	0.000	0.010	0.016	0.088	0.084	0.108	0.026	0.001	0.021	0.000	0.000	0.000	0.000	0.345	1.345	14	14
R	RH041	0.100	0.520	0.490	0.490	0.800	0.050	0.800	0.000	0.000	0.000	0.040	0.011	0.104	0.098	0.098	0.027	0.002	0.023	0.000	0.000	0.000	0.001	0.363	1.363	16	16
R	RH046	0.180	0.430	0.480	0.440	0.940	0.030	0.990	-0.010	0.020	0.000	0.040	0.020	0.086	0.096	0.088	0.031	0.001	0.028	0.000	0.001	0.000	0.001	0.352	1.352	15	15
R	RH047	0.036	0.500	0.490	0.660	0.930	0.060	0.900	-0.010	-0.010	0.000	0.040	0.004	0.100	0.098	0.132	0.031	0.002	0.026	0.000	0.000	0.000	0.001	0.394	1.394	18	18
R	RH048	0.100	1.200	1.100	1.100	0.900	0.050	0.910	0.000	0.010	0.000	0.000	0.011	0.240	0.220	0.220	0.030	0.002	0.026	0.000	0.000	0.000	0.000	0.748	1.749	36	36

Sum of Ranks = WRSR =	623
Survey unit sample number = n =	14
Reference area sample number = m =	24
α =	0.05
z =	1.645
WRSC =	522

Table D9: Area 4020 Soil Sampling
Wilcoxon Rank Sum Test

Survey Unit 2

		Soil Concentrations (pCi/g)											Isotopic Fractions (concentration/DCGL)											Sum of Fractions	Adjusted Reference	Rank	Reference Area Rank
		Cs-137	Th-228	Th-230	Th-232	U-234	U-235	U-238	Pu-238	Pu-239	Am-241	Sr-90	Cs-137	Th-228	Th-230	Th-232	U-234	U-235	U-238	Pu-238	Pu-239	Am-241	Sr-90				
Sample Type	Soil I.D.	9.2	5	5	5	30	30	35	37.2	33.9	5.44	36															
S	020-99-0015	0.095	1.190	1.190	1.190	1.000	0.090	1.160	0.078	0.018	0.080	0.430	0.010	0.238	0.238	0.238	0.033	0.003	0.033	0.002	0.001	0.015	0.012	0.823	0.823	5	0
S	020-99-0016	0.145	1.470	1.110	1.110	0.570	0.018	0.590	0.100	0.070	0.004	0.230	0.016	0.294	0.222	0.222	0.019	0.001	0.017	0.003	0.002	0.001	0.006	0.802	0.802	3	0
S	020-99-0017	0.125	1.500	0.910	1.180	0.620	-0.006	0.620	0.100	0.033	0.016	0.170	0.014	0.300	0.182	0.236	0.021	0.000	0.018	0.003	0.001	0.003	0.005	0.781	0.781	2	0
S	020-99-0018	0.140	1.570	1.430	1.810	0.700	0.041	0.750	0.066	0.024	0.007	0.090	0.015	0.314	0.286	0.362	0.023	0.001	0.021	0.002	0.001	0.001	0.003	1.030	1.030	10	0
S	020-99-0019	0.120	1.340	0.650	0.780	0.660	0.078	0.690	0.080	0.100	0.057	0.190	0.013	0.268	0.130	0.156	0.022	0.003	0.020	0.002	0.003	0.010	0.005	0.632	0.632	1	0
S	020-99-0020	0.120	1.560	1.260	1.790	0.680	0.022	0.730	0.047	0.007	0.049	0.400	0.013	0.316	0.256	0.358	0.023	0.001	0.021	0.001	0.000	0.009	0.011	1.009	1.009	8	0
S	020-99-0021	0.180	1.940	1.170	1.620	0.800	0.040	0.580	0.021	0.005	-0.003	0.250	0.020	0.388	0.234	0.324	0.027	0.001	0.017	0.001	0.000	-0.001	0.007	1.017	1.017	9	0
S	020-99-0022	0.150	2.550	1.300	2.260	0.480	0.000	0.820	0.002	0.005	0.033	0.050	0.016	0.510	0.260	0.452	0.016	0.000	0.023	0.000	0.000	0.006	0.001	1.285	1.285	14	0
S	020-99-0023	0.145	2.270	1.180	1.870	0.630	0.074	0.520	-0.026	0.015	0.072	0.220	0.016	0.454	0.236	0.374	0.021	0.002	0.015	-0.001	0.000	0.013	0.006	1.137	1.137	13	0
S	020-99-0024	0.135	1.150	1.130	1.540	0.600	0.045	0.730	0.037	0.000	0.012	-0.060	0.015	0.230	0.226	0.308	0.020	0.002	0.021	0.001	0.000	0.002	-0.002	0.823	0.823	4	0
S	020-99-0025	0.100	1.990	1.680	1.460	0.690	-0.010	0.600	0.041	0.010	-0.023	0.110	0.011	0.398	0.336	0.292	0.023	0.000	0.017	0.001	0.000	-0.004	0.003	1.077	1.077	12	0
S	020-99-0026	0.110	1.890	1.470	1.480	0.650	0.043	0.760	0.180	0.013	0.011	0.110	0.012	0.378	0.294	0.296	0.022	0.001	0.022	0.005	0.000	0.002	0.003	1.035	1.035	11	0
S	020-99-0027	0.110	1.470	1.200	1.190	0.630	-0.013	0.550	0.075	0.006	0.049	0.300	0.012	0.294	0.240	0.238	0.021	0.000	0.016	0.002	0.000	0.009	0.008	0.840	0.840	6	0
S	020-99-0028	0.090	1.390	1.120	1.710	0.790	0.000	0.640	0.012	-0.003	0.035	0.100	0.010	0.278	0.224	0.342	0.026	0.000	0.018	0.000	0.000	0.006	0.003	0.908	0.908	7	0
R	RH002	0.045	0.830	0.730	0.810	0.650	0.050	0.580	0.000	0.000	0.000	0.020	0.005	0.166	0.146	0.162	0.022	0.002	0.017	0.000	0.000	0.000	0.001	0.519	1.519	25	25
R	RH003	0.016	1.200	1.100	1.200	1.000	0.060	0.990	0.000	0.000	0.000	-0.010	0.002	0.240	0.220	0.240	0.033	0.002	0.028	0.000	0.000	0.000	0.000	0.765	1.765	37	37
R	RH004	0.010	0.670	0.470	0.670	1.000	0.050	0.940	0.000	0.000	0.000	-0.020	0.001	0.134	0.094	0.134	0.033	0.002	0.027	0.000	0.000	0.000	-0.001	0.424	1.424	21	21
R	RH005	0.009	1.100	1.400	0.890	0.410	0.030	0.460	0.000	0.000	0.000	0.010	0.001	0.220	0.280	0.178	0.014	0.001	0.013	0.000	0.000	0.000	0.000	0.707	1.707	35	35
R	RH006	0.150	1.100	0.970	0.960	1.000	0.067	0.980	0.000	0.010	0.000	0.030	0.016	0.220	0.194	0.192	0.033	0.002	0.028	0.000	0.000	0.000	0.001	0.687	1.687	34	34
R	RH007	0.089	1.000	0.920	1.100	1.000	0.070	1.100	0.000	0.010	0.000	-0.010	0.010	0.200	0.184	0.220	0.033	0.002	0.031	0.000	0.000	0.000	0.000	0.681	1.681	33	33
R	RH011	0.026	1.000	0.850	1.000	0.880	0.070	0.770	0.000	0.000	0.000	-0.090	0.003	0.200	0.170	0.200	0.029	0.002	0.022	0.000	0.000	0.000	-0.003	0.624	1.624	31	31
R	RH012	0.015	0.930	0.570	0.910	0.580	0.030	0.610	0.030	0.000	0.000	-0.060	0.002	0.186	0.114	0.182	0.019	0.001	0.017	0.001	0.000	0.000	-0.002	0.520	1.520	26	26
R	RH013	0.012	0.830	0.690	0.920	0.440	0.030	0.420	0.010	0.000	0.000	-0.080	0.001	0.166	0.138	0.184	0.015	0.001	0.012	0.000	0.000	0.000	-0.002	0.515	1.515	24	24
R	RH014	0.034	0.920	0.580	0.980	0.430	0.030	0.520	0.000	0.000	0.000	-0.030	0.004	0.184	0.116	0.196	0.014	0.001	0.015	0.000	0.000	0.000	-0.001	0.529	1.529	27	27
R	RH015	0.008	1.000	0.550	0.830	0.540	0.030	0.680	0.000	0.000	0.000	-0.040	0.001	0.200	0.110	0.166	0.016	0.001	0.019	0.000	0.000	0.000	-0.001	0.514	1.514	23	23
R	RH016	0.013	0.870	0.560	0.870	0.570	0.030	0.500	-0.010	0.000	0.000	-0.040	0.001	0.174	0.112	0.174	0.019	0.001	0.014	0.000	0.000	0.000	-0.001	0.494	1.494	22	22
R	RH021	0.008	0.880	0.830	1.000	0.570	0.030	0.550	0.000	0.000	0.000	-0.030	0.001	0.176	0.166	0.200	0.019	0.001	0.016	0.000	0.000	0.000	-0.001	0.576	1.576	29	29
R	RH025	0.007	0.700	0.590	0.540	0.490	0.030	0.510	0.000	0.000	0.000	0.000	0.001	0.140	0.118	0.108	0.016	0.001	0.015	0.000	0.000	0.000	0.000	0.399	1.399	20	20
R	RH026	0.007	0.870	0.700	0.980	0.790	0.060	0.880	0.000	0.000	0.000	-0.050	0.001	0.174	0.140	0.196	0.026	0.002	0.025	0.000	0.000	0.000	-0.001	0.563	1.563	28	28
R	RH030	0.014	1.200	0.710	1.000	0.730	0.040	0.680	0.000	0.000	0.000	-0.070	0.002	0.240	0.142	0.200	0.024	0.001	0.019	0.000	0.000	0.000	-0.002	0.627	1.627	32	32
R	RH031	0.013	1.300	1.000	1.500	0.720	0.050	0.670	0.010	0.010	0.000	-0.010	0.001	0.260	0.200	0.300	0.024	0.002	0.019	0.000	0.000	0.000	0.000	0.806	1.806	38	38
R	RH032	0.011	0.660	0.350	0.790	0.360	0.010	0.370	0.010	0.010	0.000	-0.090	0.001	0.132	0.070	0.158	0.012	0.000	0.011	0.000	0.000	0.000	-0.003	0.382	1.382	18	18
R	RH033	0.080	0.710	1.200	0.660	0.900	0.060	0.860	0.000	0.000	0.000	0.010	0.009	0.142	0.240	0.132	0.030	0.002	0.025	0.000	0.000	0.000	0.000	0.580	1.580	30	30
R	RH036	0.150	0.440	0.420	0.540	0.770	0.030	0.740	0.010	0.000	0.000	0.010	0.016	0.088	0.084	0.108	0.026	0.001	0.021	0.000	0.000	0.000	0.000	0.345	1.345	15	15
R	RH041	0.100	0.520	0.490	0.490	0.800	0.050	0.800	0.000	0.000	0.000	0.040	0.011	0.104	0.098	0.098	0.027	0.002	0.023	0.000	0.000	0.000	0.001	0.363	1.363	17	17
R	RH046	0.180	0.430	0.480	0.440	0.940	0.030	0.990	-0.010	0.020	0.000	0.040	0.020	0.086	0.096	0.088	0.031	0.001	0.028	0.000	0.001	0.000	0.001	0.352	1.352	16	16
R	RH047	0.036	0.500	0.490	0.660	0.930	0.060	0.900	-0.010	-0.010	0.000	0.040	0.004	0.100	0.098	0.132	0.031	0.002	0.026	0.000	0.000	0.000	0.001	0.394	1.394	19	19
R	RH048	0.100	1.200	1.100	1.100	0.900	0.050	0.910	0.000	0.010	0.000	0.000	0.011	0.240	0.220	0.220	0.030	0.002	0.026	0.000	0.000	0.000	0.000	0.749	1.749	36	36

Sum of Ranks = WRSR = 636
Survey unit sample number = n = 14
Reference area sample number = m = 24
α = 0.05
z = 1.645
WRSC = 522
Critical Value < Sum of Ranks

Table D10: Area 4020 Soil Sampling
Wilcoxon Rank Sum Test

Survey Unit 3

		Soil Concentrations (pCi/g)											Isotopic Fractions (concentration/DCGL)											Sum of Fractions	Adjusted Reference	Rank	Reference Area Rank
		Cs-137	Th-228	Th-230	Th-232	U-234	U-235	U-238	Pu-238	Pu-239	Am-241	Sr-90	Cs-137	Th-228	Th-230	Th-232	U-234	U-235	U-238	Pu-238	Pu-239	Am-241	Sr-90				
Sample Type	Soil I.D.	9.2	5	5	5	30	30	35	37.2	33.9	5.44	36															
S	020-99-0029	0.130	1.960	1.160	2.150	0.670	0.024	0.750	0.074	0.014	0.029	0.050	0.014	0.392	0.232	0.430	0.022	0.001	0.021	0.002	0.000	0.005	0.001	1.122	1.122	10	0
S	020-99-0030	0.120	2.340	1.500	1.890	0.500	0.035	0.670	0.036	0.020	0.003	0.250	0.013	0.468	0.300	0.378	0.017	0.001	0.019	0.001	0.001	0.001	0.007	1.205	1.205	11	0
S	020-99-0031	0.145	1.210	1.090	1.150	0.650	0.000	0.480	0.230	0.017	0.032	0.000	0.016	0.242	0.218	0.230	0.022	0.000	0.014	0.006	0.001	0.006	0.000	0.754	0.754	1	0
S	020-99-0032	0.120	1.470	0.830	1.560	0.560	0.074	0.870	0.014	-0.002	0.020	0.120	0.013	0.294	0.166	0.312	0.019	0.002	0.025	0.000	0.000	0.004	0.003	0.838	0.838	3	0
S	020-99-0033	0.135	1.870	1.020	1.920	0.650	0.270	0.650	0.180	0.016	0.025	0.130	0.015	0.374	0.204	0.384	0.022	0.009	0.019	0.005	0.000	0.005	0.004	1.039	1.039	6	0
S	020-99-0034	0.125	2.000	1.090	1.830	0.570	0.033	0.550	0.006	0.015	0.039	0.200	0.014	0.400	0.218	0.366	0.019	0.001	0.016	0.000	0.000	0.007	0.006	1.047	1.047	7	0
S	020-99-0035	0.155	1.770	1.230	2.190	0.690	0.040	0.590	0.130	0.007	-0.031	0.080	0.017	0.354	0.246	0.438	0.023	0.001	0.017	0.003	0.000	-0.006	0.002	1.096	1.096	8	0
S	020-99-0036	0.155	1.540	0.740	1.490	0.600	0.040	0.550	0.009	0.015	0.026	0.180	0.017	0.308	0.148	0.298	0.020	0.001	0.016	0.000	0.000	0.005	0.005	0.818	0.818	2	0
S	020-99-0037	0.160	1.290	1.300	1.200	0.970	0.043	0.560	0.002	0.013	0.058	0.170	0.017	0.258	0.260	0.240	0.032	0.001	0.016	0.000	0.000	0.011	0.005	0.841	0.841	4	0
S	020-99-0038	0.140	2.310	1.180	2.440	0.820	-0.021	0.580	0.180	-0.003	0.055	0.180	0.015	0.462	0.236	0.488	0.027	-0.001	0.017	0.005	0.000	0.010	0.005	1.264	1.264	12	0
S	020-99-0039	0.160	1.380	1.780	1.940	0.660	0.130	0.520	0.110	0.060	0.069	0.640	0.017	0.276	0.356	0.388	0.022	0.004	0.015	0.003	0.002	0.013	0.018	1.114	1.114	9	0
S	020-99-0040	0.110	1.470	1.370	1.550	0.530	0.130	0.760	0.045	0.005	0.044	0.330	0.012	0.294	0.274	0.310	0.018	0.004	0.022	0.001	0.000	0.008	0.009	0.952	0.952	5	0
S	020-99-0041	0.155	2.070	2.000	1.930	0.720	0.010	0.910	0.052	0.046	0.049	0.130	0.017	0.414	0.400	0.386	0.024	0.000	0.026	0.001	0.001	0.009	0.004	1.283	1.283	13	0
S	020-99-0042	0.115	2.250	1.940	2.650	0.020	-0.008	0.000	0.190	0.006	0.003	0.050	0.013	0.450	0.388	0.530	0.001	0.000	0.000	0.005	0.000	0.001	0.001	1.388	1.388	18	0
R	RH002	0.045	0.830	0.730	0.810	0.650	0.050	0.580	0.000	0.000	0.000	0.020	0.005	0.166	0.146	0.162	0.022	0.002	0.017	0.000	0.000	0.000	0.001	0.519	1.519	25	25
R	RH003	0.016	1.200	1.100	1.200	1.000	0.060	0.990	0.000	0.000	0.000	-0.010	0.002	0.240	0.220	0.240	0.033	0.002	0.028	0.000	0.000	0.000	0.000	0.765	1.765	37	37
R	RH004	0.010	0.670	0.470	0.670	1.000	0.050	0.940	0.000	0.000	0.000	-0.020	0.001	0.134	0.094	0.134	0.033	0.002	0.027	0.000	0.000	0.000	-0.001	0.424	1.424	21	21
R	RH005	0.009	1.100	1.400	0.890	0.410	0.030	0.460	0.000	0.000	0.000	0.010	0.001	0.220	0.280	0.178	0.014	0.001	0.013	0.000	0.000	0.000	0.000	0.707	1.707	35	35
R	RH006	0.150	1.100	0.970	0.960	1.000	0.067	0.980	0.000	0.010	0.000	0.030	0.016	0.220	0.194	0.192	0.033	0.002	0.028	0.000	0.000	0.000	0.001	0.687	1.687	34	34
R	RH007	0.089	1.000	0.920	1.100	1.000	0.070	1.100	0.000	0.010	0.000	-0.010	0.010	0.200	0.184	0.220	0.033	0.002	0.031	0.000	0.000	0.000	0.000	0.681	1.681	33	33
R	RH011	0.026	1.000	0.850	1.000	0.880	0.070	0.770	0.000	0.000	0.000	-0.090	0.003	0.200	0.170	0.200	0.029	0.002	0.022	0.000	0.000	0.000	-0.003	0.624	1.624	31	31
R	RH012	0.015	0.930	0.570	0.910	0.580	0.030	0.610	0.030	0.000	0.000	-0.060	0.002	0.186	0.114	0.182	0.019	0.001	0.017	0.001	0.000	0.000	-0.002	0.520	1.520	26	26
R	RH013	0.012	0.830	0.690	0.920	0.440	0.030	0.420	0.010	0.000	0.000	-0.080	0.001	0.166	0.138	0.184	0.015	0.001	0.012	0.000	0.000	0.000	-0.002	0.515	1.515	24	24
R	RH014	0.034	0.920	0.580	0.980	0.430	0.030	0.520	0.000	0.000	0.000	-0.030	0.004	0.184	0.116	0.196	0.014	0.001	0.015	0.000	0.000	0.000	-0.001	0.529	1.529	27	27
R	RH015	0.008	1.000	0.550	0.830	0.540	0.030	0.680	0.000	0.000	0.000	-0.040	0.001	0.200	0.110	0.166	0.018	0.001	0.019	0.000	0.000	0.000	-0.001	0.514	1.514	23	23
R	RH016	0.013	0.870	0.560	0.870	0.570	0.030	0.500	-0.010	0.000	0.000	-0.040	0.001	0.174	0.112	0.174	0.019	0.001	0.014	0.000	0.000	0.000	-0.001	0.494	1.494	22	22
R	RH021	0.008	0.880	0.830	1.000	0.570	0.030	0.550	0.000	0.000	0.000	-0.030	0.001	0.176	0.166	0.200	0.019	0.001	0.016	0.000	0.000	0.000	-0.001	0.578	1.578	29	29
R	RH025	0.007	0.700	0.590	0.540	0.490	0.030	0.510	0.000	0.000	0.000	0.000	0.001	0.140	0.118	0.108	0.016	0.001	0.015	0.000	0.000	0.000	0.000	0.399	1.399	20	20
R	RH026	0.007	0.870	0.700	0.980	0.790	0.060	0.880	0.000	0.000	0.000	-0.050	0.001	0.174	0.140	0.196	0.026	0.002	0.025	0.000	0.000	0.000	-0.001	0.563	1.563	28	28
R	RH030	0.014	1.200	0.710	1.000	0.730	0.040	0.680	0.000	0.000	0.000	-0.070	0.002	0.240	0.142	0.200	0.024	0.001	0.019	0.000	0.000	0.000	-0.002	0.627	1.627	32	32
R	RH031	0.013	1.300	1.000	1.500	0.720	0.050	0.670	0.010	0.010	0.000	-0.010	0.001	0.260	0.200	0.300	0.024	0.002	0.019	0.000	0.000	0.000	0.000	0.806	1.806	38	38
R	RH032	0.011	0.660	0.350	0.790	0.360	0.010	0.370	0.010	0.010	0.000	-0.090	0.001	0.132	0.070	0.158	0.012	0.000	0.011	0.000	0.000	0.000	-0.003	0.382	1.382	17	17
R	RH033	0.080	0.710	1.200	0.660	0.900	0.060	0.860	0.000	0.000	0.000	0.010	0.009	0.142	0.240	0.132	0.030	0.002	0.025	0.000	0.000	0.000	0.000	0.580	1.580	30	30
R	RH036	0.150	0.440	0.420	0.540	0.770	0.030	0.740	0.010	0.000	0.000	0.010	0.016	0.088	0.084	0.108	0.026	0.001	0.021	0.000	0.000	0.000	0.000	0.345	1.345	14	14
R	RH041	0.100	0.520	0.490	0.490	0.800	0.050	0.800	0.000	0.000	0.000	0.040	0.011	0.104	0.098	0.098	0.027	0.002	0.023	0.000	0.000	0.000	0.001	0.363	1.363	16	16
R	RH046	0.180	0.430	0.480	0.440	0.940	0.030	0.990	-0.010	0.020	0.000	0.040	0.020	0.086	0.096	0.088	0.031	0.001	0.028	0.000	0.001	0.000	0.001	0.352	1.352	15	15
R	RH047	0.036	0.500	0.490	0.660	0.930	0.060	0.900	-0.010	-0.010	0.000	0.040	0.004	0.100	0.098	0.132	0.031	0.002	0.026	0.000	0.000	0.000	0.001	0.394	1.394	19	19
R	RH048	0.100	1.200	1.100	1.100	0.900	0.050	0.910	0.000	0.010	0.000	0.000	0.011	0.240	0.220	0.220	0.030	0.002	0.026	0.000	0.000	0.000	0.000	0.749	1.749	36	36

Sum of Ranks = WRSR =	632
Survey unit sample number = n =	14
Reference area sample number = m =	24
α =	0.05
z =	1.645
WRSC =	522

Critical Value < Sum of Ranks

Table D11: Area 4020 Soil Sampling
Wilcoxon Rank Sum Test

Survey Unit 4

		Soil Concentrations (pCi/g)											Isotopic Fractions (concentration/DCGL)											Sum of Fractions	Adjusted Reference	Rank	Reference Area Rank
		Cs-137	Th-228	Th-230	Th-232	U-234	U-235	U-238	Pu-238	Pu-239	Am-241	Sr-90	Cs-137	Th-228	Th-230	Th-232	U-234	U-235	U-238	Pu-238	Pu-239	Am-241	Sr-90				
Sample Type	Soil I.D.	9.2	5	5	5	30	30	35	37.2	33.9	5.44	36															
S	020-99-0043	0.125	2.550	2.530	1.910	0.660	-0.038	0.690	0.040	0.003	0.010	0.110	0.014	0.510	0.506	0.382	0.022	-0.001	0.020	0.001	0.000	0.002	0.003	1.458	1.458	17	0
S	020-99-0044	0.090	1.870	1.430	1.660	0.380	0.016	0.550	0.022	0.039	0.005	0.200	0.010	0.374	0.286	0.332	0.013	0.001	0.016	0.001	0.001	0.001	0.006	1.039	1.039	2	0
S	020-99-0045	0.090	3.520	1.910	2.850	0.580	0.049	0.540	-0.015	0.017	0.081	0.120	0.010	0.704	0.382	0.570	0.019	0.002	0.015	0.000	0.001	0.015	0.003	1.720	1.720	35	0
S	020-99-0046	0.125	1.970	1.830	2.210	1.300	0.033	1.380	0.360	0.880	0.053	0.190	0.014	0.394	0.366	0.442	0.043	0.001	0.039	0.010	0.026	0.010	0.005	1.350	1.350	10	0
S	020-99-0047	0.125	2.540	1.730	2.190	2.580	0.200	3.100	0.090	0.020	0.030	0.300	0.014	0.508	0.346	0.438	0.086	0.007	0.089	0.002	0.001	0.006	0.008	1.504	1.504	20	0
S	020-99-0048	0.090	2.520	1.520	2.020	0.660	-0.017	0.590	0.049	0.015	0.018	0.230	0.010	0.504	0.304	0.404	0.022	-0.001	0.017	0.001	0.000	0.003	0.006	1.272	1.272	8	0
S	020-99-0049	0.120	3.220	1.590	2.670	0.740	0.023	0.720	0.034	0.017	0.047	0.120	0.013	0.644	0.318	0.534	0.025	0.001	0.021	0.001	0.001	0.009	0.003	1.568	1.568	27	0
S	020-99-0050	0.115	2.120	1.460	2.220	0.540	0.040	0.560	-0.004	-0.004	0.052	-0.060	0.013	0.424	0.292	0.444	0.018	0.001	0.018	0.000	0.000	0.010	-0.002	1.215	1.215	6	0
S	020-99-0051	0.145	1.720	1.040	2.030	1.000	0.029	0.890	0.055	0.000	-0.003	0.060	0.016	0.344	0.208	0.406	0.033	0.001	0.025	0.001	0.000	-0.001	0.002	1.036	1.036	1	0
S	020-99-0052	0.120	2.000	1.380	2.000	0.640	0.027	0.670	0.009	0.016	0.022	0.270	0.013	0.400	0.276	0.400	0.021	0.001	0.019	0.000	0.000	0.004	0.008	1.143	1.143	3	0
S	020-99-0053	0.130	1.840	1.550	2.040	0.660	0.060	0.900	0.070	0.058	0.069	0.090	0.014	0.368	0.310	0.408	0.022	0.002	0.026	0.002	0.002	0.013	0.003	1.169	1.169	4	0
S	020-99-0054	0.115	2.130	2.080	2.440	1.500	0.067	1.910	0.060	0.010	0.047	0.180	0.013	0.426	0.416	0.488	0.050	0.002	0.055	0.002	0.000	0.009	0.005	1.465	1.465	18	0
S	020-99-0055	0.200	1.790	1.790	1.990	0.660	0.070	0.870	0.042	0.012	0.054	0.220	0.022	0.358	0.358	0.398	0.022	0.002	0.025	0.001	0.000	0.010	0.006	1.202	1.202	5	0
S	020-99-0056	0.190	1.490	2.400	1.900	0.680	0.010	0.830	-0.004	0.040	0.094	0.140	0.021	0.298	0.480	0.380	0.023	0.000	0.024	0.000	0.001	0.017	0.004	1.248	1.248	7	0
R	RH002	0.045	0.830	0.730	0.810	0.650	0.050	0.580	0.000	0.000	0.000	0.020	0.005	0.166	0.146	0.162	0.022	0.002	0.017	0.000	0.000	0.000	0.001	0.519	1.519	23	23
R	RH003	0.016	1.200	1.100	1.200	1.000	0.060	0.990	0.000	0.000	0.000	-0.010	0.002	0.240	0.220	0.240	0.033	0.002	0.028	0.000	0.000	0.000	0.000	0.765	1.765	37	37
R	RH004	0.010	0.670	0.470	0.670	1.000	0.050	0.940	0.000	0.000	0.000	-0.020	0.001	0.134	0.094	0.134	0.033	0.002	0.027	0.000	0.000	0.000	-0.001	0.424	1.424	16	16
R	RH005	0.009	1.100	1.400	0.890	0.410	0.030	0.460	0.000	0.000	0.000	0.010	0.001	0.220	0.280	0.178	0.014	0.001	0.013	0.000	0.000	0.000	0.000	0.707	1.707	34	34
R	RH006	0.150	1.100	0.970	0.960	1.000	0.067	0.980	0.000	0.010	0.000	0.030	0.018	0.220	0.194	0.192	0.033	0.002	0.028	0.000	0.000	0.000	0.001	0.687	1.687	33	33
R	RH007	0.089	1.000	0.920	1.100	1.000	0.070	1.100	0.000	0.010	0.000	-0.010	0.010	0.200	0.184	0.220	0.033	0.002	0.031	0.000	0.000	0.000	0.000	0.681	1.681	32	32
R	RH011	0.026	1.000	0.850	1.000	0.880	0.070	0.770	0.000	0.000	0.000	-0.090	0.003	0.200	0.170	0.200	0.029	0.002	0.022	0.000	0.000	0.000	-0.003	0.624	1.624	30	30
R	RH012	0.015	0.930	0.570	0.910	0.580	0.030	0.610	0.030	0.000	0.000	-0.060	0.002	0.186	0.114	0.182	0.019	0.001	0.017	0.001	0.000	0.000	-0.002	0.520	1.520	24	24
R	RH013	0.012	0.830	0.690	0.920	0.440	0.030	0.420	0.010	0.000	0.000	-0.080	0.001	0.166	0.138	0.184	0.015	0.001	0.012	0.000	0.000	0.000	-0.002	0.515	1.515	22	22
R	RH014	0.034	0.920	0.580	0.980	0.430	0.030	0.520	0.000	0.000	0.000	-0.030	0.004	0.184	0.116	0.196	0.014	0.001	0.015	0.000	0.000	0.000	-0.001	0.529	1.529	25	25
R	RH015	0.008	1.000	0.550	0.830	0.540	0.030	0.680	0.000	0.000	0.000	-0.040	0.001	0.200	0.110	0.166	0.018	0.001	0.019	0.000	0.000	0.000	-0.001	0.514	1.514	21	21
R	RH016	0.013	0.870	0.560	0.870	0.570	0.030	0.500	-0.010	0.000	0.000	-0.040	0.001	0.174	0.112	0.174	0.019	0.001	0.014	0.000	0.000	0.000	-0.001	0.494	1.494	19	19
R	RH021	0.008	0.880	0.830	1.000	0.570	0.030	0.550	0.000	0.000	0.000	-0.030	0.001	0.176	0.166	0.200	0.019	0.001	0.016	0.000	0.000	0.000	-0.001	0.578	1.578	28	28
R	RH025	0.007	0.700	0.590	0.540	0.490	0.030	0.510	0.000	0.000	0.000	0.000	0.001	0.140	0.118	0.108	0.016	0.001	0.015	0.000	0.000	0.000	0.000	0.399	1.399	15	15
R	RH026	0.007	0.870	0.700	0.980	0.790	0.060	0.880	0.000	0.000	0.000	-0.050	0.001	0.174	0.140	0.196	0.026	0.002	0.025	0.000	0.000	0.000	-0.001	0.563	1.563	26	26
R	RH030	0.014	1.200	0.710	1.000	0.730	0.040	0.680	0.000	0.000	0.000	-0.070	0.002	0.240	0.142	0.200	0.024	0.001	0.019	0.000	0.000	0.000	-0.002	0.627	1.627	31	31
R	RH031	0.013	1.300	1.000	1.500	0.720	0.050	0.670	0.010	0.010	0.000	-0.010	0.001	0.260	0.200	0.300	0.024	0.002	0.019	0.000	0.000	0.000	0.000	0.806	1.806	38	38
R	RH032	0.011	0.660	0.350	0.790	0.360	0.010	0.370	0.010	0.010	0.000	-0.090	0.001	0.132	0.070	0.158	0.012	0.000	0.011	0.000	0.000	0.000	-0.003	0.382	1.382	13	13
R	RH033	0.080	0.710	1.200	0.660	0.900	0.060	0.860	0.000	0.000	0.000	0.010	0.009	0.142	0.240	0.132	0.030	0.002	0.025	0.000	0.000	0.000	0.000	0.580	1.580	29	29
R	RH036	0.150	0.440	0.420	0.540	0.770	0.030	0.740	0.010	0.000	0.000	0.010	0.016	0.088	0.084	0.108	0.026	0.001	0.021	0.000	0.000	0.000	0.000	0.345	1.345	9	9
R	RH041	0.100	0.520	0.490	0.490	0.800	0.050	0.800	0.000	0.000	0.000	0.040	0.011	0.104	0.098	0.098	0.027	0.002	0.023	0.000	0.000	0.000	0.001	0.363	1.363	12	12
R	RH045	0.180	0.430	0.480	0.440	0.940	0.030	0.990	-0.010	0.020	0.000	0.040	0.020	0.086	0.096	0.088	0.031	0.001	0.028	0.000	0.001	0.000	0.001	0.352	1.352	11	11
R	RH047	0.036	0.500	0.490	0.660	0.930	0.060	0.900	-0.010	-0.010	0.000	0.040	0.004	0.100	0.098	0.132	0.031	0.002	0.026	0.000	0.000	0.000	0.001	0.394	1.394	14	14
R	RH048	0.100	1.200	1.100	1.100	0.900	0.050	0.910	0.000	0.010	0.000	0.000	0.011	0.240	0.220	0.220	0.030	0.002	0.026	0.000	0.000	0.000	0.000	0.749	1.749	36	36

Sum of Ranks = WRSR =	578
Survey unit sample number = n =	14
Reference area sample number = m =	24
α =	0.05
z =	1.645
WRSC =	522

Critical Value < Sum of Ranks

Table D12: Area 4020 Soil Sampling
Wilcoxon Rank Sum Test

Survey Unit 5

		Soil Concentrations (pCi/g)											Isotopic Fractions (concentration/DCGL)											Sum of Fractions	Adjusted Reference	Rank	Reference Area Rank
		Cs-137	Th-228	Th-230	Th-232	U-234	U-235	U-238	Pu-238	Pu-239	Am-241	Sr-90	Cs-137	Th-228	Th-230	Th-232	U-234	U-235	U-238	Pu-238	Pu-239	Am-241	Sr-90				
Sample Type	Soil I.D.	9.2	5	5	5	30	30	35	37.2	33.9	5.44	36															
S	020-99-0057	0.110	1.700	1.820	2.310	0.410	0.040	0.730	0.086	0.050	0.042	0.440	0.012	0.340	0.364	0.462	0.014	0.001	0.021	0.002	0.001	0.008	0.012	1.238	1.238	12	0
S	020-99-0058	0.140	2.800	1.640	2.760	0.810	0.090	0.810	0.030	-0.011	-0.004	0.180	0.015	0.560	0.328	0.552	0.027	0.003	0.023	0.001	0.000	-0.001	0.005	1.513	1.513	22	0
S	020-99-0059	0.115	2.150	2.090	2.370	0.580	0.110	0.800	0.073	0.011	0.032	0.180	0.013	0.430	0.418	0.474	0.019	0.004	0.023	0.002	0.000	0.006	0.005	1.394	1.394	17	0
S	020-99-0060	0.110	1.780	1.420	1.080	0.420	0.026	0.690	0.014	0.031	0.014	0.380	0.012	0.356	0.284	0.216	0.014	0.001	0.020	0.000	0.001	0.003	0.011	0.917	0.917	6	0
S	020-99-0061	0.110	1.280	1.170	1.520	0.570	0.023	0.640	0.016	0.008	0.042	0.310	0.012	0.256	0.234	0.304	0.019	0.001	0.018	0.000	0.000	0.008	0.009	0.861	0.861	5	0
S	020-99-0062	0.100	1.470	1.520	1.310	0.790	0.021	0.920	0.011	0.011	0.069	0.300	0.011	0.294	0.304	0.262	0.026	0.001	0.026	0.000	0.000	0.013	0.008	0.946	0.946	8	0
S	020-99-0063	0.125	1.560	0.710	1.350	0.790	0.000	0.580	0.055	0.000	0.011	0.280	0.014	0.312	0.142	0.270	0.026	0.000	0.017	0.001	0.000	0.002	0.008	0.792	0.792	4	0
S	020-99-0064	0.105	1.000	0.790	1.180	0.640	0.020	0.570	0.045	0.016	0.068	0.330	0.011	0.200	0.158	0.236	0.021	0.001	0.016	0.001	0.000	0.013	0.009	0.667	0.667	1	0
S	020-99-0065	0.110	0.850	1.040	1.280	0.640	0.027	0.530	0.025	0.200	0.080	0.000	0.012	0.170	0.208	0.256	0.021	0.001	0.015	0.001	0.006	0.015	0.000	0.705	0.705	2	0
S	020-99-0066	0.085	1.600	1.320	1.500	0.790	-0.007	0.590	0.077	-0.027	-0.010	0.010	0.009	0.320	0.264	0.300	0.026	0.000	0.017	0.002	-0.001	-0.002	0.000	0.936	0.936	7	0
S	020-99-0067	0.105	1.160	0.890	1.190	0.610	0.012	0.660	0.029	0.490	0.010	0.060	0.011	0.232	0.178	0.238	0.020	0.000	0.019	0.001	0.014	0.002	0.002	0.718	0.718	3	0
S	020-99-0086	0.140	1.500	1.060	2.180	0.360	0.013	0.530	0.210	0.060	0.012	0.110	0.015	0.300	0.212	0.436	0.012	0.000	0.015	0.006	0.002	0.002	0.003	1.003	1.003	9	0
S	020-99-0087	0.135	1.990	1.820	1.460	0.790	0.090	0.940	0.750	-0.016	0.024	0.050	0.015	0.398	0.364	0.292	0.026	0.003	0.027	0.020	0.000	0.004	0.001	1.150	1.150	11	0
S	020-99-0088	0.150	2.110	1.270	1.460	0.680	0.100	0.720	0.050	0.005	0.006	0.360	0.016	0.422	0.254	0.292	0.023	0.003	0.021	0.001	0.000	0.001	0.010	1.043	1.043	10	0
R	RH002	0.045	0.830	0.730	0.810	0.650	0.050	0.580	0.000	0.000	0.000	0.020	0.005	0.166	0.146	0.162	0.022	0.002	0.017	0.000	0.000	0.000	0.001	0.519	1.519	25	25
R	RH003	0.016	1.200	1.100	1.200	1.000	0.060	0.990	0.000	0.000	0.000	-0.010	0.002	0.240	0.220	0.240	0.033	0.002	0.028	0.000	0.000	0.000	0.000	0.765	1.765	37	37
R	RH004	0.010	0.670	0.470	0.670	1.000	0.050	0.940	0.000	0.000	0.000	-0.020	0.001	0.134	0.094	0.134	0.033	0.002	0.027	0.000	0.000	0.000	-0.001	0.424	1.424	20	20
R	RH005	0.009	1.100	1.400	0.890	0.410	0.030	0.460	0.000	0.000	0.000	0.010	0.001	0.220	0.280	0.178	0.014	0.001	0.013	0.000	0.000	0.000	0.000	0.707	1.707	35	35
R	RH006	0.150	1.100	0.970	0.960	1.000	0.067	0.980	0.000	0.010	0.000	0.030	0.016	0.220	0.194	0.192	0.033	0.002	0.028	0.000	0.000	0.000	0.001	0.687	1.687	34	34
R	RH007	0.089	1.000	0.920	1.100	1.000	0.070	1.100	0.000	0.010	0.000	-0.010	0.010	0.200	0.184	0.220	0.033	0.002	0.031	0.000	0.000	0.000	0.000	0.681	1.681	33	33
R	RH011	0.026	1.000	0.850	1.000	0.880	0.070	0.770	0.000	0.000	0.000	-0.090	0.003	0.200	0.170	0.200	0.029	0.002	0.022	0.000	0.000	0.000	-0.003	0.624	1.624	31	31
R	RH012	0.015	0.930	0.670	0.910	0.580	0.030	0.610	0.030	0.000	0.000	-0.060	0.002	0.186	0.114	0.182	0.019	0.001	0.017	0.001	0.000	0.000	-0.002	0.520	1.520	26	26
R	RH013	0.012	0.830	0.690	0.920	0.440	0.030	0.420	0.010	0.000	0.000	-0.080	0.001	0.166	0.138	0.184	0.015	0.001	0.012	0.000	0.000	0.000	-0.002	0.515	1.515	24	24
R	RH014	0.034	0.920	0.580	0.980	0.430	0.030	0.520	0.000	0.000	0.000	-0.030	0.004	0.184	0.116	0.196	0.014	0.001	0.015	0.000	0.000	0.000	-0.001	0.529	1.529	27	27
R	RH015	0.008	1.000	0.550	0.830	0.540	0.030	0.680	0.000	0.000	0.000	-0.040	0.001	0.200	0.110	0.166	0.018	0.001	0.019	0.000	0.000	0.000	-0.001	0.514	1.514	23	23
R	RH016	0.013	0.870	0.560	0.870	0.570	0.030	0.500	-0.010	0.000	0.000	-0.040	0.001	0.174	0.112	0.174	0.019	0.001	0.014	0.000	0.000	0.000	-0.001	0.494	1.494	21	21
R	RH021	0.008	0.880	0.830	1.000	0.570	0.030	0.550	0.000	0.000	0.000	-0.030	0.001	0.176	0.166	0.200	0.019	0.001	0.016	0.000	0.000	0.000	-0.001	0.578	1.578	29	29
R	RH025	0.007	0.700	0.590	0.540	0.490	0.030	0.510	0.000	0.000	0.000	0.000	0.001	0.140	0.118	0.108	0.016	0.001	0.015	0.000	0.000	0.000	0.000	0.399	1.399	19	19
R	RH026	0.007	0.870	0.700	0.980	0.790	0.060	0.880	0.000	0.000	0.000	-0.050	0.001	0.174	0.140	0.196	0.026	0.002	0.025	0.000	0.000	0.000	-0.001	0.563	1.563	28	28
R	RH030	0.014	1.200	0.710	1.000	0.730	0.040	0.680	0.000	0.000	0.000	-0.070	0.002	0.240	0.142	0.200	0.024	0.001	0.019	0.000	0.000	0.000	-0.002	0.627	1.627	32	32
R	RH031	0.013	1.300	1.000	1.500	0.720	0.050	0.670	0.010	0.010	0.000	-0.010	0.001	0.260	0.200	0.300	0.024	0.002	0.019	0.000	0.000	0.000	0.000	0.806	1.806	38	38
R	RH032	0.011	0.660	0.350	0.790	0.360	0.010	0.370	0.010	0.010	0.000	-0.090	0.001	0.132	0.070	0.158	0.012	0.000	0.011	0.000	0.000	0.000	-0.003	0.382	1.382	16	16
R	RH033	0.080	0.710	1.200	0.660	0.900	0.060	0.860	0.000	0.000	0.000	0.010	0.009	0.142	0.240	0.132	0.030	0.002	0.025	0.000	0.000	0.000	0.000	0.580	1.580	30	30
R	RH036	0.150	0.440	0.420	0.540	0.770	0.030	0.740	0.010	0.000	0.000	0.010	0.016	0.088	0.084	0.108	0.026	0.001	0.021	0.000	0.000	0.000	0.000	0.345	1.345	13	13
R	RH041	0.100	0.520	0.490	0.490	0.800	0.050	0.800	0.000	0.000	0.000	0.040	0.011	0.104	0.098	0.098	0.027	0.002	0.023	0.000	0.000	0.000	0.001	0.363	1.363	15	15
R	RH046	0.180	0.430	0.480	0.440	0.940	0.030	0.990	-0.010	0.020	0.000	0.040	0.020	0.086	0.096	0.088	0.031	0.001	0.028	0.000	0.001	0.000	0.001	0.352	1.352	14	14
R	RH047	0.036	0.500	0.490	0.660	0.930	0.060	0.900	-0.010	-0.010	0.000	0.040	0.004	0.100	0.098	0.132	0.031	0.002	0.026	0.000	0.000	0.000	0.001	0.394	1.394	18	18
R	RH048	0.100	1.200	1.100	1.100	0.900	0.050	0.910	0.000	0.010	0.000	0.000	0.011	0.240	0.220	0.220	0.030	0.002	0.026	0.000	0.000	0.000	0.000	0.749	1.749	36	36

Sum of Ranks = WRSR =	624
Survey unit sample number = n =	14
Reference area sample number = m =	24
α =	0.05
z =	1.645
WRSC =	522

Critical Value < Sum of Ranks

Table D13: Area 4020 Soil Sampling
Wilcoxon Rank Sum Test

Survey Unit 6

		Soil Concentrations (pCi/g)											Isotopic Fractions (concentration/DCGL)											Sum of Fractions	Adjusted Reference	Rank	Reference Area Rank
		Cs-137	Th-228	Th-230	Th-232	U-234	U-235	U-238	Pu-238	Pu-239	Am-241	Sr-90	Cs-137	Th-228	Th-230	Th-232	U-234	U-235	U-238	Pu-238	Pu-239	Am-241	Sr-90				
Sample Type	Soil I.D.	9.2	5	5	5	30	30	35	37.2	33.9	5.44	36															
S	020-99-0072	0.185	2.170	1.270	1.700	1.080	0.060	0.950	0.026	-0.009	-0.004	0.690	0.020	0.434	0.254	0.340	0.036	0.002	0.027	0.001	0.000	-0.001	0.019	1.132	1.132	6	0
S	020-99-0073	0.190	2.000	1.680	1.210	0.770	0.040	0.470	0.037	0.035	0.008	0.410	0.021	0.400	0.336	0.242	0.026	0.001	0.013	0.001	0.001	0.001	0.011	1.054	1.054	3	0
S	020-99-0074	0.165	1.560	1.960	2.030	0.790	0.015	0.790	0.024	0.037	0.019	0.070	0.018	0.312	0.392	0.406	0.026	0.001	0.023	0.001	0.001	0.003	0.002	1.185	1.185	8	0
S	020-99-0075	0.155	1.810	1.390	2.060	0.560	0.080	0.500	0.025	-0.016	0.100	0.460	0.017	0.362	0.278	0.412	0.019	0.002	0.014	0.001	0.000	0.018	0.013	1.135	1.135	7	0
S	020-99-0076	0.140	1.620	1.450	1.370	0.800	-0.008	1.020	0.090	0.015	0.150	0.330	0.015	0.324	0.290	0.274	0.027	0.000	0.029	0.002	0.000	0.028	0.009	0.998	0.998	1	0
S	020-99-0077	0.195	1.920	1.820	1.820	0.520	0.060	0.580	0.025	0.054	0.072	0.080	0.021	0.384	0.364	0.364	0.017	0.002	0.017	0.001	0.002	0.013	0.002	1.187	1.187	9	0
S	020-99-0078	0.125	2.840	1.910	1.810	0.750	0.090	0.890	-0.042	-0.021	0.009	0.840	0.014	0.568	0.382	0.362	0.025	0.003	0.025	-0.001	-0.001	0.002	0.023	1.402	1.402	17	0
S	020-99-0079	0.155	1.980	2.180	1.650	0.320	0.026	0.650	0.016	0.036	0.025	0.180	0.017	0.396	0.436	0.330	0.011	0.001	0.019	0.000	0.001	0.005	0.005	1.220	1.220	10	0
S	020-99-0080	0.150	2.550	2.110	2.840	0.910	0.090	0.860	0.033	-0.003	-0.016	0.190	0.016	0.510	0.422	0.568	0.030	0.003	0.025	0.001	0.000	-0.003	0.005	1.577	1.577	28	0
S	020-99-0081	0.160	1.990	1.260	1.870	0.670	0.068	0.780	0.035	0.015	0.083	0.520	0.017	0.398	0.252	0.374	0.022	0.002	0.022	0.001	0.000	0.016	0.014	1.119	1.119	5	0
S	020-99-0082	0.160	1.780	1.670	1.540	0.650	0.070	0.600	0.058	0.000	0.056	0.350	0.017	0.356	0.334	0.308	0.022	0.002	0.017	0.002	0.000	0.010	0.010	1.078	1.078	4	0
S	020-99-0083	0.115	1.300	1.250	1.680	2.110	0.200	2.060	0.170	0.041	0.010	0.140	0.013	0.260	0.250	0.336	0.070	0.007	0.059	0.005	0.001	0.002	0.004	1.006	1.006	2	0
S	020-99-0084	0.145	2.390	2.100	2.340	1.040	0.070	0.970	0.140	-0.035	0.190	0.210	0.016	0.478	0.420	0.468	0.035	0.002	0.028	0.004	-0.001	0.035	0.006	1.490	1.490	20	0
S	020-99-0085	0.120	3.000	1.780	2.100	0.500	0.022	0.590	0.026	-0.003	0.081	0.150	0.013	0.600	0.356	0.420	0.017	0.001	0.017	0.001	0.000	0.016	0.004	1.443	1.443	19	0
R	RH002	0.045	0.830	0.730	0.810	0.650	0.050	0.580	0.000	0.000	0.000	0.020	0.005	0.166	0.146	0.162	0.022	0.002	0.017	0.000	0.000	0.000	0.001	0.519	1.519	24	24
R	RH003	0.016	1.200	1.100	1.200	1.000	0.060	0.990	0.000	0.000	0.000	-0.010	0.002	0.240	0.220	0.240	0.033	0.002	0.028	0.000	0.000	0.000	0.000	0.765	1.765	37	37
R	RH004	0.010	0.670	0.470	0.670	1.000	0.050	0.940	0.000	0.000	0.000	-0.020	0.001	0.134	0.094	0.134	0.033	0.002	0.027	0.000	0.000	0.000	-0.001	0.424	1.424	18	18
R	RH005	0.009	1.100	1.400	0.890	0.410	0.030	0.480	0.000	0.000	0.000	0.010	0.001	0.220	0.280	0.178	0.014	0.001	0.013	0.000	0.000	0.000	0.000	0.707	1.707	35	35
R	RH006	0.150	1.100	0.970	0.960	1.000	0.067	0.980	0.000	0.010	0.000	0.030	0.016	0.220	0.194	0.192	0.033	0.002	0.028	0.000	0.000	0.000	0.001	0.687	1.687	34	34
R	RH007	0.089	1.000	0.920	1.100	1.000	0.070	1.100	0.000	0.010	0.000	-0.010	0.010	0.200	0.184	0.220	0.033	0.002	0.031	0.000	0.000	0.000	0.000	0.681	1.681	33	33
R	RH011	0.026	1.000	0.850	1.000	0.880	0.070	0.770	0.000	0.000	0.000	-0.090	0.003	0.200	0.170	0.200	0.029	0.002	0.022	0.000	0.000	0.000	-0.003	0.624	1.624	31	31
R	RH012	0.015	0.930	0.670	0.910	0.580	0.030	0.610	0.030	0.000	0.000	-0.060	0.002	0.186	0.114	0.182	0.019	0.001	0.017	0.001	0.000	0.000	-0.002	0.520	1.520	25	25
R	RH013	0.012	0.830	0.690	0.920	0.440	0.030	0.420	0.010	0.000	0.000	-0.080	0.001	0.166	0.138	0.184	0.015	0.001	0.012	0.000	0.000	0.000	-0.002	0.515	1.515	23	23
R	RH014	0.034	0.920	0.580	0.980	0.430	0.030	0.520	0.000	0.000	0.000	-0.030	0.004	0.184	0.116	0.196	0.014	0.001	0.015	0.000	0.000	0.000	-0.001	0.529	1.529	26	26
R	RH015	0.008	1.000	0.550	0.830	0.540	0.030	0.660	0.000	0.000	0.000	-0.040	0.001	0.200	0.110	0.166	0.018	0.001	0.019	0.000	0.000	0.000	-0.001	0.514	1.514	22	22
R	RH016	0.013	0.870	0.560	0.870	0.570	0.030	0.500	-0.010	0.000	0.000	-0.040	0.001	0.174	0.112	0.174	0.019	0.001	0.014	0.000	0.000	0.000	-0.001	0.494	1.494	21	21
R	RH021	0.008	0.880	0.830	1.000	0.570	0.030	0.550	0.000	0.000	0.000	-0.030	0.001	0.176	0.166	0.200	0.019	0.001	0.016	0.000	0.000	0.000	-0.001	0.578	1.578	29	29
R	RH025	0.007	0.700	0.590	0.540	0.490	0.030	0.510	0.000	0.000	0.000	0.000	0.001	0.140	0.118	0.108	0.016	0.001	0.015	0.000	0.000	0.000	0.000	0.399	1.399	16	16
R	RH026	0.007	0.870	0.700	0.980	0.790	0.060	0.880	0.000	0.000	0.000	-0.050	0.001	0.174	0.140	0.196	0.026	0.002	0.025	0.000	0.000	0.000	-0.001	0.563	1.563	27	27
R	RH030	0.014	1.200	0.710	1.000	0.730	0.040	0.680	0.000	0.000	0.000	-0.070	0.002	0.240	0.142	0.200	0.024	0.001	0.019	0.000	0.000	0.000	-0.002	0.627	1.627	32	32
R	RH031	0.013	1.300	1.000	1.500	0.720	0.050	0.670	0.010	0.010	0.000	-0.010	0.001	0.260	0.200	0.300	0.024	0.002	0.019	0.000	0.000	0.000	0.000	0.806	1.806	38	38
R	RH032	0.011	0.660	0.350	0.790	0.360	0.010	0.370	0.010	0.010	0.000	-0.090	0.001	0.132	0.070	0.158	0.012	0.000	0.011	0.000	0.000	0.000	-0.003	0.382	1.382	14	14
R	RH033	0.080	0.710	1.200	0.660	0.900	0.060	0.860	0.000	0.000	0.000	0.010	0.009	0.142	0.240	0.132	0.030	0.002	0.025	0.000	0.000	0.000	0.000	0.580	1.580	30	30
R	RH036	0.150	0.440	0.420	0.540	0.770	0.030	0.740	0.010	0.000	0.000	0.010	0.016	0.088	0.084	0.108	0.026	0.001	0.021	0.000	0.000	0.000	0.000	0.345	1.345	11	11
R	RH041	0.100	0.520	0.490	0.490	0.800	0.050	0.800	0.000	0.000	0.000	0.040	0.011	0.104	0.098	0.098	0.027	0.002	0.023	0.000	0.000	0.000	0.001	0.363	1.363	13	13
R	RH046	0.180	0.430	0.480	0.440	0.940	0.030	0.990	-0.010	0.020	0.000	0.040	0.020	0.086	0.096	0.088	0.031	0.001	0.028	0.000	0.001	0.000	0.001	0.352	1.352	12	12
R	RH047	0.036	0.500	0.490	0.660	0.930	0.060	0.900	-0.010	-0.010	0.000	0.040	0.004	0.100	0.098	0.132	0.031	0.002	0.026	0.000	0.000	0.000	0.001	0.394	1.394	15	15
R	RH048	0.100	1.200	1.100	1.100	0.900	0.050	0.910	0.000	0.010	0.000	0.000	0.011	0.240	0.220	0.220	0.030	0.002	0.026	0.000	0.000	0.000	0.000	0.749	1.749	36	36

Sum of Ranks = WRSR =	602
Survey unit sample number = n =	14
Reference area sample number = m =	24
α =	0.05
z =	1.645
Critical Value WRSC =	522

Critical Value < Sum of Ranks

APPENDIX E

1997 SOIL SAMPLING RESULTS

This appendix summarizes the 1997 surface and subsurface soil sampling results at the Hot Laboratory following excavation of Building 4020.

In 1997, two hundred and sixteen (216) surface and subsurface soil locations were sampled following removal of the concrete basement area of Building 4020 and analyzed in-house by gamma spectroscopy. The sampling results are shown in the attached Table E1, and the locations are shown in the attached map. One hundred thirty five (135) soil samples were non-detectable. The highest detectable level in soil for Cs-137 was 0.91 pCi/gm with an average level of 0.17 pCi/gm, well below the $DCGL_W$ of 9.2 pCi/gm.

Table E1: 1996 - 1997 Surface and Subsurface Soil Samples from RIHL

Samples	Soil Samples 1996 - 1997	LOCATION B4020	DEPTH	CS - 137 pCi/g
96094	Under original concrete pad		surface	0.12970
96103	Under slab dividing rooms 111 - 113		surface	not detecte
96114	Trench west of basement front of D- 4 door		surface	0.00822
96115	4 ft. West of D - 4 after slab removal		surface	not detected
96116	Bottom of ditch west of D - 4		8' below	not detected
96117	Side of ditch west of D - 4		8' below	not detected
96118	Trench west side of Bldg. 468		8' below	not detected
96119	Trench west side of Bldg. 468		8' below	0.03003
96125	Northside of Liquid Waste Facilty		surface	0.02263
97004	E/ NE corner of Decon 4		surface	not detected
97005	E/NE corner Decon 4 (4') N. Of sample # 4		surface	not detected
97006	E/NE corner Decon 4 N. Of sample # 5		surface	not detected
97007	E/NE corner Decon 4 N. Of sample # 6		surface	not detected
97008	E/NE corner Decon 4 N. Of sample # 7		surface	not detected
97009	10' E Ops Gallery Double Door		2' below	not detected
97010	E/ NE corner of Decon 4 under concrete slab # 6		surface	not detected
97011	Mock -Up area uder concrete slab # 7		surface	not detected
97012	Mock -Up area uder concrete slab # 8 N of sample # 11		surface	not detected
97013	Mock -Up area uder concrete slab # 9 N of sample # 12		surface	not detected
97014	West of south corner Liquid Waste Facility		surface	0.02760
97015	Under concrete slab SB # 23 west of SB # 9		surface	not detected
97016	Under concrete slab SB # 20 west of SB # 2		surface	not detected
97017	Under concrete slab SB # 21 west of SB # 3		surface	not detected
97018	Under concrete slab SB # 22 west of SB # 4		surface	not detected
97019	Under concrete slab SB # 19 west of sample # 4		surface	not detected
97020	Under concrete slab SB # 10 east of sample # 4		surface	not detected
97021	Under concrete slab SB # 11 west of sample # 5		surface	not detected
97022	Under concrete slab SB # 12 + 13 east of sample # 6		surface	not detected
97023	Under concrete slab SB # 14 east of sample # 7		surface	not detected
97024	Under concrete slab SB # 15 east of sample # 8		surface	not detected
97025	Under concrete slab SB # 16 east of sample # 10		surface	not detected
97026	Under concrete slab SB # 17 east of SB # 7		surface	not detected
97027	Under asphalt 4' N. From S. End of Liquid Waste Facility		surface	0.03543
97028	Under asphalt bottom of slope 44' from S. W. Corner of Bldg. 468		surface	0.31480
97029	Under asphalt bottom of slope 20' from S. W. Corner of Bldg. 468		surface	0.43850
97030	Under asphalt bottom of slope at S. W. Corner of Bldg. 468		surface	0.16250
97031	Under asphalt top of slope 8 ' up form S.W. Corner of Bldg. 468		surface	0.06223
97032	Under concrete slab SB # 27 next to trench outside of cell # 4		surface	not detected
97033	Under concrete slab SB # 27 next to trench outside of cell # 4		surface	not detected
97034	Under concrete slabs SB # 24 + 26		surface	not detected
97036	Around drains in S. Ops Gallery		surface	not detected
97037	S. E. Corner of Liquid Waste Facility at bottom of wall		surface	0.39000
97038	West of wall at center of wall west of sample # 97037		surface	0.05962
97039	Under concrete slab SB# 31 operating gallery		surface	not detected
97040	Under concrete slab SB # 30 + 31 at center operating gallery		surface	not detected
97041	Under concrete slab SB # 32 operating gallery		surface	not detected

Table E1: 1996 - 1997 Surface and Subsurface Soil Samples from RIHL

Samples	Soil Samples 1996 - 1997	LOCATION B4020	DEPTH	CS - 137 pCi/g
97042	Under concrete slab SB # 33 operating gallery		surface	not detected
97043	Under concrete slab SB # 35 operating gallery		surface	not detected
97044	Under concrete slab SB # 34 operating gallery		surface	not detected
97045	Under drain between slab # 36 + 37 operating gallery		surface	0.20960
97046	Under concrete slab SB # 35 operating gallery		surface	not detected
97047	Under concrete slab SB # 37 operating gallery		surface	not detected
97048	Under concrete slab SB # 36 operating gallery		surface	not detected
97049	Under concrete slab SB # 36 + 37 south of sb # 38 + 39 operating gallery		surface	not detected
97050	Under asphalt removal northeast by stairwell crane area		surface	0.51190
97051	Under asphalt removal by stairwell crane area west of sample # 50		surface	0.03298
97052	Under asphalt removal by stairwell crane area north of sample # 50		surface	not detected
97053	Trench south side of Bldg. # 468 after asphalt		8' below	0.02033
97054	Between operating gallery and sample # 53 after removal		surface	0.03658
97055	West of sample # 53 after asphalt removal		surface	0.02816
97056	North of sample # 53 after asphalt removal		surface	0.10630
97058	Hot Change Room 2' east of sample # 57 next to block # 47		surface	not detected
97060	Under slab SB # 68		surface	not detected
97061	Under slab SB # 49A + 49B		surface	0.01565
97062	Under slab SB # 49A + 49B		surface	not detected
97063	Under slab SB # 45		surface	not detected
97064	Under slab SB # 42		surface	not detected
97065	Under asphalt 12' N. of Liquid Waste Facility, top of slope		surface	not detected
97066	Under asphalt 42' N. of Liquid Waste Facility, 7' west of top of slope		surface	0.02065
97067	Under asphalt 64' N. of Liquid Waste Facility, 12' west of top of slope		surface	0.03798
97068	Under asphalt 54' N. of Liquid Waste Facility, 2' west of top of slope		surface	0.10630
97069	Under asphalt 20' N. of Liquid Waste Facility, bottom of slope		surface	0.28970
97070	Under asphalt < 12' N. of Liquid Waste Facility,bottom of slope		surface	0.16430
97071	Under concrete slab SB # 49 drain removal		3' below	not detected
97072	In trench drain removal / ops gallery in front of cell # 1		3' below	0.75920
97073	North end cell # 3 after drain removal		3' below	not detected
97074	Ops Gallery middle of cell after drain removal		3' below	0.25595
97076	Ops Gallery north end after drain removal		4' below	not detected
97078	Under slab south end room # 101		surface	not detected
97079	Under slab south end room # 101 between rooms # 103 + 110		surface	not detected
97080	Under slab SB # 95 southwest end hot change room		surface	not detected
97082	Under slab SB # 97 southwest end hot change room		surface	not detected
97083	Under slab SB # 100 southwest end of srevice gallery		surface	0.10660
97084	Under slab SB # 101 southwest end of service gallery		surface	not detected
97085	Under slab SB # 103 southwest end of service gallery		surface	0.91010
97086	Under slab SB # 101 east side accross from sample # 85		surface	0.09025
97087	Under slab SB # 102 west side north of sample # 85		surface	0.40070
97088	Under slab SB # 103 east side north of sample # 85		surface	0.07640
97089	Decon 3 under concrete slab SB # 103 adjacent to slab # 104		surface	0.43780
97090	In trench along decon # 3 wall just past slab # 104		10' below	0.69690
97091	In trench along decon # 3 wall north of sample # 90		10' below	0.72660
97092	In trench along decon # 3 wall north of sample # 91		10' below	0.29560

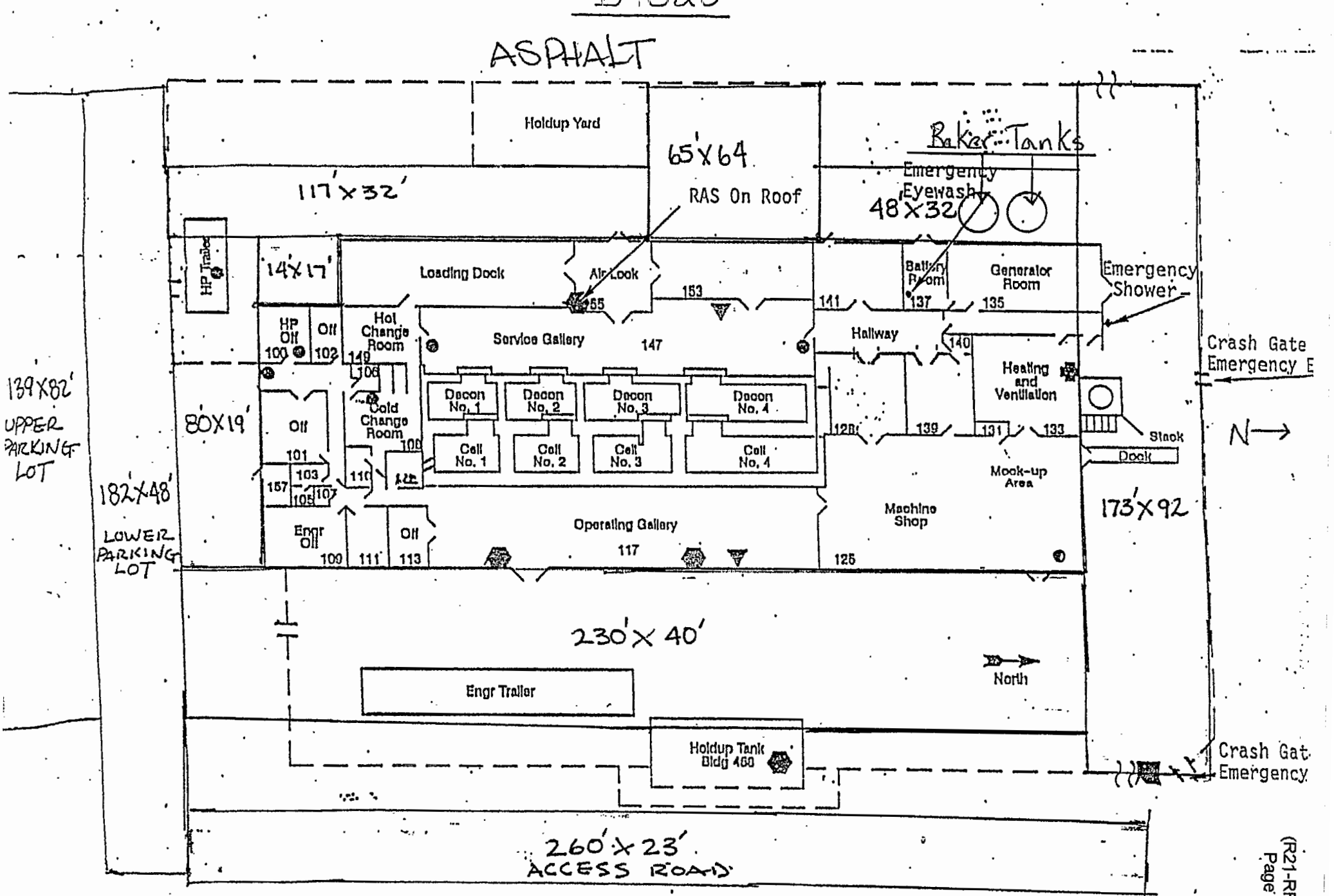
Table E1: 1996 - 1997 Surface and Subsurface Soil Samples from RIHL

Samples	Soil Samples 1996 - 1997	LOCATION B4020	DEPTH	CS - 137 pCi/g
97093	Sample 16 poles south of N.W. Corner of outer fence , 20' east of outer fence		surface	0.06824
97094	Sample 12 poles south of N.W. Corner of outer fence , 12' east of outer fence		surface	0.51570
97095	In trench from end of decon # 4 northwest side		surface	0.22120
97096	Sample 4' N. 6' 6" east , from S.W. Corner of office bldg.		surface	not detected
97097	Sample 6' N. 9' south of S.E. Corner of bldg.		5' below	not detected
97098	Sample 12' N. 7' W. Of N.w. Corner of decon # 3		8' below	not detected
97099	Sample 16' W. , 4' 6" S. Of N.W. Corner of cell # 4		2' below	0.60190
97100	Sample 32' N. 16' west , from N.W. Corner of cell # 1		5' below	0.55530
97101	Under slab SB # 135 at service gallery		surface	not detected
97102	Under slab SB # 131 at service gallery		surface	not detected
97103	Sample 4' N. 6' 6" east , from S.W. Corner of office bldg.		4' below	not detected
97104	Under slab SB # 135 at service gallery		surface	not detected
97105	Sample 32' N. , of basement cover north wall , 18' east of cell # 3		4' below	0.01715
97106	In trench west of of corner of crane well		5' below	not detected
97107	In trench 32' N. Of sample # 106 east side		4' 5" below	not detected
97108	In trench 56' N. Of sample # 106 east side		3' below	not detected
97109	Sample N. Of machine shop east side		7' 5" below	not detected
97110	Sample 12' south of the northeast end of the machine shop		3' 10" below	not detected
97111	Sample 27' from northeast corner of machine shop		4' 8" below	not detected
97113	Sample 8' from bottom of loading dock southwest corner of concrete block		4' 5" below	not detected
97115	Sample 12' from Baker Tanks		4' 5" below	not detected
97116	Sample 24' from sample # 115		4' below	not detected
97117	Sample 36' from sample # 115		5' 6" below	0.02133
97118	Sample west side top of loading dock at end of dock along barrier wall		1' below	not detected
97119	Sample 12' S. From sample # 118 at loading dock at barrier wall		1' below	not detected
97120	Sample 12' S. From sample # 119 at loading dock top level at barrier wall sample		1' below	not detected
97121	Sample 12' S. From sample # 120 loading dock top level barrier wall 3' from wall		1' below	not detected
97122	Sample 24' at bottom at ground level at loading dock south end of loading dock		7' below	0.01551
97123	Sample taken 13' N. From sample # 122 bottom at 7' deep along wall		7' below	not detected
97124	Sample taken 13' N. From sample # 123 bottom of barrier wall		7' below	not detected
97126	Sample taken foundation wall at loading dock, west side of bldg. TO20		7' below	not detected
97127	Sample taken foundation wall at loading dock, west side of bldg.		7' below	not detected
97128	Sample taken foundation wall at loading dock, west side of bldg. At ramp		7' below	not detected
97129	Sample taken foundation wall at loading dock, west side of bldg. At airlock		7' below	not detected
97130	Sample taken in trench at airlock barrier wall after wall removal		7' below	not detected
97131	Sample taken in trench by transite pipe 20' from Baker Tanks N.W. Side		4' below	not detected
97134	Sample taken 10 ' from decon 4 barrier wall		7' below	not detected
97135	Sample taken 37' from baker tanks N.W. Side in transite pipe trench		4' below	not detected
97136	Sample taken 16' S. From sample # 135 in trench at transite piping		4' below	not detected
97137	Sample taken 12' from end of decon # 4 east side in transite piping		4' 5" below	not detected
97138	Sample taken 21' S. Of sample # 137 in trench		4' below	not detected
97139	Sample in trench on W. Side of decon # 2 composite for rolloff # 52154		4' below	not detected
97140	Sample taken behind west wall at airlock		7' below	0.18900
97141	Sample taken from trench west side of decon 1		4' below	0.02654
97143	Sample taken at cell # 2 wall basement outer S.E. End 6' from wall		10' below	0.02654
97144	Sample taken from 10' east of first sample at vent piping		10' below	0.02098

Table E1: 1996 - 1997 Surface and Subsurface Soil Samples from RIHL

Samples	Soil Samples 1996 - 1997	LOCATION B4020	DEPTH	CS - 137 pCi/g
97145	Sample taken under slabs and track north side of cell 4 northward		surface	not detected
97146	In trench from transite pipe on west side near generator room		4' below	not detected
97147	In trench at transite pipe of cell # 4		4' below	0.32770
97150	Sample taken under slabs on west side of decon 3		7' below	not detected
97151	Sample from transite pipe trench on W. Side of bldg. 15' W. of decon # 3		4' below	not detected
97153	Sample taken from S.W. Side of hot change room area		5' below	0.03216
97154	Sample taken 20' from sample # 153		4' below	0.06056
97155	Sample from transite pipe trench on S.W. Side 15' W. of decon # 1		4' below	not detected
97156	Sample taken from transite pipe trench on E. Side 10' N. of cell # 4		4' below	0.05008
97160	Sample from under generator pad N. W. Corner of bldg.		surface	0.22740
97161	Sample taken from N.W. Corner at bottom of foundation wall		14' below	0.02303
97163	Sample taken from W. Side of basement tunnel at bottom of wall		14' below	not detected
97164	Sample taken W. Side of basement tunnel at bottom of wall 20' S.		14' below	not detected
97165	Sample taken from W. Side of basement at bottom of wall		14' below	0.08585
97166	Sample taken from vent. Plenum on W. Side		4' below	0.01985
97167	Sample taken from under pad baker tanks		surface	not detected
97169	Sample taken from under pad N. End of bldg. E. Of loading dock		surface	0.11220
97170	Sample taken from under loading dock		surface	0.03564
97172	Sample taken N.W. Corner of basement wall		6' below	not detected
97173	15' S. of sample # 172		6' below	not detected
97174	30' S. of sample # 172		6' below	not detected
97175	45' S. of sample # 172		6' below	not detected
97176	60' S. of sample # 172		6' below	0.00763
97177	75' S. of sample # 172		6' below	not detected
97178	90' S. of sample # 172		6' below	not detected
97179	105' S. of sample # 172		6' below	not detected
97180	120' S. of sample # 172		6' below	not detected
97181	135' S. of sample # 172		6' below	not detected
97182	150' S. of sample # 172		6' below	not detected
97183	160' S. of sample # 172		6' below	not detected
97185	Sample taken from excavation of TO20 basement wall		6' below	not detected
97186	50' S. Of N.W. Corner		15' below	0.08359
97187	60' South		15' below	0.04789
97188	70' South		15' below	0.05452
97189	80' South		15' below	0.01494
97190	90' South		15' below	not detected
97191	100' South		15' below	0.01997
97192	110' South		15' below	not detected
97193	120' South		15' below	not detected
97194	130' South		15' below	not detected
97195	140' South		15' below	not detected
97196	150' South		15' below	not detected
97197	160' South at S.W. Corner		15' below	not detected
97198	Sample taken from W. wall from N.W. corner to center		10' below	not detected
97199	Sample taken from W. wall from center to S. W. corner		10' below	not detected
97200	Sample taken from pad at N. End of basement N. of steps		17' below	0.01613

Samples	Soil Samples 1996 - 1997	LOCATION B4020	DEPTH	CS - 137 pCi/g
97201	Sample taken from behind wall on N. End of E. of steps		17' below	not detected
97204	Sample taken from under dilution fan pad on N. End of basement		17' below	0.26090
97205	Sample taken from N. End of basement wall		17' below	not detected
97206	Sample from trench area N.end of cell # 4		16' below	0.13690
97209	Sample taken for Drum # 1 taken at S.W. End of cell # 1 bottom of wall		15' below	not detected
97212	Sample taken for Drum # 2 taken at S.W. End of cell # 1 bottom of wall		15' below	not detected
97213	Sample taken for Drum # 3 taken at S.W. End of cell # 1 bottom of wall		15' below	not detected
97214	Sample taken for Drum # 4 taken at S.W. End of cell # 1 bottom of wall		15' below	not detected
97218	Sample from bottom of E. basement wall		15' below	not detected
97219	10' S. of sample # 218		15' below	0.01727
97220	20' S. of sample # 218		15' below	0.01613
97221	30' S. of sample # 218		15' below	not detected
97222	40' S. of sample # 218		15' below	not detected
97223	50' S. of sample # 218		15' below	not detected
97224	Composite sample from E. Basement wall from cell # 4 to N. End		15' below	not detected
97225	Composite sample from basement wall from N. End of cell # 4		15' below	not detected
97226	Composite sample from E. Side of N. Basement steps		15' below	not detected
97231	Sample taken from S.E. Outer wall at base 14' after cut to check slurry		14' below	not detected
97232	Sample taken from pathway to Step Off Pad		15' below	0.01448
97236	Soil and gravel taken from bottom of pit W. of stack		16' below	0.66280
97237	Sample taken from surface prior to excavation of E. Basement wall at cell #1		surface	0.03878
97238	Sample taken from S. End of W. Trench prior to backfill		15' below	0.06982
97239	Sample taken from N. End of W. Trench prior to backfill		15' below	0.27410
97254	Sample taken from trench on west side after back fill roadway 24' from basement wa		5' from grade	not detected
97255	Sample taken from from trench after back fill northwest end 17' from end of ba		5' from grade	0.04119
97257	Sample taken from under basement tunnel floor		17' below	0.28600
97258	Sample taken from S. End of basement		15' below	0.01839
97259	Sample taken from S.W. Corner of basement		15' below	0.04567
97270	Sample taken from under stack pad		16' below	not detected
97271	Sample taken from around N. Sump		18' below	0.02099
97274	Sample taken under concrete W. Side basement		16' below	0.07035
97275	Sample taken at exit to basement on eastside		15' below	0.03128
	NOTE:			
	N. = North	**Below means below surface**		
	S. = South	**Surface samples at 6" depth**		
	E. = East	**Richard Deschamps document completed on 11/11/99**		
	W.= West			


ASPHALT
Holdup Yard
65'X64'
Baker Tanks
Emergency Eyewash
48'X32'
117'X32'
RAS On Roof
HP Trailer
14'X17'
Loading Dock
Air Lock
155
153
141
Battery Room
137
Generator Room
135
Emergency Shower
HP Off
100
Off
102
Hot Change Room
149
106
Service Gallery
147
Hallway
140
Crash Gate Emergency E
139'X82'
UPPER PARKING LOT
80'X19'
Off
101
Cold Change Room
108
Decon No. 1
Decon No. 2
Decon No. 3
Decon No. 4
Cell No. 1
Cell No. 2
Cell No. 3
Cell No. 4
128
139
Heating and Ventilation
131
133
Stack
Dock
N
182'X48'
LOWER PARKING LOT
157
103
105
107
110
112
Engr Off
109
111
Off
113
Operating Gallery
117
125
Machine Shop
Mock-up Area
173'X92'
230'X 40'
North
Engr Trailer
Holdup Tank Bldg 460
Crash Gat Emergency
260'X23'
ACCESS ROAD

APPENDIX F

BUILDING 4468 SAMPLE RESULTS

BOEING®

The Boeing Company
Rocketdyne Propulsion & Power

6633 Canoga Ave.
P.O. Box 7922
Canoga Park, CA 91309-7922

Date: August 3, 1998

No.: SHEA-015873

To: Philip Rutherford FOR
D/641, 055, T487
(818)586-6140

From: John Shao/James Barnes
D/641, 055, T487
(818)586-8024

Subject: Soil Sampling Results for Buildings 468 & 020 at SSFL

This report summarizes the findings from a radiation survey performed on samples from excavated soil from Building 468, and the septic columns and leach field associated with Building 20. The soil sampling method, as well as analytical techniques used, are also described.

In the past, in order to ascertain the levels of radioactivity in soil, a relatively large series of samples was obtained from stockpiles of soil after excavation. These samples generally were then counted on a GeLi gamma spectroscopy system. This resulted in a significant investment of project schedule time for sample analysis. A technique using a screening process for preliminary sample selection was needed in order to reduce schedule impact. The screening process and the results of analysis are described below.

During the soil excavation at Building 468, one soil sample was taken from approximately every 10 cubic feet of excavated soil. All together, a total of 195 soil samples were taken. Each sample was placed in a plastic bag, uniquely numbered, and subsequently placed in a "B"-box in numerical order.

Approximately a week later, each soil sample was removed from the "B"-box and measured in a one-minute count. During the survey, each soil sample, while still in its plastic bag, was carefully wrapped around the tip of a 1"x1" NaI detector. One soil sample was measured at a time. The counts were conducted in a low background area.

The results from the NaI detector are presented in Table 1. The measurement results range from 1897 to 2194 counts/minute with the mean value at 1990 counts/minute. To determine the background radiation level at SSFL, a soil sample was taken approximately 150 feet west of the excavation area in an area unaffected by Building 20 operations. Using the same sodium iodine detector and the same method, ten measurements were taken. The mean background soil measurement was 2013 counts/minute, and the experimental standard deviation was 50 counts/minute (see Table 2). Since all the actual sample measurements are relatively close to the mean background measurement, no contamination above background was expected.

To better understand the results of the survey, futher statistical analysis was performed. A cumulative probability chart was plotted using Cumplot Version 2.20[1] (see Figure 1). This chart shows that

[1] Proprietary Software. Boeing.

the gamma exposure results have nearly ideal normal distribution. Only minimal variance from normal distribution was detected at the extremes of the cumulative probability. This analysis indicates no other influencing factor, particularly heterogeneous radioactive contamination, was detected.

Since the soil gamma exposure measurements suggested that the soil radioactive content was normally distributed, the highest, lowest, and mid-range samples were selected for analysis. Each sample was transferred to a marinelli, weighed, and analyzed. The high and low samples were found to be less than the minimum detectable activity (MDA) for Cs-137. The mid-range sample was found to contain 0.21 pCi/g of Cs-137; well within the levels expected due to fallout contamination. Two additional samples were then selected (at the "1/4" point and the "3/4" point of the distribution). The "1/4" point and the"3/4" point samples had 0.09 pCi/g of Cs-137 and less than MDA of Cs-137, respectively. Table 3 summarizes the results from the gamma spectroscopy analysis. The two samples with measurable levels of Cs-137 had significant amount of clay in the soil.

In summary, it can be safely concluded that all 195 samples are at background radioactivity levels because: 1) all samples measured with NaI detector are close to the background level (within 200 counts/minute), 2) statistical analysis of the survey data reveals a "normal" pattern, indicating no heterogeneous radioactive contamination, and 3) five samples representing the entire survey range were confirmed to be at background level using gamma spectroscopy. The two samples with trace levels of Cs-137 will be sent to Teledyne for alpha spectroscopy. It is anticipated that the soil will be found to be free of alpha emitting contamination. The results presented in this report suggest that the screening process technique used has a great potential for reducing the time and costs of field sample analysis.

If you have any questions regarding this report, please call me at (818) 586-8024.

John Shao

John Shao
Radiation Safety

cc: Philip Horton
James Barnes
Building 20 File

TABLE 1. Gamma Exposure Measurements of Soil Samples from Building 468.

Bag #	1-Min. Count	Bag #	1-Min. Count	Bag #	1-Min. Count	Bag #	1-Min. Count
1	1958	51	1987	101	1950	151	1964
2	2010	**52**	**1991**	102	1960	152	1943
3	1940	53	2033	103	2075	153	1995
4	1962	54	1902	104	2010	154	2002
5	1930	55	2000	105	2043	155	1956
6	2009	56	1900	106	1913	156	2038
7	1976	57	1959	107	1930	157	2062
8	2043	58	1946	108	1981	158	2007
9	1925	59	2023	109	1971	159	2073
10	2046	60	1930	110	1917	160	2020
11	2014	61	2023	111	1923	161	1979
12	1988	62	1999	112	1985	162	2063
13	1978	63	1994	113	1936	**163**	**2085**
14	2018	64	1960	114	1978	164	2113
15	2048	65	1934	115	2041	165	2037
16	1961	66	1955	116	2016	166	2106
17	1927	67	1930	117	1930	167	2042
18	1965	68	1985	118	1915	168	2079
19	1920	69	2004	119	1930	169	1970
20	1947	70	1975	120	1931	170	2102
21	1963	71	1965	121	1988	171	2055
22	2013	72	1974	122	1951	172	2134
23	1956	73	1912	123	2017	173	2099
24	1983	74	1961	124	1939	174	2037
25	1974	75	1985	125	1939	**175**	**2194**
26	1987	76	1992	126	1924	176	1991
27	2003	77	1963	127	2066	177	2034
28	**1944**	78	1935	128	2002	178	2123
29	2057	79	1927	129	1977	179	2131
30	1951	80	2009	130	2041	180	1959
31	1941	81	1965	131	2015	181	2117
32	2006	82	1993	132	1978	182	2015
33	1931	83	1974	133	1992	183	1987
34	1906	84	1910	134	1974	184	2099
35	1957	85	1917	135	2010	185	1961
36	1936	86	1938	136	1969	186	2049
37	1969	87	1978	137	1929	187	2018
38	1913	88	1942	138	1901	188	2038
39	1968	89	1917	**139**	**1897**	189	2029
40	1951	90	2105	140	1938	190	2000
41	2007	91	1976	141	1939	191	1957
42	2034	92	2009	142	2020	192	1968
43	1938	93	2042	143	2051	193	2010
44	2072	94	1974	144	2035	194	1943
45	1936	95	2003	145	2023	195	1994
46	1991	96	1977	146	2047		
47	2026	97	1980	147	1982	max	2194
48	1936	98	2021	148	1972	min	1897
49	1906	99	1966	149	1948	mean	1990
50	1975	100	1989	150	1940	stand.dev.	53.83

Note: Samples selected for gamma spectroscopy analysis are in boldprint.

TABLE 2. Gamma Exposure Measurements of Background Soil Sample.

Trial #	1-Min. Count
1	2041
2	2047
3	1974
4	2076
5	1943
6	1988
7	1965
8	2081
9	2046
10	1970
Mean	2013
Experimental Standard Deviation (68% Confidence Limit)	50.36

Table 3. Summary of Gamma Spectroscopy Analysis

Sample Name	Counts/Minute	Cs-137 (pCi/g)	Soil Type	Bag #	Sample #
lowest	1897	<MDA	Sandy Clay	139	T2098024
"1/4" point	1944	0.09	Clay	28	T2098028
mid-range	1991	0.21	Clay	52	T2098025
"3/4" point	2085	<MDA	Sandy Clay	163	T2098029
highest	2194	<MDA	Sandy Clay	175	T2098026

Note: The minimum detectable activity (MDA) of Cs-137 is 0.02 pCi/g.

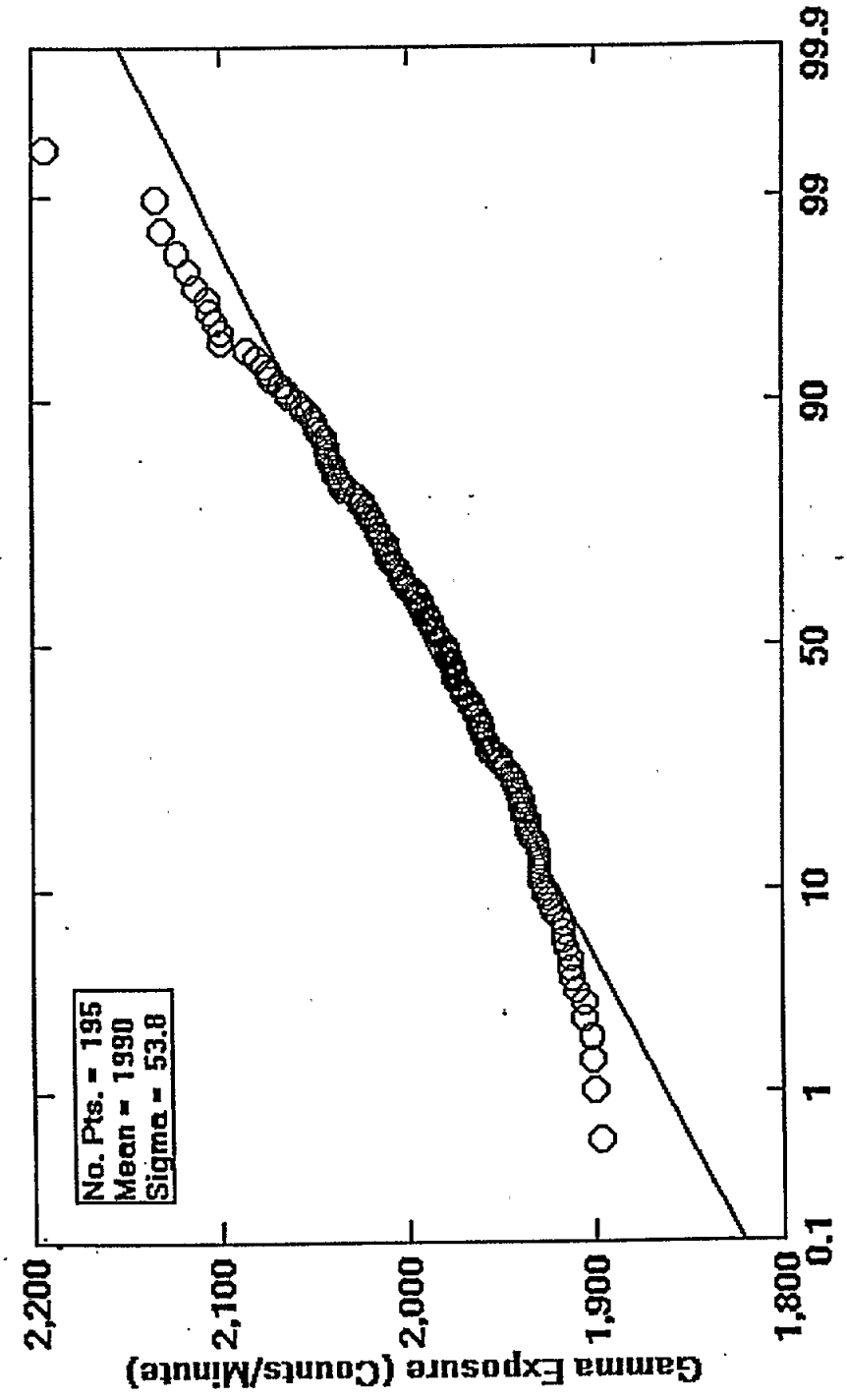


FIGURE 1. Cumulative Probability Chart.

SAMPO 90, 1990 PA,MN,JR. 20-Jul-1998 15:18: 6

G A M M A S P E C T R U M A N A L Y S I S R E P O R T

FOR T2098024

Boeing North American / Rocketdyne - SHEA Env Lab
Sample description: T020- T468 SOIL EXCAV #1, 020980024, 7/17/98
Spectrum file name: T2098024
Sample identifier : DARCY
Sample size : 5.630E+02 g
Measured by : FCD

Date of Activity Calculation : 17-Jul-1998 at 14:16:54
Collect started on : 17-Jul-1998 at 14:16:54
Collect ended on : 17-Jul-1998 at 16:13:39

Decay time : 0 years 0 days 0 hours 0 minutes
Live time: 7.000E+03 s real time: 7.005E+03 s dead time: .07 %

Calibration Files

Shape calibration requested : ZM051198
Shape calibration used : ZM051198
Created : 5-Jan-1995 9:39:36
Modified : 28-May-1998 15:21:41

Energy calibration requested : ZM051198
Energy calibration used : ZM051198
Created : 5-Jan-1995 9:39: 3
Modified : 28-May-1998 15:26:23

Efficiency calibration requested : ZM051198
Efficiency calibration used : ZM051198
Created : 2-Feb-1996 10: 6:29
Modified : 28-May-1998 15:29:49

Last search discrimination level: 3.00
Last search FROM channel 12 TO channel 8180
Last fitting discrimination level: 1.64
Last fit FROM channel 1 TO channel 8192
Identification energy tolerance : 1.40
Minimum intensity conv. factor : 10.00
Gamma reference library : C:\SAMPO\LIBRARY\LIBRARY.ILF
with 38 isotopes and 191 gamma lines.

MDA library name: C:\SAMPO\LIBRARY\MDALIB1A.ILF 3
MDA energy tolerance: 1.40 keV
MDA decision limit 1-alpha: 95.00 %
MDA detection limit 1-beta: 95.00 %

Peaked backround file: C:\SAMPO\SPECTRA\BX051198.PTF
Energy tolerance for peaked backround subtraction: 1.40 keV
Threshold factor for peak areas: 1.00

Report Reviewed and
Conforms to N001OP000028 By: _____ RP&HPS Date: 7/20/98

Acceptable for Non-radioactive Disposal
(See Rocketdyne N001OP000034)

Spectrum file: T2098024 Date: 17-Jul-1998 Time: 16:13:39

********** R A D I O N U C L I D E A N A L Y S I S R E P O R T *******

	number	nuclide	conf.value	Activity (pCi/g) measured		decay corrected	saturation
C	1	K-40	.8633	1.648E+01	+- 4.91%	1.648E+01	0.000E+00
	2	Tl-208T	.9406	3.846E-01	+- 4.92%	3.846E-01	0.000E+00
	3	Pb-210U	.9978	7.973E-01	+- 18.85%	7.973E-01	0.000E+00
	4	Pb-212T	.9988	1.180E+00	+- 5.05%	1.180E+00	0.000E+00
C	5	Pb-214U	.8619	6.385E-01	+- 3.65%	6.385E-01	0.000E+00
	6	Bi-214U	.7850	5.408E-01	+- 5.22%	5.408E-01	0.000E+00
	7	Ra-224T	.9990	1.389E+00	+- 8.15%	1.389E+00	0.000E+00
C	8	Ra-226U	.9982	1.552E+00	+- 7.12%	1.552E+00	0.000E+00
C	9	Ac-228T	.5995	9.642E-01	+- 3.08%	9.642E-01	0.000E+00
C	10	Th-234U	.7209	6.248E-01	+- 15.11%	6.248E-01	0.000E+00
	11	U-235	.9973	9.623E-02	+- 6.98%	9.623E-02	0.000E+00
				2.465E+01		2.465E+01	0.000E+00

Flags: C = check; nuclide is a part of an underdetermined solution

SAMPO 90, 1990 PA,MN,JR. 20-Jul-1998 15:20:21

G A M M A S P E C T R U M A N A L Y S I S R E P O R T

FOR T2098025

Boeing North American / Rocketdyne - SHEA Env Lab
Sample description: T020- T468 SOIL EXCAV #2, 020980025, 7/17/98
Spectrum file name: T2098025
Sample identifier : DARCY
Sample size : 5.530E+02 g
Measured by : FCD

Date of Activity Calculation : 20-Jul-1998 at 9:58: 4
Collect started on : 20-Jul-1998 at 9:58: 4
Collect ended on : 20-Jul-1998 at 11:54:49

Decay time : 0 years 0 days 0 hours 0 minutes
Live time: 7.000E+03 s real time: 7.005E+03 s dead time: .07 %

Calibration Files

Shape calibration requested : ZM051198
Shape calibration used : ZM051198
Created : 5-Jan-1995 9:39:36
Modified : 28-May-1998 15:21:41

Energy calibration requested : ZM051198
Energy calibration used : ZM051198
Created : 5-Jan-1995 9:39: 3
Modified : 28-May-1998 15:26:23

Efficiency calibration requested : ZM051198
Efficiency calibration used : ZM051198
Created : 2-Feb-1996 10: 6:29
Modified : 28-May-1998 15:29:49

Last search discrimination level: 3.00
Last search FROM channel 12 TO channel 8180
Last fitting discrimination level: 1.64
Last fit FROM channel 1 TO channel 8192
Identification energy tolerance : 1.40
Minimum intensity conv. factor : 10.00
Gamma reference library : C:\SAMPO\LIBRARY\LIBRARY.ILF
with 38 isotopes and 191 gamma lines.

MDA library name: C:\SAMPO\LIBRARY\MDALIB1A.ILF 3
MDA energy tolerance: 1.40 keV
MDA decision limit 1-alpha: 95.00 %
MDA detection limit 1-beta: 95.00 %

Peaked backround file: C:\SAMPO\SPECTRA\BX051198.PTF
Energy tolerance for peaked backround subtraction: 1.40 keV
Threshold factor for peak areas: 1.00

Report Reviewed and
Conforms to N001OP000028 By: _____ Date: 7/20/98
RP&HPS

Acceptable for Non-radioactive Disposal
(See Rocketdyne N001OP000034)

Cs-137 0.21 pCi/g

Spectrum file: T2098025 Date: 20-Jul-1998 Time: 11:54:49

********** R A D I O N U C L I D E A N A L Y S I S R E P O R T *******

	number	nuclide	conf.value	Activity (pCi/g) measured	decay corrected	saturation
C	1	K-40	.8293	1.580E+01 +- 4.94%	1.580E+01	0.000E+00
	2	CS-137	.9699	2.138E-01 +- 5.50%	2.138E-01	0.000E+00
	3	Tl-208T	.9346	3.361E-01 +- 5.62%	3.361E-01	0.000E+00
	4	Pb-210U	.9963	8.494E-01 +- 19.84%	8.494E-01	0.000E+00
	5	Pb-212T	.9985	1.278E+00 +- 4.96%	1.278E+00	0.000E+00
C	6	Pb-214U	.8708	7.452E-01 +- 3.49%	7.452E-01	0.000E+00
	7	Bi-214U	.8002	6.037E-01 +- 5.00%	6.037E-01	0.000E+00
C	8	Ra-223A	.9883	1.072E-01 +- 21.68%	1.072E-01	0.000E+00
	9	Ra-224T	.9965	1.291E+00 +- 6.66%	1.291E+00	0.000E+00
C	10	Ra-226U	.9997	1.624E+00 +- 10.12%	1.624E+00	0.000E+00
C	11	Ac-228T	.4995	9.652E-01 +- 3.05%	9.652E-01	0.000E+00
C	12	Th-234U	.7105	1.063E+00 +- 10.94%	1.063E+00	0.000E+00
	13	U-235	.9940	1.006E-01 +- 9.92%	1.006E-01	0.000E+00
				2.498E+01	2.498E+01	0.000E+00

Flags: C = check; nuclide is a part of an underdetermined solution

SAMPO 90, 1990 PA,MN,JR. 17-Jul-1998 15: 5: 8

G A M M A S P E C T R U M A N A L Y S I S R E P O R T

FOR T2098026

Boeing North American / Rocketdyne - SHEA Env Lab
Sample description: T020- 468 SOIL EXCAVATION #3, 020980026, 7/17/98
Spectrum file name: T2098026
Sample identifier : DARCY
Sample size : 5.440E+02 g
Measured by : FCD

Date of Activity Calculation : 17-Jul-1998 at 11:44:26
Collect started on : 17-Jul-1998 at 11:44:26
Collect ended on : 17-Jul-1998 at 13:41:10

Decay time : 0 years 0 days 0 hours 0 minutes
Live time: 7.000E+03 s real time: 7.004E+03 s dead time: .06 %

Calibration Files

Shape calibration requested : ZM051198
Shape calibration used : ZM051198
Created : 5-Jan-1995 9:39:36
Modified : 28-May-1998 15:21:41

Energy calibration requested : ZM051198
Energy calibration used : ZM051198
Created : 5-Jan-1995 9:39: 3
Modified : 28-May-1998 15:26:23

Efficiency calibration requested : ZM051198
Efficiency calibration used : ZM051198
Created : 2-Feb-1996 10: 6:29
Modified : 28-May-1998 15:29:49

Last search discrimination level: 3.00
Last search FROM channel 12 TO channel 8180
Last fitting discrimination level: 1.64
Last fit FROM channel 1 TO channel 8192
Identification energy tolerance : 1.40
Minimum intensity conv. factor : 10.00
Gamma reference library : C:\SAMPO\LIBRARY\LIBRARY.ILF
with 38 isotopes and 191 gamma lines.

MDA library name: C:\SAMPO\LIBRARY\MDALIB1A.ILF 3
MDA energy tolerance: 1.40 keV
MDA decision limit 1-alpha: 95.00 %
MDA detection limit 1-beta: 95.00 %

Peaked backround file: C:\SAMPO\SPECTRA\BX051198.PTF
Energy tolerance for peaked backround subtraction: 1.40 keV
Threshold factor for peak areas: 1.00

Report Reviewed and
Conforms to N001OP000028 By: _____ Date: 7/17/98
RP&HPS

Acceptable for Non-radioactive Disposal
(See Rocketdyne N001OP000034)

Spectrum file: T2098026 Date: 17-Jul-1998 Time: 13:41:10

********** R A D I O N U C L I D E A N A L Y S I S R E P O R T *******

	number	nuclide	conf.value	Activity (pCi/g) measured	decay corrected	saturation
C	1	K-40	.8258	1.526E+01 +- 4.97%	1.526E+01	0.000E+00
	2	Tl-208T	.9394	3.389E-01 +- 5.56%	3.389E-01	0.000E+00
	3	Pb-210U	1.0000	7.227E-01 +- 19.81%	7.227E-01	0.000E+00
	4	Pb-212T	.9983	1.177E+00 +- 5.04%	1.177E+00	0.000E+00
C	5	Pb-214U	.8822	5.619E-01 +- 3.76%	5.619E-01	0.000E+00
	6	Bi-214U	.7254	5.207E-01 +- 4.79%	5.207E-01	0.000E+00
	7	Ra-224T	.9994	1.204E+00 +- 8.89%	1.204E+00	0.000E+00
C	8	Ra-226U	.9963	1.165E+00 +- 11.84%	1.165E+00	0.000E+00
C	9	Ac-228T	.5348	9.686E-01 +- 2.91%	9.686E-01	0.000E+00
C	10	Th-234U	.7333	6.935E-01 +- 13.57%	6.935E-01	0.000E+00
	11	U-235	.9989	7.274E-02 +- 11.52%	7.274E-02	0.000E+00
				2.269E+01	2.269E+01	0.000E+00

Flags: C = check; nuclide is a part of an underdetermined solution

SAMPO 90, 1990 PA,MN,JR. 22-Jul-1998 11:24:38

G A M M A S P E C T R U M A N A L Y S I S R E P O R T

FOR T2098028

Boeing North American / Rocketdyne - SHEA Env Lab
Sample description: T020- SOIL T468 EXCAV #4, 020980028, 7/20/98
Spectrum file name: T2098028
Sample identifier : DARCY
Sample size : 5.160E+02 g
Measured by : FCD

Date of Activity Calculation : 20-Jul-1998 at 19:41:54
Collect started on : 20-Jul-1998 at 19:41:54
Collect ended on : 20-Jul-1998 at 21:38:39

Decay time : 0 years 0 days 0 hours 0 minutes
Live time: 7.000E+03 s real time: 7.005E+03 s dead time: .07 %

Calibration Files

Shape calibration requested : ZM051198
Shape calibration used : ZM051198
Created : 5-Jan-1995 9:39:36
Modified : 28-May-1998 15:21:41

Energy calibration requested : ZM051198
Energy calibration used : ZM051198
Created : 5-Jan-1995 9:39: 3
Modified : 22-Jul-1998 11:20:21

Efficiency calibration requested : ZM051198
Efficiency calibration used : ZM051198
Created : 2-Feb-1996 10: 6:29
Modified : 28-May-1998 15:29:49

Last search discrimination level: 3.00
Last search FROM channel 12 TO channel 8180
Last fitting discrimination level: 1.64
Last fit FROM channel 1 TO channel 8192
Identification energy tolerance : .70
Minimum intensity conv. factor : 10.00
Gamma reference library : C:\SAMPO\LIBRARY\LIBRARY.ILF
with 38 isotopes and 191 gamma lines.

MDA library name: C:\SAMPO\LIBRARY\MDALIB1A.ILF
MDA energy tolerance: .70 keV
MDA decision limit 1-alpha: 95.00 %
MDA detection limit 1-beta: 95.00 %

Peaked backround file: C:\SAMPO\SPECTRA\BX051198.PTF
Energy tolerance for peaked backround subtraction: .70 keV
Threshold factor for peak areas: 1.00

Report Reviewed and
Conforms to N001OP000028 By: _____ Date: 7/22/98
RP&HPS

Cs-137 0.09 pCi/g

Acceptable for Non-radioactive Disposal
(See Rocketdyne N001OP000034)

Spectrum file: T2098028 Date: 20-Jul-1998 Time: 21:38:39

********** R A D I O N U C L I D E A N A L Y S I S R E P O R T *******

number	nuclide	conf.value	Activity (pCi/g) measured		decay corrected	saturation
1	K-40	.9991	1.629E+01	+- 4.93%	1.629E+01	0.000E+00
2	CS-137	.9998	9.381E-02	+- 7.14%	9.381E-02	0.000E+00
3	Tl-208T	.9981	3.711E-01	+- 5.18%	3.711E-01	0.000E+00
4	Pb-210U	.9996	6.513E-01	+- 20.69%	6.513E-01	0.000E+00
5	Pb-212T	.9992	1.259E+00	+- 5.11%	1.259E+00	0.000E+00
6	Pb-214U	.9027	6.789E-01	+- 3.88%	6.789E-01	0.000E+00
7	Bi-214U	.9556	6.296E-01	+- 4.59%	6.296E-01	0.000E+00
8	Ra-224T	1.0000	1.282E+00	+- 10.42%	1.282E+00	0.000E+00
9	Ra-226U	1.0000	1.646E+00	+- 7.55%	1.646E+00	0.000E+00
10	Ac-228T	.9684	9.624E-01	+- 2.96%	9.624E-01	0.000E+00
11	Th-234U	.9995	5.440E-01	+- 21.74%	5.440E-01	0.000E+00
12	U-234U	.9901	1.268E+01	+- 26.67%	1.268E+01	0.000E+00
13	U-235	.9806	1.000E-01	+- 7.55%	1.000E-01	0.000E+00
			3.718E+01		3.718E+01	0.000E+00

Flags: C = check; nuclide is a part of an underdetermined solution

SAMPO 90, 1990 PA,MN,JR. 22-Jul-1998 11:29:53

G A M M A S P E C T R U M A N A L Y S I S R E P O R T

FOR T2098029

Boeing North American / Rocketdyne - SHEA Env Lab
Sample description: T020- SOIL T468 EXCAV #5, 020980029, 7/20/98
Spectrum file name: T2098029
Sample identifier : DARCY
Sample size : 4.560E+02 g
Measured by : FCD

Date of Activity Calculation : 21-Jul-1998 at 10:38:10
Collect started on : 21-Jul-1998 at 10:38:10
Collect ended on : 21-Jul-1998 at 12:34:54

Decay time : 0 years 0 days 0 hours 0 minutes
Live time: 7.000E+03 s real time: 7.004E+03 s dead time: .06 %

Calibration Files

Shape calibration requested : ZM051198
Shape calibration used : ZM051198
Created : 5-Jan-1995 9:39:36
Modified : 28-May-1998 15:21:41

Energy calibration requested : ZM051198
Energy calibration used : ZM051198
Created : 5-Jan-1995 9:39:3
Modified : 22-Jul-1998 11:20:21

Efficiency calibration requested : ZM051198
Efficiency calibration used : ZM051198
Created : 2-Feb-1996 10: 6:29
Modified : 28-May-1998 15:29:49

Last search discrimination level: 3.00
Last search FROM channel 12 TO channel 8180
Last fitting discrimination level: 1.64
Last fit FROM channel 1 TO channel 8192
Identification energy tolerance : .70
Minimum intensity conv. factor : 10.00
Gamma reference library : C:\SAMPO\LIBRARY\LIBRARY.ILF
with 38 isotopes and 191 gamma lines.

MDA library name: C:\SAMPO\LIBRARY\MDALIB1A.ILF
MDA energy tolerance: .70 keV
MDA decision limit 1-alpha: 95.00 %
MDA detection limit 1-beta: 95.00 %

Peaked backround file: C:\SAMPO\SPECTRA\BX051198.PTF
Energy tolerance for peaked backround subtraction: .70 keV
Threshold factor for peak areas: 1.00

Report Reviewed and
Conforms to N001OP000028 By: _____ Date: 7/20/98
RP&HPS

Acceptable for Non-radioactive Disposal
(See Rocketdyne N001OP000034)

Spectrum file: T2098029 Date: 21-Jul-1998 Time: 12:34:54

********** R A D I O N U C L I D E A N A L Y S I S R E P O R T *******

Number	nuclide	conf.value	Activity (pCi/g) measured	decay corrected	saturation
1	K-40	.9972	1.469E+01 +- 5.05%	1.469E+01	0.000E+00
2	Tl-208T	.9962	3.669E-01 +- 5.05%	3.669E-01	0.000E+00
3	Pb-212T	.9993	1.313E+00 +- 5.06%	1.313E+00	0.000E+00
4	Pb-214U	.9004	7.067E-01 +- 3.72%	7.067E-01	0.000E+00
5	Bi-214U	.9722	6.182E-01 +- 4.62%	6.182E-01	0.000E+00
6	Ra-223A	.9965	9.310E-02 +- 46.14%	9.310E-02	0.000E+00
7	Ra-224T	.9996	1.455E+00 +- 8.39%	1.455E+00	0.000E+00
C 8	Ra-226U	.9994	1.746E+00 +- 8.43%	1.746E+00	0.000E+00
9	Ac-228T	.9773	1.046E+00 +- 3.01%	1.046E+00	0.000E+00
10	Th-234U	.9994	9.547E-01 +- 15.26%	9.547E-01	0.000E+00
C 11	U-235	.9883	1.061E-01 +- 8.43%	1.061E-01	0.000E+00
			2.309E+01	2.309E+01	0.000E+00

Flags: C = check; nuclide is a part of an underdetermined solution