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*Include
some data
results?*

Monday, December 15, 2001

A. Joseph Nardi, Supervisory Engineer
Westinghouse Electric Company, LLC
P.O. Box 355
Energy Center East 355
Pittsburgh, PA 15230-0355

Dear Joe:

Enclosed for your review is the Draft Final Status Survey Report for the Blairsville Site.
Please provide comments at your earliest convenience.

Sincerely yours,


Barry Koh, Ph.D.
President

cc: D. Wesolowski, WSMP
J. Chapman, Partners

BK/cmw

NWF/Westinghouse-13b

**FINAL STATUS SURVEY REPORT
FORMER ZIRCALOY BURN AREA
WESTINGHOUSE SPECIALTY METALS PLANT
BLAIRSVILLE, PENNSYLVANIA**

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1.0 Background

This document is the Final Status Survey Report for the Former Zircaloy Burn (FZB) Area located at the Westinghouse Specialty Metals Plant Site (WSMPS), Blairsville, Pennsylvania. The area was decommissioned because licensed activities ceased and company management endeavored to use the property without restrictions. The selected remediation of the FZB Area consisted of in-situ characterization/final survey followed by excavation of soils. Soils containing concentrations of uranium that exceed the performance objectives identified in the Branch Technical Position, "Disposal or Onsite Storage of Residual Thorium or Uranium Waste From Past Operations" SECY-81-576 ("1981 BTP") were excavated and disposed of at a licensed low-level radioactive waste facility. The final status survey was conducted in accordance with NUREG/CR-5849 "Manual for Conducting Radiological Surveys in Support of License Termination" ("NUREG/CR-5849"). Concrete and other construction debris type material associated with the FZB Area surveyed and evaluated to the levels specified in "Guidance for Decontamination of Facilities and Equipment Prior to Release for Unrestricted Use or Termination of License for Byproduct, Source, or Special Nuclear Materials". Site remediation activities were conducted in August 2000, and November 2001.

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combination
with*

2.0 Operating History

During the period from approximately 1955 to 1961, fuel manufacturing operations were conducted at the WSMPS facility using enriched uranium in both metal and oxide forms. This involved highly enriched uranium for the Navy fuel program, under contract to the Bettis Atomic Power Laboratory, and low enriched uranium for atomic power plants under License SNM-37 from the U.S. Atomic Energy Commission. AEC license SUC-509 authorized Westinghouse to perform research and development for fuel elements using

depleted uranium at the Blairsville facility. This license was terminated on December 31, 1964. As part of a United States Nuclear Regulatory Commission (USNRC) program to ensure that AEC and USNRC licenses previously terminated meet the USNRC's current criteria for unrestricted use, the Blairsville site was identified as requiring additional review.

Beginning in 1993, Westinghouse personnel performed preliminary screening measurements in areas of the facility where licensed material had been handled. Several interior and exterior areas have since been characterized and released.

^A
remains about

Records indicated that the radioactive wastes were processed and packaged in the area known as the FZB Area (or Cow Palace) of the Blairsville site. The investigation into the FZB Area was initiated in 1995. The results of the initial investigations did not indicate the presence of significant radioactive contamination.

However, in June 1998, during removal of an underground pipe and some sumps in the FZB Area, evidence of more significant radioactive contamination of the area was identified. Subsequent investigation and characterization has identified a variety of uranium contamination, including low enriched, high enriched, depleted uranium, and processed natural uranium.

3.0 Site Description

The remediation site occupied approximately 3 acres, south of the main manufacturing plant at the Blairsville facility. It was a grass-covered field, sloping slightly from west to east. As shown on Figure 1, the site has several prominent features. Excavations remained from the demolition of the FZB building and the removal of underground pipes and sumps. In addition, trenches were excavated as part of the early site characterization. There were two piles of excavated soil, one clean and the other contaminated. Also, an abandoned lagoon that contained concrete construction debris was located during the earlier site activities. (For a full description of the previous characterizations, demolition and excavations see Section 3 of the "Site Remediation Plan, June 2000 ("SRP").)

4.0 Potential Contaminants and Release Guidelines

Based on the operating history of the facility, the potential contaminant was processed uranium. Because of the variety of fuels that were processed, the enrichment of the uranium varied from depleted to fully enriched. As described in a later section, a systematic investigation of the isotopic ratios was conducted to determine actual and average enrichments.

Referring to the Branch Technical Position, several guidelines are applicable to uranium contaminants. Since only processed uranium was used at the Blairsville facility, the guideline for natural uranium is not appropriate. Since the guideline for enriched uranium is a lower concentration than that for depleted uranium, it was selected as the release criteria for the FZB. In addition, the 1981 BTP limits the exposure an individual may receive from any residual contamination. Hence, the guidelines for unrestricted release of the FZB were as follows:

- An average soil contamination concentration of less than 30 pCi/g for total uranium,
- Soil concentration should be sufficiently low so that no individual may receive an external exposure in excess of 10 μ R/hr.

At this concentration and exposure rate level, no further restrictions on land use are needed. (See 1981 BTP)

5.0 Decommissioning Activities

Using the "in-situ characterization" methodology, the final release survey was combined with remedial activities in a streamlined, two-step approach. This approach was intended to ensure a timely and cost effective remediation strategy.

The following activities were conducted in Step One:

- A 10 meter x 10 meter grid was established on the impacted area (FZB Area and surroundings) (Figure 1). The affected area was divided into three sub areas as follows:

- Sub Area A (E20 to E70) x (N0 to N80)
- Sub Area B (E70 to E110) x (N30 to N80)
- Sub Area C (E110 to E130) x (N30 to N80)

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The areas of A, B and C were 4,000 m², 2,000 m² and 1,000 m², respectively, for a total of 7,000 m².

The remainder of the site was classified as unaffected, its area being 5,100 m².

- A 100% walkover gamma scan utilizing a Ludlum Model 2221 coupled with a Ludlum 44-10 (2" x 2" NaI) detector to identify elevated areas. The high and low readings were recorded for each 10 m x 10 m grid. Elevated readings were marked for further investigation.
- Consistent with NUREG/CR-5849 guidance, soil samples were obtained within each 5 meter x 5 meter quadrant of each grid of the affected area, i.e., four samples per 100 m² grid. Samples were collected using a Geoprobe sampler at four foot intervals until native till was reached. Soil cores were scanned with a Ludlum Model 2221 coupled with a Ludlum Model 44-9 detector for field screening and handling purposes. The cores were divided into 2.0 to 2.5 foot sections, depending on the total depth of fill, and submitted for uranium analysis.

Because an underground 8 inch high pressure gas pipeline was located along the western edge of the site, no samples were removed from the unaffected area designate by grids A through J and 1 through 2.

All soil samples were analyzed for U²³⁸ by gamma spectroscopy. The total uranium concentration was calculated using a U²³⁸ to total uranium conversion factor. As will be described in a later section, the conversion factor was derived from results of isotopic uranium analysis of soil containing measurable concentrations of uranium.

- Exposure rate measurements were obtained using a Ludlum Model 19 exposure rate survey meter at each soil sampling location.

Evaluation of the surface and subsurface soil samples and exposure rate measurements were consistent with NUREG/CR-5849 methodology and the results presented in an "Addendum to the Site Remediation Plan, August 2001" ("SRP Addendum"). Grids whose surface and subsurface uranium concentrations and exposure rate measurements were less than the cleanup criteria were deemed as meeting the USNRC guidelines for unrestricted release. No additional final survey/sampling or remediation efforts were conducted at these locations.

Step Two was undertaken at those grids that exceeded the USNRC release criteria as follows:

- The grid/area was excavated and the contaminated material stockpiled for disposal offsite. Soil samples were extracted from the base of the excavation and analyzed by gamma spectroscopy of U-238. The conversion to total uranium concentration was based on the factors developed during Step One, and described in a later section.
- Exposure rate measurements were made with a Ludlum Model 19 detector.

This in-situ characterization/final survey approach was used for all of the soil encompassing the FZB Area, with the exception of the filled-in former lagoon, located to the east (Figure 1). Since it was known that construction debris material was placed in the former lagoon as backfill, it was not possible to utilize the in-situ characterization/final survey approach completely. To supplement the in-situ characterization/final survey, an ex-situ characterization/final survey methodology was undertaken.

The soil and construction debris material were excavated from the lagoon, segregating the construction debris material and stockpiling the soil. The construction debris material was surveyed and found to be in compliance with the USNRC release criteria contained in Regulatory Guide 1.86 (RG 1.86).

Contaminated soil was stockpiled with the contaminated soil from the excavations. Soils with contamination less than 30 pCi/g were used as onsite backfill.

The excavated lagoon was subjected to a 100% walkover gamma scan, soil sampling consistent with NUREG/CR-5849 (i.e., four samples per 100 meter²) and exposure rate measurements obtained at each soil sample location.

In addition, one surface/subsurface sample per each 10 meter x 10 meter grid of the unaffected area was collected via a Geoprobe sampler. The soil samples were collected at four foot intervals until native till was reached. The cores will be scanned, handled and analyzed in a manner identical to the affected area samples. An exposure rate measurement will be obtained at each soil sample location.

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6.0 Final Status Survey Overview

A final radiological survey was conducted to demonstrate that the remedial objectives for the FZB Area had been achieved. The initial final radiological survey was conducted as part of the characterization to identify grids requiring excavation. Contaminated soil was excavated from the identified grids and a follow-up final radiological survey performed of the excavated grids.

6.1 Surface Activity of Construction Debris Material

The specific objectives of the radiological survey of construction debris material were to demonstrate that:

- Average surface contamination levels for each survey unit are within the acceptable release limits (RG 1.86). Averaging will be based on 1 meter² grid area direct measurements and indirect measurements (wipes) will be obtained at each grid intersection.

- (2) Small areas of residual activity known as "hot spots" do not exceed three times the average value. NUREG/CR-5849 allows averaging elevated areas if the contamination levels are between one and three times the average limit and the weighted average over any contiguous 1 meter² area is less than the average limit.
- (3) Reasonable efforts have been made to clean up removable activity and removable activity does not exceed 20% of the average surface activity guidelines.

6.2 Soil Activity

The specific objectives of the radiological survey and analysis of potentially contaminated soil were to demonstrate that:

- (1) Average uranium concentrations are within the release criteria. Averaging is based on 100 meter² grid area and approximately 1 meter depth (i.e., 100 meter³).
- (2) Small areas of residual activity known as "hotspots" do not exceed three times the average value.
- (3) Reasonable efforts have been made to identify and remove hotspots that may exceed the average guideline by greater than a factor of $(100/A)^{1/2}$, where A is the area (in meter²) of the hotspot.
- (4) Exposure rates do not exceed 10 μ R/hr above background at 1 m above the surface. Exposure rates may be averaged over a 100 meter² grid area. Maximum exposure rates over any discrete of <100 meter² may not exceed 20 μ R/hr above background.

The above conditions will be demonstrated at the 95% confidence level for each survey unit as a whole.

The survey data will be used to calculate the total inventory of residual activity from site operations.

6.3 Release Criteria

On the basis of the site contaminants, the release criteria are:

- The soil cleanup criterion for enriched uranium is 30 pCi/g total uranium (1981 BTP).

The surface contamination guidelines for uranium are (RG 1.86):

1,000 dpm alpha, beta-gamma/100 cm², average over 1 meter²

3,000 dpm alpha, beta-gamma/100 cm², maximum over 100 cm²

200 dpm alpha, beta-gamma/100 cm², removable

The exposure rate guideline is:

10 μRem/hr above background (average) at one meter from soil surfaces (if the weighted average over surrounding 100 meter² is less than the average limit).

20 μRem/hr above background (maximum) at one meter from soil surfaces.

6.4 Survey Plan and Procedures

The survey plan and procedures were as described in Section 4 of the Site Remediation Plan (SRP). The instruments used during the surveys are described in Table C.

7.0 Survey Results and Evaluations

7.1 Step One Results

The soil samples were removed during August 2000. The previously used 10 meter x 10 meter grid, consisting of 102 grids, was reestablished on the site. (Refer to Figure 1) A 100% walkover survey was conducted, recording the highest and lowest reading for each grid, and marking any "hot spots" exceeding twice background. Sampling occurred at

one location within each grid in the unaffected area and at four locations within each grid in the affected area. In the affected area, each sample location is identified as a quadrant, i.e., 5 meter x 5 meter. In most instances, two 2 foot samples were removed at each location. However, there were some grids where physical constraints prevented complete sample removal. Exposure rate measurements were made at each sampling location. As shown on Table B, the exposure rates varied from background to a maximum of 5 μ R/hr above background.

A Geoprobe® was used to extract the soil samples, which were scanned and packaged as required by the remediation plan. Outreach Laboratory, Broken Arrow, Oklahoma, initially analyzed all samples by gamma spectrometry to determine the U²³⁸ concentration. As reported by Cummings Riter Consultants, Inc. in the “Data Summary Report – Radiological Testing, June 15, 1999”, (Data Summary) previous tests on soil samples from the site revealed a wide variation in the amount of enrichment among the samples. The conservative ratio, U^{Total}/U²³⁸, of 10 was used to screen the initial results for total uranium concentration in excess of the guideline value, 30 pCi/gm. In this manner 39 quadrants were identified for potential excavation.

One sample from each of the 39 quadrants that exceeded the guideline was then analyzed by alpha spectrometry to determine the concentrations of U²³⁴ and U²³⁵. These results, plus the results of 22 other samples, were used to develop U²³⁴/U²³⁸ and U²³⁵/U²³⁸ ratios, which were applied to the gamma spectrometry results as, follows:

- The ratios determined for a particular sample were applied to the sample and the other samples from the same grid,
- The alpha spectrometry results were used to calculate average ratios for each of the four site areas; A, B, C, and unaffected, and were applied to all other samples in the area.

The calculated average ratios for each area can be found in Table D.

After recalculating the total uranium concentration of all samples using the U²³⁴/U²³⁸ and U²³⁵/U²³⁸ ratios as described above, average total uranium concentration was calculated

for each quadrant or grid as specified in Section 2.1.2.2 of the Site Remediation Plan. The average total Uranium concentration of 14 quadrants exceeded the guideline value. The maximum and average concentration, as well as, the uranium ratios for each of these quadrants are presented in Table D.

In addition, samples from the following four quadrants failed to meet the "hot spot" criterion (3): H5-5, H6-2, G4-4, and A7.

7.2 Step Two Results

Excavation of contaminated soils began on October 29, 2001 and was completed by November 20, 2001. The excavations were characterized by three separate activities. The first was the removal of contaminated soils from the 14 grid locations identified on Table D. The second was the removal and analysis of additional soil samples from the grids that did meet the "hot spot" criterion. Based on the results of the additional analyses, two grids, H5-5 and H6-2 were excavated. The third activity was removal of contaminated soils from the former lagoon. Direct measurements were used to define the limits of contamination within the lagoon area. All concrete debris removed from the lagoon was scanned and found to be uncontaminated.

After soil removal, the open excavations were scanned to confirm that no "hot spots" remained. Soil samples were removed for analysis and exposure rate measurements made at the sample location. The exposure rates measured after excavation are presented on Table B.

The results of 543 soil samples are presented in Table A. The conversion of the U^{238} to U^{Total} is based on ratios as described in Section 7.1, above. The table shows that after soil removal, the average U^{Total} concentration within all grids is within the guideline value, 30 pCi/gm. A statistical analysis of the data, presented at the conclusion of Table A, confirmed that the average concentration of U^{Total} , at the 95% confidence level, is less than 30 pCi/gm.

Results of eighteen individual samples, from thirteen separate grids, exceeded 30 pCi/gm. The guidance of NUREG/CR 5849 states that when the concentration exceeds the

guideline value, but is less than three times the guideline value, the area weighted average of elevated activity must be considered when calculating the grid average concentration. The statistical analyses for each grid are included as Appendix A and demonstrate compliance with the guideline value, 30 pCi/gm.

In addition to excavating sixteen grids and the former lagoon, the "contaminated soil pile," shown on Figure 1, was removed. Soil samples extracted from beneath the pile and surface scans after the pile was removed confirmed removal of the "contaminated soil pile."

8.0 Radioactive Waste Disposal

Approximately 760 cubic yards of contaminated soil from the excavations and the "contaminated soil pile" were disposed of offsite at Envirocare of Utah. The total weight of the soil, as measured during loading for transportation, was 1,586,390 pounds. Based on the average concentration of U^{Total} of the excavated grids, as shown on Table D, the disposed material contained 62.6 milliCuries of Uranium.

9.0 Residual Uranium

The following assumptions were used to calculate the residual uranium at the site:

- The volume is 102 grids (10,200 meter²) and an average depth of 2 feet,
- The soil density is the same as the material shipped offsite,
- The Uranium concentration is the average concentration of the sample results presented in Table, A, i.e., 13 pCi/gm.

Based on these assumptions, the residual Uranium at the site is approximately 101 millicuries.

10.0 Conclusion

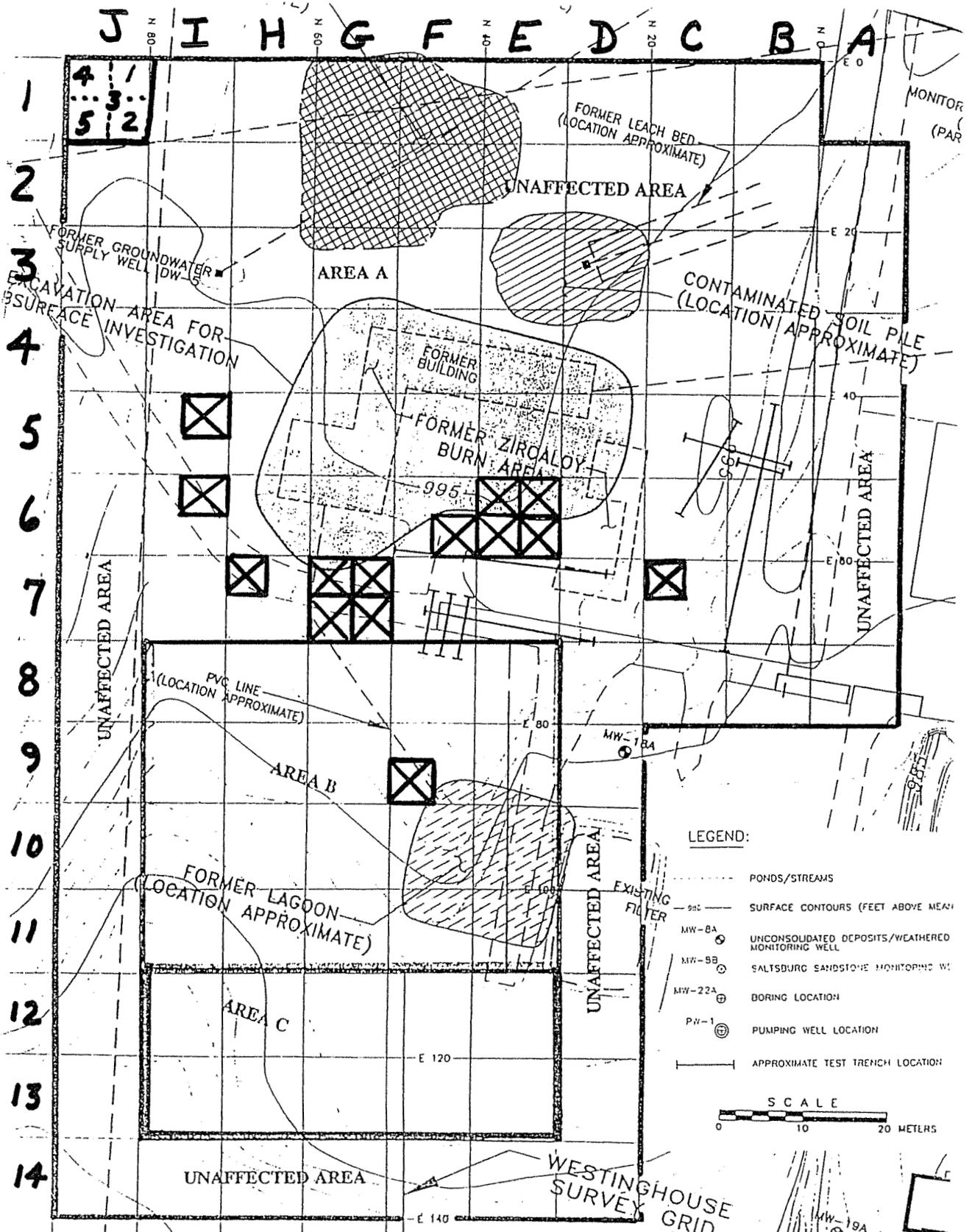
The results presented in this Final Status Survey Report demonstrate that residual Uranium concentration at the Blairsville Site of the Westinghouse Specialty Metals Plant

Removal
2 half?

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is less 30 pCi/gm, and is therefore in compliance with the guidelines of 1981 Branch Technical Position for unrestricted use of the site.

AREAS TO BE EXCAVATED ☒



LOCATION MAP

FORMER ZIRCALOY BURN AREA
SPECIALTY METALS PLANT
BLAIRSVILLE, PENNSYLVANIA

Table A
Soil Sample Results
U238, Total U, and Average Total U per grid

Location	Comment	U ²³⁸ pCi/g	U ²³⁸ /U' pCi/g	U ^{Total} pCi/g	U ^{Total} Average pCi/g
A 3-3 0.2'	BDL	2.27	3.1	7.0	
A 3-3 2.4'		2.42	3.1	7.5	
					7.2
A 4-3 0-2'	BDL	1.92	3.1	5.9	
A 4-3 2-4'	BDL	2.71	3.1	8.3	
					7.1
A 5-3 0-2'	BDL	2.10	3.1	6.5	
A 5-3 2-4'	BDL	2.77	3.1	8.5	
					7.5
A 6-3 0-2'	BDL	2.76	3.1	8.5	
A 6-3 2-4'	BDL	2.97	3.1	9.1	
					8.8
A 7-3 0-2'	BDL	1.94	5.6	10.9	
A 7-3 2-4'	Isotopic	6.32	5.6	35.6	
A7-3R 2-4'		1.89	3.1	5.8	
A7-5R 2-4'		2.51	3.1	7.8	
					15.0
A 8-3 0.2'	BDL	2.83	3.1	8.7	
A 8-3 2.4'	BDL	2.43	3.1	7.5	
					8.1
B3-1 0-2'	Isotopic	26.60	2.1	55.3	
B3-1 2-4'	BDL	1.00	2.1	2.1	
B3-4 0-2'	BDL	1.01	2.1	2.1	
B3-4 2-4'	BDL	0.94	2.1	2.0	
B3-5 0-2.5'	BDL	1.02	2.1	2.1	
B3-2 0-2.5'	BDL	2.64	2.1	5.5	
					11.5
B 4-1 0-2'	Isotopic	1.10	2.3	2.6	
B 4-1 2-4'	BDL	2.63	2.3	6.1	
B4-2 0-2'	BDL	2.17	2.0	4.4	
B4-2 2-4'	BDL	2.86	2.0	5.8	
B4-4 0-2'	Isotopic	0.80	2.0	1.6	
B4-4 2-4'	BDL	2.97	2.0	6.0	
B4-5 0-2'	BDL	2.31	2.0	4.7	
B4-5 2-4'	BDL	2.25	2.0	4.5	
					4.5
B 5-1 0-2'	BDL	2.53	3.4	8.7	
B 5-1 2-4'	BDL	1.82	3.4	6.2	
B 5-2 0-2'		3.76	3.4	12.9	
B5-4 0-2'	Isotopic	0.85	3.4	2.9	
B5-4 0-4'	BDL	2.09	3.4	7.1	
B5-5 0-2'	BDL	2.85	3.4	9.7	
B5-5 2-4'	BDL	1.02	3.4	3.5	
					7.3

*All BDLs?
 What used
 in calculations?*

Table A
Soil Sample Results
U238, Total U, and Average Total U per grid

Location	Comment	U ²³⁸	U ²³⁸ /U ¹	U ^{Total}	U ^{Total} Average
B6-1 0-2'	BDL	1.15	2.6	3.0	
B6-1 2-4'	BDL	0.98	2.6	2.6	
B 6-2 0-2'	Isotopic	7.90	2.6	20.7	
B 6-2 2-4'	BDL	2.63	2.6	6.9	
B6-4 0-2'	BDL	2.95	2.6	7.7	
B6-4 2-4'	BDL	1.02	2.6	2.7	
B6-5 0-2'		2.5	2.6	6.6	
B6-5 2-4'	BDL	1.29	2.6	3.4	
					6.7
B 7-1 0-2'	Isotopic	4.74	3.0	14.0	
B 7-1 2-4'	BDL	2.84	3.0	8.4	
B 7-2 0-2'	Isotopic	3.88	2.5	9.7	
B 7-2 2-4'	BDL	2.50	2.5	6.3	
B7-4 0-2'		2.54	2.7	6.9	
B7-4 2-4'	BDL	1.94	2.7	5.3	
B7-5 0-2'	BDL	0.99	2.7	2.7	
B7-5 2-4'	BDL	0.93	2.7	2.5	
					7.0
B 8-3 0-2'	BDL	1.60	3.1	4.9	
B 8-3 2-4'	BDL	0.72	3.1	2.2	
					3.6
C 3-1 0-2'	BDL	2.09	8.1	16.9	
C 3-1 2-4'	BDL	2.92	8.1	23.6	
C 3-2 0-2'	BDL	2.04	8.1	16.5	
C 3-2 2-4'	BDL	2.52	8.1	20.4	
C 3-4 0-2'		2.67	8.1	21.6	
C 3-4 2-4'		2.75	8.1	22.2	
C 3-5 0-2'	BDL	2.93	8.1	23.7	
					20.7
C 4-1 0-2'	BDL	2.53	2.4	6.0	
C 4-1 2-4'		1.88	2.4	4.5	
C 4-2 0-2'	Isotopic	4.41	2.4	10.5	
C 4-2 2-4'	BDL	2.07	2.4	4.9	
C 4-4 0-2	BDL	2.29	2.4	5.4	
C 4-4 2-4'	BDL	1.86	2.4	4.4	
					5.9
C 5-1 0-2.5	BDL	2.85	8.1	23.1	
C 5-2 0-2'	BDL	1.34	8.1	10.8	
C 5-2 2-4'	BDL	0.93	8.1	7.5	
C 5-4 0-2.5	BDL	2.92	8.1	23.6	
C 5-5 0-2'	BDL	2.42	8.1	19.6	
C 5-5 2-4'	BDL	2.87	8.1	23.2	
					18.0
C 6-2 0-2'	BDL	3.00	10.0	30.0	
C 6-2 2-4'	BDL	2.83	10.0	28.3	
C 6-4 0-2.5	BDL	2.05	10.0	20.5	
C 6-5 0-2.5	BDL	2.14	10.0	21.4	
C6-1 0-2'	BDL	2.39	10.0	23.9	
C6-1 2-4'	BDL	2.93	10.0	29.3	
					25.5

Table A
Soil Sample Results
U238, Total U, and Average Total U per grid

Location	Comment	U ²³⁸	U ²³⁸ /U ¹	U ^{Total}	U ^{Total} Average
C7-1 0-2'	BDL	2.35	5.6	13.2	
C7-1 2-4'	BDL	2.72	5.6	15.3	
C7-2 0-2'	BDL	1.16	5.6	6.5	
C7-2 2-4'	BDL	1.03	5.6	5.8	
C7-4B	BDL	1.54	8.1	12.5	
C 7-5 0-2'	Isotopic	4.73	5.6	26.6	
C 7-5 2-4'	BDL	2.01	5.6	11.3	
					13.0
C 8-3 0-2'	BDL	2.42	3.1	7.5	
C 8-3 2-4'	BDL	0.47	3.1	1.4	
					4.5
D 3-1 0-2'	BDL	2.64	8.1	21.4	
D 3-1 2-4'	BDL	2.90	8.1	23.5	
D 3-2 0-2'	BDL	2.88	8.1	23.3	
D 3-2 2-4'	BDL	2.74	8.1	22.2	
D 3-4 0-2'	BDL	2.77	8.1	22.4	
D 3-4 2-4'	BDL	2.40	8.1	19.4	
D 3-5 0-2'	BDL	2.65	8.1	21.4	
D 3-5 2-4'	BDL	1.90	8.1	15.4	
					21.1
D 4-1 0-2'	BDL	1.45	8.1	11.7	
D 4-1 2-4'	BDL	2.42	8.1	19.6	
D 4-2 0-2'	BDL	2.59	8.1	21.0	
D 4-2 2-4'	BDL	2.12	8.1	17.2	
D 4-4 2-4'	BDL	2.46	8.1	19.9	
D 4-5 0-2'	BDL	3.00	8.1	24.3	
D 4-5 2-4'	BDL	2.50	8.1	20.2	
					19.1
D 5-1 0-2'	Isotopic	1.34	4.5	6.0	
D 5-1 2-4'	BDL	2.39	4.5	10.7	
D 5-2 0-2'	BDL	2.06	4.5	9.2	
D 5-2 2-4'	BDL	2.21	4.5	9.9	
D 5-4 0-2'	BDL	2.29	4.5	10.3	
D 5-4 2-4'	BDL	2.43	4.5	10.9	
D 5-5 0-2'	BDL	1.83	4.5	8.2	
D 5-5 2-4'	BDL	0.23	4.5	1.0	
					8.3
D 6-1 0-2'	BDL	2.13	10.6	22.6	
D 6-1 2-4'	BDL	2.63	10.6	27.9	
D 6-2 0-2'	BDL	1.99	10.6	21.1	
D 6-2 2-4'	BDL	1.91	10.6	20.3	
D 6-4 0-2'	BDL	1.99	10.6	21.1	
D 6-4 2-4'	BDL	2.24	10.6	23.8	
D 6-5 0-2'	Isotopic	2.55	10.6	27.1	
D 6-5 2-4'		2.21	10.6	23.5	
					23.4

Table A
Soil Sample Results
U238, Total U, and Average Total U per grid

Location	Comment	U ²³⁸	U ²³⁸ /U ¹	U ^{Total}	U ^{Total} Average
D 7-1 0-2'	Isotopic	5.46	7.2	39.5	
D 7-1 2-4'	BDL	3.00	7.2	21.7	
D 7-2 0-2'	BDL	3.00	7.4	22.3	
D 7-2 2-4'	BDL	2.60	7.4	19.3	
D 7-4 0-2'	Isotopic	6.73	9.5	64.2	
D 7-4 2-4'		0.842	9.5	8.0	
D 7-5 0-2'	Isotopic	1.78	5.7	10.2	
D 7-5 2-4'	BDL	1.66	5.7	9.5	
					24.4
D 8-3 0.2'	BDL	2.49	3.1	7.7	
D 8-3 2.4'	BDL	1.90	3.1	5.9	
					6.8
D 9-3 0-2'	BDL	2.42	3.1	7.5	
D 9-3 2-4'	BDL	2.91	3.1	9.0	
					8.2
D 12-3 0.2'	BDL	2.37	3.1	7.3	
D 12-3 2.4'	BDL	1.96	3.1	6.0	
					6.7
D 13-3 0.2'	BDL	2.9	3.1	8.9	
D 13-3 2.4'	BDL	2.19	3.1	6.7	
					7.8
D 14-3 0.2'	BDL	2.14	3.1	6.6	
D 14-3 2.4'	BDL	2.19	3.1	6.7	
					6.7
E 3-1 0-2'	BDL	2.60	8.1	21.0	
E 3-1 2-4'	BDL	2.48	8.1	20.1	
E 3-2 0-2'	BDL	2.37	8.1	19.2	
E 3-2 2-4'	BDL	1.86	8.1	15.0	
E 3-4 0-2'	BDL	2.15	8.1	17.4	
E 3-4 0-2'	BDL	2.49	8.1	20.1	
E 3-4 2-4'	BDL	2.88	8.1	23.3	
E 3-4 2-4'	BDL	2.54	8.1	20.5	
E 3-5 0-2'	BDL	1.58	8.1	12.8	
E 3-5 2-4'	BDL	2.90	8.1	23.5	
					19.3
E 4-1 0-2.5'	BDL	2.80	4.9	13.7	
E 4-2 0-2'	Isotopic	1.36	4.9	6.7	
E 4-2 2-4'	BDL	1.95	4.9	9.5	
E 4-5 0-2'	BDL	2.45	4.9	12.0	
E 4-5 2-4'	BDL	2.59	4.9	12.7	
					10.9
E 5-1 0-2'	BDL	2.74	8.1	22.2	
E 5-1 2-4'	BDL	2.66	8.1	21.5	
E 5-2 0-2'	Isotopic	2.21	16.5	36.4	
E 5-2 2-4'	BDL	2.07	16.5	34.1	
E 5-4 0-2'	BDL	2.12	8.1	17.2	
E 5-5 0-2'	BDL	2.60	8.1	21.0	
					25.4

Table A
Soil Sample Results
U238, Total U, and Average Total U per grid

Location	Comment	U ²³⁸	U ²³⁸ /U ¹	U ^{Total}	U ^{Total} Average
E 6-1B	BDL	2.67	8.1	21.6	
E 6-2B	BDL	2.39	8.1	19.4	
E 6-4B		1.14	8.1	9.2	
E 6-5B		2.19	8.1	17.7	
					17.0
E 7-1 0-2.5	BDL	2.83	5.8	16.4	
E 7-2 0-2'	BDL	1.72	5.8	10.0	
E 7-2 2-4'	BDL	2.48	5.8	14.4	
E 7-4 0-2'	Isotopic	6.00	5.8	34.7	
E 7-4 2-4'	BDL	3.00	5.8	17.4	
E 7-5 0-2'	BDL	1.86	5.8	10.8	
					17.3
E 8-1 0-2'	BDL	2.61	4.6	12.0	
E 8-2 0-2'	BDL	2.36	4.6	10.8	
E 8-2 2-4'	BDL	2.39	4.6	10.9	
E 8-4 0-2'	BDL	2.91	4.6	13.3	
E 8-4 2-4'	BDL	2.67	4.6	12.2	
E 8-5 0-2'	BDL	2.83	4.6	13.0	
E 8-5 2-4'	BDL	2.78	4.6	12.7	
					12.1
E 9-1 0-2'		2.83	4.6	13.0	
E 9-1 2-4'		1.11	4.6	5.1	
E 9-2 0-2'	BDL	2.24	4.6	10.3	
E 9-2 2-4'		1.81	4.6	8.3	
E 9-4 0-2'	BDL	2.60	4.6	11.9	
E 9-4 2-4'	BDL	2.40	4.6	11.0	
E 9-5 0-2'	BDL	2.72	4.6	12.5	
E 9-5 2-4'		1.97	4.6	9.0	
					10.1
E 10-4 0-2.5	BDL	2.96	4.6	13.6	
E 10-5 0-2	BDL	2.89	4.6	13.2	
E 10-5 2-4	BDL	2.45	4.6	11.2	
					12.7
E 11-4 0-2.5	BDL	2.55	4.6	11.7	
					11.7
E12-1 0-2'	BDL	2.01	2.6	5.2	
E12-1 2-4'		2.52	2.6	6.5	
E12-2 0-2'	BDL	2.94	2.6	7.6	
E12-2 2-4'	BDL	2.75	2.6	7.1	
E12-4 0-2'	BDL	2.75	2.6	7.1	
E12-4 2-4'	BDL	1.82	2.6	4.7	
E12-5 0-2'	BDL	2.78	2.6	7.1	
E12-5 2-4'		0.951	2.6	2.4	
					5.9

Table A
Soil Sample Results
U238, Total U, and Average Total U per grid

Location	Comment	U ²³⁸	U ²³⁸ /U ¹	U ^{Total}	U ^{Total} Average
E13-1 0-2'	BDL	2.89	2.7	7.8	
E13-1 2-4'	BDL	2.41	2.7	6.5	
E13-2 0-2'	BDL	3.0	2.6	7.8	
E13-2 2-4'	Isotopic	1.10	2.6	2.8	
E13-4 0-2'	BDL	2.91	2.7	7.9	
E13-4 2-4'	BDL	2.05	2.7	5.6	
E13-5 0-2'	BDL	2.66	2.8	7.5	
E13-5 2-4'	Isotopic	3.00	2.8	8.5	
					6.8
E 14-3 0.2'	BDL	2.31	2.7	6.3	
E 14-3 2.4'	Isotopic	1.29	2.7	3.5	
					4.9
F 3-1 0-2'	BDL	2.07	6.2	12.7	
F 3-1 2-4'	BDL	2.83	6.2	17.4	
F 3-2 0-2'	Isotopic	2.31	6.2	14.2	
F 3-5 0-2'	BDL	2.83	6.2	17.4	
F 3-5 2-4'	BDL	2.04	6.2	12.5	
					14.9
F 4-1 0-2'	Isotopic	7.42	7.7	57.2	
F 4-1R 0-2'	BDL	1.79	8.1	14.5	
F 4-1 2-4'	BDL	2.09	7.7	16.1	
F 4-2 0-2.5'	BDL	2.41	7.7	18.6	
F 4-4 0-2'	BDL	2.36	7.7	18.2	
F 4-4 2-4'	BDL	2.76	7.7	21.3	
F 4-4 2-4'	BDL	2.09	7.7	16.1	
					23.1
F 5-1 0-2'	BDL	2.28	8.1	18.4	
F 5-1 2-4'	BDL	2.81	8.1	22.7	
F 5-2 0-2'	BDL	2.27	8.1	18.4	
F 5-4 0-2'	BDL	2.82	8.1	22.8	
F 5-4 2-4'	BDL	2.31	8.1	18.7	
F 5-5 0-2'		2.45	8.1	19.8	
F 5-5 2-4'	BDL	2.83	8.1	22.9	
					20.5
F 6-1 0-2.5'		3.59	2.4	8.6	
F 6-2B	BDL	2.55	8.1	20.7	
F 6-4 0-2'	Isotopic	1.53	2.4	3.7	
F 6-4 0-2'	BDL	2.10	2.4	5.0	
F 6-4 2-4'	BDL	2.10	2.4	5.0	
F 6-5 0-2'	BDL	2.77	2.4	6.6	
F 6-5 2-4'	BDL	2.41	2.4	5.8	
					7.9
F 7-1 0-2.5'	BDL	2.61	8.1	21.1	
F 7-2 0-2'	BDL	2.83	8.1	22.9	
F 7-4 0-2'	BDL	2.86	8.1	23.1	
F 7-4 2-4'	BDL	1.71	8.1	13.8	
F 7-5 0-2'	BDL	2.84	8.1	23.0	
F 7-5 2-4'	BDL	2.34	8.1	18.9	
					20.5

Table A
Soil Sample Results
U238, Total U, and Average Total U per grid

Location	Comment	U ²³⁸	U ²³⁸ /U ¹	U ^{Total}	U ^{Total} Average
F 8-1 0-2'	BDL	2.64	4.6	12.1	
F 8-1 2-4'	BDL	2.01	4.6	9.2	
F 8-2 0-2'	BDL	2.01	4.6	9.2	
F 8-2 2-4'	BDL	2.39	4.6	10.9	
F 8-4 0-2'	BDL	2.69	4.6	12.3	
F 8-4 2-4'	BDL	2.81	4.6	12.9	
F 8-5 0-2.5'	BDL	2.40	4.6	11.0	
					11.1
F 9-1B	BDL	1.90	4.6	8.7	
F 9-2B		2.11	4.6	9.7	
F 9-4B	BDL	1.49	4.6	6.8	
F 9-5B	BDL	1.51	4.6	6.9	
					8.0
F 10-1 0-2'		1.93	3.4	6.5	
F 10-1 2-4'	BDL	2.15	4.6	9.9	
F 10-2 0-2'	Isotopic	3.17	4.6	14.6	
F 10-2 2-4'	BDL	1.99	4.6	9.1	
F 10-4 0-2'	BDL	1.69	3.4	5.7	
F 10-4 2-4'	BDL	1.43	3.4	4.8	
F 10-5 0-2'	BDL	1.86	2.1	3.9	
F 10-5 2-4'	Isotopic	3.55	2.1	7.3	
					7.7
F 11-1 0-2'	BDL	1.97	4.6	9.0	
F 11-1 2-4'	BDL	2.31	4.6	10.6	
F 11-2 0-2'	BDL	2.04	4.6	9.3	
F 11-2 2-4'	BDL	2.86	4.6	13.1	
F11-4 0-2'	BDL	2.06	4.6	9.4	
F11-4 2-4'	BDL	2.77	4.6	12.7	
F11-5 0-2'	BDL	2.98	4.6	13.6	
F11-5 2-4'	BDL	2.21	4.6	10.1	
					11.0
F12-1 0-2'	BDL	3.00	2.9	8.7	
F12-1 2-4'	BDL	2.75	2.9	7.9	
F12-2 0-2'	BDL	2.92	2.3	6.7	
F12-2 2-4'	Isotopic	1.20	2.3	2.8	
F12-4 0-2'	BDL	2.38	2.9	6.9	
F12-4 2-4'	BDL	2.78	2.9	8.0	
F12-5 0-2'	Isotopic	0.52	3.5	1.8	
F12-5 2-4'	BDL	2.54	3.5	8.9	
					6.5
F13-1 0-2'	BDL	2.18	2.6	5.6	
F13-1 2-4'	BDL	1.99	2.6	5.1	
F13-2 0-2'	BDL	2.53	2.6	6.5	
F13-2 2-4'		2.13	2.6	5.5	
F13-4 0-2'	BDL	4.98	2.6	12.8	
F13-4 2-4'	BDL	2.62	2.6	6.7	
F13-5 0-2'	BDL	2.71	2.6	7.0	
F13-5 2-4'	BDL	2.75	2.6	7.1	
					6.5

Table A
Soil Sample Results
U238, Total U, and Average Total U per grid

Location	Comment	U ²³⁸	U ²³⁸ /U ¹	U ^{Total}	U ^{Total} Average
F 14-3 0-2'	BDL	2.97	3.1	9.1	
F 14-3 2-4'	BDL	2.71	3.1	8.3	
					8.7
G 3-1 0-2'	BDL	2.44	8.1	19.7	
G 3-1 2-4'	BDL	2.14	8.1	17.3	
G 3-2 0-2'	BDL	1.89	8.1	15.3	
G 3-2 2-4'	BDL	2.63	8.1	21.3	
G 3-4 0-2'	BDL	2.52	8.1	20.4	
G 3-5 0-2'	BDL	2.70	8.1	21.8	
G 3-5 2-4'	BDL	2.68	8.1	21.7	
					19.6
G 4-1 0-2'	BDL	1.79	8.1	14.5	
G 4-1 2-4'	BDL	2.67	8.1	21.6	
G 4-2 0-2'	BDL	2.05	8.1	16.6	
G 4-2 2-4'	BDL	2.02	8.1	16.3	
G 4-4 0-2'	BDL	1.85	8.1	15.0	
G 4-5 0-2.5'	BDL	2.48	8.1	20.1	
					17.3
G 5-1 0-2'	BDL	2.69	8.1	21.8	
G 5-1 2-4'	BDL	1.79	8.1	14.5	
G 5-2 0-2'	BDL	2.36	8.1	19.1	
G 5-2 2-4'	BDL	1.94	8.1	15.7	
G 5-4 0-2'	BDL	2.04	8.1	16.5	
G 5-4 2-4'	BDL	2.97	8.1	24.0	
G 5-5 0-2'	BDL	2.64	8.1	21.4	
G 5-5 2-4'	BDL	2.06	8.1	16.7	
					18.7
G 6-1 0-2'	Isotopic	6.79	8.1	55.0	
G 6-1 2-4'	BDL	1.97	8.1	16.0	
G 6-2 0-2'	BDL	2.87	8.1	23.2	
G 6-2 2-4'		1.98	8.1	16.0	
G 6-4 0-2'		3.09	8.1	25.0	
G 6-4 2-4'	BDL	2.20	8.1	17.8	
G 6-5 0-2'	BDL	2.44	8.1	19.8	
					24.7
G 7-1B		2.01	8.1	16.3	
G 7-1 2-4'	BDL	2.89	8.1	23.5	
G 7-2B		1.32	8.1	10.7	
G 7-2BR		5.33	8.1	43.2	
G 7-2 2-4'	BDL	3.00	2.8	8.4	
G 7-4B		3.54	8.1	28.7	
G 7-4 2-4'	BDL	2.91	11.2	32.7	
G 7-5B	BDL	2.46	8.1	19.9	
G 7-5 2-4'	BDL	1.92	4.6	8.8	
					21.4

Table A
Soil Sample Results
U238, Total U, and Average Total U per grid

Location	Comment	U ²³⁸	U ²³⁸ /U ¹	U ^{Total}	U ^{Total} Average
G 8-1 0-2'		4.12	3.5	14.5	
G 8-1 2-4'		4.00	3.5	14.1	
G 8-2 0-2'	Isotopic	9.78	3.7	36.4	
G 8-2 2-4'	BDL	1.96	3.7	7.3	
G 8-4 0-2'	Isotopic	16.60	3.3	55.4	
G 8-4 2-4'	BDL	2.85	3.3	9.5	
G 8-5 0-2.5'		2.50	3.5	8.8	
					20.9
G 9-1 0-2'	Isotopic	0.64	4.8	3.1	
G 9-1 2-4'	BDL	2.19	4.8	10.5	
G 9-2 0-2'	BDL	2.74	3.9	10.6	
G 9-2 2-4'	BDL	2.11	3.9	8.1	
G 9-4 0-2'		2.53	3.9	9.8	
G 9-4 2-4'	BDL	2.06	3.9	8.0	
G 9-5 0-2'	Isotopic	0.40	2.9	1.2	
G 9-5 2-4'	BDL	2.79	2.9	8.0	
					7.4
G 10-1 0-2'	Isotopic	0.26	2.8	0.7	
G 10-1 2-4'	BDL	1.91	2.8	5.4	
G 10-4 0-2'	BDL	2.09	2.8	5.9	
G 10-4 2-4'	BDL	2.36	2.8	6.6	
G 10-2 0-2.5'	BDL	2.40	2.8	6.7	
G 10-5 0-2.5'	BDL	1.01	2.8	2.8	
					4.7
G 11-1 0-2'	BDL	2.12	4.6	9.7	
G 11-2 0-2.5'	BDL	2.82	4.6	12.9	
G 11-4 0-2'	BDL	1.87	4.6	8.6	
G 11-4 2-4'	BDL	2.44	4.6	11.2	
G 11-5 0-2'	BDL	2.57	4.6	11.8	
G 11-5 2-4'	BDL	2.83	4.6	13.0	
					11.2
G 12-1 0-2'	BDL	2.79	2.6	7.2	
G 12-2 0-2'	BDL	2.98	2.6	7.7	
G 12-2 2-4'	BDL	2.24	2.6	5.8	
G 12-4 0-2'	BDL	2.03	2.6	5.2	
G 12-4 2-4'	BDL	2.51	2.6	6.5	
G 12-5 0-2'	BDL	2.02	2.6	5.2	
					6.2
G 13-1 0-2'	BDL	2.80	2.4	6.7	
G 13-1 2-4'	BDL	2.76	2.4	6.6	
G 13-2 0-2'	BDL	2.12	2.4	5.0	
G 13-2 2-4'	BDL	2.01	2.4	4.8	
G 13-4 0-2'		2.75	2.4	6.5	
G 13-4 2-4'	BDL	2.93	2.4	7.0	
G13-5 0-2.5'	Isotopic	1.13	2.4	2.7	
					5.6
G 14-3 2.4'	BDL	2.44	3.1	7.5	
G 14-3 0.2'	BDL	2.5	3.1	7.7	
					7.6

Table A
Soil Sample Results
U238, Total U, and Average Total U per grid

Location	Comment	U ²³⁸	U ²³⁸ /U ¹	U ^{Total}	U ^{Total} Average
H 3-1 0-2'	BDL	2.73	6.6	18.1	
H 3-1 2-4'	BDL	2.35	6.6	15.6	
H 3-2 0-2'	BDL	2.51	6.6	16.6	
H 3-2 2-4'	BDL	2.63	6.6	17.4	
H 3-4 0-2'	Isotopic	4.11	6.6	27.2	
H 3-4 2-4'	BDL	2.49	6.6	16.5	
H 3-5 0-2'		3.13	6.6	20.7	
H 3-5 2-4'	BDL	2.87	6.6	19.0	
					18.9
H 4-1 0-2'	BDL	2.91	8.1	23.5	
H 4-2 0-2'	BDL	1.88	8.1	15.2	
H 4-2 2-4'		2.71	8.1	21.9	
H 4-4 0-2.5'	BDL	2.65	8.1	21.4	
H 4-5 0-2'	BDL	2.49	8.1	20.1	
H 4-5 2-4'	BDL	2.40	8.1	19.4	
					20.3
H 5-1 0-2.5'		4.27	8.2	34.9	
H 5-2 0-2'	Isotopic	3.35	10.6	35.6	
H 5-2 2-4'	BDL	1.77	10.6	18.8	
H 5-4 0-2'		2.53	8.2	20.7	
H 5-4 2-4'	BDL	2.42	8.2	19.8	
H 5-5 0-2'	BDL	1.04	5.9	6.1	
H 5-5 2-4'		4.74	5.9	28.0	
H 5-5RR		1.68	8.1	13.6	
					22.2
H 6-1 0-2'	BDL	2.65	8.3	22.1	
H 6-1 2-4'	BDL	1.74	8.3	14.5	
H 6-2RR 2-4'		4.31	8.1	35.0	
H 6-4 0-2.5'		2.68	8.3	22.3	
H 6-5 0-2'		2.15	8.3	17.9	
H 6-5 2-4'	BDL	2.09	8.3	17.4	
					21.5
H 7-1 0-4'	BDL	1.89	8.1	15.3	
H 7-1 4-8'	BDL	1.97	8.1	15.9	
H 7-2 0-2'	BDL	2.03	8.1	16.4	
H 7-2 2-4'	BDL	1.14	8.1	9.2	
H7-4B	BDL	2.49	8.1	20.2	
H7-4 2-4'	BDL	1.70	19.6	33.3	
H7-5 0-2.5'	BDL	2.09	8.1	16.9	
					18.2
H8-1 0-2'		2.62	4.6	12.0	
H8-2 0-2'	BDL	2.42	4.6	11.1	
H8-4 0-2.5'	BDL	2.59	4.6	11.9	
H8-5 0-2'	BDL	2.55	4.6	11.7	
H8-5 2-4'	BDL	1.28	4.6	5.9	
					10.5

Table A
Soil Sample Results
U238, Total U, and Average Total U per grid

Location	Comment	U ²³⁸	U ²³⁸ /U ¹	U ^{Total}	U ^{Total} Average
H9-1 0-2'	BDL	2.82	2.9	8.2	
H9-2 0-2'	Isotopic	2.51	2.9	7.3	
H9-2 2-4'	BDL	1.44	2.9	4.2	
H9-4 0-2.5'	BDL	1.56	2.9	4.5	
H9-5 0-2'	BDL	2.92	2.9	8.5	
H9-5 2-4'		3.62	2.9	10.5	
					7.2
H10-1 0-2'	BDL	2.58	5.1	13.2	
H10-1 2-4'	BDL	2.64	5.1	13.5	
H10-2 0-2'	BDL	1.97	5.1	10.1	
H10-2 2-4'	BDL	2.29	5.1	11.7	
H10-4 0-2'		2.57	5.1	13.2	
H10-4 2-4'	BDL	1.60	5.1	8.2	
H10-5 0-2'	Isotopic	1.22	5.1	6.3	
H10-5 2-4'	BDL	2.87	5.1	14.7	
					11.4
H11-1 0-2'		2.64	4.6	12.1	
H11-1 2-4'	BDL	2.18	4.6	10.0	
H11-2 0-2'	BDL	2.12	4.6	9.7	
H11-2 0-2.5'	BDL	1.60	4.6	7.3	
H11-2 2-4'	BDL	2.08	4.6	9.5	
H11-4 0-2'	BDL	3.17	4.6	14.5	
H11-4 2-4'	BDL	2.71	4.6	12.4	
					10.8
H12-1 0-3'	BDL	1.99	2.6	5.1	
H12-2 0-2'	BDL	2.28	2.6	5.9	
H12-2 2-4'		2.72	2.6	7.0	
H12-4 0-2'	BDL	2.15	2.6	5.5	
H12-4 2-4'	BDL	2.39	2.6	6.1	
H12-5 0-2'	BDL	1.38	2.6	3.5	
H12-5 2-4'	BDL	1.94	2.6	5.0	
					5.5
H13-2 0-2'		2.52	2.6	6.5	
H13-2 2-4'	BDL	2.50	2.6	6.4	
H13-4 0-2'	BDL	2.11	2.6	5.4	
H13-4 2-4'	BDL	2.31	2.6	5.9	
H13-5 0-2'	BDL	2.31	2.6	5.9	
H13-5 0-2.5'	BDL	1.36	2.6	3.5	
H13-5 2.5-5'	BDL	2.18	2.6	5.6	
H13-5 2-4'	BDL	2.62	2.6	6.7	
					5.8
H 14-3 0.2'	BDL	2.88	3.1	8.9	
H 14-3 2.4'	BDL	2.48	3.1	7.6	
					8.3
I 3-1 0-2'	BDL	2.36	8.1	19.1	
I 3-1 2-4'	BDL	2.43	8.1	19.7	
I 3-2 0-2'		3.22	8.1	26.0	
I 3-4 0-2'	BDL	2.95	8.1	23.9	
I 3-5 0-2'	BDL	3.00	8.1	24.3	
I 3-5 2-4'	BDL	1.70	8.1	13.8	
					21.1

Table A
Soil Sample Results
U238, Total U, and Average Total U per grid

Location	Comment	U ²³⁸	U ²³⁸ /U ¹	U ^{Total}	U ^{Total} Average
I 4-1 0-2'	BDL	2.90	7.1	20.5	
I 4-2 0-2'	Isotopic	7.44	7.1	52.7	
I 4-2 2-4'	BDL	2.09	7.1	14.8	
I 4-4 0-2.5'	BDL	3.00	7.1	21.2	
I 4-5 0-2'	BDL	2.12	7.1	15.0	
I 4-5 2-4'	BDL	2.33	7.1	16.5	
					23.5
I 5-1B		1.74	8.1	14.1	
I 5-1 2-4'	BDL	2.88	8.1	23.3	
I 5-2 0-2'	BDL	2.62	8.1	21.2	
I 5-2 2-4'	BDL	2.75	8.1	22.2	
I 5-4 0-2'	BDL	2.47	8.1	20.0	
I 5-4 2-4'	BDL	3.00	8.1	24.3	
I 5-5 0-2'	BDL	2.35	8.1	19.0	
I 5-5 2-4'	BDL	2.80	8.1	22.7	
					20.8
I 6-1B		1.10	8.1	8.9	
I 6-2 0-2'		3.43	8.1	27.7	
I 6-2 2-4'		1.80	8.1	14.6	
I 6-4 0-2.5'		2.70	8.1	21.8	
I 6-5 0-2'	BDL	1.69	8.1	13.7	
I 6-5 2-4'	BDL	1.87	8.1	15.1	
					17.0
I 7-1 0-2'		3.37	8.1	27.3	
I 7-1 2-4'	BDL	2.55	8.1	20.6	
I 7-2 0-2'	BDL	2.78	8.1	22.5	
I 7-2 2-4'	BDL	2.16	8.1	17.5	
I 7-4 0-2'	BDL	2.44	8.1	19.7	
I 7-4 2-4'	BDL	2.52	8.1	20.4	
I 7-5 0-2'		2.04	8.1	16.5	
I 7-5 2-4'	BDL	1.99	8.1	16.1	
					20.1
I 8-1 0-2'	BDL	1.98	4.6	9.1	
I 8-1 2-4'	BDL	2.00	4.6	9.2	
I 8-4 0-2'	BDL	2.80	4.6	12.8	
I 8-4 2-4'	BDL	1.71	4.6	7.8	
I 8-5 0-2'	BDL	1.98	4.6	9.1	
I 8-2 0-2'	BDL	1.50	4.6	6.9	
I 8-2 2-4'	BDL	1.07	4.6	4.9	
					8.5
I 9-1 0-2'		1.15	4.6	5.3	
I 9-2 0-2.5'	BDL	1.06	4.6	4.9	
I 9-4 0-2'	BDL	2.82	4.6	12.9	
I 9-5 0-2'	BDL	2.94	4.6	13.5	
I 9-5 2-4'		2.65	4.6	12.1	
					9.7

Table A
Soil Sample Results
U238, Total U, and Average Total U per grid

Location	Comment	U ²³⁸	U ²³⁸ /U ¹	U ^{Total}	U ^{Total} Average
I10-1 0-2'	BDL	2.27	2.7	6.1	
I10-1 2-4'	BDL	2.28	2.7	6.1	
I10-2 0-2'	BDL	1.46	2.7	3.9	
I 10-4 0-2'	BDL	1.74	2.7	4.7	
I 10-4 2-4'	BDL	2.85	2.7	7.7	
I 10-5 0-2'	BDL	2.99	2.7	8.0	
I 10-5 2-4'	Isotopic	0.35	2.7	0.9	
					5.4
I 11-4 0-2'	BDL	2.30	4.6	10.5	
I 11-4 2-4'	BDL	1.92	4.6	8.8	
I 11-5 0-2'	BDL	2.36	4.6	10.8	
I 11-5 2-4'	BDL	1.77	4.6	8.1	
I11-1 0-2'	BDL	2.97	4.6	13.6	
I11-1 2-4'	BDL	2.37	4.6	10.9	
I11-2 0-2'	BDL	1.96	4.6	9.0	
I11-2 2-4'		2.23	4.6	10.2	
					10.2
I12-1 0-2.5'	BDL	2.71	2.6	7.0	
I12-2 0-2'	BDL	2.85	2.6	7.3	
I12-2 2-4'	BDL	3.00	2.6	7.7	
I12-4 0-2'	BDL	1.90	2.6	4.9	
I12-4 2-4'	BDL	2.45	2.6	6.3	
I12-5 0-2.5'	BDL	2.98	2.6	7.7	
					6.8
I13-1 0-2'	Isotopic	1.86	1.9	3.5	
I13-1 2-4'		2.31	1.9	4.4	
I13-2 0-2'	BDL	1.71	2.0	3.5	
I13-2 2-4'	BDL	2.22	2.0	4.5	
I13-4 0-2'	Isotopic	0.99	2.2	2.1	
I13-4 2-4'		4.44	2.2	9.6	
I13-5 0-2'	BDL	2.68	2.0	5.4	
I13-5 2-4'	BDL	2.08	2.0	4.2	
					4.7
I 14-3 0-2'		3.0	3.1	9.2	
I 14-3 2-4'	BDL	1.92	3.1	5.9	
					7.6
J1-3 0-2'	BDL	1.97	3.1	6.1	
J1-3 2-4'	BDL	2.97	3.1	9.1	
					7.6
J2-3 0-2'	BDL	2.65	3.1	8.2	
J2-3 2-4'	BDL	2.9	3.1	8.9	
					8.5
J 3-3 0-2'	Isotopic	1.39	1.7	2.4	
J 3-3 2-4'	BDL	2.48	1.7	4.2	
					3.3
J 4-3 0.2'	BDL	2.42	3.1	7.5	
J 4-3 2.4'	BDL	2.33	3.1	7.2	
					7.3
J 5-3 0.2'	BDL	2.5	3.1	7.7	
J 5-3 2.4'		2.23	3.1	6.9	
					7.3

Table A
Soil Sample Results
U238, Total U, and Average Total U per grid

Location	Comment	U ²³⁸	U ²³⁸ /U ¹	U ^{Total}	U ^{Total} Average
J6-3 2-4'	BDL	1.99	3.1	6.1	
J6-3 0.2'	BDL	1.6	3.1	4.9	
					5.5
J7-3 2.4'	BDL	2.62	3.1	8.1	
J 7-3 0.2'	BDL	2.47	3.1	7.6	
					7.8
J 8-3 0.2'	BDL	1.10	3.1	3.4	
J 8-3 2.4'	BDL	2.6	3.1	8.0	
					5.7
J 9-3 0-2'		1.68	3.1	5.2	
J 9-3 2-4'	BDL	2.58	3.1	7.9	
					6.6
J 10-3 0-2'	BDL	2.53	3.1	7.8	
J 10-3 2-4'	BDL	2.83	3.1	8.7	
					8.3
J 11-3 0-2'	Isotopic	1.25	2.3	2.9	
J 11-3 2-4'		4.26	2.3	9.9	
					6.4
J 12-3 0-2'	BDL	2.7	3.1	8.3	
J 12-3 2-4'	BDL	2.65	3.1	8.2	
					8.2
J 13-3 0-2'	BDL	2.1	3.1	6.5	
J 13-3 2-4'	BDL	2.2	3.1	6.8	
					6.6
J 14-3 0-2'	BDL	2.66	3.1	8.2	
J 14-3 2-4'	BDL	2.30	3.1	7.1	
					7.6
				13.0	11.7

Total Number of Samples, n: 543 samples

Mean DU concentration, AVE: 13.0 pCi/g

Standard deviation, STD: 8.8 pCi/g

95% Confidence level, μ_α : 13.6 pCi/g

$$\mu_\alpha = AVE + t_{1-\alpha, df} \frac{STD}{\sqrt{n}}$$

Table B
Maximum Exposure Rate
μREM/hr above background

	A	B	C	D	E	F	G	H	I	J
1		bkg	bkg	bkg	bkg	bkg	bkg	bkg	bkg	1
2	bkg	bkg	bkg	1	bkg	bkg	bkg	bkg	bkg	1
3	bkg	3	2	2	1	2	3	2	2	2
4	bkg	2	2	1	3	2	2	2	1	bkg
5	1	2	2	3	3	1	2	3*	3*	1
6	1	2	2	2	3*	bkg *	2	3*	5*	2
7	bkg	2	1*	2	2	2*	3*	2*	2	2
8	bkg	bkg	1	1	1	1	1	2	2	1
9				bkg	2	bkg *	2	1	2	3
10					2	2	2	1	2	2
11					1	2	2	3	3	1
12				1	3	2	1	1	4	bkg
13				bkg	bkg	1	2	1	1	bkg
14				bkg	1	2	bkg	bkg	1	1

*Indicates that measurements made after excavation

Table C
Instruments for Radiological Surveys

- Exposure rate measurements
 - Instrument: Ludlum Model 19
 - Detector: Internal, 1 inch x 1 inch NaI scintillation
 - Background: ~ 7 μ R
 - Efficiency: NA
 - Sensitivity: 2 μ R
 - Mode: Analog display of exposure rate

- Low-level gamma scans
 - Instrument: Ludlum Model 2221
 - Detector: Ludlum 44-10, 2 inch x 2 inch NaI scintillation
 - Background: ~ 2000 cpm
 - Efficiency: ~ 500 cpm per μ R/hr
 - Sensitivity: 2 μ R
 - Mode: Digital and analog display of count rate

- Direct measurement for beta emitters
 - Instrument: Ludlum Model 2221
 - Detector: Ludlum 44-9, 15 cm² GM tube
 - Background: ~ 50 cpm
 - Efficiency: ~ 26%
 - Sensitivity: 77 cpm
 - Mode: Digital and analog display of count rate

- Air sample and smear counter scaler
 - Instrument: Ludlum Model 2929
 - Detector: Ludlum 43-10-1
 - Background: ~ 60 cpm beta, ~0.07 cpm alpha
 - Efficiency: ~ 27% beta, 30% alpha
 - Sensitivity: 89 cpm beta, 3.7 cpm alpha
 - Mode: Digital display of count rate

Table D
Average Isotopic Ratios
Step One Results

Average Isotopic Ratios

Area	Ratio U-234/U-238	Ratio U-235/U-238
Unaffected *	1.8	0.28
Affected – A*	6.6	0.49
Affected – B*	3.3	0.28
Affected – C*	1.3	0.28

** See Figure 1*

Quadrants Exceeding Guideline Value

Grid	Quads	Max. U- total (pCi/g)	Avg. U- total (pCi/g)	Ratio U-234/U-238	Ratio U-235/U-238
C7	4	155	37	17.8	0.9
E6	1,2,4,5	156	87	19	0.9
F6	2	1,560	228	45.6	2.1
F9	5	187	38	19.6	0.9
G7	1,2,4,5	119	49	9.6	0.6
H7	4	1111	174	17	1.6
I5	1	238	48	4	0.1
I6	1	130	35	8	0.1

**FINAL STATUS SURVEY REPORT
FORMER ZIRCALLOY BURN AREA
WESTINGHOUSE SPECIALTY METALS PLANT**

Attachment A

**FINAL STATUS SURVEY REPORT
FORMER ZIRCALOY BURN AREA
WESTINGHOUSE SPECIALTY METALS PLANT**

Appendix A

Statistical Evaluation of Soil Samples WSMP

Grid Number - A 7
Samples - 4

Guideline Value - 30.0 pCi/g
Maximum Value - 90.0 pCi/g

Sample Results (pCi/g Total Uranium)					
	Sample Number		Total Uranium < or > GL		Total Uranium
			Uranium <GL (pCi/g)	Uranium >GL (pCi/g)	TU (pCi/g)
	3	0-2'	10.90		10.90
	3	2-4'		35.60	35.60
	3	R2-4'	5.80		5.80
	5	R2-4'	7.80		7.80
Average Activities					
			8.17	35.60	15.03

(A) - Maximum Value (< 3 times guideline value) 35.60 Accept

(B) - Average of Samples >Guideline Value ($\leq \text{SQRT}(100/A) \times \text{Guideline Value (GL)}$)

A = Area of hot spot - 25 m²
 $\text{SQRT}(100/A)$ - 60 Maximum 90 pCi/g
 Average of Samples >GL - 35.60 Accept

(C) - Average Activity - 15 Accept

(D) - Weighted Average (WA) - 15 $\text{WA} = A(1-a/100) + B(a/100)$ Accept
 A = Average of samples less than 30 pCi/g TU
 B = Average of samples Greater than 30 pCi/g TU
 a = Area of hot spot (m²)

Prepared By/Date - Benny Felt 12/14/01 Reviewed By/Date - _____

Statistical Evaluation of Soil Samples WSMP

Grid Number - **B 3**
Samples - **6**

Guideline Value - **30.0 pCi/g**
Maximum Value - **90.0 pCi/g**

Sample Results (pCi/g Total Uranium)					
	Sample Number		Total Uranium < or > GL		Total Uranium
			Uranium <GL (pCi/g)	Uranium >GL (pCi/g)	TU (pCi/g)
	1	0-2'		55.30	55.30
	1	2-4'	2.10		2.10
	4	0-2'	2.10		2.10
	4	2-4'	2.00		2.00
	5	0-2.5'	2.10		2.10
	2	0-2.5'	2.64		2.64
Average Activities					
			2.19	55.30	11.04

- (A) - Maximum Value (< 3 times guideline value) 55.30 Accept
- (B) - Average of Samples >Guideline Value ($\leq \text{SQRT}(100/A) \times \text{Guideline Value (GL)}$)
- A = Area of hot spot - 25 m²
- SQRT(100/A) - 60 Maximum 90 pCi/g
- Average of Samples >GL - 55.30 Accept
- (C) - Average Activity - 11 Accept
- (D) - Weighted Average (WA) - 15 Accept
- WA = $A(1-a/100) + B(a/100)$
- A = Average of samples less than 30 pCi/g TU
- B = Average of samples Greater than 30 pCi/g TU
- a = Area of hot spot (m²)

Prepared By/Date - Bany *[Signature]* 12/14/01 Reviewed By/Date - _____

Statistical Evaluation of Soil Samples WSMP

Grid Number - **D 7**
Samples - **8**

Guideline Value - **30.0 pCi/g**
Maximum Value - **90.0 pCi/g**

Sample Results (pCi/g Total Uranium)				
	Sample Number	Total Uranium < or > GL		Total Uranium
		Uranium <GL (pCi/g)	Uranium >GL (pCi/g)	TU (pCi/g)
	1	0-2'		39.50
	1	2-4'	21.70	21.70
	2	0-2'	22.30	22.30
	2	2-4'	19.30	19.30
	4	0-2'		64.20
	4	2-4'	8.00	8.00
	5	0-2'	10.20	10.20
	5	2-4'	9.50	9.50
Average Activities				
			15.17	51.85
				24.34

(A) - Maximum Value (< 3 times guideline value) 64.20 Accept

(B) - Average of Samples >Guideline Value ($\leq \text{SQRT}(100/A) \times \text{Guideline Value (GL)}$)

A = Area of hot spot - 25 m²
 $\text{SQRT}(100/A)$ - 60 Maximum 90 pCi/g
 Average of Samples >GL - 51.85 Accept

(C) - Average Activity - 24 Accept

(D) - Weighted Average (WA) - 24 $\text{WA} = A(1-a/100) + B(a/100)$ Accept

A = Average of samples less than 30 pCi/g TU
 B = Average of samples Greater than 30 pCi/g TU
 a = Area of hot spot (m²)

Prepared By/Date - B. Buehler 12/14/01 Reviewed By/Date - _____

Statistical Evaluation of Soil Samples WSMP

Grid Number - E 5

Samples - 6

Guideline Value - 30.0 pCi/g

Maximum Value - 90.0 pCi/g

Sample Results (pCi/g Total Uranium)					
	Sample Number		Total Uranium < or > GL		Total Uranium
			Uranium <GL (pCi/g)	Uranium >GL (pCi/g)	TU (pCi/g)
	1	0-2'	22.20		22.20
	1	2-4'	21.50		21.50
	2	0-2'		36.40	36.40
	2	2-4'		34.10	34.10
	4	0-2'	17.20		17.20
	5	0-2'	21.00		21.00
Average Activities			20.48	35.25	25.40

(A) - Maximum Value (< 3 times guideline value) 36.40 Accept

(B) - Average of Samples > Guideline Value ($\leq \text{SQRT}(100/A) \times \text{Guideline Value (GL)}$)

A = Area of hot spot - 25 m²

 SQRT(100/A) - 60 Maximum 90 pCi/g

Average of Samples >GL - 35.25 Accept

(C) - Average Activity - 25 Accept

(D) - Weighted Average (WA) - 24 Accept WA = A(1-a/100) + B(a/100)

A = Average of samples less than 30 pCi/g TU

B = Average of samples Greater than 30 pCi/g TU

a = Area of hot spot (m²)

Prepared By/Date - Baerly/12/14/01 Reviewed By/Date - _____

Statistical Evaluation of Soil Samples WSMP

Grid Number - F 4

Samples - 7

Guideline Value - 30.0 pCi/g

Maximum Value - 90.0 pCi/g

Sample Results (pCi/g Total Uranium)					
	Sample Number		Total Uranium < or > GL	Total Uranium	
			Uranium <GL (pCi/g)	Uranium >GL (pCi/g)	TU (pCi/g)
	1	0-2'		57.20	57.20
	1	R0-2'	14.50		14.50
	1	2-4'	16.10		16.10
	2	0-2.5'	18.60		18.60
	4	0-2'	18.20		18.20
	4	2-4'	21.30		21.30
	5	2-4'	16.10		16.10
Average Activities					
			17.47	57.20	23.14

(A) - Maximum Value (< 3 times guideline value) 57.20 Accept

(B) - Average of Samples >Guideline Value ($\leq \text{SQRT}(100/A) \times \text{Guideline Value (GL)}$)

A = Area of hot spot - 25 m²
 $\text{SQRT}(100/A)$ - 60 Maximum 90 pCi/g

Average of Samples >GL - 57.20 Accept

(C) - Average Activity - 23 Accept

(D) - Weighted Average (WA) - 27 WA = $A(1-a/100) + B(a/100)$ Accept

A = Average of samples less than 30 pCi/g TU
 B = Average of samples Greater than 30 pCi/g TU
 a = Area of hot spot (m²)

Prepared By/Date - Baughat 12/14/01 Reviewed By/Date - _____

Statistical Evaluation of Soil Samples WSMP

Grid Number - **G 7**
Samples - **9**

Guideline Value - **30.0 pCi/g**
Maximum Value - **90.0 pCi/g**

Sample Results (pCi/g Total Uranium)					
	Sample Number		Total Uranium < or > GL		Total Uranium
			Uranium <GL (pCi/g)	Uranium >GL (pCi/g)	TU (pCi/g)
	1	B	16.30		16.30
	1	2-4'	23.50		23.50
	2	B	10.70		10.70
	2	BR	16.00	43.20	59.20
	2	2-4'	8.40		8.40
	4	B	28.70		28.70
	4	2-4'		32.70	32.70
	5	B	19.90		19.90
	5	2-4'	8.80		8.80
Average Activities			16.54	37.95	23.13

(A) - Maximum Value (< 3 times guideline value) 59.20 Accept

(B) - Average of Samples >Guideline Value ($\leq \text{SQRT}(100/A) \times \text{Guideline Value (GL)}$)

A = Area of hot spot - 25 m²
SQRT(100/A) - 60 Maximum 90 pCi/g

Average of Samples >GL - 37.95 Accept

(C) - Average Activity - 23 Accept

(D) - Weighted Average (WA) - 22 $WA = A(1-a/100) + B(a/100)$ Accept

A = Average of samples less than 30 pCi/g TU
B = Average of samples Greater than 30 pCi/g TU
a = Area of hot spot (m²)

Prepared By/Date - Burgett 12/14/01 Reviewed By/Date - _____

Statistical Evaluation of Soil Samples WSMP

Grid Number - **G 8**

Samples - **7**

Guideline Value - 30.0 pCi/g

Maximum Value - 90.0 pCi/g

Sample Results (pCi/g Total Uranium)					
	Sample Number		Total Uranium < or > GL		Total Uranium
			Uranium <GL (pCi/g)	Uranium >GL (pCi/g)	TU (pCi/g)
	1	0-2'	14.50		14.50
	1	2-4'	14.10		14.10
	2	0-2'		36.40	36.40
	2	2-4'	7.30		7.30
	4	0-2'		55.40	55.40
	4	2-4'	9.50		9.50
	5	0-2.5'	8.80		8.80
Average Activities			10.84	45.90	20.86

(A) - Maximum Value (< 3 times guideline value) 55.40 Accept

(B) - Average of Samples >Guideline Value ($\leq \text{SQRT}(100/A) \times \text{Guideline Value (GL)}$)

A = Area of hot spot - 25 m²
 SQRT(100/A) - 60 Maximum 90 pCi/g

Average of Samples >GL - 45.90 Accept

(C) - Average Activity - 21 Accept

(D) - Weighted Average (WA) - 19 WA = $A(1-a/100) + B(a/100)$ Accept

A = Average of samples less than 30 pCi/g TU
 B = Average of samples Greater than 30 pCi/g TU
 a = Area of hot spot (m²)

Prepared By/Date - Accepted 12/14/01

Reviewed By/Date - _____

Statistical Evaluation of Soil Samples WSMP

Grid Number - **H 5**

Samples - **8**

Guideline Value - **30.0 pCi/g**

Maximum Value - **90.0 pCi/g**

Sample Results (pCi/g Total Uranium)					
	Sample Number		Total Uranium < or > GL		Total Uranium
			Uranium <GL (pCi/g)	Uranium >GL (pCi/g)	TU (pCi/g)
	1	0-2.5'		34.90	34.90
	2	0-2'		35.60	35.60
	2	2-4'	18.80		18.80
	4	0-2'	20.70		20.70
	4	2-4'	19.80		19.80
	5	0-2'	6.10		6.10
	5	2-4'	28.00		28.00
	5	RR	13.60		13.60
Average Activities					
			17.83	35.25	22.19

(A) - Maximum Value (< 3 times guideline value) 35.60 Accept

(B) - Average of Samples > Guideline Value ($\leq \text{SQRT}(100/A) \times \text{Guideline Value (GL)}$)

A = Area of hot spot - 25 m²

SQRT(100/A) - 60 Maximum 90 pCi/g

Average of Samples >GL - 35.25 Accept

(C) - Average Activity - 22 Accept

(D) - Weighted Average (WA) - 22 Accept $WA = A(1-a/100) + B(a/100)$

A = Average of samples less than 30 pCi/g TU

B = Average of samples Greater than 30 pCi/g TU

a = Area of hot spot (m²)

Prepared By/Date -

[Signature] 12/14/01

Reviewed By/Date -

Statistical Evaluation of Soil Samples WSMP

Grid Number - **H 6**
Samples - **6**

Guideline Value - 30.0 pCi/g
Maximum Value - 90.0 pCi/g

Sample Results (pCi/g Total Uranium)					
	Sample Number		Total Uranium < or > GL		Total Uranium
			Uranium <GL (pCi/g)	Uranium >GL (pCi/g)	TU (pCi/g)
	1	0-2'	22.10		22.10
	1	2-4'	14.50		14.50
	2	RR2-4'		35.00	35.00
	4	0-2.5'	22.30		22.30
	5	0-2'	17.90		17.90
	5	2-4'	17.40		17.40
Average Activities			18.84	35.00	21.53

(A) - Maximum Value (< 3 times guideline value) 35.00 Accept

(B) - Average of Samples >Guideline Value ($\leq \text{SQRT}(100/A) \times \text{Guideline Value (GL)}$)

A = Area of hot spot - 25 m²
SQRT(100/A) - 60 Maximum 90 pCi/g

Average of Samples >GL - 35.00 Accept

(C) - Average Activity - 22 Accept

(D) - Weighted Average (WA) - 23 $WA = A(1-a/100) + B(a/100)$ Accept

A = Average of samples less than 30 pCi/g TU
B = Average of samples Greater than 30 pCi/g TU
a = Area of hot spot (m²)

Prepared By/Date - Benny Tate 12/1/01 Reviewed By/Date - _____

Statistical Evaluation of Soil Samples WSMP

Grid Number - H 7
Samples - 7

Guideline Value - 30.0 pCi/g
Maximum Value - 90.0 pCi/g

Sample Results (pCi/g Total Uranium)					
	Sample Number		Total Uranium < or > GL		Total Uranium
			Uranium <GL (pCi/g)	Uranium >GL (pCi/g)	TU (pCi/g)
	1	0-4'	15.30		15.30
	1	4-8'	15.90		15.90
	2	0-2'	16.40		16.40
	2	2-4'	9.20		9.20
	4	B	20.20		20.20
	4	2-4'		33.30	33.30
	5	0-2.5'	16.90		16.90
Average Activities			15.65	33.30	18.17

(A) - Maximum Value (< 3 times guideline value) 33.30 Accept

(B) - Average of Samples >Guideline Value ($\leq \text{SQRT}(100/A) \times \text{Guideline Value (GL)}$)

A = Area of hot spot - 25 m²
SQRT(100/A) - 60 Maximum 90 pCi/g

Average of Samples >GL - 33.30 Accept

(C) - Average Activity - 18 Accept

(D) - Weighted Average (WA) - 20 $WA = A(1-a/100) + B(a/100)$ Accept

A = Average of samples less than 30 pCi/g TU
B = Average of samples Greater than 30 pCi/g TU
a = Area of hot spot (m²)

Prepared By/Date - *Beckett* 12/14/01

Reviewed By/Date - _____

Statistical Evaluation of Soil Samples WSMP

Grid Number - **I 4**
Samples - **6**

Guideline Value - **30.0 pCi/g**
Maximum Value - **90.0 pCi/g**

Sample Results (pCi/g Total Uranium)						
	Sample Number		Total Uranium < or > GL		Total Uranium	
			Uranium <GL (pCi/g)	Uranium >GL (pCi/g)	TU (pCi/g)	
	1	0-2'	20.50		20.50	
	2	0-2'		52.70	52.70	
	2	2-4'	14.80		14.80	
	4	0-2.5'	21.20		21.20	
	5	0-2'	15.00		15.00	
	5	2-4'	16.50		16.50	
Average Activities			17.60	52.70	23.45	

(A) - Maximum Value (< 3 times guideline value) 52.70 Accept

(B) - Average of Samples >Guideline Value ($\leq \text{SQRT}(100/A) \times \text{Guideline Value (GL)}$)

A = Area of hot spot - $\frac{25}{60}$ m²
 SQRT(100/A) - $\frac{60}{52.70}$ Maximum 90 pCi/g
 Average of Samples >GL - 52.70 Accept

(C) - Average Activity - 23 Accept

(D) - Weighted Average (WA) - 26 $WA = A(1-a/100) + B(a/100)$ Accept

A = Average of samples less than 30 pCi/g TU
 B = Average of samples Greater than 30 pCi/g TU
 a = Area of hot spot (m²)

Prepared By/Date - Samuel 12/14/01

Reviewed By/Date - _____