



UNITED STATES  
NUCLEAR REGULATORY COMMISSION

REGION II  
SAM NUNN ATLANTA FEDERAL CENTER  
61 FORSYTH STREET SW SUITE 23T85  
ATLANTA, GEORGIA 30303-8931

March 1, 2000

Commandant  
U. S. Army Chemical School  
ATTN: ATSN-CM  
401 Engineer Loop  
Ft. Leonard Wood, MO 65473-8926

SUBJECT: NRC INSPECTION REPORT NO. 01-02861-05/99-01

Dear Colonel Patricia L. Nilo:

On October 1, 1999, the NRC completed an inspection regarding Buildings 1081 and 2281, and the areas known as Iron Mountain and Rattlesnake Gulch at Fort McClellan, Alabama. The inspection findings were discussed with Ron Levy, the Environmental Coordinator for Fort McClellan on October 1, 1999.

The confirmatory soil samples obtained for the areas known as Rattlesnake Gulch and Iron Mountain were analyzed by our Region I Office in King of Prussia, Pennsylvania. They were counted on a Canberra high resolution gamma spectroscopy system. The results of the analysis, received on January 30, 2000, indicate that no sample contained cesium-137 or cobalt-60 above a concentration of 0.5 picocuries per gram of dirt. The results of the NRC analysis are contained in the enclosed report. These samples were obtained to confirm the results of your final survey of the areas documented in Industrial Radiation Study No. 27-MH-0987-RI-96, dated March 28, 1997. These areas meet the release criteria contained in 10 CFR 20.1402 and are acceptable for unrestricted use.

This report also contains the results of the NRC's confirmatory survey of Building 2281, the former site of the Army's Chemical School at Fort McClellan. This survey confirmed the results of your final survey dated March 7, 1989. This building meets the criteria for unrestricted release.

The NRC also completed a confirmatory survey of Building 1081 based on your final survey plan and draft results in response to your request for a timely termination of your materials license in support of the base closure. We have delayed the issuance of this report while waiting for your final survey results. We are not able to complete our review without them and cannot release the building and terminate your license until this information is received. Please provide your final survey report or advise us when the report will be completed within 30 days of the date of this letter.

We have received your reports titled Radiological Historical Assessment Main Post, and Radiological Historical Assessment Pelham Range, both dated November 1999, and understand that additional potentially contaminated areas at Fort McClellan have been identified. Please provide any additional information regarding these areas as your assessment continues. We will follow up on your progress during future inspections.

In accordance with 10 CFR 2.790 of the NRC's "Rules of Practice," a copy of this letter and its enclosure will be placed in the NRC Public Document Room.

Should you have any questions concerning this letter, please contact us.

Sincerely,

/RA/

Thomas R. Decker, Chief  
 Materials Licensing/Inspection Branch 1  
 Division of Nuclear Materials Safety

Docket No. 030-14784  
 License No. 01-02861-05

Enclosure: NRC Inspection Report

cc w/encl:  
 State of Alabama

Richard G. Button, Jr.  
 Environmental Protection Agency  
 345 Courtland Street, N.E.  
 Atlanta, GA 30365

James T. Williams  
 Division of Radiation Control  
 State of Alabama  
 Department of Public Health  
 201 Monroe Street, Suite 700  
 Montgomery, AL 36104

Lisa Kingsberry  
 Directorate of Environment  
 Bldg. 141A 13th Ave.  
 ATTN: ATZN-EM  
 Fort McClellan, AL 36205

Distribution w/encl:

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U. S. NUCLEAR REGULATORY COMMISSION

REGION II

Docket No.: 030-14759

License No.: 01-02861-05

Report No.: 01-12861-05/99-01

Licensee: Department of The Army

Location: Fort McClellan, Alabama

Date: September 27 - October 1, 1999

Inspectors: Jay L. Henson, Senior Health Physicist  
Orysia Masnyk Bailey, Health Physicist  
Bryan A. Parker, Health Physicist  
John M. Pelchat, Senior Health Physicist

Approved by: Thomas R. Decker, Chief  
Materials Licensing/Inspection Branch 1  
Division of Nuclear Materials Safety

Enclosure

## EXECUTIVE SUMMARY

Department of the Army  
Fort McClellan, Alabama  
NRC Inspection Report No. 01-02861-05/99-01

This special, announced inspection was conducted to evaluate the licensee's closeout surveys in support of releasing Buildings 1081 and 2281, and the areas known as Rattlesnake Gulch and Iron Mountain for unrestricted use. The licensee's survey results for Building 2281 were contained in the final survey report dated March 7, 1989. The survey results for Rattlesnake Gulch and Iron Mountain were contained in Industrial Radiation Study No. 27-MH-0 987-RI-96, dated March 28, 1997. The licensee's final survey report for Building 1081 is not available at this time; the NRC's evaluation of the release of the building will continue after the report is provided.

The confirmatory surveys, fixed point measurements, smears for removable contamination, and soil samples were at or near background levels and were below release criteria specified in 10 CFR 20.1402. The NRC survey results were comparable with the licensee's survey results.

Building 2281, and the areas identified as Rattlesnake Gulch and Iron Mountain in your March 28, 1997 report may be released for unrestricted use.

### Attachments:

List of Persons Contacted  
Inspection Procedures Used  
Survey Instruments Used  
Confirmatory Survey Results

## REPORT DETAILS

### 01. Scope

This special, announced inspection was conducted to evaluate the licensee's closeout surveys in support of releasing Buildings 1081 and 2281, and the areas identified as Rattlesnake Gulch and Iron Mountain for unrestricted use. The method used for the NRC confirmatory survey was that described in NUREG/CR-5849, "Manual for Conducting Radiological Surveys in Support of License Termination," published in June, 1992.

The inspectors performed a confirmatory survey of the areas under review. One hundred percent of the floor areas of the affected areas were scanned using a portable gas flow proportional detector. The inspectors selected approximately 10% of the licensee's fixed point measurements for confirmation. The grid associated with the point was scanned, and both a fixed point measurement and a smear for removable contamination were obtained. A microR meter was used to obtain a dose rate at the selected point at one meter above the surface. The inspectors performed scans of areas that had the potential for contamination, such as sinks, cracks in the floor or walls, lighting and climate controls, and work surfaces. The inspectors obtained approximately 10% of the licensee's number of soil samples for confirmatory analysis. Although the inspectors could not identify the same sampling points, all samples were taken from the areas surveyed by the Army. The confirmatory results were compared to the licensee's final survey results and the release criteria specified in 10 CFR 20.1402.

The survey results for Rattlesnake Gulch and Iron Mountain were contained in Industrial Radiation Study No. 27-MH-0 987-RI-96, dated March 28, 1997. The licensee's survey results for Building 2281 were contained in a report dated March 7, 1989. The licensee's final survey report for Building 1081 is not available at this time; NRC review of the release of Building 1081 will continue after the report is provided.

The licensee used building surface release criteria contained in Policy and Guidance Directive FC 83-23, "Termination of Byproduct, Source and Special Nuclear Material Licenses," Attachment 2, "Guidelines for Decontamination of Facilities and Equipment Prior to Release for Unrestricted Use or Termination of Licenses for Byproduct, Source, or Special Nuclear Material," dated August 1987. These were more conservative than the current release limits published in the Federal Register, Volume 63, No. 222, dated November 18, 1998, pages 64132-64133. The licensee used the May 6, 1987, memo concerning Fort McClellan from the Chief, Operations Branch, Division of Fuel Cycles, Medical, Academic and Commercial Use Safety to Region II concerning soil concentrations of cobalt-60 and cesium-137, which were 8 and 15 picocuries per gram of soil respectively. The current soil release limits, published in the Federal Register, Volume 64, No. 234, on pages 68395-68396, on December 7, 1999, for cobalt-60 and cesium-137 are 3.8 and 11 picocuries per gram of soil, respectively. Although the licensee used release criteria that were higher than the current release criteria, the soil samples indicate that the actual concentrations were below current release limits.

## 2. Observations and Findings

In 1980, the Army Chemical School relocated to Fort McClellan, with the school housed in Building 2281. In November of 1988, the school was moved to Building 1081, and Building 2281 was decommissioned and surveyed. The survey results are contained in Reference No. AMCSF-P/89-0008 dated March 7, 1989. Although the survey was done prior to the publication of NUREG/CR-5849, "Manual for Conducting Radiological Surveys in Support of License Termination," published in June 1992, the methods were comparable to those described in the NUREG. The survey was thorough and adequate to detect contamination; none was found and the building was released.

A summary of licensed material use at Rattlesnake Gulch and Iron Mountain is contained in NRC Inspection Report No. 01-02861-04/97-01 which was issued on October 1, 1997. The licensee used cobalt-60 sources in this area in the 1950s. The area was remediated to some extent in 1971, with some of the buried waste moved to Pelham Range, also located at Fort McClellan. The contamination in the burial mound at Pelham Range is the subject of a decommissioning plan under review by the NRC. The licensee performed a survey of the Rattlesnake Gulch and Iron Mountain sites in 1995 and determined that there was no residual contamination. The survey was conducted in accordance with NUREG/CR-5849. The results of the survey are contained in Industrial Radiation Study No. 27-MH-0 987-RI-96, dated March 28, 1997.

During the inspection, the inspectors became aware of additional information relative to the radiological status of Fort McClellan. The licensee has an ongoing effort to survey areas where radioactive material was used outside of the scope of this license. This effort is called the "Release Survey of Ft. McClellan Commodity Storage Sites." The licensee has also completed two historical assessments, one of the main post and one of Pelham Range. These assessments indicate that there may be some additional areas of contamination at Fort McClellan. These areas will be evaluated during future inspections.

## 3. Conclusions

The confirmatory surveys, fixed point measurements, smears for fixed and removable contamination, and soil samples were at or near background levels and were below release criteria contained in 10 CFR 20.1402, and were comparable with the licensee's survey results. Building 2281, and the areas known as Rattlesnake Gulch and Iron Mountain may be released for unrestricted use. The status of Building 1081 will be evaluated when the licensee submits its final survey report.

### EXIT MEETING SUMMARY

The inspectors discussed the inspection results with the Environmental Coordinator for Fort McClellan on October 1, 1999. The inspectors discussed the survey performed and the release criteria that would be applied. The licensee was advised that they would be kept informed as data and samples were analyzed. The inspectors stated that review of Building 1081 would continue when the Army provided its final survey results.

## ATTACHMENTS

### LIST OF PERSONS CONTACTED

#### Department of the Army, Fort McClellan

Paul E. James, Environmental Specialist, Fort McClellan  
Lisa Kingsberry, BRAC Coordinator, Fort McClellan  
Ron Levy, Environmental Coordinator, Fort McClellan  
Bill Shanks, Environmental Planner, Fort McClellan  
Mike Styvaert, Health Physicist, Rock Island

#### State of Alabama

Kirksey E. Whatley, Director, Office of Radiation Control  
Terry Williams, Radiation Physicist

#### Allied Technology Group

Mike Bollenbocher (by teleconference)  
Lee Young, Project Manager

#### Environmental Protection Agency

Richard Button, Health Physicist

### INSPECTION PROCEDURES USED

IP 83890	Closeout Inspection and Summary
IP 87104	Decommissioning Inspection Procedure for Materials Licensees



CONFIRMATORY SURVEY RESULTS  
DEPARTMENT OF THE ARMY - FORT MCCLELLAN  
SEPTEMBER 27 - OCTOBER 1, 1999

Location/Grid	Fixed Point Measurement (dpm/100 cm <sup>2</sup> )	uR/hr at 1 m	Wipe Test Alpha (dpm/100 cm <sup>2</sup> )	Wipe Test Beta (dpm/100 cm <sup>2</sup> )
<b>BUILDING 2281- LAB #1</b>				
NORTH WALL - 1 LOW	-136	-3	-0.1	2.7
NORTH WALL - 5 LOW	339	-1	-0.1	2.7
NORTH WALL - 8 LOW	-30	-4	-0.1	8.7
WEST WALL - A LOW	-171	-6	-0.1	2.7
WEST WALL - C LOW	-150	-5	-0.1	2.7
WEST WALL - F LOW	-86	-5	-0.1	5.7
SOUTH WALL - 8 LOW	500	1	0.9	4.7
SOUTH WALL - 5 LOW	532	-1	-0.1	1.7
SOUTH WALL - 2	707	0	-0.1	1.7
EAST WALL - G	671	2	-0.1	0.7
EAST WALL - D	729	3	-0.1	3.7
EAST WALL - A	764	-1	-0.1	5.7
<b>BUILDING 2281 - HP LAB</b>				
NORTH - RIGHT OF LIGHT SWITCH	-243	-3	-0.1	-1.3
WEST WALL - 8 FT SOUTH - LOW	-239	-5	-0.1	0.7
WEST WALL - 14 FT SOUTH	-96	-6	-0.1	0.7
WEST WALL - 22 FT SOUTH	-286	-8	1.9	1.7
SOUTH WALL - BETWEEN WINDOWS	-343	-8	-0.1	-0.3
EAST WALL - 20 FT SOUTH	575	-1	-0.1	-0.3
EAST WALL - 14 FT SOUTH	-46	-1	-0.1	-0.3
EAST WALL - 6 FT SOUTH	464	0	-0.1	0.7

Location/Grid	Fixed Point Measurement (dpm/100 cm <sup>2</sup> )	uR/hr at 1 m	Wipe Test Alpha (dpm/100 cm <sup>2</sup> )	Wipe Test Beta (dpm/100 cm <sup>2</sup> )
FLOOR - 6 FT NORTH - 3 FT EAST	-164	7	-0.1	-0.3
FLOOR - 10 FT NORTH - 4 FT EAST	-211	-5	-0.1	-1.3
FLOOR - 18 FT NORTH - 1 FT EAST	-136	-4	-0.1	1.7
FLOOR - 22 FT NORTH - 4 FT EAST	-114	-6	-0.1	-0.3
FLOOR - 20 FT NORTH - 8 FT EAST	-246	-5	0.9	2.7
FLOOR - 12 FT NORTH - 6 FT EAST	-239	-6	-0.1	2.7
<b>BUILDING 2281 - DECON ROOM A</b>				
WEST WALL - 4 FT SOUTH	246	-6	-0.1	-0.3
WEST WALL - 22 FT NORTH	-143	-7	-0.1	5.7
SOUTH WALL - 5 FT EAST - HIGH	-93	-7	-0.1	-0.3
SOUTH WALL - 16 FT EAST - LOW	161	-4	-0.1	-0.3
SOUTH WALL - 22 FT EAST - LOW	161	-6	-0.1	1.7
EAST WALL - 6 FT NORTH	-179	-5	-0.1	-0.3
EAST WALL - 16 FT NORTH	-293	-5	-0.1	-0.3
EAST WALL - 22 FT NORTH	-246	-4	-0.1	-0.3
EAST WALL - XX FT NORTH	-239	-3	-0.1	-0.3
NORTH WALL - 3 FT EAST	489	-3	-0.1	-0.3
NORTH WALL - 8 FT WEST	621	-3	-0.1	0.7
<b>BUILDING 2281 - DECON ROOM B</b>				
WEST WALL - 2 FT SOUTH	-161	-4	-0.1	-0.3
WEST WALL - 12 FT SOUTH	-407	-4	1.9	5.7
WEST WALL - 20 FT SOUTH	-225	-4	-0.1	-0.3
WEST WALL - 24 FT SOUTH	-279	-4	-0.1	1.7
SOUTH WALL - 4FT WEST	-186	06	-0.1	-0.3
SOUTH WALL - 4 FT NORTH	-425	-4	-0.1	-0.3

Location/Grid	Fixed Point Measurement (dpm/100 cm <sup>2</sup> )	uR/hr at 1 m	Wipe Test Alpha (dpm/100 cm <sup>2</sup> )	Wipe Test Beta (dpm/100 cm <sup>2</sup> )
EAST WALL - 10 FT NORTH	-171	-6	-0.1	0.7
EAST WALL - 20 FT NORTH	-68	-4	0.9	2.7
EAST WALL - 24 FT NORTH	-161	-4	-0.1	0.7
EAST WALL - 28 FT NORTH	-207	-4	-0.1	-0.3
NORTH WALL - 4 FT EAST	489	-2	-0.1	2.7
NORTH WALL - 16 FT EAST	189	-2	-0.1	-0.3
<b>BUILDING 2281 - PREP LAB</b>				
NORTH WALL - 3 FT EAST	832	-4	-0.1	0.7
NORTH WALL - 15 FT EAST	432	-5	-0.1	1.7
WEST WALL - 7 FT SOUTH	-132	-4	-0.1	-0.3
WEST WALL - 14 FT SOUTH	-296	-5	-0.1	-0.3
WEST WALL - 23 FT SOUTH	-239	-5	-0.1	2.7
SOUTH WALL - 6 FT EAST	118	-5	-0.1	-0.3
SOUTH WALL - 15 FT EAST	-82	-5	-0.1	-0.3
EAST WALL - 2 FT NORTH	757	-4	-0.1	0.7
EAST WALL - 7 FT NORTH	800	-4	-0.1	-0.3
EAST WALL - 13 FT NORTH	-61	-3	0.9	-0.3
EAST WALL - 23 FT NORTH	564	2	-0.1	-0.3
<b>BUILDING 2281 - LAB 2</b>				
T1	-332	-5	-0.1	-1.3
S1	-75	-5	-0.1	-1.3
M2	-396	-4	-0.1	-1.3
L6	-407	-3	-0.1	-1.3
R9	-143	-3	-0.1	-0.3
R11	39	-3	-0.1	0.7

Location/Grid	Fixed Point Measurement (dpm/100 cm <sup>2</sup> )	uR/hr at 1 m	Wipe Test Alpha (dpm/100 cm <sup>2</sup> )	Wipe Test Beta (dpm/100 cm <sup>2</sup> )
O1	-46	-6	-0.1	-0.3
L11	-300	-4	-0.1	-1.3
N9	-261	-4	-0.1	0.7
<b>BUILDING 2281 - HALLWAY OUTSIDE LAB 2</b>				
X11	-307	-3	-0.1	-1.3
V9	-229	-4	-0.1	0.7
BB11	493	-3	-0.1	-0.3
FF10	-64	-3	-0.1	0.7
<b>BUILDING 2281 - LAB 2 OFFICE</b>				
V5	-289	-5	-0.1	-0.3
U4	-282	-4	-0.1	-0.3
V1	-71	-4	0.9	0.7
U8	-179	-6	-0.1	2.7
X7	421	-3	-0.1	2.7
X6	564	-4	0.9	-1.3
X3	400	-4	-0.1	0.7
U1	-257	-4	-0.1	-0.3
U4	-336	-6	-0.1	1.7
V1	-139	-5	-0.1	0.7
<b>BUILDING 2281 - VAULT</b>				
JJ5 TOP	150	-3	-0.1	-1.3
JJ7 BOTTOM	754	-3	-0.1	1.7
JJ5 BOTTOM	-79	4	0.9	0.7
LL6 BOTTOM	-29	-2	-0.1	-1.3
LL8 BOTTOM	-314	-2	-0.1	0.7

Location/Grid	Fixed Point Measurement (dpm/100 cm <sup>2</sup> )	uR/hr at 1 m	Wipe Test Alpha (dpm/100 cm <sup>2</sup> )	Wipe Test Beta (dpm/100 cm <sup>2</sup> )
LL8 TOP	-139	-2	-0.1	-1.3
LL8 FLOOR	-164	-3	-0.1	0.7
JJ5 FLOOR	-64	-2	-0.1	-1.3
DD1	582	-4	-0.1	2.7
1AA BOTTOM	704	3	0.9	-0.3
1AA TOP	457	3	0.9	-0.3
3Y BOTTOM	486	3	-0.1	2.7
4Y BOTTOM	436	-4		-1.3
5Y TOP	-207	2	-0.1	0.7
BB8 TOP	132	-4	-0.1	-0.3
CC8 BOTTOM	-354	-4	-0.1	-0.3
Y8 BOTTOM	471	3	0.9	1.7
GG8 BOTTOM	582	3	-0.1	-1.3
II5 BOTTOM	-221	2	-0.1	-0.3
II2 BOTTOM	-286	4	-0.1	-0.3
II1	-136	5	-0.1	-0.3
<b>BUILDING 2281 - LAB 2</b>				
A8	136	0	-0.1	2.7
A2	-7	-2	-0.1	-1.3
D1	-189	-2	0.9	0.7
J1	-318	-4	-0.1	0.3
H1	57	-1	-0.1	-0.3
K-6	-504	-4	0.9	1.7
G-11	-64	-2	-0.1	0.7
J-11	-236	-2	-0.1	-0.3

Location/Grid	Fixed Point Measurement (dpm/100 cm <sup>2</sup> )	uR/hr at 1 m	Wipe Test Alpha (dpm/100 cm <sup>2</sup> )	Wipe Test Beta (dpm/100 cm <sup>2</sup> )
J-7	-296	-4	-0.1	-1.3
I-3	-111	-1	-0.1	0.7
F-1	-32	-2	-0.1	0.7
G-5	-107	-3	-0.1	0.7
C-9	-32	-2	-0.1	-1.3
A-3 TOP	-136	-2	-0.1	0.7
A-3 BOTTOM	-196	-2	-0.1	0.7
A-9	218	-2	-0.1	1.7
C-11	-86	-1	-0.1	0.7

CONFIRMATORY SURVEY RESULT  
 DEPARTMENT OF THE ARMY - FORT MCCLELLAN  
 RATTLESNAKE GULCH - IRON MOUNTAIN SOIL SAMPLES  
 SEPTEMBER 27 - OCTOBER 1, 1999

LOCATION	CS-137	CO-60
N33° 41.707 min W85° 48.631 min (surface background)	0.54 ± 0.02 pCi/g	<0.03 pCi/g
N33° 41.707 min W85° 48.631 min background - 4 foot depth	0.067 ± 0.016 pCi/g	<0.03 pCi/g
N33° 41.707 min W85° 48.631 min background - 8 foot depth	0.017 ± 0.011 pCi/g	<0.03 pCi/g
N33° 41.774 min W85° 48.559 min - surface	0.431 ± 0.015 pCi/g	<0.03 pCi/g
N33° 41.774 min W85° 48.559 min - 4 foot depth	0.039 ± 0.008 pCi/g	<0.02 pCi/g
N33° 41.774 min W85° 48.559 min - 8 foot depth	0.033 ± 0.011 pCi/g	<0.03 pCi/g
N33° 41.764 min W85° 48.634 min - surface	0.41 ± 0.02 pCi/g	<0.02 pCi/g
N33° 41.764 min W85° 48.634 min - 4 foot depth	0.034 ± 0.010 pCi/g	<0.03 pCi/g

LOCATION	CS-137	CO-60
N33° 41.764 min W85° 48.634 min - 6 foot depth	0.031 ± 0.014 pCi/g	<0.04 pCi/g
N33° 41.785 min W85° 48.615 min - surface	0.290 ± 0.15 pCi/g	<0.02 pCi/g
N33° 41.785 min W85° 48.615 min - 4 foot depth	0.23 ± 0.02 pCi/g	<0.02 pCi/g
N33° 41.785 min W85° 48.615 min - 8 foot depth	0.0143 ± 0.016 pCi/g	<0.03 pCi/g
20 feet 240° from last point - surface	0.075 ± 0.014 pCi/g	<0.03 pCi/g
20 feet 240° from last point - 4 foot depth	<0.03 pCi/g	<0.02 pCi/g
20 feet 240° from last point - 8 foot depth	<0.03 pCi/g	<0.03 pCi/g
N33° 42.002 min W85° 48.711 min - surface	0.58 ± 0.02 pCi/g	<0.03 pCi/g
N33° 42.002 min W85° 48.711 min - 3 foot depth	0.088 ± 0.014 pCi/g	0.02 pCi/g
N33° 42.000 min W85° 48.720 min - surface	0.41 ± 0.02 pCi/g	<0.03 pCi/g
20 feet 350° from last point - surface	0.50 ± 0.02 pCi/g	0.02 pCi/g
20 feet 350° from last point - 3 foot depth	0.080 ± 0.012 pCi/g	0.02 pCi/g
N33° 41.997 min W85° 48.725 min - surface	0.28 ± 0.02 pCi/g	0.02 pCi/g
N33° 41.997 min W85° 48.725 min - 4 foot depth	<0.03 pCi/g	<0.03 pCi/g
N33° 41.997 min W85° 48.725 min - 6 foot depth	<0.03 pCi/g	<0.03 pCi/g
N33° 41.020 min W85° 48.719 min - surface	0.46 ± 0.02 pCi/g	0.02 pCi/g
N33° 41.020 min W85° 48.719 min - 5 foot depth	0.111 ± 0.014 pCi/g	0.02 pCi/g
N33° 41.020 min W85° 48.719 min	0.079 ± 0.016 pCi/g	0.02 pCi/g
N33° 42.145 min W85° 48.745 min - (downgrade background surface)	<0.03 pCi/g	<0.03 pCi/g
N33° 42.145 min W85° 48.745 min - 4 foot depth	<0.03 pCi/g	<0.03 pCi/g
N33° 42.145 min W85° 48.745 min - 6.5 foot depth	<0.03 pCi/g	<0.03 pCi/g