APPENDIX B-1

Nuclear Regulatory Commission Letters

APPENDIX B-1

NUCLEAR REGULATORY COMMISSION LETTERS

Bailey, Orysia Masnyk, License Reviewer

1998 Letter to Commandant, U.S. Army Chemical School, Fort McClellan, Alabama, Termination of License No. 01-02861-0401-02861-04 (Reference: Control No. 257737; Docket No. 030-14759030-14759), 19 October 1998. Directorate of Environment, Fort McClellan, Alabama.

2000 Letter to Commandant, Department of the Army, U.S. Army Chemical School, Fort Leonard Wood, Missouri, Transmittal and Explanation of Amendment to License No. 01-02861-05 (Reference Control No. 258979; Docket No. 030-17584), 27 July 2000. Directorate of Environment, Fort McClellan, Alabama.

Boland, Anne T., Acting Chief

2001 Letter to Commandant, Department of the Army, U.S. Army Chemical School, Fort Leonard Wood, Missouri, NRC Inspection Report 01-02861-05/01-01, 9 March 2001. Directorate of Environment, Fort McClellan, Alabama.

Decker, Thomas R., Chief

1998 Letter to Commandant, U.S. Army Chemical School, Fort McClellan, Alabama, NRC Inspection Report No. 01-02861-04/98-01, 21 April 1998. Directorate of Environment, Fort McClellan, Alabama.

1998 Letter to Commandant, U.S. Army Chemical School, Fort McClellan, Alabama, NRC Inspection Report No. 01-02861-04/98-02, 22 May 1998. Directorate of Environment, Fort McClellan, Alabama.

2000 Letter to Commandant, U.S. Army Chemical School, Fort Leonard Wood, Missouri, NRC Inspection Report No. 01-02861-05/99-01, 1 March 2000. Directorate of Environment, Fort McClellan, Alabama.

Potter, John P., Chief

1997 Letter to Commandant, Department of the Army, U.S. Chemical School, Fort McClellan, Alabama, NRC Inspection Report 01-02861-04/97-01, 7 October 1997. Directorate of Environment, Fort McClellan, Alabama.

Bailey, Orysia Masnyk, License Reviewer

1998 Letter to Commandant, U.S. Army Chemical School, Fort McClellan, Alabama, Termination of License No. 01-02861-0401-02861-04 (Reference: Control No. 257737; Docket No. 030-14759030-14759), 19 October 1998. Directorate of Environment, Fort McClellan, Alabama.

UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION II
ATLANTA FEDERAL CENTER
61 FORSYTH STREET, SW, SUITE 23T85
ATLANTA, GEORGIA 30303-3415

October 19, 1998

Commandant
ATTN: AZTM-CM-AHP
U.S. Army Chemical School
Ft. McClellan, Alabama 36205

SUBJECT: TERMINATION OF LICENSE NO. 01-02861-0401-02861-04 (REFERENCE: CONTROL NO. 257737; DOCKET NO. 030-14759030-14759)

Dear Commandant:

On December 1, 1997, you contacted the U. S. Nuclear Regulatory Commission and indicated that you wished to terminate your NRC radioactive materials license. The NRC staff has reviewed your Allied Technology Group remediation and closeout survey report dated December 1996, Industrial Radiation Survey No. 27-MH-6999-97, Facility Close-out Verification Survey, Fort McClellan, AL, 17-22 August 1997 report dated February 6, 1998, July 16, 1998 memorandum providing additional sample analysis results, and NRC Form 314, Certificate of Disposition of Materials dated December 5, 1997. The NRC performed confirmatory surveys and observed decommissioning work in progress as documented in NRC Inspection Report Nos. 01-02861-04/97-01, 98-01, and 98-02, dated October 7, 1997, April 21, 1998, and May 22, 1998, respectively. Sample analysis results of soil, water, and clay samples obtained during these inspections are contained in the enclosure to this letter.

Based on its review, the staff has concluded that Buildings 3182 and 3192 and the surrounding fenced area at Fort McClellan, Alabama is suitable for unrestricted use in that residual radioactive material attributable to licensed activity does not exceed current NRC criteria.

If there are any errors or questions, please notify this office (ATTN: Ms. Diane Heim at (404) 562-4723) so that we can provide appropriate corrections and answers.

Sincerely,

Orysia Masnyk Bailey

Orysia Masnyk Bailey, License Reviewer
Division of Nuclear Materials Safety

Enclosures: 1. NRC Materials License Termination
2. Sample Analysis Results

cc w/encls: (See page 2)

cc w/encls:
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

NRC FORM 374A U.S. NUCLEAR REGULATORY COMMISSION

MATERIALS LICENSE
SUPPLEMENTARY SHEET

License No.
01-02861-04

Docket or Reference No.
030-14759

Amendment No. 17

Commandant
U.S. Army Chemical School
ATTN: AZTM-CM-AHP
Ft. McClellan, Alabama 36205

In accordance with Certification of Disposition of Materials dated December 5, 1997, License No. 01-02861-04, is hereby terminated.

FOR THE U.S. NUCLEAR REGULATORY COMMISSION

ORYSIA MASNYK BAILEY

Date OCT 19 1998

By Orysia Masnyk Bailey

Region II, Division of Nuclear Materials Safety
61 Forsyth Street, SW, Suite 23T85
Atlanta, GA 30303

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NRC FORM 374A U.S. NUCLEAR REGULATORY COMMISSION PAGE 1 of 1 PAGES

MATERIALS LICENSE
SUPPLEMENTARY SHEET

License No.
01-02861-04

Docket or Reference No.
030-14759

Amendment No. 17

Commandant
U.S. Army Chemical School
ATTN: AZTM-CM-AHP
Ft. McClellan, Alabama 36205

In accordance with Certification of Disposition of Materials dated December 5, 1997, License No. 01-02861-04, is hereby terminated.

FOR THE U.S. NUCLEAR REGULATORY COMMISSION

ORYSIA MASNYK BAILEY

Date OCT 19 1998

By Orysia Masnyk Bailey

Region II, Division of Nuclear Materials Safety
61 Forsyth Street, SW, Suite 23T85
Atlanta, GA 30303

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SAMPLE ANALYSIS RESULTS
DEPARTMENT OF THE ARMY - FORT MCCLELLAN
MARCH 9-12, 1997

SOIL AND WATER GAMMA ANALYSIS FOR Co-60 AND Cs-137

LOCATION	Cs-137 picocuries per gram)	Co-60 (picocuries per gram)
Grid M-18 (soil)	0.15 ± 0.02	0.10 ± 0.02
Grid M-28 (soil)	0.46 ± 0.02	<0.03
Grid P-20 (soil)	0.169 ± 0.013	0.025 ± 0.008
Grid K-21 (soil)	0.51 ± 0.02	0.18 ± 0.02
Grid H-17 (soil)	0.235 ± 0.015	0.62 ± 0.02
Grid K-26 (soil)	0.208 ± 0.015	0.029 ± 0.013
left side museum door (soil)	5:17 ± 0.05	0.19 ± 0.02
middle museum door (soil)	1.90 ± 0.04	0.30 ± 0.02
Grid Z-18 (soil)	0.044 ± 0.010	0.03 ± 0.02
Well #2 depth 13 feet (water)	< 0.05	<0.04
Well #6 depth 17 feet (water)	<0.04	< 0.05
Well #11 depth 2 feet (water)	<0.03	<0.04
Well #7 depth 2 feet (water	<0.04	<0.04
hot cell trench (clay)	0.035 ± 0.02	0.15 ± 0.02
Summerall Gate (dirt)	<0.02	0.094 ± 0.010

Two soil samples were obtained on April 15, 1998, for analysis for Sr-90 contamination. These were taken from the area where Building 3180 stood. Sample #1 contained 0.02 ± 0.51 picocuries per gram of soil of Sr-90, and sample #2 contained 0.08 ± 0.46 picocuries per gram.

Enclosure 2

Bailey, Orysia Masnyk, License Reviewer

2000 Letter to Commandant, Department of the Army, U.S. Army Chemical School, Fort Leonard Wood, Missouri, Transmittal and Explanation of Amendment to License No. 01-02861-05 (Reference Control No. 258979; Docket No. 030-17584), 27 July 2000. Directorate of Environment, Fort McClellan, Alabama.

UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION II
SAM NUNN ATLANTA FEDERAL CENTER
61 FORSYTH STREET SW SUITE 23T85
ATLANTA, GEORGIA 30303-8931

July 27, 2000

Department of the Army
ATTN: Colonel Patricia L. Nilo
Commandant
U. S. Army Chemical School
Fort Leonard Wood, Missouri 65473-8926

SUBJECT: TRANSMITTAL AND EXPLANATION OF AMENDMENT TO LICENSE NO. 01-02861-05 (REFERENCE CONTROL NO. 258979; DOCKET NO. 030-17584)

Dear Colonel Nilo:

Enclosed please find Amendment No. 15 to your NRC materials license. This action was taken in response to your letter dated June 12, 2000, providing additional survey data obtained at the former Chemical School (Building 1081) at Fort McClellan, Alabama. This information, and the information provided in your March, 2000 Final Survey Report, was compared to the NRC's data obtained during an inspection completed on October 1, 1999. The inspection results were documented in Inspection Report No. 01-02861-05/99-01 issued on March 1, 2000. Additional survey results from the survey conducted in Building 1081 are contained in Enclosure 2 to this letter. The results of this review confirm that Building 1081 meets the criteria for unrestricted release delineated in 10 CFR 20.1402. Accordingly it has been removed from your license. A survey of Alpha Field was not required since the only licensed materials used there were plated U-233 sources and your report indicated that there was no contamination found when the plates were tested.

The following is an update of the remaining issues concerning the burial mound at Pelham Range.

1. The Environmental Assessment for the Decommissioning Plan for the contaminated soil in the burial mound at Pelham Range is under final review and will be published in the Federal Register for public review and comment shortly.

2. We are awaiting your response to our letter dated May 4, 1999. In it we asked what assurance you can provide that contamination is limited to the area of the burial mound. We understand that you plan to address this concern by performing an aerial fly over of the area and have received your fax dated July 12, 2000, which delineates the areas to be considered. Please ensure that the area to be surveyed contains the areas used for radiological exercises at the Pelham Range.

3. We have received your letter dated July 6, 2000, containing information regarding the hydro geologic conditions at the Pelham Range. It will be used to help determine whether the groundwater in the area has been affected by the burial mound.

4. We are also awaiting your response to our letter dated March 1, 2000, asking you to discuss your method of securing any licensed material that may be removed from the mound or accumulated as the work continues.

We have reviewed your November, 1999, Radiological Historical Assessments of the Pelham Range and Main Post as well as your March, 2000, Commodity Site Survey Report. Based on the information provided in these documents and previous NRC inspection activities at Fort McClellan we have determined that the following areas identified in the Commodity Site Survey Report do not require additional attention from the NRC; Buildings 337, 338, 339, 341, 3181, 345, 335, 228, 303-A, 812-1/2, 257, 4416, 256, 3182, and 350, Bromine Field, and Alpha Field. We have no further radiological concerns regarding the use or control of these areas.

No further action is required based on the adequacy and thoroughness of your final surveys, your conservative assessment of the appropriate MARSSIM Class of the areas to be surveyed, your findings that no residual contamination remained, and for the following reasons.

1. Inspectors from the Alabama Department of Radiological Safety and the Federal Environmental Protection Agency were present during the final survey of Building 3181, and based on discussions with them, and review of your report, we have determined that the survey was appropriate and adequate.

2. The materials used in Buildings 228, 256, 257, 303A, 335, 337, 338, 339, 341, 345, 350, 812-1/2, and 4416 were in sealed source form with no history of leaking or contamination or were material not regulated by the NRC.

3. The material used at Bromine Field, Br-82, has a half life of 2.4 days, no contamination can remain, and no survey is required.

We have received your Sampling Plan dated July 20, 2000 for the remaining areas to be surveyed as follows: Buildings T-810, 811, 812, 836 and 837 which housed the original Chemical School in the 1950s; three additional burial or use sites in the Rattlesnake Gulch area, two near the Summerall Gate area and one in the northeast corner of the Anniston Community Center Property; a room in Building 3182, and a location at Range 25 which was used for the testing of prototype actuators.

We will observe the decommissioning and survey activities as time and work load permit. Please advise us if you deviate from the schedule provided in the Sampling Plan.

If you have any questions please call me at (404) 562-4739.

Sincerely,

Orysia Masnyk Bailey

Orysia Masnyk Bailey, License Reviewer
Division of Nuclear Materials Safety

Enclosures: 1. Amendment No. 15
License No. 01-02861-05
2. Building 1081 Survey Results

cc w/encls: (See page 3)

cc w/encls:
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

NRC FORM 374

U.S. NUCLEAR REGULATORY COMMISSION

Amendment **15**

MATERIALS LICENSE

Pursuant to the Atomic Energy Act of 1954, as amended, the Energy Reorganization Act of 1974 (Public Law 93-438), and Title 10, Code of Federal Regulations, Chapter I, Parts 30, 31, 32, 33, 34, 35, 36, 39, 40, and 70, and in reliance on statements and representations heretofore made by the licensee, a license is hereby issued authorizing the licensee to receive, acquire, possess, and transfer byproduct, source, and special nuclear material designated below; to use such material for the purpose(s) and at the place(s) designated below; to deliver or transfer such material to persons authorized to receive it in accordance with the regulations of the applicable Part(s). This license shall be deemed to contain the conditions specified in Section 183 of the Atomic Energy Act of 1954, as amended, and is subject to all applicable rules, regulations, and orders of the Nuclear Regulatory Commission now or hereafter in effect and to any conditions specified below.

Licensee	In accordance with the letter dated **March 20, 2000**
1. Department of the Army	3. License No. 01-02861-05 is amended in its entirety to read as follows:
2. U. S. Army Chemical School Fort Leonard Wood, Missouri 65473-8926	4. Expiration date February 28, 2002
	5. Docket No. 030-17584

6. Byproduct, source, and/or special nuclear material	7. Chemical and/or physical form	8. Maximum amount that licensee may possess at any one time under this license
A. Cobalt 60	A. Residual contamination in soil	A. 296 megabequerels (MBq) (8 millicuries)
B. Cesium 137	B. Residual contamination in soil	B. 18.5 MBq (0.5 millicuries)

9. Authorized use:

A. and B. For possession of residual contamination and to perform decontamination and decommissioning activities.

CONDITIONS

10. Licensed material shall be used only at the U. S. Army Chemical School, Building 1081, Fort McClellan, Alabama.

11. The Radiation Protection Officer for the activities authorized by this license is John W. May, and in his absence, John E. Aperans, Ronald DeGumbia, Robert L. Stephens, and Thomas Robinson, Jr.

12. Licensed material shall be used by, or under the supervision of individuals designated by the licensee's Radiation Safety Committee and trained in accordance with the application dated November 29, 1990 and the letter with attachments dated February 6, 1992. The licensee shall maintain records of the training and experience of individuals designated as authorized users.

MATERIALS LICENSE
SUPPLEMENTARY SHEET

License No.
01-02861-05

Docket No.
030-17584

Amendment No. **15**

13. Except as specifically provided otherwise in this license, the licensee shall conduct its program in accordance with the statements, representations, and procedures contained in the documents including any enclosures, listed below. The Nuclear Regulatory Commission's regulations shall govern unless the statements, representations and procedures in the licensee's application and correspondence are more restrictive than the regulations.

A. Application dated November 29, 1990

B. Letter dated August 29, 1991

C. Letter with attachments dated February 6, 1992

D. Letter dated May 18, 1998 (changes alternate Radiation Protection Officers)

E. Letter dated May 28, 1998 (adds Cobalt and Cesium contamination possession)

F. Letter dated July 16, 1998 (additional information)

G. Letter dated March 20, 2000 [Final survey for Building 1081 and Alpha Field]

H. Letter dated June 12, 2000 [Additional information, deletes Building 1081 and Alpha Field from license, deletes "Broad Scope" use of licensed material, license for possession and decontamination only]

FOR THE U.S. NUCLEAR REGULATORY COMMISSION

ORYSIA MASNYK BAILEY

JUL 27 2000

Date _____

By _____

Region II, Division of Nuclear Materials Safety
61 Forsyth Street, SW, Suite 23T85
Atlanta, GA 30303

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Location/Grid	Fixed Point Measurement (dpm/100 cm²)	uRem/Hr at one meter	Wipe Test Alpha (dpm/100 cm²)	Wipe Test Beta (dpm/100 cm²)
Building 1081 Room 0				
4N	79	0	-0.1	-1.3
6M	150	0	-0.1	0.7
7L	32	0	-0.1	0.7
6N	150	-1	0.9	-1.3
5N	339	0	-0.1	-0.3
9H	336	-1	-0.1	-0.3
9I	107	0	-0.1	-1.3
8G	382	0	-0.1	0.7
9E	161	-1	-0.1	1.7
8D	7	0	-0.1	-1.3
10F	232	0	0.9	1.7
7G	68	-1	0.9	-0.3
5B	50	-1	-0.1	-0.3
4C	89	-1	-0.1	-0.3
4A	107	0	-0.1	1.7
6B	196	0	-0.1	-0.3
2D	207	-1	-0.1	-0.3
2E	139	-1	-0.1	2.7
3G	286	-1	-0.1	3.7
3I	218	-1	0.9	-1.3
1I	171	-1	-0.1	-1.3
4D	14	0	-0.1	1.7
5E	57	-1	-0.1	-1.3
6F	-46	-1	-0.1	-0.3
7G	79	-1	0.9	-0.3

Location/Grid	Fixed Point Measurement (dpm/100 cm²)	uRem/Hr at one meter	Wipe Test Alpha (dpm/100 cm²)	Wipe Test Beta (dpm/100 cm²)
6I	1282	-1	-0.1	2.7
5K	32	-1	-0.1	-0.3
5I	657	-1	-0.1	-0.3
6H	-57	-1	-0.1	-0.3
6D	504	0	-0.1	-0.3
BUILDING 1081 PREP LAB				
Inside Fume Hood	-50	0	-0.1	17.70
Floor Surrounding Fume Hood	scan only	--	-0.1	1.7
6B	118	0	-0.1	3.7
4C	175	0	-0.1	-0.3
9C	257	-2	-0.1	2.7
13F	268	2	-0.1	-0.3
12H	361	-1	-0.1	-0.3
14I	307	0	0.9	-1.3
9M	221	3	-0.1	1.7
10L	61	2	0.9	-0.3
6M	314	3	-0.1	0.7
2I	211	2	-0.1	-1.3
4I	14	1	-0.1	-0.3
1G	100	0	-0.1	-1.3
5F	0	0	-0.1	2.7
2D	239	-1	-0.1	0.7
5E	-57	0	-0.1	-1.3
8F	-21	-1	-0.1	-1.3
9I	79	-1	-0.1	1.7
6K	-14	-1	-0.1	0.7

Location/Grid	Fixed Point Measurement (dpm/100 cm²)	uRem/Hr at one meter	Wipe Test Alpha (dpm/100 cm²)	Wipe Test Beta (dpm/100 cm²)
10D	-50	-1	-0.1	0.7
8E	557	-1	-0.1	-1.3
8I	579	-1	-0.1	-0.3
6K	575	0	-0.1	0.7
BUILDING 1081 AREA V -VAULT				
9G	1411	-1	-0.1	2.7
9J	-96	0	0.9	-0.3
6I	-21	0	-0.1	-0.3
4D	-4	0	-0.1	0.7
6E	18	1	-0.1	-0.3
11I	7	-1	0.9	-0.3
13G	179	0	-0.1	-1.3
9F	182	0	-0.1	-1.3
9I	146	0	-0.1	-1.3
8M	29	0	-.01	0.7
5L	36	0	-0.1	-0.3
2I	221	0	0.9	-0.3
3F	61	1	-0.1	1.7
4B	154	1	-0.1	-1.3
7F	643	0	-0.1	2.7
9G	-61	0	-0.1	-0.3
8I	557	0	-0.1	0.7
BUILDING 1081 - AREA P - LAB 1				
16D	43	0	0.9	3.7
15G	68	-1	-0.1	0.7
14F	18	-1	-0.1	1.7
11H	7	-1	-0.1	0.7

Location/Grid	Fixed Point Measurement (dpm/100 cm^2)	uRem/Hr at one meter	Wipe Test Alpha (dpm/100 cm^2)	Wipe Test Beta (dpm/100 cm^2)
12E	39	-1	-0.1	-1.3
10G	57	-1	-0.1	-1.3
7H	57	-1	-0.1	0.7
6J	75	-1	-0.1	-0.3
6F	100	-1	-0.1	-0.3
4G	107	-1	-0.1	-1.3
10A	246	-1	-0.1	1.7
12B	246	0	-0.1	1.7
14C	232	1	-0.1	-0.3
15B	293	1	-0.1	2.7
6L	114	-1	0.9	-0.3
7K	296	-1	-0.1	-0.3
13L	296	0	-0.1	-1.3
16M	271	0	-0.1	-1.3
19H	418	0	-0.1	0.7
18D	243	0	-0.1	0.7
2I	296	-1	-0.1	-1.3
3D	250	-1	-0.1	0.7
4F	571	-1	-0.1	0.7
8H	579	-1	-0.1	1.7
12D	425	0	-0.1	5.7
15F	650	0	-0.1	-0.3
14I	582	0	-0.1	-0.3
BUILDING 1081 - AREA Q - LAB HALLWAY				
5E	-14	0	-0.1	0.7
8D	61	-1	-0.1	-0.3
11D	-143	0	-0.1	1.7

Location/Grid	Fixed Point Measurement (dpm/100 cm²)	uRem/Hr at one meter	Wipe Test Alpha (dpm/100 cm²)	Wipe Test Beta (dpm/100 cm²)
14H	61	-2	-0.1	-1.3
10J	-18	-1	-0.1	-0.3
7E	-86	-1	-0.1	-1.3
13E	-36	-2	-0.1	-0.3
BUILDING 1081 - LAB #2				
13F	157	-1	-0.1	-0.3
12Q	196	-1	.09	.07
10Q	-82	-2	-0.1	-0.3
8W	243	-1	-0.1	-1.3
7S	100	-1	-0.1	-0.3
3R	129	-1	-0.1	-0.3
5R	-32	-2	-0.1	-1.3
6O	-71	-1	-0.1	-1.3
2G	264	0	-0.1	0.7
6F	-118	-1	-0.1	2.7
8C	264	-1	0.9	3.7
9F	7	-1	0.9	1.7
7H	-21	-1	-0.1	-1.3
BUILDING 1081 - LAB #7				
7E	-14	-2	-0.1	0.7
1E	161	-1	-0.1	-1.3
4F	-18	-1	-0.1	-0.3
9L	200	-1	0.9	-0.3
10I	-54	-1	-0.1	-0.3
11F	43	-2	-0.1	0.7
BUILDING 1081 VAULT				
9G	429			

Location/Grid	Fixed Point Measurement (dpm/100 cm²)	uRem/Hr at one meter	Wipe Test Alpha (dpm/100 cm²)	Wipe Test Beta (dpm/100 cm²)
9G	364			
LSC SMEARS FOR H-3				
WATER BACKGROUND			138	
9G			13	
9J			-4	
6I			-51	
4D			42	
6E			-5	
9F			5	
5L			7	
9G			27	
8H			4	
BUILDING 1081 - TANK ROOM				
5D	96	-3	-0.1	4.7
7E	293	-3	-0.1	2.7
7C	75	-3	-0.1	4.7
BUILDING 2281- LAB #1				
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

Location/Grid	Fixed Point Measurement (dpm/100 cm²)	uRem/Hr at one meter	Wipe Test Alpha (dpm/100 cm²)	Wipe Test Beta (dpm/100 cm²)
EAST WALL - D	729	3	-0.1	3.7
EAST WALL - A	764	-1	-0.1	5.7
BUILDING 22 81 - HP LAB				
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
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
BUILDING 2281 - DECON ROOM A				
WEST WALL - 4 FT SOUTH	246	-6	-0.1	-0.3
WEST WALL - 22 FT NORTH	-143	-7	-0.1	5.7

Location/Grid	Fixed Point Measurement (dpm/100 cm^2)	uRem/Hr at one meter	Wipe Test Alpha (dpm/100 cm^2)	Wipe Test Beta (dpm/100 cm^2)
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
BUILDING 2281 - DECON ROOM 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
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

Location/Grid	Fixed Point Measurement (dpm/100 cm²)	uRem/Hr at one meter	Wipe Test Alpha (dpm/100 cm²)	Wipe Test Beta (dpm/100 cm²)
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
BUILDING 2281 - PREP LAB				
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
BUILDING 2281 - LAB 2				
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
O1	-46	-6	-0.1	-0.3

Location/Grid	Fixed Point Measurement (dpm/100 cm^2)	uRem/Hr at one meter	Wipe Test Alpha (dpm/100 cm^2)	Wipe Test Beta (dpm/100 cm^2)
L11	-300	-4	-0.1	-1.3
N9	-261	-4	-0.1	0.7
BUILDING 2281 - HALLWAY OUTSIDE LAB 2				
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
BUILDING 2281 - LAB 2 OFFICE				
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
BUILDING 2281 - VAULT				
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
LL8 TOP	-139	-2	-0.1	-1.3
LL8 FLOOR	-164	-3	-0.1	0,7
JJ5 FLOOR	-64	-2	-0.1	-1.3

Boland, Anne T., Acting Chief

2001 Letter to Commandant, Department of the Army, U.S. Army Chemical School, Fort Leonard Wood, Missouri, NRC Inspection Report 01-02861-05/01-01, 9 March 2001. Directorate of Environment, Fort McClellan, Alabama.

UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION II
SAM NUNN ATLANTA FEDERAL CENTER
61 FORSYTH STREET, SW. SUITE 23T85
ATLANTA, GEORGIA 30303-8931

March 9, 2001

Department of the Army
ATTN: Colonel Patricia L. Nilo
Commandant
U.S. Army Chemical School
Fort Leonard Wood, Missouri 65473-8926

SUBJECT: NRC INSPECTION REPORT 01-02861-05/01-01

Dear Colonel Nilo:

On February 20-22, 2001, the NRC completed an inspection and confirmatory survey at several locations at the former site of the Army Chemical School in Fort McClellan, Alabama. These locations are those areas where NRC licensed material was used as described in your report, HQ, OSC Project Number USA 99-100, dated October 2000. These areas included Buildings 3182, 3185, T-810, T-811, T-812, and T-837, the foundation of the demolished Building T-836, and areas identified by you as the original Rattlesnake Gulch area and Chemical School Radiological Burial Grounds.

During the inspection records were reviewed, procedures were discussed with personnel, and direct confirmatory measurements were taken. The inspectors also obtained smears for removable contamination assessment. Based on these reviews, discussions, and measurements, no violations were identified. Survey and smear results are contained in the enclosed report.

Based on its review, the staff has concluded that the areas delineated above meet the criteria for unrestricted use described in 10 CFR 20.1402. The remaining area of concern at Fort McClellan is the Pelham Range Burial Mound and the need to ensure that no residual contamination remains in other areas of the Range, including any impact on the ground water.

In accordance with 10 CFR 2.790 of the NRC's "Rules of Practice," a copy of this letter and its enclosure will be available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records, (PARS) component of NRC's document system (ADAMS). ADAMS is accessible from the NRC Web site at http://www.nrc.gov/NRC/ADAMS/index.html (the Public Electronic Reading Room).

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

Sincerely,

Anne T. Boland, Acting Chief
Materials Licensing and Inspection Branch 1
Division of Nuclear Materials Safety

Docket No. 030-17584
License No. 01-02861-05

Enclosure: NRC Inspection Report
No. 01-02861-05/01-01

cc w/encl:
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Division of Radiation Control
State of Alabama
Department of Public Health
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Lisa Kingsberry
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Fort McClellan, AL 36205-5000

U.S. NUCLEAR REGULATORY COMMISSION

REGION II

Docket No.:	030-17584
License No.:	01-02861-05
Report No.:	01-02861-05/21-01
Licensee:	Department of the Army
Location:	Fort McClellan, Alabama
Date:	February 20-22, 2001
Inspectors:	Orysia Masnyk Bailey, Health Physicist
Accompanying Personnel:	Jeff Griffis, Co-op Student Andy Miller, CHP, Health Physicist Anita Turner, Ph.D., Health Physicist
Approved by:	Anne T. Boland, Acting Chief Materials Licensing and Inspection Branch 1 Division of Nuclear Materials Safety

EXECUTIVE SUMMARY

DEPARTMENT OF THE ARMY
FORT MCCLELLAN, ALABAMA
NRC INSPECTION REPORT NO. 01-02861-05/21-01

This special, announced inspection was conducted to evaluate the licensee's closeout surveys in support of releasing Buildings 3182, 3185, T-810, T-811, T-812, and T-837, the foundation of the demolished Building T-836, and areas identified by the licensee as the original Rattlesnake Gulch area and Chemical School Radiological Burial Grounds as described in the Army's report, HQ, OSC Project Number USA 99-100, dated October 2000. The release criteria were those contained in 10 CFR 20.1402.

The confirmatory fixed point measurements and smears for removable contamination were at or near background levels and were well below release limits. The NRC survey results were comparable with the results documented in the Army's survey report. The staff has concluded that the areas described in this report are acceptable for release for unrestricted use.

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

REPORT DETAILS

1. Scope

This special, announced inspection was conducted to evaluate the licensee's closeout surveys in support of releasing Buildings 3182, 3185, T-810, T-811, T-812, and T-836, and areas identified by the licensee as the original Rattlesnake Gulch area and Chemical School Radiological Burial Grounds as described in the Army's report, HQ, OSC Project Number USA 99-100, dated October 2000. 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 release criteria were those contained in 10 CFR 20.1402. A site is considered acceptable for unrestricted use if the residual radioactivity that is distinguishable from background radiation results in a Total Effective Dose Equivalent (TEDE) to an average member of the critical group that does not exceed 25 mrem per year, including that from groundwater sources of drinking water, and that residual radioactivity has been reduced to levels that are as low as reasonably achievable (ALARA). The critical group means the group of individuals reasonably expected to receive the greatest exposure to residual radioactivity for any applicable set of circumstances. The surface contamination levels used were those published in the Federal Register, Volume 63, No. 222, on November 18, 1998 - Table 1- "Acceptable License Termination Screening Values of Common Radionuclides for Building Surface Contamination."

2. Observations and Findings

The Army performed a Historical Records Search as a part of its Base Realignment and Closure (BRAC) process. This records search identified several areas as having radiological issues (the storage and/or routine maintenance of Army radioactive commodities). A contractor, Allied Technology Group (ATG), was hired to survey, and remediate as necessary, any areas that had not been previously addressed. This work was detailed in a report, HQ, OSC Project Number USA 99-100, Select Commodity Site Areas, dated October 2000. The work was performed from August 1 through the 18, 2000. During the conduct of the survey, an NRC inspection was performed, this is documented in Report No. 01-12861-05/00-01. The surveys and remediation were performed in accordance with the approved decommissioning plan. The final report was reviewed and found to be complete and accurate. It demonstrated that the facility could be released for unrestricted use.

Nine potentially impacted areas were identified; Buildings 3182, 3185, T-810, T-811, T-812, and T-837, and three outdoor areas; the foundation for T-836, the original Rattlesnake Gulch area, and the Chemical School Radiological Burial Grounds. Although these last two areas were previously identified by records review and survey activity to be located elsewhere, the Army chose to be conservative and perform additional surveys in these new areas. Three additional areas were identified to be non-impacted areas,

based on records investigation, and no surveys were performed. These areas were the Radiological Survey Area, the Field Hot Cell area, and Range 25. These first two areas are included in a portion of the base that was previously surveyed and released, it was called the Rattlesnake Gulch Area in earlier Army and NRC reports. This is not to be confused with the "original Rattlesnake Gulch" area discussed in this report.

Although Building 3182, the site of an earlier Chemical School classroom and the Military Police Museum, was preciously surveyed and released, elevated areas of activity were found in two rooms after the building was emptied as part of the BRAC process. The contractor remediated these areas and performed a final close out survey. The remediation consisted of some scabbling of the concrete floors in these rooms.

The "T" Buildings were the original Chemical School buildings used in the early 1950s. NRC review of records associated with this building indicate that isotope use in this building consisted of Co-60, short lived radionuclides, and sealed sources.

Building 3185 was historically used as a personnel decontamination center for training purposes. Earlier NRC review of records showed that the isotope used in this building was Bromine 82 with a half life of 35 hours.

The Army, conservatively, surveyed all buildings for Cesium 137, Radium 226, Cobalt 60 and Strontium 90.

The inspector performed confirmatory surveys and took smears for removable contamination. The inspectors selected approximately 10 percent of the licensee's fixed point measurements for verification and approximately 10 percent of the floor area was surveyed for "hot spots." The two rooms where elevated raedings were found by the licensee were subjected to a 100 percent scan of the floor and one meter up the wall. In addition, the inspectors surveyed the sink surface and removed the trap. A sodium iodide (NaI) probe was lowered into the drain, no elevated readings were seen. Approximately 50 percent of the outdoor areas were scanned for elevated activity. The fixed point measurements were performed using either an Eberline ESP-2 or E-600 with a pancake probe. The scans were performed with an Eberline ESP-2 with a pancake or SPA-6 probes, or the E-600 with pancake probe. Fixed point contamination smears were counted on a Gamma 5000 Alpha/Beta counter.

The results of the measurements and smear analysis are given in the attachment to this report. Average background levels were 51 counts per minute (cpm) for the pancake probes for inside surfaces, and 1,700 cpm for the SPA-6 probe for outdoor areas. Average background smears were 5 cpm for beta.

3. Conclusions

The confirmatory fixed point measurements and smears for fixed and removable contamination were at or near background levels and were well below release limits. The NRC survey results were comparable with the licensee's results. Buildings 3182, 3185, T-810, T-811, T-812, and T-837, the foundation for Building T-836, and areas identified by the licensee as the original Rattlesnake Gulch area and Chemical School

Radiological Burial Grounds as described in the Army's report, HQ, OSC Project Number USA 99-100, dated October 2000 may be released for unrestricted use.

EXIT MEETING SUMMARY

The inspectors discussed the inspection results with the BRAC manager on February 22, 2001. The licensee was advised that were no further radiological concerns with Buildings 3182, 3185, T-810, T-811, T-812, and T-837, the foundation for Building T-836, and areas identified by the licensee as the original Rattlesnake Gulch area and Chemical School Radiological Burial Grounds as described in the Army's report, HQ, OSC Project Number USA 99-100, dated October 2000, and that these areas could be released for unrestricted use. The inspectors advised that the remaining area of concern at Fort McClellan was the Pelham Range Burial Mound and the need to ensure that no residual contamination remained in other areas of the Range, including any impact on the ground water.

ATTACHMENT

LIST OF PERSONS CONTACTED

Department of the Army, Fort McClellan:

*Lisa Kingsberry, Base Relocation and Closure Coordinator
Ron Levy, Environmental Manager

Environmental Protection Agency:

Lloyd Generette

State of Alabama:

*James T. Williams, Radiation Physicist, Division of Radiation Control

*Attended exit interview.

INSPECTION PROCEDURES USED

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

SURVEY INSTRUMENTS USED FOR CONFIRMATORY SURVEY

1. Eberline ESP-2 with Eberline "pancake" HP-260 probe
   NRC Tag: 026730 Calibrated: 09-23-00
   Background: 36 cpm Efficiency: 15% Tc-99**
   70% Cs-137
   MDA* 4,800 dpm/100cm^2 (scanning)
   1,360 dpm/100cm^2 (scaler) for Tc-99
   986 dpm/100cm^2 (scanning)
   280 dpm/100cm^2 (scaler) for Cs-137

   With SPA-6 probe, Serial No. 286: 8% efficiency for Cs-137. MDA is 9000 dpm/100cm^2 (scanning mode)

2. Eberline ESP-2 with Eberline "pancake" HP-260 probe
   NRC Tag: 026729 Calibrated: 05-26-00
   Background: 34 cpm Efficiency: 14% Tc-99
   72 % Cs-137
   MDA: 4,857 dpm/100cm^2 (scanning)
   1,420 dpm/100cm^2 (scaler) for Tc-99
   944 dpm/100cm^2 (scanning)
   369 dpm/100cm^2 (scaler) for Cs-137

3. Eberline ESP-2 with Eberline "pancake" HP-260 probe
   NRC Tag: 026418 Calibrated: 05-27-00
   Background: 36 cpm Efficiency: 18% Tc-99
   74 % Cs-137
   MDA: 4,000 dpm/100cm^2 (scanning)
   1,134 dpm/100cm^2 (scaler) for Tc-99
   973dpm/100cm^2 (scanning)
   276 dpm/100cm^2 (scaler) for Cs-137

4. Eberline E-600 with Eberline HP-360 pancake probe
   NRC Tag: 073470 Calibrated: 09-23-00
   Background: 45 cpm Efficiency: 48% Tc-99
   71 % Cs-137
   MDA: 1,875 dpm/100cm^2 (scanning)
   471 dpm/100cm^2 (scaler) for Tc-99
   1,268 dpm/100cm^2 (scanning)
   318 dpm/100cm^2 (scaler) for Cs-137

5. The removable contamination smears were counted on a Gamma 5000 gas flow proportional counter. The efficiency for Tc-99 was 29% with an MDA of 25 dpm/100cm^2.

* Minimum detectable activity

** A Tc-99 standard was used in lieu of a Co-60 standard to determine efficiencies and MDAs. Its beta energy of 292 Kev is comparable to that of Co-60's beta energy of 314 Kev.

CONFIRMATORY SURVEY RESULTS
DEPARTMENT OF THE ARMY - FORT MCCLELLAN
FEBRUARY 20-22, 2001

ALL READINGS EXCEPT WHERE INDICATED ARE NET READINGS ABOVE BACKGROUND

LOCATION/GRID	FIXED POINT MEASUREMENT (dpm/100cm^2)	WIPE TEST BETA (dpm/100cm^2)
Building 3182, Room 6, J-2	762	2.7
Building 3182, Room 6, I-2	24	-1.3
Building 3182, Room 6, J-3	24	-0.3
Building 3182, Room 6, J-4	714	10.7
Building 3182, Room 6, J-5	24	-1.3
Building 3182, Room 6, I-4	143	-1.3
Building 3182, Room 6, scabbled hole	1286	5.7
Building 3182, Hallway, C-21	238	2
Building 3182, Hallway, C-13	190	8.7
Building 3182, Hallway, B-9	-190	-0.3
Building 3182, Hallway, D-3	286	10.7
Building 3182, Room 16, D-3	428	0.7
Building 3182, Room 16, C-4	-333	-0.3
Building 3182, Room 16, B-6	-95	2.7
Building 3182, Room 16, H-6	-238	2.7
Building 3182, Room 16, G-4	-143	-0.3
Building 3182, Room 16, H-3	333	4.7
Building 3182, Room 2, center floor	524	9.7
Building 3182, Room 3, center floor	238	3.7
Building 3182, Room 1, B-1	-428	-1.3
Building 3182, Rom 1, C-3	95	-0.3

LOCATION/GRID	FIXED POINT MEASUREMENT (dpm/100cm^2)	WIPE TEST BETA (dpm/100cm^2)
Building T837, downstairs bathroom, under sink	125	0.7
Building T837, F-2	97	1.7
Building T837, B-2	0	1.7
Building T837, upstairs bathroom, under sink	-111	-0.3
Building T837, upstairs laundry room, center floor	-111	0.7
Building T812, middle floor in storage room	306	2.7
Building T812, C-2	306	0.7
Building T812, XE-1	458	-1.3
Building T812, F-2 wall	153	1.7
Building T812, C-2	208	2.7
Building T812, E-1	236	3.7
Building T812, E-2	53	1.7
Building T812, storage room, middle floor	194	1.7
Building T812 ½, middle floor	97	-0.3
Building T810, C-1	389	0.7
Building T810, B-2	292	-0.3
Building T810, A-2 wall	-14	1.7
Building T810, E-1	-83	0.7
Building 3180, Room 11, B-3	514	0.7
Building 3180, Room 11, C-1	347	-0.3
Building 3180, Room 15, under sinks, center floor	667	3.7
Building 3180, Room 13, under sinks, center floor	1236	-0.3
Building 3180, Room 12, center floor	167	1.7

LOCATION/GRID	FIXED POINT MEASUREMENT (dpm/100cm^2)	WIPE TEST BETA (dpm/100cm^2)
Building 3180, Room 14, center floor	472	0.7
Building 3180, Room 14, N-1	69	2.7
Building 3182, Room 10, C-2	167	-1.3
Building 3182, Room 10, B-2	83	-0.3
Building 3182, Room 5, B-2	444	3.7
Building 3182, Room 5, A-4	583	9.7
Building 3182, Room 4, B-2	-222	8.7
Building 3182, Room 4, D-5	-111	-0.3
Building 3182, Room 4, E-3	-111	5.7
Building 3182, Room 4, G-5	-56	5.7
Building 3182, Room 4, H-3	-103	-0.3
Building 3182, Room 4, D-2	-250	2.7
Building 3185, ladies room, under sink	1911	3.7
Building 3185, under sink, outside ladies' room	89	10.7
Building 3185, Room 5, center floor	-311	2.7
Building 3185, men room, under sink	3067	-0.3
Building 3185, Room 15, center floor	400	-1.3
Building 3185, mop closet, center floor	222	2.7
Building 3185, sink outside ladies' room, drain	311	0.7

Decker, Thomas R., Chief

1998 Letter to Commandant, U.S. Army Chemical School, Fort McClellan, Alabama, NRC Inspection Report No. 01-02861-04/98-01, 21 April 1998. Directorate of Environment, Fort McClellan, Alabama.

UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION II
ATLANTA FEDERAL CENTER
61 FORSYTH STREET, SW, SUITE 23T85
ATLANTA, GEORGIA 30303-3415

April 21, 1998

Commandant
U. S. Army Chemical School
ATTN: AZTM-CM-AHP
Ft. McClellan, AL 36205-

SUBJECT: NRC INSPECTION REPORT NO. 01-02861-04/98-01

Dear Commandant:

On March 12, 1998, the NRC completed an inspection and confirmatory survey at Buildings 3182 and 3192 and surrounding grounds at Fort McClellan, Alabama. The enclosed report presents the results of that inspection, which were discussed with Colonel Uyesugi on March 12, 1998.

During the inspection records were reviewed, procedures were discussed with personnel, and direct confirmatory measurements were taken. The inspectors also obtained several smears and water and soil samples; the latter are being analyzed. You will be advised by separate correspondence of the results of these analyses. Based on those reviews, discussions, and measurements, no violations were identified.

As discussed in the inspection report, there is some discrepancy concerning the release limit for fixed contamination and the associated background value. Specifically, the inspectors were not able to replicate the background levels you obtained in Building 3169 as a background reference for Building 3192. Buildings 3182 and 3192 and surrounding grounds may not be released for unrestricted use until these discrepancies are resolved.

A conference call was held on March 25, 1998. That call is also summarized in the report. Based on that call we understand that on April 15, 1998, samples will be taken to resolve the background issue and to allow for the release of the former site of Building 3180. We also understand that you are aggressively working to determine the radiolgical status and the need for additional remediation of sites at Ft. McClellan where licensed materials may have been used prior to the relocation of licensed activities to Aberdeen Proving Ground, Maryland, in 1973. This includes your efforts to secure funds to remediate the burial mound at Pelham Range. Although these formerly utilized sites are not directly associated with the release of Buildings 3182 and 3192, we are concerned that the radiological status of these sites be determined, and remediated as required, prior to transfer of Ft. McClellan from the U.S. Army's control.

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,

for Douglas M. Collins

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

Docket No. 030-14759
License No. 01-02861-04

Enclosure: NRC Inspection Report
No. 01-02861-04/98-01

cc w/encl:
State of Alabama

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201 Monroe Street, Suite 700
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U. S. NUCLEAR REGULATORY COMMISSION

REGION II

Docket No.:	030-14759
License No.:	01-02861-04
Report No.:	01-02861-04/98-01
Licensee:	Department of the Army
Location:	Fort McClellan, Alabama
Date:	March 9-12, and March 25, 1998
Inspectors:	Jay L. Henson, Senior Radiation Specialist Orysia Masnyk Bailey, Radiation Specialist Bryan A. Parker, Radiation Specialist
Accompanying Personnel:	Brian Smith, 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. 01-02861-04/98-01

This special, announced inspection was conducted to evaluate the licensee's closeout survey in support of releasing Buildings 3182 and 3192 and the surrounding (unpaved) fenced areas for unrestricted use. The licensee described its proposed remediation and final survey procedures in a decommissioning plan dated March 31, 1995. The release criteria used were the following: 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, and the May 6, 1987 memo concerning Fort McClellan from the Chief, Operations Branch, Division of Fuel Cycle, Medical, Academic and Commercial Use Safety to Region II concerning acceptable concentrations of Cobalt 60 and Cesium 137 in soil. The conduct of this inspection included discussions with cognizant licensee representatives, review of documents, and direct observations and radiological surveys of the site.

The confirmatory fixed point measurements and smears for fixed and removable contamination were at or near background levels and were well below release limits. The NRC survey results were comparable with the results documented in the U. S. Army Center for Health Promotion and Preventative Medicine final survey report. The soil samples obtained at Fort McClellan are currently being analyzed and will be addressed by separate correspondence when the results are available.

Exposure rates cannot be evaluated due to the conflicting background levels attained by the licensee and the NRC. This will have to be resolved by building material analysis or acceptable background level determination before the buildings and surrounding grounds may be released for unrestricted use.

In addition, based upon review of historical documents provided by the licensee and discussions with licensee staff, the inspectors determined that there are several formerly licensed sites at the base which require further review before the Army relinquishes control of Ft. McClellan. This includes the sites where Buildings 3180 and 3181 were located and the burial mound at Pelham Range. Based upon the information available to the inspectors, it appeared that these sites were not adequately decommissioned and/or decommissioning efforts were not properly documented when the licensed activities were terminated in 1973. These issues will be addressed during future correspondence and inspections.

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 survey in support of releasing Building 3192 (Hot Cell), Building 3182 (Military Police Museum), and the surrounding, unpaved, outdoor areas 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 release criteria used were those delineated in Policy and Guidance Directive (P&GD)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 limits for beta-gamma emitters other than Strontium-90 (Sr-90) are 5,000 dpm/100 cm^2 average and 15,000 dpm/100 cm^2 maximum for fixed contamination and 1000 dpm/100 cm^2 for removable contamination; and for Sr-90, 1000 dpm/100 cm^2 average and 3000 dpm/100 cm^2 maximum for fixed contamination and 200 dpm/100 cm^2 for removable contamination.

The release criteria for radiation levels associated with surface contamination resulting from beta-gamma emitters was clarified in an April 21, 1992, memorandum from the Chief of the Standardization and Special Projects Branch, Division of Licensing to Stanford University regarding the external dose criterion for Cobalt-60 (Co-60), Cesium-137 (Cs-137), and Europium-152 (Eu-152) that may exist in concrete, components, and structures at nuclear reactor research facilities. The NRC has routinely applied the 5 microrem/hour (urem/hr) above background, at 1 meter, external dose limit established in the Stanford University letter to the release of other licensed facilities where a site specific limit has not been established.

The 5 urem/hr limit was applied to the interior areas of the facilities at Ft. McClellan as described in NUREG/CR-5849. As stated in the NUREG, the limit was applied such that, "Exposure rates do not exceed background levels by greater than the exposure rate limit, at 1 m from the surface. In occupiable building locations, exposure rates are measured at 1 meter from floor/lower wall surfaces and may be averaged over floor areas, not to exceed the size of a small office (i.e., about 10 m^2.) This manual assumes that maximum exposure rates over any discrete area may not exceed two times the limit, above background."

Site specific soil release limits for this site were established in the May 6, 1987, memo concerning Fort McClellan from the Chief, Operations Branch, Division of Fuel Cycle, Medical, Academic and Commercial Use Safety to Region II concerning acceptable concentrations of cobalt-60 (Co-60) and cesium-137 (Cs-137) in soil. For external radiation, the following was used: "The gamma exposure at 1 meter above the ground surface shall not exceed 10 urem/hr above background for an area of

greater than 30 ft x 30 ft and shall not exceed 20 urem/hr above background for any discrete area (i.e. less than 30 ft x 30 ft). The acceptable soil concentration levels for Co-60 are 8 pCi/g above background and 15 pCi/g above background for Cs-137.

02. Observations and Findings

NRC License No. 01-02861-04 was issued when the Army relocated the Army Chemical School from Fort McClellan to Aberdeen Proving Ground, Maryland, in 1973. The license was issued for Co-60 and Cs-137 contamination in Building 3192. NRC personnel reviewed licensee and NRC records and interviewed licensee personnel to establish the history of use of licensed materials at the facility.

Building 3192 previously housed a classroom and hot cell. The hot cell was used to prepare and maintain multi-curie Co-60 sources used elsewhere at the base. Cesium-137 was purchased in 1956 or 1957 for encapsulation, but source sealing proved unsuccessful and the material was disposed.

The hot cell was contaminated in the late 1950s or early 1960s when sources containing powdered Co-60 were segmented. The ventilation system allowed the contamination to migrate out of the hot cell into the building and the grounds around the building. The underground piping, storage tanks, valve control pit and man-way that serviced the hot cell by collecting decontamination water were contaminated from normal operations. In 1963, the Army changed its method of contamination surveying to incorporate the use of wet swipes, and as a result also discovered that the facility was contaminated with Cs-137.

The Army had decontaminated the facility to some extent in the early 1970s but some contamination remained. The license application dated May 1973, stated that the exact activity was unknown but that there was an estimated 10 millicuries of contamination present in the facility. The application also indicated that the maximum dose rate in the facility was 65 millirem/hr (mrem/hr) and that the level of removable contamination was found to be up to 550,000 dpm/100 cm^2.

The decontamination efforts conducted from February to March, 1973 were described in a Memorandum to File dated May 1973. Hot spots in the hot cell building were jack hammered and/or vacuumed, and the holes were filled with mortar and painted. The drains were filled in and some of the contaminated soil was removed and the holes were backfilled. The hot cell building was secured and fenced, and warning signs were posted. A Bill of Lading available for review showed that contaminated waste from this area was shipped to the Nuclear Engineering Company in Moorehead Kentucky.

The Army Chemical School was moved back to Fort McClellan in 1983. In the U. S. Army Environmental Health Agency (USAEHA) Radiation Protection Study No. 28-42-012-84 which was issued in 1983, the Army concluded that both Cs-137 and Co-60 contamination was present in Building 3192 and

generally spread over the entire area west of the building. Low level soil contamination was detected as deep as 8 feet below the surface and 15 feet down the slope from the underground storage tanks. The licensee discovered Cs-137 contamination outside of the fenced area to the west in February, 1984 and to the east in June, 1985. The building doors were welded shut and the surrounding area fence was moved further out and posted with warning signs.

Building 3182 now houses the Military Police Museum. USAEHA Report No. 27-43-EU66-93 stated that only two sealed sources were used in Laboratory W, a 106 Curie Cs-137 source and a 1 Curie Co-60 calibrator. However, the May, 1973, Army Memo to File indicated the existence of fixed contamination within the building. It discussed the decontamination work performed in and around this building, to include decontamination of the door frame outside the W lab and the floor adjacent to the door and in the hallway, which was retiled. Some of the tile blocks in the wall were also replaced.

In 1985, Chem Nuclear Systems, Inc. (CNSI) completed a partial remediation of Building 3192 and the surrounding area. A review of the Project Report for Fort McClellan prepared by Hilbert Associates, Inc. for CNSI disclosed that from approximately September 2, to November 23, 1985, CNSI performed an initial site investigation. Remediation work was performed in February and August through September of 1986. The initial investigation and subsequent sample analysis confirmed Co-60 and Cs-137 as the "dominant" radionuclides. Soil analysis disclosed the presence of radium and thorium and their progeny.

Remedial action consisted of excavation and removal of the 1500 and 100 gallon holding tanks in the discharge stream, removal and disposal of loose contaminated materials in the hot cell, removal and disposal of some surrounding contaminated soil, and removal of the HEPA ventilation system servicing the hot cell. On November 25, 1985, CNSI discovered that the source well next to Building 3180 (a building previously located between Buildings 3182 and 3192 and discussed later in this report) had a strong beta emitter in it which had been enclosed in a steel pipe and capped with concrete. The source was thought to be Sr-90. Water samples taken and analyzed by CNSI showed the presence of Sr-90 (28.9 pCi/l) in the bottom of the control pit floor located between the loading dock of Building 3180 and Building 3192.

The USAEHA conducted Radiation Protection Study No. 27-43-0002-88 from March 29 through April 1, 1988. The report stated that the inside of Building 3192 had not been decontaminated so no readings were taken there. Water samples had been periodically taken from monitoring wells installed by the U. S. Geological Survey and from surrounding streams and creeks to monitor any movement of the contamination. All results had shown negative movement. Results of measurements taken with an ESP-2 with SPA-3 probe indicated that the external radiation levels around

Building 3192 did not average greater than 10 urem/hr in a 30 ft by 30 ft area and did not exceed 20 urem/hr in any discrete area. A total of 103 soil samples were taken from a depth of 3 to 6 inches and 14 samples exceeded release limits.

External radiation measurements, and some soil samples, exceeded release limits near the southwest end of Building 3182. Hot spots were detected in Building 3180, on its loading dock, and in the control pit. The report concluded that the levels of radioactive material contamination in the soil and the field around Building 3192 exceeded release limits. These measurements and water samples addressed only Cs-137 and Co-60.

In March of 1995, the Army submitted a decommissioning plan for License No. 01-02861-04. This included the characterization survey of the site performed by Allied Technology Group (ATG) in November of 1994, and the proposed work plan. The isotopes considered were those for which the license was issued, that of Co-60 and Cs-137.

ATG was contracted to complete remediation of Buildings 3192 and 3182 and the surrounding grounds. ATG described the results of the remediation and final surveys in a report issued in December of 1996. As stated in the report, the only contamination found in Building 3192 consisted of Co-60, which was found mostly in and around the hot cell. Maximum concentrations were found on the crane components (100,000 dpm/cm^2). Both Co-60 and Cs-137 were detected in the surrounding grounds. Samples from outside the fence indicated that there was no migration of activity. Fixed Cs-137 contamination was found in and near Building 3182. Some level of Sr-90 contamination remained in the area adjacent to the Building 3180 location.

ATG remediation of Buildings 3192 and 3182 and the surrounding grounds began in November of 1995 and was completed in July of 1996. All removable items were surveyed and released. Building 3192 was stripped to the block structure which was scabbled where necessary. The final release survey was conducted utilizing 1 yard square grids.

The area surrounding the east doorway to Building 3182 was remediated and surveyed, which included angled soil borings beneath the door. Samples of concrete, sludge, and soil were taken from the storm drain northwest of Building 3192 and the sewer in the street of Building 3182. The results indicated that contamination levels were below guideline limits. Some detectable contamination was found in the west storm sewer, so it was excavated and disposed of as radioactive waste as was the entry piping.

The entire fenced-in grounds area was surveyed by obtaining four soil samples from every 10 foot square grid, with more extensive sampling done in the areas where contamination was previously detected. One hundred and twelve confirmatory soil samples were taken at the completion of remediation activities.

The close out surveys were conducted in accordance with NUREG/CR 5849 and the survey records indicated that appropriate instrumentation was used. The identified isotopes of interest were Cs-137 and Co-60. The release criteria used by the licensee for the two facilities and surrounding areas were those contained in the May 6, 1987, NRC memorandum concerning Co-60 and Cs-137 release criteria and Enclosure 2 of P&GD FC 83-23 for fixed and removable contamination. The ATG close out report showed that analysis of fixed contamination smears were below release criteria. Fixed point contact contamination measurements were at or below background. The ATG final survey report concluded that Buildings 3182 and 3192 and the surrounding areas could be released for unrestricted use.

The close out survey results were reviewed by the inspectors who noted that various exposure rate readings were given as background levels, ranging from 6 to 29 urem/hr. Since release limits are stated as urem/hr above background, determining background levels is vital. The NRC asked the licensee for clarification of these background levels in Inspection Report (IR) No. 01-02861-4/97-01 issued on October 7, 1997.

The licensee provided a memorandum dated September 16, 1997, from ATG to the Radiation Safety Officer (RSO) at Fort McClellan in response to the NRC's request for clarification. The ATG memorandum stated that background readings were taken with a Ludlum Model 19 Micro-R meter in Building 3182, in "unaffected" areas, and ranged from 6 to 8 urem/hr, from 40 to 100 counts per minute (cpm) using a Ludlum Model 3 Count Rate meter with pancake probe, and 400 cpm using the Model 18 meter with a 44-9 probe. Outside area background levels were taken in each quadrant of the site outside of the affected area and ranged from 7 to 13 urem/hr. There was no explanation given as to the various background values listed on the data sheets.

During the week of August 17-22, 1997, the U. S. Army Center for Health Promotion and Preventative Medicine (CHPPM) performed a verification survey to ensure that the final status survey results for Buildings 3182 and 3192 and the surrounding outdoor areas met release for unrestricted use criteria. An NRC inspector was present during this survey, and the results of that inspection are contained in IR 01-02861-04/97-01, dated October 7, 1997.

The CHPPM report entitled Industrial Radiation Survey No. 27-MH-6999-07, Facility Close-out Verification Survey, Fort McClellan, AL was issued on February 6, 1998. The cover page stated that the report was provided to allow for timely decommissioning; that it had not been through the CHPPM editorial release process, but that the findings and recommendations will not change in the final report. On February 17, 1998, the Fort McClellan RSO advised the NRC by telephone that there were two clarifications to the report. He advised that background readings for the survey were performed in Building 3169 and that the release criteria stated in the report for gamma radiation measured at one meter should be changed from "shall not exceed background" to "shall not exceed two times background."

The CHPPM survey was conducted using the procedures developed for the ATG remediation project, and were equivalent to the NUREG/CR 5849 criteria. Release criteria used were those contained in Enclosure 2 of P&GD 83-23 and the May 6, 1987, soil release memorandum. Background soil samples and instrument readings were taken in five outdoor locations away from the affected area. Building material samples were not taken.

Two areas in the CHPPM report have been identified as requiring further clarification. The report, on page E-3, listed the following release limit: "The level of gamma radiation measured at one meter shall not exceed 2X background." In fact, the release limit for gamma radiation is 5 urem/hr above background, and is further clarified in NUREG/CR-5849 "Manual for Conducting Radiological Surveys in Support of License Termination," published in June 1992. As stated in the NUREG regarding dose rate limits, "Exposure rates do not exceed background levels by greater than the exposure rate limit, at 1 m from the surface. In occupiable building locations, exposure rates are measured at 1 meter from floor/lower wall surfaces and may be averaged over floor areas, not to exceed the size of a small office (i.e., about 10 m^2.) This manual assumes that maximum exposure rates over any discrete area may not exceed two times the limit, above background."

The second area of concern is with the background levels themselves. The report data sheets list 12 urem/hr as a background level, and page 5 indicates that these were obtained in Building 3169. The inspectors took numerous readings in Building 3169 with two Ludlum Model 19 Micro-R meters and were not able to obtain readings above 6 urem/hr.

Approximately 10 percent of the ATG values were confirmed during the CHPPM verification survey. The gross alpha readings ranged from -4.0 to 2.8 dpm/100 cm^2. Average background was 1 dpm/100cm^2. Gross beta/gamma readings ranged from -582 to 3966 dpm/100 cm^2, and average background was 157 dpm/100 cm^2. Gross gamma readings ranged from -4 to 22 urem/hr, with an average background of 12 urem/hr. Gross alpha activity for removable contamination ranged from .2 (+/-) .2 to 2.8 (+/-) 2.5 dpm/100 cm^2. The gross removable beta activity ranged from -1.9 (+/-) 1.5 to 20.5 (+/-) 7 dpm/100 cm^2. Thirty random soil samples were analyzed for beta emitters as a gross screening tool, and further analyzed for Co-60 and Cs-137 by Gamma Spectroscopy. No readings above the release limits were noted. Gamma readings were taken at each soil sampling location, and no readings above the release criteria were noted. The report concluded that the area may be released for unrestricted use.

USAEHA-RH Radiation Special Study No. 43-041 dated February, 1973, indicated the presence of 11 monitoring wells in this area. Neither the ATG nor the CHPPM reports addressed these wells. The inspectors were able to obtain results of well monitoring done by the base Radiological

Safety staff. The results of a February 19, 1998, sampling indicated that the beta and gamma activity detected in each sample was at or slightly above background levels (less than 18 disintegrations per minute (dpm) beta and 14 dpm gamma above background).

On December 31, 1997, the licensee requested that License No. 01-02861-04 be terminated. On December 5, 1997, the licensee submitted NRC Form 314, Certificate of Disposition of Materials, with an enclosed radioactive waste shipment and disposal manifest indicating that the radioactive waste was shipped to NSSI/Recovery Services, Inc. in Houston Texas and to Envirocare of Utah, Inc. On February 27, 1998, the inspectors verified that these waste shipments were properly received in a timely fashion.

The inspectors performed confirmatory surveys and took samples during the week of March 9-12, 1998. The inspectors identified approximately 10 percent of the CHPPM fixed points measurements for verification and approximately 10 percent of the interior and exterior areas were surveyed for "hot spots." The fixed point measurements were performed using an Eberline ESP-2 with pancake probe. The scan surveys were done with Eberline ESP-2s with either pancake probes or SPA-6 probes and with Ludlum Model 3 Ratemeters with pancake probes. Gamma measurements were made at one meter using Eberline micro-R meters. Fixed point contamination smears were counted on a Gamma 5000 Alpha/Beta counter, and soil and water samples were sent to the NRC Region I lab for analysis.

The results of the measurements and smear analysis are given in Attachment 3. These averaged from less than MDA to 1907 dpm/100cm^2 for fixed point measurements. Gamma readings at one meter ranged from levels at or below background to 16 urem/hr above background levels.

The average background radiation levels measured by the NRC inspectors were 6 urem/hr in Building 3169, 12 urem/hr in Building 3182, and 20 urem/hr in Building 3181. The inspectors were not able to verify the 12 urem/hr background level in Building 3169 which was used by CHPPM as their baseline background radiation level for the survey of Building 3192. Since the release criteria are based, in part, on the gamma dose rate level above background, the establishment of the background dose rate is critical in establishing compliance with the release criteria.

NUREG/CR-5849 discusses background levels as follows: "Preferable locations for interior background determinations are within on-site buildings of similar construction, but having no history of licensed operations." Building 3182, which was used by ATG for background measurements, was used for licensed operations.

Based upon the licensee's background data and the data obtained by the inspectors, the inspectors could not confirm that the elevated gamma dose rates in Building 3192 were due to an elevated background dose rate that results from the presence of radioactive materials other than Co-60 and Cs-137 (e.g., naturally occurring radioactive materials contained in

concrete blocks). This issue cannot not be resolved until the licensee either identifies a building of similar time frame and construction or performs analysis of the building material in question. However, the inspectors observed that exposure measurements, taken on contact of the concrete block from which the building is constructed, were similar both inside and outside of the building. The inspectors also observed that the exposure rates were lower within the hot cell, which is fabricated of poured concrete. This seems to support the conclusion that the elevated exposure readings were due to the concrete block, rather than residual contamination from licensed activities. Higher readings due to contamination would be expected within the hot cell which was highly contaminated prior to remediation.

NRC fixed point measurements and smear analyses were comparable to that of the CHPPM results, with nothing noted above release limits, and most of the results were comparable with background levels. Results of soil and water analyses will be communicated by separate correspondence once the analyses are complete.

The inspectors noted that four vertical pipes within the hot cell were filled in with concrete. Although elevated readings were not noted on contact with the surface of the pipe, the licensee was asked to determine why these pipes were filled in and to ensure that no licensed material was contained inside the pipes.

Building 3180 was previously located in this area and has been demolished. USAEHA Industrial Radiation Consultation Report No. 27-43-EU66-93, dated July 27, 1993, documented the disposition of this area. It concluded that, "Data are not available that documents the radiological status of the ground area below and near the demolished Building 3180 and the concrete pad," and recommends further surveys to include core sampling. The report concluded that all of the building, concrete floor, and outside concrete pad area had been removed and disposed of in 1989. It referenced an Army Memorandum for Record, ATZN-CM-AHP, dated August 3, 1989, which reports that beta and gamma measurements were made during demolition and only background levels were detected. At this time, a Sr-90 source was found and removed from a storage well near the building. No NRC closeout survey or inspection was performed to support closeout of this area. The licensee plans to take random soil samples to ascertain the level of Sr-90 contamination in this area. The NRC will be present when the licensee obtains these samples and will split some soil samples with the licensee for confirmatory analysis.

A November 1961 Atomic Energy Commission (AEC) report discussed the "possession of unknown quantities of unknown radioisotopes which emanate significant quantities of radiation" stored in this building. These included "a 5 ton storage container which, with the top partially opened, reads 500 mr/hr at twelve inches; and a storage well approximately 5 to 8 feet deep which reads 500 mr/hr at the surface of the water."

The May 1973 Army Memo to File discussed the decontamination work performed in and around this building. Hot spots were removed by jack hammer and vacuum. The concrete pad surrounding the building was broken up and disposed. A new concrete apron was poured over the area.

Some decontamination work was performed by a contractor in this building in August and September of 1986. All contents were surveyed and disposed of if contaminated. Some contaminated concrete was scabbled and removed. Final swipe surveys were all less than 1000 dpm/100 cm^2.

An Army Memo to File, ATZN-CM-AHP (385-11a) entitled Demolition of Building 3180 detailed the demolition work started on July 31, 1989, and completed on August 3, 1989. During and after the demolition, surveys were performed using the following equipment: Ludlum Model 3 with GM and NaI detectors and an Eberline E-120 with a pancake and pickle probe. No readings were found above background (3.5 cpm with the Ludlum and NaI; .05 mR/hr with the E-120 at 1 cm from the surface. The rubble was dumped at the "Stump Dump" on the left side (north east corner) of the Fort McClellan landfill. Army Memorandum for Record ATZN-CM-AHP (385-11) entitled Demolition of Control Pit and Removal of Building 3180's Floor documents the removal of the source well, floor base, and valve control pit. On December 7, 1989, the area was surveyed with an Eberline Model 520 with pancake probe and Ludlum Model 3 with NaI probe with no readings above background noted. Concrete samples obtained of rubble showed no radionuclides using a gas flow proportional counter and NaI MCA.

This area is located within the fenced area reviewed during this inspection, but was not included in the scope of this inspection. It will have to be addressed by both the NRC and the licensee during additional inspections by the NRC and further closeout surveys or submission of documentation by the licensee that demonstrates the area is suitable for release for unrestricted use.

USAEHA Report No. 27-43-EU66-93 characterized Building 3181, which had been extensively remodeled and is now the Military Police Building. Unsealed and sealed sources were used in Room 35. A hood duct may still be inside the building above this room with the ends capped.

Another room, Room 36, had only sealed sources occasionally brought into it. The report concluded that records were not available to indicate that a termination survey was ever conducted of Building 3181 and that a contaminated duct from the former hood system may still be in place above Room 35. There are no records of an NRC closeout inspection of this building.

The inspectors attempted to find the duct to determine if there was a current radiological hazard, but were unable to locate it. Room 35 is now a computer lab, with a ceiling approximately 15 feet above the floor. Readings were taken using a Ludlum Model 19 uR meter and no elevated readings were noted. This area will require additional attention from the licensee and the NRC.

03. Conclusions

The confirmatory fixed point measurements and smears for fixed and removable contamination were at or near background levels and were well below release limits. The NRC survey results were comparable with the results documented in the CHPPM survey report. The soil samples obtained at Fort McClellan are currently being analyzed and will be addressed by separate correspondence when the results are available.

Exposure rates cannot be evaluated due to the conflicting background levels attained by the licensee and the NRC. This will have to be resolved by building material analysis or acceptable background level determination before the buildings and surrounding grounds may be released for unrestricted use.

In addition, the formerly licensed sites at the base require further attention by the licensee and the NRC before the Army relinquishes control of Ft. McClellan. These issues will be addressed during future correspondence and inspections.

EXIT MEETING SUMMARY

The inspectors discussed the inspection results with the Assistant Commandant of the Army Chemical School on March 12, 1998. The licensee was advised that Buildings 3182 and 3192 and the surrounding area could not be released pending resolution of the background value issue. The licensee was advised that there were further radiological concerns regarding previously licensed sites that would have to be resolved and would be addressed separately. These include the Building 3180 site, which would not be released as a result of this survey. Other previous use areas that remain an issue are Building 3181, Rattlesnake Gulch and Iron Mountain, and Pelham Range and Rideout Field.

The inspectors stated that the RSO had provided information concerning these areas recently. The Rattlesnake Gulch and Iron Mountain sites appear to have had a closeout survey which is currently under review by the NRC. The burial mound at Pelham Range was assessed by CHPPM in January of 1996 and their report described a site where residual contamination for both Cs-137 and Co-60 exceeded release limits. CHPPM reported that in some areas the subsurface measurements were 1000 times the background measurement. The inspectors toured this area and noted that it was neither fenced nor posted. The inspectors urged the licensee to address these areas and advised that further correspondence would be forthcoming after review of the most recently received documents.

The licensee initiated a conference call on March 25, 1998. During that call, the licensee advised that on April 15, 1998, they would obtain concrete block samples from Buildings 3182 and 3192 for analysis to demonstrate that the exposure rate is due to naturally occurring material. These concrete block samples will be subjected to spectral analysis. The inspectors clarified the release limit for gamma exposure as being 5 urem/hr above background. On the day the concrete block samples are obtained, the licensee stated it would take

soil core samples from the area where Building 3180 once stood, to include its loading dock and control pit. These samples will be analyzed for Sr-90 to support the assertion that the entire area is suitable for release for unrestricted use.

The inspectors cautioned the licensee to ensure that soil samples were taken from a depth that will adequately assess potential contamination based on previous use and material storage at the building. They noted that contamination had been identified in the control pit that has been excavated and backfilled. The licensee was advised that ATG reports may provide the information that is required if adequate beta analysis had been done. The licensee was also asked to explain the four filled in vertical pipes in the hot cell of Building 3192 and agreed to do so.

The licensee stated that they were aggressively pursuing funding to remediate the Pelham Range burial mound and that this area was now posted. The licensee advised that the Engineering staff at the base had been cautioned not to do any work in the area of the potentially contaminated duct in Building 3181 without first contacting the RSO. The licensee stated that all areas at Fort McClellan where radioactive material had been used would be addressed to ensure that no residual contamination remained. The NRC will be kept advised of the Army's efforts in this endeavor.

ATTACHMENT

LIST OF PERSONS CONTACTED

Department of the Army, Fort McClellan:

*#Sgt. Aperans, Radiation Protection Specialist
*Sgt. Degumbia, Radiation Protection Specialist
#Major Johnson, Environmental Office
#Lisa Kingsberry, Base Relocation and Closure Coordinator
*Col. Uyesugi, Asst. Commandant, Army Chemical School

Environmental Protection Agency:

*Lloyd Generette

State of Alabama:

*#James T. Williams, Radiation Physicist, Division of Radiation Control

*Attended exit interview on March 12, 1998
#Participated in conference call on March 25, 1998

INSPECTION PROCEDURES USED

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

SURVEY INSTRUMENTS USED FOR CONFIRMATORY SURVEY

DEPARTMENT OF THE ARMY- FORT MCCLELLAN
March 9-12, 1998

1. Ludlum Model 3 Rate meter with 44-9 "pancake" probe
   Serial No.: 102129 Calibrated: May 8, 1997
   Background: 68 cpm Efficiency: 14% Tc-99*
   69% Cs-137
   MDA: 10,200 dpm/100cm^2 (scanning mode) Tc-99
   1,855 dpm/100cm^2 (scanning mode) Cs-137

2. Ludlum Model 3 Rate meter with 44-9 "pancake" probe
   Serial No.: 102518 Calibrated: June 16, 1997
   Background: 76 cpm Efficiency: 14% Tc-99
   69% Cs-137
   MDA: 11,400 dpm/100cm^2 (scanning mode) Tc-99
   2,280 dpm/100cm^2 (scanning mode) Cs-137

3. Eberline ESP-2 with Eberline "pancake" HP-260 probe
   Serial No.: 00793 Calibrated: March 24, 1997
   Background: 34 cpm Efficiency: 32% Tc-99
   70% Cs-137
   MDA: 2,550 dpm/100cm^2 (scanning mode)
   596 dpm/100cm^2 (scaler mode)
   15 dpm/100cm^2 (ratemeter mode) for Tc-99
   12 dpm/100cm^2 (scanning mode) 271 dpm/100cm^2 (scaler mode)
   7 dpm/100cm^2 (ratemeter mode) for Cs-137

   With SPA-6 probe, Serial No.286: 8% efficiency for Cs-137, MDA is 4552 dpm/100cm^2 (ratemeter mode)

4. Eberline ESP-2 with Eberline "pancake" HP-260 probe
   Serial No.: 00782 Calibrated: March 24, 1997
   Background: 34 cpm Efficiency: 37% Tc-99
   80% Cs-137

   MDA: 1,700 dpm/100cm^2 (scanning mode)
   497 dpm/100cm^2 (scaler mode)
   128 dpm/100cm^2 (ratemeter mode) for Tc-99
   850 dpm/100cm^2 (scanning mode)
   249 dpm/100cm^2 (scaler mode)
   64 dpm/100cm^2 (ratemeter mode) for Cs-137

   With SPA-6 probe, Serial No.287: 6% efficiency for Cs-137, MDA is 5,192 dpm/100cm^2 (ratemeter mode)

5. Eberline Micro R/hr meter with internal probe
   Serial No.: 101703 Calibrated: November 26, 1997
   Background: 6 urem/hr

6. Eberline Micro R/hr meter with internal probe
   Serial No.: 101770 Calibrated: November 26, 1997
   Background: 6 urem/hr

7. The removable contamination smears were counted for Cs-137 and Co-60 on a Gamma 5000 gas flow proportional counter. The efficiency for Cs-137 was 97% with an MDA of 6 dpm/100cm^2. The efficiency for Tc-99 was 29% with an MDA of 25 dpm/100cm^2.

*A Tc-99 standard was used in lieu of a Co-60 standard to determine efficiencies and MDAs. Its B energy of 292 Kev is comparable to that of Co-60's B energy of 314 Kev.

CONFIRMATORY SURVEY RESULTS
DEPARTMENT OF THE ARMY - FORT MCCLELLAN
MARCH 9-12, 1998

LOCATION/GRID	FIXED POINT MEASUREMENT (dpm/100 cm)	uREM/HR AT ONE METER	WIPE TEST BETA
Building 3192, north wall/6-A-A	1104	7	<MDA
Building 3192, east wall/5-A-3	667	12	<MDA
Building 3192, south wall/7-A-2	<MDA	0	<MDA
Building 3192, east wall/3-C-1	458	7	<MDA
Building 3192, entrance floor/4-A-2	417	5	<MDA
Building 3192, east wall/8-C-A	1333	8	<MDA
Building 3192, east wall/4-A-A	1042	8	<MDA
Building 3192, east wall/13-B-A	353	10	<MDA
Building 3192, south wall/4-D-A	1083	9	<MDA
Building 3192, south wall/6-C-C	563	10	<MDA
Building 3192, south wall/7-E-C	125	9	<MDA
Building 3192, west wall/13-B-A	979	14	<MDA
Building 3192, west wall/11-C-B	1270	9	<MDA
Building 3192, floor/13-B-9	542	14	<MDA
Building 3192, floor/12-7-C	688	11	<MDA
Building 3192, west wall/8-C-A	1250	11	<MDA
Building 3192, west wall/4-C-C	271	5	<MDA
Building 3192, west wall/1-C-B	667	5	<MDA
Building 3192, floor/5-9-B	500	9	<MDA
Building 3192, north wall/8-C-C	<MDA	3	<MDA
Building 3192, north wall/5-C-B	146	1	<MDA
Building 3192, north wall/2-A-C	<MDA	2	<MDA
Building 3192, floor/1-6-A	125	1	<MDA
Building 3192, floor/2-9-C	<MDA	12	<MDA
Building 3192, north wall/7-A-B	<MDA	2	<MDA

ALL READINGS EXCEPT WHERE INDICATED ARE NET READINGS ABOVE BACKGROUND

LOCATION/GRID	FIXED POINT MEASUREMENT (dpm/100 cm)	uREM/HR AT ONE METER	WIPE TEST BETA
Building 3192, north wall/4-A-C	20	8	<MDA
Building 3192, east wall/8-B-A	167	5	<MDA
Building 3192, south wall/5-B-A	<MDA	6	<MDA
Building 3192, south wall/6-A-C	<MDA	9	<MDA
Building 3192, west wall/8-B-B	227	6	<MDA
Building 3192, north wall/4-B-B	<MDA	3	<MDA
Building 3192, north wall/8-C-A	83	4	<MDA
Building 3192, east wall/9-B-C	63	6	<MDA
Building 3192, east wall/7-A-C	<MDA	6	<MDA
Building 3192, west wall/8-B-C	104	6	<MDA
Building 3192, west wall/10-A-C	<MDA	6	<MDA
Building 3192, hot cell roof/2-C-A	<MDA	2	<MDA
Building 3192, hot cell roof/4-B-C	104	<1>	<MDA
Building 3192, hot cell roof/7-A-C	<MDA	1	<MDA
Building 3192, classroom ceiling/3-8-B	188	4	<MDA
Building 3192, classroom ceiling/15-9-C	<MDA	8	<MDA
Building 3192, classroom ceiling/15-2-A	104	1	<MDA
Building 3192, east wall/14-E-C	271	9	<MDA
Building 3182, ATG #10	1907	13	<MDA
Building 3182, right corner of door	1125	12	<MDA
Building 3182, ATG #31	1417	16	<MDA
Building 3182, ATG #5	563	16	<MDA
Building 3182, ATG #43	1063	12	<MDA
Building 3182, ATG #41	542	14	<MDA
Building 3182, door right	938	11	<MDA
Building 3182, door left	750	12	<MDA
Building 3182, door middle	271	11	<MDA

ALL READINGS EXCEPT WHERE INDICATED ARE NET READINGS ABOVE BACKGROUND

LOCATION/GRID	FIXED POINT MEASUREMENT (dpm/100 cm)	uREM/HR AT ONE METER	WIPE TEST BETA
Background Building 3169, hallway	<MDA	2 (gross)	<MDA
Background Building 3169, hallway	<MDA	9 (gross)	<MDA
Background Building 3169, hallway	750	8 (gross)	<MDA
Background Building 3169, hallway	<MDA	6 (gross)	<MDA
Background Building 3169, hallway	<MDA	6 (gross)	<MDA
Building 3182, unaffected offices	63	9 (gross)	N/A
Building 3182, unaffected offices	542	8 (gross)	N/A
Building 3182, unaffected offices	21	11 (gross)	N/A
Building 3182, unaffected offices	375	8 (gross)	N/A
Building 3182, unaffected offices	729	14 (gross)	N/A
Summerall Gate	N/A	10 (gross)	N/A
Background Outdoors	N/A	10 (gross)	N/A
Background Outdoors	N/A	10 (gross)	N/A
Background Outdoors	N/A	10 (gross)	N/A
Background Outdoors	N/A	10 (gross)	N/A
Right of Well Post 1	N/A	-1	N/A
Right of Well Post 2	N/A	-3	N/A
Right of Well Post 3	N/A	0	N/A
Right of Well Post 4	N/A	1	N/A
Right of Well Post 5	N/A	1	N/A
Right of Well Post 6	N/A	-2	N/A
Right of Well Post 7	N/A	-3	N/A
Right of Well Post 8	N/A	-2	N/A
Right of Well Post 9	N/A	-1	N/A
Right of Well Post 10	N/A	-3	N/A
Right of Well Post 11	N/A	-3	N/A

ALL READINGS EXCEPT WHERE INDICATED ARE NET READINGS ABOVE BACKGROUND

Decker, Thomas R., Chief

1998 Letter to Commandant, U.S. Army Chemical School, Fort McClellan, Alabama, NRC Inspection Report No. 01-02861-04/98-02, 22 May 1998. Directorate of Environment, Fort McClellan, Alabama.

UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION II
ATLANTA FEDERAL CENTER
61 FORSYTH STREET, SW, SUITE 23T85
ATLANTA, GEORGIA 30303-3415

May 22, 1998

Commandant
U. S. Army Chemical School
ATTN: AZTM-CM-AHP
Ft. McClellan, AL 36205

SUBJECT: NRC INSPECTION REPORT NO. 01-02861-04/98-02

Dear Commandant:

On May 18, 1998, the NRC completed an inspection regarding Buildings 3182 and 3192 and the surrounding fenced area at Fort McClellan, Alabama. The enclosed report presents the results of that inspection, which were discussed with John May on April 15 and May 18, 1998.

During the inspection inspector observed sampling activity and obtained several soil samples which are being analyzed. You will be advised by separate correspondence of the results of these analyses. Based on those reviews, discussions, and measurements, no violations were identified.

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,

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

Docket No. 030-14759
License No. 01-02861-04

Enclosure: NRC Inspection Report
No. 01-02861-04/98-02

cc w/encl: (See Page 2)

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.:	01-02861-04
Report No.:	01-02861-04/98-02
Licensee:	Department of the Army
Location:	Fort McClellan, Alabama
Date:	April 15 and May 18, 1998
Inspectors:	Orysia Masnyk Bailey, Radiation Specialist
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. 01-02861-04/98-02

This special, announced inspection was conducted to observe the licensee obtain soil samples from the site of the now demolished Building 3180 to be analyzed for strontium 90 and building block samples from Building 3192 to be analyzed to determine if the block is contaminated with cobalt 60 or cesium 137. The inspector also obtained two confirmatory soil samples. The release criteria used were the following: 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. The conduct of this inspection included discussions with cognizant licensee representatives, review of documents, and direct observations.

Attachments:
List of Persons Contacted
Inspection Procedures Used

REPORT DETAILS

01. Scope

This special, announced inspection was conducted to observe the licensee obtain soil samples from the site of the now demolished Building 3180 and building block samples from Building 3192.

The release criteria used were those delineated in Policy and Guidance Directive (P&GD)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. The limit for strontium-90 (Sr-90) in soil is 5 pCi/g.

02. Observations and Findings

Building 3180 was previously located in this area and has been demolished. USAEHA Industrial Radiation Consultation Report No. 27-43-EU66-93, dated July 27, 1993, documented the disposition of this area. It concluded that, "Data are not available that documents the radiological status of the ground area below and near the demolished Building 3180 and the concrete pad," and recommends further surveys to include core sampling. The report concluded that all of the building, concrete floor, and outside concrete pad area had been removed and disposed of in 1989. There was no substructure to the building. It referenced an Army Memorandum for Record, ATZN-CM-AHP, dated August 3, 1989, which reports that beta and gamma measurements were made during demolition and only background levels were detected. At this time, a Sr-90 source was found and removed from a storage well near the building. No NRC closeout survey or inspection was performed to support closeout of this area.

During the current inspection, several soil samples were obtained by the licensee from the site where Building 3180 stood. The inspector obtained two soil samples which were sent to the Department of Energy's Oak Ridge Institute for Scientific Education for analysis. The analysis results will be communicated by separate correspondence.

The inspector noted, during a previous inspection, that four vertical pipes within the hot cell inside of Building 3192 were filled in with concrete. Although elevated readings were not noted on contact with the surface of the pipe, the licensee was asked to determine why these pipes were filled in and to ensure that no licensed material was contained inside the pipes. A member of the licensee's Radiation Safety staff was present when the concrete was jack hammered from the pipes and they were found to be empty. The inspector verified that the pipes were empty.

The inspector observed the licensee obtain two concrete block samples from Building 3192 to be analyzed to determine if they are contaminated by cobalt 60 or cesium 137 since an acceptable background level could not be determined to be used for comparison.

03. Conclusions

Building 3192 may be released if analysis of the concrete block demonstrates that Co-60 and Cs-137 contamination are not present. The area where Building 3180 stood may be released when soil analysis rules out Sr-90 contamination.

EXIT MEETING SUMMARY

On April 12, 1998, the inspector advised the RSO that any decisions regarding the release of the area in question would have to be made after results of the licensee's and NRC's sample analysis were complete.

On May 15, 1998, the licensee met with representatives with the Army's Industrial Operations Command, the State of Alabama's Radiological Health Department, the Environmental Protection Agency, and Allied Technology Group to scope out remaining remediation work and closeout surveys at Fort McClellan. This was discussed during a phone conversation between the inspector and the RSO on May 18, 1998. ATG will provide a work plan to remediate and/or perform a close out survey of areas where radionuclides were used. This will include the burial mound at Rideout Field. The mound will be excavated and shipped as waste as necessary. The licensee will submit work plans to the NRC prior to initiating any remediation or surveys. The work plan will discuss all previous areas where radionuclides were used where further remediation or close out surveys are required.

ATTACHMENT

LIST OF PERSONS CONTACTED

Department of the Army, Fort McClellan:
Sgt. Aperans, Radiation Protection Specialist
L. Kin
J. May, Radiation Protection Officer

Environmental Protection Agency:
R. Button, Jr.

State of Alabama:
James T. Williams, Radiation Physicist, Division of Radiation Control

INSPECTION PROCEDURES USED

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

Decker, Thomas R., Chief

2000 Letter to Commandant, U.S. Army Chemical School, Fort Leonard Wood, Missouri, NRC Inspection Report No. 01-02861-05/99-01, 1 March 2000. Directorate of Environment, Fort McClellan, Alabama.

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,

Thomas R Decker

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

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

SURVEY INSTRUMENTS USED FOR CONFIRMATORY SURVEY

1. Ludlum Model 2221 with 43-68 probe (gas flow proportional detector)
   Serial No: 117647 Calibrated: September 15, 1999
   Background: 555 cpm/100 cm^2 Efficiency: Th-230 43%

2. Ludlum Model 2221 with 43-68 probe (gas flow proportional detector)
   Serial No: 117632 Calibrated: August 10, 1999
   Background: 530 cpm/100 cm^2 Efficiency: Th-230 35%

3. Ludlum Model 2221 with 43-37 probe (floor monitor)
   Serial No. 117632 Calibrated: August 10, 1999
   Background: 540 cpm/100 cm^2 Efficiency: Th-230 35%

4. Ludlum Model 19 MicroR Meter with internal probe
   Serial No: 101770 Calibrated: June 20, 1999
   Background: 26uR/hr

4. Ludlum Model 19 MicroR Meter with internal probe
   Serial No: 101770 Calibrated: June 18, 1999
   Background: 26uR/hr

5. The removable contamination smears were counted on a Gamma Products, Inc. G-5000 Alpha/Beta Gas Proportional Counter. The efficiency counting for both gross alpha and beta was 0.27 and 0.28 respectively.

6. The soil samples were counted by Region I in King of Prussia, Pennsylvania on a Canberra High Resolution Gamma Spectroscopy System. The detection limit for Co-60 and Cs-137 is 0.026 pCi/g and 0.028 pCI/g, respectively.

Results of fixed point measurements and smear analysis are given with background subtracted.

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

Location/Grid	Fixed Point Measurement (dpm/100 cm²)	uR/hr at 1 m	Wipe Test Alpha (dpm/100 cm²)	Wipe Test Beta (dpm/100 cm²)
BUILDING 2281- LAB #1				
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
BUILDING 2281 - HP LAB				
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^2)	uR/hr at 1 m	Wipe Test Alpha (dpm/100 cm^2)	Wipe Test Beta (dpm/100 cm^2)
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
BUILDING 2281 - DECON ROOM A				
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
BUILDING 2281 - DECON ROOM 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^2)	uR/hr at 1 m	Wipe Test Alpha (dpm/100 cm^2)	Wipe Test Beta (dpm/100 cm^2)
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
BUILDING 2281 - PREP LAB				
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
BUILDING 2281 - LAB 2				
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^2)	uR/hr at 1 m	Wipe Test Alpha (dpm/100 cm^2)	Wipe Test Beta (dpm/100 cm^2)
O1	-46	-6	-0.1	-0.3
L11	-300	-4	-0.1	-1.3
N9	-261	-4	-0.1	0.7
BUILDING 2281 - HALLWAY OUTSIDE LAB 2				
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
BUILDING 2281 - LAB 2 OFFICE				
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
BUILDING 2281 - VAULT				
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 cm²)	uR/hr at 1 m	Wipe Test Alpha (dpm/100 cm²)	Wipe Test Beta (dpm/100 cm²)
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
BUILDING 2281 - LAB 2				
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 cm²)	uR/hr at 1 m	Wipe Test Alpha (dpm/100 cm²)	Wipe Test Beta (dpm/100 cm²)
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

Potter, John P., Chief

1997 Letter to Commandant, Department of the Army, U.S. Chemical School, Fort McClellan, Alabama, NRC Inspection Report 01-02861-04/97-01, 7 October 1997. Directorate of Environment, Fort McClellan, Alabama.

UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION II
ATLANTA FEDERAL CENTER
61 FORSYTH STREET, SW, SUITE 23T85
ATLANTA, GEORGIA 30303

October 7, 1997

Department of the Army
ATTN: Commandant
U.S. Army Chemical School
ATZN-CMA-HP
Fort McClellan, AL 36205-5020

SUBJECT: NRC INSPECTION REPORT 01-02861-04/97-01

Dear Commandant:

This refers to the inspection conducted August 15-19, and September 5 and 22, 1997, at the Army Chemical School at Fort McClellan, Alabama. The purpose of the inspection was to determine if decommissioning activities were conducted safely and in accordance with NRC requirements. At the conclusion of the inspection, the findings were discussed with Mr. John May on September 23, 1997, by telephone.

Areas examined during the inspection are identified in the report. Within these areas, the inspection consisted of selective examinations of procedures and records, interviews with personnel, and observation of activities in progress.

Within the scope of the inspection, violations or deviations were not identified. However, several additional documents and further information are necessary in order for us to continue our evaluation of decommissioning efforts at Ft. McClellan prior to our being able to perform confirmatory measurements and surveys to release the areas in consideration for unrestricted use. These are delineated in the enclosed report.

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,

John P. Potter, Chief
Materials Licensing/Inspection Branch
Division of Nuclear Materials Safety

Docket No. 030-14759
License No. 01-02861-04

Enclosure: NRC Inspection Report

cc w/encl: (See page 2)

cc w/encl:
State of Alabama

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

U.S. NUCLEAR REGULATORY COMMISSION

REGION II

Docket No.:	030-14759
License No.:	01-02861-04
Report No.:	01-02861-04/97-01
Licensee:	Department of the Army
Location:	Fort McClellan, Alabama
Dates:	August 15-19, and September 5 and 22, 1997
Inspector:	Orysia Masnyk Bailey, Radiation Specialist
Approved by:	John P. Potter, Chief Materials Licensing/Inspection Branch 2 Division of Nuclear Materials Safety

Enclosure

EXECUTIVE SUMMARY

The Department of the Army Chemical School
NRC Inspection Report No. 01-02861-04/97-01

This special, announced inspection was conducted to evaluate the Army's activities associated with the decommissioning of buildings 3192 and 3182 and the surrounding fenced area at Fort McClellan, Alabama. At the same time the inspector evaluated the licensee's radiological status in reference to areas where radionuclides were previously used. Representatives from the Atlanta office of the United States Environmental Protection Agency (EPA) and the Alabama Department of Public Health were present during the inspection. The inspection included discussions with licensee representatives, employees of the Department of Energy, and National Archives representatives; reviews of documents; and direct observations of licensed activities to ensure compliance with regulatory requirements and the licensee's license and application, and to determine the radiological history and status of Fort McClellan. This report covers activities conducted by the licensee at buildings 3182 and 3192, Pelham Range, Bromine and Alpha Fields, and Rattlesnake Gulch and Iron Mountain.

Attachment:
List of Persons Contacted
Inspection Procedure Used

REPORT DETAILS

01. Inspection Scope

This special, announced inspection was conducted to evaluate the current radiological status of previously licensed facilities and areas where radionuclides were previously used at Fort McClellan, Alabama and to ascertain their radiological history and status. The inspector also observed individuals from the U.S. Army Center for Health Promotion and Preventative Medicine (CHPPM) perform a close out survey of buildings 3182, 3192, and the surrounding fenced area. All known areas where radioactive material was previously used at Ft. McClellan were toured by the inspector. The NRC release criteria considered were those contained in a May 6, 1987 memorandum from the Chief, Operations Branch, Division of Fuel Cycle, Medical, Academic, and Commercial Use Safety to the Chief, Nuclear Materials Safety and Safeguards Branch; concerning the release limits for Fort McClellan as follows. "The gamma exposure at 1 meter above the ground shall not exceed 10 uR/h above background for an area greater than 30 ft. x 30 ft. and shall not exceed 20 uR/h above background for any discrete area, (i.e., less than 30 ft. x 30.ft)." These were the limits set for Co-60 and Cs-137 for surface contamination. The concentration limits for soil were 8 pCi/g above background for Co-60 and 15 pCi/g above background for Cs-137. This memorandum was limited to Co-60 and Cs-137. However, a review of documents related to the use of radionuclides at the base indicates that there was a potential for other contaminants; there is documentation of a Sr-90 spill and of possession of "unknown" radioisotopes at the now demolished storage building 3180, which was located between buildings 3182 and 3192.

In the case of radionuclides other than Cs-137 and Co-60, the release criteria in NRC letter dated August 1987, "Guidelines for Decontamination of Facilities and Equipment prior to Release for Unrestricted Use or Termination of Licenses for Byproduct, Source, or Special Nuclear Material" are to be considered. The licensee, in its application for the decommissioning license, committed to the decommissioning methodology delineated in NUREG/CR-5849, "Manual for Conducting Radiological Surveys in Support of License Termination," dated June 1992.

02. Observations and Findings

The inspector reviewed available license related records and interviewed licensee employees familiar with the facility. The inspector retrieved archived material from the NRC archives and obtained related material from the Radiation Safety Officer (RSO) at Ft. McClellan. The inspector interviewed personnel, by telephone, at the Department of Energy's Oak Ridge facility and Washington Offices of the Historian, of Non

Proliferation and National Security, and of Declassification, and the Atlanta offices of the National Archives and Repository to determine if there were any historical records of work involving radionuclides at Ft. McClellan under the auspices of the Atomic Energy Commission (AEC) prior to issuance of an NRC license. No such records were found. All determinations related to radionuclide use were based on NRC, AEC, or Army records. The NRC records consisted of the files related to previous and current NRC licenses. The current licenses at the facility are 01-02861-05 and SNM 1877 issued to the Army Chemical School for use in Building 1081 and Alpha Field. These were issued when the school was relocated back to Ft. McClellan in 1980. The following is a discussion of radionuclide use at the base. A memo to the Isotopes Extension Files dated November 16, 1956 titled Visit to U. S. Army Chemical Corps School, Fort McClellan, Alabama, states: "This institution has not had a license. They have been operating under a General Authorization with an unlimited procurement limit. The authorization expires on December 31, 1956." Previous licenses issued for the Army Chemical School were 01-02861-01, 01-02861-02, and SNM 344. The Chemical School was first licensed on October 24, 1957. The licenses were terminated in 1973 when the school relocated. These authorized the possession and use of both sealed and unsealed material at various locations at the base. License No. 01-02861-04 was issued for the residual contamination at the hot cell, this was suspected of being primarily Cobalt 60 with some Cesium 137. This license was issued in 1973. It was initially issued for possession and later changed to a decommissioning license.

Another consideration is the fact that many Army material licenses authorize the use of radioactive material at sites other than those for which the license was issued.

Review of records and discussions with licensee personnel disclosed the following. Radioactive materials were previously used at several locations at Ft. McClellan. In the early 1950s some sort of activity occurred at Rattlesnake Gulch and Iron Mountain. Second and third party information based on discussion with Army personnel involved with the activity indicates that the work was performed with Atomic Energy personnel, possibly dealing with training personnel to detect radiation and contamination. No records were found documenting this work and the inspector was unable to locate anyone with first hand knowledge.

The inspector reviewed the RSO's historical file as it applies to this area and was able to learn the following. A Memo for Record, dated February 22, 1971, from Major Raymond Anderson, documenting the discovery of the Iron Mountain and Rattlesnake Gulch burial sites provides the following information. On February 18, 1971, the author and two other individuals began a search for the burial site based on rumors and some old dosimetry records. An area was found with at least six hot spots with the highest reading being 5 mr/hr. On February 19, 1971, a detailed survey was conducted by members of the Health Physics department. A total of eighteen hotspots were identified, the highest reading being 5.5 mr/hr at the surface and 22 mr/hr at a depth of one foot. The contaminants were suspected to be Co-60 or Cs-137. On July 19,

1971, the area was trenched by backhoe, work was complete by July 27, 1971, and the area was filled in. The search disclosed three bleach cans of lab waste, two lead cylinders of Cs-137 and Sr-90, contaminated dirt which was loaded into eighteen 55 gallon drums. The letter concludes that "a health physics survey of the area failed to reveal significant surface contamination remaining." No quantitative data was supplied.

A Memo For Record, dated June 14, 1973, Final Radiological Clearance, written by Major Charles Wickstrom, concludes: "This site was surveyed by USAEHA 4-7 Feb 73 and again 29-31 May 73, having been decontaminated by soil removal in the meantime. Ten drums of soil were removed by troop labor and sent to Kentucky for burial. The site was found to be within acceptable contamination limits at the time of the radiological clearance survey 29-31 May 73." No further information is given in this memo. The USAEHA reports were not available for review during the inspection.

The burial grounds were not licensed by the NRC and were not formally inspected. However, a November 16, 1956 Isotope Extension File memo titled Visit to U.S. Army Chemical Corps School, Fort McClellan, Alabama, states: "It was learned that Ft. McClellan has set aside a field for the disposal of radioactive waste. Most of the waste is contaminated equipment, although we did not see this disposal area. It was reported to have been enclosed and secured against unauthorized entry. It was reported also that the field was posted to assist in controlling entry to the area. The area was selected because of its topographical qualifications and the low possibility of radioactive materials migrating into drinking water supplies. All waste is buried at a depth not less than 10 feet below the surface."

A May 29, 1957 Isotope Extension File memo, titled Report of Captain Corner on findings at U.S. Army Chemical Corps School, Fort McClellan, Alabama, states "Another field of contention was that of a burial ground which had been abandoned but still had a radiation level at certain points of approximately 50 mr/hr. This burial ground was again surrounded by two strand barbed wire fence. However, there was a new housing site nearby and it was pointed out that this whole burial area would be an excellent place for children to want to play. This installation is endeavoring to establish a new burial ground and some effort is being made to clean up the old one."

An August 7, 1959 memo documenting an AEC office visit by Ft. McClellan personnel states "They have a burial ground in which considerable radioactive material of unknown activity, isotope or form has been buried."

A June 17, 1957 report titled Report of Radiation Protection Agency Survey No. 2672R75-57 performed by the U.S. Army Environmental Health Laboratory recommends "Render the old burial ground inaccessible to children pending completion of decontamination. Decontaminate the old burial ground. Fence and post the new burial ground."

There are indications that the material was moved in the late 1950s to Pelham Range, and that efforts were made in 1971 and 1973 to evaluate this area. This is supported by an excerpt from a July 24, 1957 letter from the Army Chief of Health Physics to the Atomic Energy Commission: "Decontamination processes are near completion (but require coordination with AEC for final completion.) Present radiation levels are less than 5 mr/hr. To accomplish decontamination to an acceptable level (less than 1 mr/hr) will require that a large amount of earth be removed and taken elsewhere. The most practical solution appears to be to enlarge the new storage area at Pelham Range. The old contaminated area is being made as inaccessible as possible through the use of barbed wire (concertina) and marked." The Army Decontamination Task List for the Chemical School relocation in 1973 lists "decon site by soil removal until there are no spots above limits. Put filled drums in waste storage yard."

The U. S. Army Center for Health Promotion and Preventative Medicine (CHPPM) performed Radiation Study No. 27-MH-0987-R1-96, February 27 through March 15, 1995. The inspector reviewed this report in draft form, the final report will have to be reviewed to ensure that the information is current and unchanged. The report contains the following overview. The Iron Mountain and Rattlesnake Gulch sites were utilized as radioactive material burial sites in the 1950s and closed in 1959. In 1959 some material was relocated to a burial ground located at Rideout Field. This area will be discussed later in the report. In 1971, after hearing rumors of these sites, the Radiation Safety Officer investigated and located, on February 18, 1971, a fenced area about 180 feet long and 80 feet wide on a ridge line of Iron Mountain, approximately 300 meters southeast of the Summerall Gate Road. Radioactive material and contaminated soil was found, packaged, and disposed of at a licensed disposal facility. The Rattlesnake Gulch site was approximated based on evidence of past trenching and comparison of vegetation to surrounding vegetation. The site is approximately 600 meters down the North Northwestern ridge line from the Iron Mountain peak and 350 meters Southeast of the Summerall Gate Road. Personnel involved in the 1971 work were also involved in the 1995 study. The best estimate was that the waste removed from the site consisted of laboratory waste, probably Cs-137, Co-60 and Sr-90. The information available indicates that the waste was loose laboratory waste, containerized laboratory waste (in Super Tropical Bleach cans), and contaminated dirt, which was buried approximately 6 to 8 feet below the surface. CHHPM personnel gridded the areas into 30 by 30 foot grids. Scanning surveys were performed, and five gamma readings were taken per grid. Five core samples were taken in each grid, using a push probe sampler. Depending on soil conditions, samples varied from the 2x4 foot depth to a 10x12 foot depth. All gamma radiation exposure measurements at the Iron Mountain site were between 1.20 uR/hr below and 1.49 uR/hr above background which was 5.26 uR/hr (average). A random walk over survey of the site was performed, no areas over twice background (1,200 cpm) were noted. The gross alpha activities ranged from 9.1 pCi/g of soil to 37 pCi/g; average background was 20.3 pCi/g. The gross beta /gamma activities ranged from 6.8 pCi/g to 42 pCi/g ; average background was 17.7 pCi/g. Gamma spectral analysis indicated the presence of K-40, Ac-228, Bi-214, and Pb-214. No

Co-60 was found and only three samples contained Cs-137, consisting of 1.4, .2, and .8 pCi/g, respectively. These are consistent with levels expected from fallout. The report concludes that there are no radiological health hazards identified in this area. There were no close out surveys of this area performed by the NRC when Ft. McClellan was decommissioned in 1973.

Several documents are listed as reference material in Report No. 27-MH-0987-RI-96. The NRC requires copies of these reports to allow for an evaluation of Iron Mountain and Rattlesnake Gulch prior to release of these areas for unrestricted use. These reports will enable the NRC to accurately evaluate the Army's decommissioning efforts plan our confirmatory survey. The documents are listed under Section 03, Findings and Conclusions of this report.

The next areas of use evaluated were the outdoor use areas. These included Pelham Range which was located at Rideout Field, and Bromine, and Alpha fields. There were various types of radionuclide use in these areas.

The use of radioactive material and decontamination efforts in these areas was better documented than the previously discussed area, also these areas were used under NRC licenses, with the exception of the burial mound at Pelham Range. Industrial Radiation Consultation No. 27-43-EU66-93, U.S. Army Chemical School and Military Police Center and Fort McClellan, Alabama, 30 March - 2 April 1993, dated July 27, 1993 and Appendix C, Industrial Radiation Survey No. 27-MH-0987-R2-96 Fort McClellan, AL performed January 8-19, 1996 were two available references. Radiation Special Study No. 43-041-73, Evaluation of Radioactive Contamination US Army Chemical Center and School, Fort McClellan, Alabama 36201, was performed February 5-7, 1973. It was conducted to assist in determining decontamination procedures and establish contamination limits.

Several documents are listed as reference material. NRC will require copies of these documents to evaluate the licensee's characterization and decontamination of this area and other areas that were used prior to the Chemical Corps School relocation in 1973 and to best plan the confirmatory survey. The documents are listed under Section 03, Findings and Conclusions of this report.

License No. 01-02861-01 allowed the use of sealed cobalt sources at Rideout Field at the Pelham Range. The Rideout Field Radiological Training Area was used to conduct aerial and ground radiological training surveys over large areas. Cobalt 60 sources were placed within wells and raised as needed.

A memo to the Isotopes Extension Files dated November 16, 1956 states: "During the past year, this institution received 1 unit of Mercury 203, 718 curies of cobalt and 2710 curies of cobalt in another shipment. At the time of our visit, 3750 curies of cobalt was in storage on the Rad Survey Area No. 3. These sources were stored underground in devices

which can be operated by a long string to bring the source above the surface. The size of these sources vary in magnitude from less than 100 millicuries to several hundred millicurie units. The area is well fenced, although we did not have a chance to visit it - it being several miles from the main school and accessible only by jeep or by foot. Other cobalt stored was 450 curies, mostly stored underground in a water bath."

An Army report titled Report of Radiation Protection Survey No. 2672R75-57, dated May 27-28, 1957, concludes: "An inventory of specific sources was not maintained." and "The pattern of Cobalt 60 sources was used to simulate a high exposure fall-out area. Students equipped with radiation rate meters and radios were trained in establishing radiation contours around the pattern and under the direct supervision of school personnel. The pattern was also used for research and development studies. The 3750 Curies of Cobalt 60 used in the pattern was contained in approximately 750 capsules. The sources ranged in curiage from 40 to 6 curies in each capsule. They were encapsulated in nonhermetically sealed galvanized iron pipe. The capsule source holders were pipes set vertically in the ground. The sources were purposely unmarked and relatively inconspicuous when they were in the irradiation position. When they were in the "safe" position within the stand pipes each source was locked and its location indicated by a Fields Area Marking." The inspector noted that the activity of the sources in this reference does not agree with the one quoted earlier.

Records show that the Army initially manufactured the sources from the mid 1950s until the mid 1960s when the sources were purchased commercially. At that time approximately 5230 curies of cobalt were disposed of by the Army on January 20, 1964, to the Nuclear Engineering Company in Morehead, Kentucky. The manufacturing of sources is discussed in an AEC memo to file dated August 7, 1957, documenting a meeting between representatives from the Army and the AEC: "They presently have 400-750 Cobalt 60 sources which are encapsulated but are not sealed. These will gradually additionally be encapsulated into a brass capsule with a screw type cap and soldered with low temperature silver solder... It was agreed that they would leak test about 5% of their old sources as soon as possible. If leakers are found, all will be leak tested, otherwise only periodic spot checks will be made. All leaking sources will be promptly encapsulated in additional capsules, while non leakers will be additional be encapsulated (sic) over a period of several years."

An AEC report dated November 9, 1961, indicates that a leak testing program was in place by 1960 and at that time all sources had been tested. It documents a June 30, 1961 test log that stated that 308 sources were tested and 55 were found to be leaking, one source was found outside of its storage pipe. Another memo of the same date states: "The method by which sources are encapsulated at Pelham Range have not been entirely satisfactory in the past." and " It was pointed out to Colonel Wood that their record system for personnel exposure was satisfactory, however, records kept on sources, their location, quantity

of activity and how such sources were identified, were not satisfactory for AEC requirements."

An AEC inspection report dated November 9, 1961, observes that the Army implemented an inventory system in 1960 with the initiation of a locator file. It states "Since May of 1960 a record of receipt of radioisotopes has been maintained... however, the licensee possesses several large quantities of unknown radioisotopes for which no receipt document exists."

A November 16, 1956 AEC memo to file indicates that the current hot cell undergoing decommissioning is the second hot cell at the base. It discusses a previous hot cell: "The hot cell already had been disassembled with a new one to be constructed." and "The encapsulation of Cobalt at this institution in the past has offered considerable hazard to individuals. The facility has been dismantled and new facilities are to be constructed." The inspector was not able to determine where this cell was located.

A February 16, 1973 memo to file written by Major Anderson contained his recollection of the Rideout Field closeout. He remembered that the south side of Rideout Field was loaded with Cobalt 60 sources in the Spring of 1970. In February of 1971, the north side was loaded. All sources were wipe tested before loading. In early 1972, the south side sources were removed, wipe tested and shipped to a waste facility. No sources were found to be leaking. The north side sources were not wipe tested. He recalls that the source actuators were checked with a E-510 radiac survey meter and that only one was found to be slightly contaminated. No formal survey results were recorded. The memo then continues with a discussion of the burial ground at Rideout Field. The concrete slab was removed and underlying soil was packaged and shipped to a waste facility. The area was surveyed with E-510 radiac meters and AN-PDR-27s; no residual contamination was found. A September 12, 1972 memorandum from the Acting Chief, Industrial Section, to the Atomic Energy Commission states that 200 sources were transferred to Nuclear Engineering Corporation on March 17, 1972 for burial and that 820 sources were shipped to the same company on July 11, 1972. No shipping papers, leak tests results, or source inventories were found by the inspector.

Industrial Radiation Consultation No. 27-43-EU66-93 indicates that a close out survey of this area was conducted in 1973 by USAEHA and is documented in USAEHA Radiation Special Study No. 43-075-73/74, which was not available at the time of the inspection.

Bromine Field was used to provide Chemical School students with a realistic decontamination exercise of military equipment. License No. 01-02861-2 authorized the use of Bromine 82, Bromine 80, Potassium 42, and Sodium 24 in this area. A liquid solution of Bromine 82 was used to contaminate equipment which was then decontaminated by the students. Bromine 82 has a half life of 37 hours and decays to Krypton 82, an inert gas. A typical exercise required 1 to 2 Curies of Bromine 82.

There was some conjecture by Army personnel that other isotopes may have been used in this area. These are Br-80m, Br-80, K-42, Na-24, and Al-28 with half lives of 4.5 hours, 18 minutes, 12.5 hours, 15 hours, and 23 minutes respectively. Industrial Radiation Consultation No. 27-43-EU66-93 references USAEHA Radiation Special Study No. 43-075-73/74 which documents a radiation survey of this area. It concludes that the area was no longer of concern but does not include survey results. This report was not available for review during the inspection.

Alpha Field was located near Bromine field and was in use until the early 1970s. License SNM-344 authorized the use of 25 milligrams of U-233 and 315 milligrams of plutonium as plated alpha sources in this area. The plates were placed on concrete pedestals to provide a field training exercise approximating a weapon accident site. USAEHA Radiation Protection Survey No. 43-0046-77 which was not available for review, contains the documentation of the termination radiological survey of Alpha field. Industrial Radiation Consultation No. 27-43-EU66-93 summarizes that all radiation levels were within release limits. However, it also states that after the uranium plates and pedestals were removed from the field, the field may have been plowed. The Army Decontamination Task List for the 1973 Chemical School relocation lists the following tasks: "Remove all plates by unscrewing and check pedestals for contamination. Wipe plates to check for contamination. Dig up all pedestals. Survey unplowed field. Plow and disc field to 6"depth. Survey plowed field." A June 14, 1973 memo to file states that "all decon tasks have been complied with on schedule...no contamination remaining." Report No. 27-43-EU66-93 provides the following suggestion. A Geiger Mueller beta-gamma radiation measuring instrument and a survey meter with a FIDLER probe were used to conduct the survey. If residual contamination or a uranium plate were plowed to a depth of six inches, they may not have been detected. Six soil samples were taken and all contained less than 4 picocuries per gram gross alpha activity. The report recommends that a radiation survey be performed using a thin NaI crystal connected to a microroentgen survey meter over the parking lot and around areas where the original Alpha Field was located. Also it recommended that additional soil samples be taken, to a depth of twelve inches, to be analyzed for gross alpha and beta activity.

The establishment of a burial ground at the Pelham Range is discussed in a May 13, 1959 inspection report as follows: "An old radioactive materials burial ground had been established in one section of the source field. The burial ground is posted Radioactive Burial Ground - Keep Out, red and black lettering on a white background. The three strand barbed wire fence surrounding the burial area is no longer intact. An inscribed granite "head-stone" in the burial ground reads: Danger - Radioisotope Burial Ground - U.S. Army Chemical Corps School - Closed July 1957 - Contents - Cobalt 60, 10 Curies - Mercury 203, Tantalum 182 and Cadmium 115, one millicurie (each). The quantity of buried byproduct material is a "best guess" and not a measured quantity." Additionally, there is evidence that radioactive waste from the Iron Mountain burial site was transferred to the Pelham Range in about 1959. A report titled After Action Report Discovery and Disposal

of a Cobalt-60 Radiation Source was written for an investigation conducted January 22 to February 1, 1985. The reports clarifies the use of cobalt sources at Rideout Field in that there were two fields of use. The first field was in service from 1958 to 1962 and utilized locally fabricated sources emplaced in Area 24C at the Pelham Range. In 1964 the second field was implemented with commercially procured sources. A cobalt-60 radiation source was discovered in Area 24C on January 25, 1985 during a routine survey. It was identified as a source from the earlier field and shipped to Barnwell for burial on January 31, 1985. The report concludes that Area 24C was surveyed on February 1, 1985 with no contamination found. The application letter for amendment 12 to license No. 01-02861-01 stated that all the original sources had been disposed of and that commercially procured sources would be used. The report continues with the statement that the burial ground at Rideout Field had been surveyed by USAEHA on February 6, and May 30, 1973. The reports associated with these surveys were not available. A letter from the Army to the AEC dated July 31, 1963 provides the following status of the possession of radionuclides at the base. "As of 17 July 1963 the U.S. Army Chemical Center and School had approximately 7,610 curies of cobalt 60. All the above cobalt is metallic in pellet or wafer form. It is proposed to procure 750 new sources...Available records indicate that approximately 541 cobalt 60 source wells were originally installed in the Pelham Range radiological field. In 1961 approximately 60 of these wells were found to have deteriorated so the sources were pulled from them and stored in sunken drums inside the radiological field. Total quantity of cobalt 60 as of 17 July 1963 in the radiological field was approximately 2,350 curies including that buried in the drums."

An Army memo dated January 22, 1985, contains information obtained from a contract employee with 34 years of work experience at the facility who remembered delivering truckloads of contaminated dirt to Rideout Field from a waste storage area off Summerall Gate Road. The author discusses finding the area and describes it as "not extremely large (25 ft. x 10 ft.). An Army memo to file dated January 25, 1985 has the following information about this area. The author describes the discovery of a length of pipe that contained a cobalt 60 source. It was felt that this was a source that was left behind after the school relocated in 1973.

Appendix C, to Industrial Radiation Survey No. 27-MH-0987-R2-96, contains the results of a survey of a burial mound at Pelham Range conducted January 8 to 19, 1996. The report provides the following information. The burial mound is located at the northwest corner of Pelham Range and is oblong in shape, approximately 25 meters long and 15 meters wide. Based on historical review, it was determined that the mound probably contained laboratory waste and contaminated dirt. The radionuclides of interest were Cs-137, Co-60 and Sr-90. The instruments used were a Reter-Stokes high pressure ionization chamber (HPIC), an ESP-2/SPA-3 survey meter/probe combination calibrated in micro-R per hour, portable Canberra MCA/3'x3" NaI detector and ASP-1/PG-2 for gamma scan. Soil samples were taken to a depth of 12 feet. After the core samples were taken the boreholes were logged with a sodium iodide detector at each foot. Fifteen soil samples were analyzed and the

results provided in an Army memo dated November 7, 1995. These two reports were in draft, the final versions will have to be reviewed by the NRC. The soil analysis ranged from a low of 0.01 to a high of 187 picocuries per gram for Co-60 and a low of 0.2 to a high of 179 picocuries per gram for Cs-137. During the course of the survey small pieces of cobalt were found. Twenty seven "hot spots" were identified.

Several buildings had radioactive material use areas. Industrial Radiation Consultation 27-43-EU66-93 summarizes the following from documents that were not available for review. Building 3180 was used as a radioactive material storage area. The building was demolished in August of 1989. The remaining concrete pad is within the area currently undergoing decommissioning under License No. 01-02861-04. Memorandums for Record dated August 3, 1989 and December 1, 1989 document the demolition and survey results. They were not available for review. Building 3181 contained one radioisotope laboratory, Room 35, unsealed and liquid sources were used. Sealed calibration sources were occasionally used in Room 36 during training. A wipe test of the facility is discussed in USAEHA Radiation Special Study No. 43-075-73/74, which was not available during the inspection. The survey was conducted while the building was still in use so it can not be considered a close-out survey. Industrial Radiation Consultation No. 27-43-EU66-93 recommends that a termination survey of Room 35 be conducted and that a search be made for a possible intact fume hood duct system. Building 3182 contained a laboratory with a 106 Curie Cs-137 calibrator and a 1 Curie Co-60 calibrator. A survey conducted in 1973 and discussed in USAEHA Radiation Special Study No. 43-041-73 indicates areas of fixed contamination. The 1973 Daily Activity Logbook -Closeout, discusses the decontamination efforts and results. USAEHA Radiation Special Study No. 43-075-73/74 concludes that the building is within release limits. None of these documents were available during the inspection. This building is being used as the Military Police Museum. Building 3192 contained a hot cell and classroom. This building is licensed for decommissioning under License No. 01-02861-04.

USAEHA Radiation Protection Survey No. 43-0046-77 discusses the use of one AN/UDM-6 Calibrator and two TS-784A/PD calibrators in building 2281. Records indicate that only sealed sources were used in the building and leak tests were reported to have been performed as required, with no adverse findings. Under the current license No. 01-02861-05, operations for the Army Chemical School were transferred from building 2281 to building 1081. The results of the closeout survey were transmitted by letter dated March 7, 1989. The facility had been in use since 1980, and monthly surveys had been performed. All lab areas were surveyed for alpha, beta, and gamma contamination, via portable survey instruments and swipes. Areas where unsealed sources were used were gridded into one foot squares, and areas where sealed sources were used were gridded into three foot squares. Three surveys were done for each grid; alpha at contact, beta/gamma at one centimeter, and gamma at one meter from the surface. No contamination was detectable with the instrument survey. Swipes were counted on a Tennelec automatic alpha/beta/gamma counter .

After background was subtracted all counts were below LLD for the counter which was 1.53 dpm for alpha, 9.35 for beta, and 42.27 for gamma. Instrument readings were all close to background, with no reading above twice background.

License No. 01-02861-04 was issued for contamination possession in building 3192 and the surrounding. Industrial Radiation Consultation No. 27-43-EU66-93 has the following to offer from a historical perspective. Building 3192 housed a classroom and a hot cell. The hot cell was used to prepare, maintain and transfer multicurie Co-60 sources for the training exercises at Rideout Field. At some time prior to 1973, a chemical excursion occurred that caused Co-60 and Cs-137 to be released throughout the facility, to include the ventilation system. The isotopes were released to the environment and contaminated the ground area around the building. However, the underground piping, storage tanks, valve control pit and manway that serviced the hot cell by collecting decontamination water was already contaminated from normal operations. USAEHA Radiation Special Study No. 43-075-73/74 and USAEHA Radiation Special Study No. 43-041-73 provided survey data from the time period prior to 1973. In May of 1973, the Radiation Committee concluded that decontamination 99% complete. USAEHA Radiation Protection Study No. 28-43-0012-84 was, prepared in 1983, concluded that both Cesium and Cobalt contamination was present; generally over the entire area west of the building, and that contamination had spread slightly outside of the originally fenced area. Low level soil contamination was detected as deep as 8 feet below the surface and 15 feet down the slope from the underground storage tanks. A Chem-Nuclear Project Report for Fort McClellan, Alabama, Decontamination Project, prepared in 1985, characterized the current radiological status. Extensive core sampling was done in soil, concrete, and asphalt. The contractor performed the following remedial action; the 1500 and 100 gallon underground holding tanks were removed, contaminated material within the building and surrounding contaminated soil was removed. Considerable contamination remained following this effort.

A search of the NRC files disclosed the following information concerning radionuclides used and stored in this area. An inspection conducted September 5-8, 1961, revealed the following comments about building 3180: "There is embedded in the concrete pad surrounding the storage vault a stainless steel plaque on which is stamped "Caution - Radioactive Contamination; Location at a depth of 6 inches from top surface of concrete; Type - Strontium-90; Half-life - 19.9 years [27.7 years]; 600 mr/hr on 7/28/59 at surface of spill."

A July 2, 1963 memo to the Region II files discusses Cesium contamination at the hot cell. In 1963, the Army changed its method of taking swipes at the hot cell and started using wet wipes. At that time Cesium 137 contamination was found. The cesium had been purchased in 1956 or 1957 for the purpose of encapsulation but source sealing proved unsuccessful, and the material was disposed of.

A November 9, 1961 AEC inspection report offers the following information about materials stored in Building 3180 which has been demolished: This licensee possesses unknown quantities of unknown radioisotopes which emanate significant quantities of radiation. These quantities are an artillery projectile reading, according to Colonel Colgin, 17,000 mr/hr with the meter in contact with the projectile; a 5-ton storage container which, with the top partially opened, reads 500 mr/hr at 12 inches; and a storage well approximately 5 to 8 feet deep which reads 500 mr/hr at the surface of the water... In addition to these quantities of unknown radioisotopes, the licensee possesses 417 sources of Cobalt 60 of unknown exact quantity or form installed as sealed sources in a field exercise area known as Pelham Range. The licensee does not know the form or quantity but believes the sources to be metal slugs ranging from 5 curies to 40 curies when installed in 1955-56. For these unknown radioisotopes and unknown quantities, Colonel Colgin has communicated with previous radiation safety officers in an attempt for identification. No positive information has been determined."

These references to radionuclide use or storage are significant since the license issued and decommissioning efforts are for Co-60 and Cs-137; other radionuclides may need to be considered. Sr-90 certainly has to be considered since there is documentation supporting the existence of a Sr-90 spill.

The licensee hired a contractor, Allied Technology Group (ATG), to remediate the hotcell building and surrounding areas. The Remediation Work Plan was submitted in December of 1994. The plan called for removal of radioactive materials on the surface and embedded into the surface of structures and piping systems. The work plan references a December 16, 1986 report prepared by Chem Nuclear Services, Inc., who had performed a characterization and partial remediation of the facility. The remedial action taken included excavation and removal of the 1500 gallon and the 100 gallon holding tanks in the discharge stream, removal and disposal of some contaminated materials in the hot cell of building 3192 and removal of some contaminated surface soil around the building. The current contractor based its work on the characterization in this report. The report was not available at the time of the inspection. NRC will need to evaluate this report to ensure that the site was appropriately characterized.

ATG published its final results in December of 1996, documenting the remediation of buildings 3192 and 3182 and the surrounding area. Work was performed from November 6, 1995 until December 21, 1995, and from June 24, 1996 until August 1, 1996, when it was completed. It advises that testing was limited to Co-60 and Cs-137. The report states that surface release guideline limits for contamination utilized were those discussed in NRC Regulatory Guide 1.86, of 5,000 dpm/100cm^2 fixed and 1,00 dpm/100cm^2 loose for beta/gamma. The May 6, 1987 NRC memo [Section 01.] limits were utilized for exposure rate and volume activity of soil and building materials for Co-60 and Cs-137. Following remediation ATG performed a final survey. Grids were established, both

inside and outside grids were 1 meter by 1 meter. Ground and building surfaces were 100% direct scan surveyed. The area behind building 3182 was gridded into 10 foot by 10 foot grids. Building interiors were scanned for alpha, beta, and gamma radiations. Soil surfaces were scanned for gamma radiation only. Three smears per grid were taken inside of the building. A microR survey of the outside area grids was performed. Soil was analyzed for Cs-137 and Co-60, a minimum of four samples was taken for every $100m^2$. Smears for removable contamination were analyzed for gross alpha and gross beta activity. Soil samples were analyzed for Co-60 and Cs-137 by Gamma Spectroscopy. Measurement data is in units of $dpm/100cm^2$ or cpm (surface activity), uR/hr (exposure rate), and pCi/g (soil concentrations) for comparison. Values were adjusted for contributions from natural background. Guidance in NUREG/CR-5849 was followed. In discussing background, the report states: "Background exposure rates were measured with microR meters." The inspector asked for clarification on this point which was provided in a September 16, 1987 memo from ATG to the licensee. The memo states that background readings were obtained in unaffected areas of building 3182 and ranged from 6 to 8 uR/hr with a Ludlum Model 19 Micro-R Meter; from 40 to 100 counts per minute with a Ludlum Model 3 Count Rate Mater with a HP-260 GM pancake probe; around 400 cpm for a Model 18 meter with a 44-9 pancake probe. Background soil samples were taken outside of the affected areas, surfaces ranged from 7 to 13 uR/hr.Background analysis for the Ludlum Model 2929 Counter/Scaler with a 44-10-1 probe for alpha and beta-gamma were performed in a counting room of a trailer behind building 3182. There is still some question remaining about background counts. In reviewing the final release surveys in Appendixes M through P, the inspector noted different values for backgrounds in each area surveyed. For example, the background values for the east wall of the classroom in Building 3192 are 15-17 uR/hr for doserate, 50 to 120 cpm for the Model 3, and 320 cpm for the for the Model 18. The background rates shown are different for each room surveyed. Since the release criteria are based on activity above background, it must be determined where the differing values on each survey report were obtained and which background values were used to determine that an area could be released. The report concludes that areas surveyed may be released for unrestricted use.

During the inspection, members from CHHPM were at the site to perform a confirmatory survey of buildings 3192 and 3182 and the fenced in area around the buildings. Basing their survey on the ATG survey, they planned to take approximately 500 fixed point measurements and smears and 16 soil samples. The inspector observed the survey and found the CHHPM personnel to be knowledgeable of the methods described in NUREG 5849 and familiar with release limits and regulatory requirements. Instrumentation was properly calibrated and appropriate for Co-60 and Cs-137. Smears were taken and the building was surveyed for alpha, beta, and gamma radiation. Doserate at one meter was measured with a microR meter. The team obtained their background readings from building 3169, a building built at the same time and from similar materials as the buildings in question. The background readings were 10-11.5 uR/hr gamma, 250-300 cpm beta, and 2.5 cpm alpha.

03. Findings and Conclusions:

The licensee has concluded that the Rattlesnake Gulch, Iron Mountain, Buildings 3182, 3192 and surrounding fenced areas, Bromine and Alpha Fields, and Pelham Range (with the exception of the burial mound) are decontaminated and ready for release for unrestricted use, pending the issuance of the report for the most recent survey conducted by CHHPM during the inspection.

In order to further evaluate the licensee's decommissioning efforts, the NRC will need to review the support documents discussed earlier for evidence of the underlying assumptions and missing information used to plan the closeout surveys upon which conclusions were drawn. These documents are as follows:

- A letter dated August 10, 1995 from the licensee to the NRC states that samples from established ground water wells will be obtained to demonstrate site meets release criteria prior to final release. The data from these samples has not been reviewed.

- Memorandum, CETHA-IR-A, USATHAMA, subject: Request for U.S. Army Environmental Hygiene Agency (AEHA) Support, 7 April 1992

- Memorandum, HSHB-MR-HI, USAEHA, subject: Radiological Status of Iron Mountain, Fort McClellan, Alabama, 15 January 1993

- Memorandum, SFIM-AEC-TSS, USAEC, subject: Request for Technical Services, 27 December 1993

- Memorandum, SFIM-AEC-ETD, ASAEC, subject: Request for U.S. Army Center for Health Promotion and Preventative Medicine Support at Fort McClellan, AL, 4 January 1996

- Hand written letter, LTC William G. Powell to MAJ Anderson, subject: Personal Recollections and Information on Iron Mountain and Rattlesnake Gulch, 6 March 1971

- USAEHA Radiation Special Study No. 43-075-73/74, U.S. Army Chemical Center and School, Fort McClellan, AL 36201, 28-31 May 1973

- Health Physics Division, USACMLCS, Iron Mountain (Rattlesnake Gulch) Radioactive Material Burial Site, 29 July 1971

- Message, ATSCM-HP, USACMLCS, 301659Z Apr 73, subject: Disposition of Radioactive Material, 30 April 1973

- Message, ATSCM-HP, USACMLCS, 041630Z Jun 73, subject: Notification of Transfer of Radioactive Material, 4 June 1973

- Health Physics Division, USACMLCS, Close-out Log 21 Feb 73- 31 May 1973

- Health Physics Division, USACMLCS, Memorandum for Record, Shipment to EA 4 Jun, 4 June 1973

- Message, DALO-MAS-I, No. 1834, 181920Z, Subject: Disposition of Radioactive Material, 18 May 1973

- Fort McClellan site visit by Mr. Allen Hilmeir and 1Lt Christopher J. Clayton on 30 March - 2 April 1993

- USAEHA-Radiation Protection Survey No. 42-0046-77, U.S. Army School/Training Center, Fort McClellan, Alabama, 4-5 May 1977

- Project Report for Fort McClellan, Alabama, Decontamination Project, Prepared by Hilbert Associates, Inc. for Chem-Nuclear Systems, Inc., 1985

- Memorandum for Record, ATZN-CM-AHP, subject: Discovery of Unlicensed Material Within the Hot Cell Area, 13 December 1985

- Memorandum for Record, ATZN-CM-AHP, subject: Demolition of Control Pit and Removal of Building 3180's Floor, 1 Dec 89

- Memorandum for Record, ATZN-CM-NR (LAB), subject: Finding of Lead Source Container, 6 December 1989

- U.S. Army Corps of Engineers Toxic and Hazardous Materials Agency, Task Order 11, Draft Enhanced Preliminary Assessment Volume 1, Fort McClellan, AL, Prepared by Roy F. Weston, Inc., September 1990

- USAEHA Radiation Protection Study no. 27-43-0002-86, U.S. Army Chemical School, Fort McClellan, AL, 29 March - 1 Apr 1988

- Memorandum for Record, subject: Final Radiological Clearance, 14 June 1973

- U.S. Army Training and Doctrine Command, Final Environmental Impact Statement, 16 July 1979

- After Action Report, Test and Evaluation Program, Radiological Decontamination Training Facility (Bromine Field), undated, (about 1967)

- Information Paper, ATZN-CM-AHP, subject: History of the Rideout Field Cobalt 60 Radiation Sources, 4 February 1985

- Letter, CMLTC-SDI-T, to Commanding Officer, Fort McClellan, AL, subject: Extension of Radiological Training Area in Pelham Range, undated (probably about April 1958)

- Disposition Form 2496, ATSCM-H, to Record File, subject: Iron Mountain Site - Memo for Record, 23 February 1971, with enclosures

- Memorandum for LTC James, ATZN-CM-AHP, subject: Radioactive Material Disposal Site, 22 January 1985

- Installation Assessment of Fort McClellan, Report No. 110, Volume I, April 1977

- ASAEHA Radiation Protection Study No. 28-43-0012-84, Hot Cell Contamination, Fort McClellan, Alabama, 1 August 1983

- U.S. Army Chemical School Minutes of the Installation Ionizing Radiation Control Committee, 23 February 1984.

- U.S. Army Chemical School Minutes of the Radiation Safety Committee Meeting, 17 May 1973

- The final version of Radiation Study No. 27-MH-0987-R1-96

- The final version and complete laboratory analysis of Appendix C to Industrial Survey No. 27-MH-0987-R2-96 concerning the burial mound at Pelham Range

- The results of sample analysis from the ground water wells at Ft. McClellan

- The report of the results of the CHHPM survey conducted during the inspection.

In addition, please provide: (1) additional information to resolve the inconsistency of background values in the ATG final survey reports, (2) your plan to resolve the issue of the burial mound at Pelham Range, (3) the location of the original hot cell, and (4) any further documentation that may be available that will provide a more complete understanding of radionuclide use or decommissioning efforts at Fort McClellan. Please advise if any of the information in this report is erroneous.

Receipt of this information is essential to provide a complete evaluation of the current radiological status of Ft. McClellan. It appears that prior to 1960, cobalt sources used at the base were locally manufactured, unsealed, and not subjected to routine leak testing; and that record keeping of radionuclide use was sketchy or nonexistent. There is virtually no documentation of the establishment of burial mounds as to location and content, or of early use of radionuclides at Iron Mountain and Rattlesnake Gulch. This is compounded by the fact that

the RSOs tended to be transferred from base to base, leading to a discontinuity of "corporate memory." This background information must be comprehensive enough to provide a current understanding of the decommissioning status to ensure that Ft. McClellan can safely be released for unrestricted use. After further review, it can be determined what further actions may be necessary, which may include further surveys and characterizations up to and including low altitude radiometric survey of certain parts of Ft. McClellan to resolve any remaining questions.

EXIT MEETING SUMMARY

The inspector discussed the inspection results to date with Mr. John May by telephone on September 23, 1997. The inspector advised that the additional information was required before any final conclusions could be drawn regarding the effectiveness of closeout surveys or the radiological status of Ft. McClellan.

ATTACHMENT

LIST OF PERSONS CONTACTED

Licensee

Lisa Kingsberry, Environmental Coordinator, Base Relaction and Closure
John May, Radiation Safety Officer, Ft. McClellan
SGT FC John Aperans, Radiation Protection Technologist, Ft. McClellan
Lorus Miller, Team Leader, U.S. Army Center for Health Promotion and Preventative Medicine (CHPPM)
SSG David Collins, Health Physics Technician, CHPPM

Environmental Protection Agency

Richard Button, Health Physicist

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Anton Silis, Document Declassification, Washington D.C.
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Ron Malcody, Oak Ridge National Laboratories
Arlie B. Ciebert, Document Declassification, Washington, D.C.

INSPECTION PROCEDURE USED

IP83890: Closeout Inspection and Summary

APPENDIX C

Photo Documentation Log
Original Photographs of the Site
And Pertinent Site Features

Figure #1
Possible 3.5" rocket shipping container found in Radiological Survey Area #1.

Figure #2
New boundary fence erected beside Old Rattlesnake Gulch Area. Land on other side of fence was once Fort McClellan property. City of Anniston now owns the land.

Figure #3
Bent over steel pipe, possibly used to suspend radiological sources during training exercises at Rattlesnake Gulch. Pipe found on Community Center Property (City of Anniston).

Figure #4
Steel pipe found laying on ground in Rattlesnake Gulch Area.

Figure #5
Steel pipes and metal drums found partially buried in Rattlesnake Gulch Area on Community Center property (City of Anniston).

Figure #6
Second photo showing partially buried steel pipe in Rattlesnake Gulch Area (Center of fore ground).

Figure #7
Second debris pile in Rattlesnake Gulch Area on Community Center property (City of Anniston).

Figure #8
Third debris pile in Rattlesnake Gulch Area (Community Center property).

Figure #9
Old barrel found in general location of Field Hot Cell.

Figure #10
Second view of old barrel.

Figure #11
Man-made depression found in Radiological Area near Biological Training Area (Possible location of Field Hot Cell).

APPENDIX D

Licenses Listing

APPENDIX D - LICENSES LISTING

Byproduct Material License No. 01-02861-01

1957 Initial issue date of license was in 1957, twenty-two amendments apply dating thru 26 July 1973. The following amendments were located (sixteen), and are currently on file in the St. Louis District Office, Corps of Engineers: 2, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 22. This license allowed for use of the following items:

Polonium^{210}

Any byproduct material between Atomic numbers 3 and 83, inclusive, with a maximum of 100 millicuries with the following exceptions:

Strontium^{90}
Cesium^{137}
Cobalt^{60}
Antimony^{122}
Bromine^{82}
Chromium^{51}
Copper^{64}
Gold^{198}
Iodine^{131}
Iridium^{194}
Mercury^{197}
Mercury^{203}
Osmium^{191}
Palladium^{109}
Phosphorous^{32}
Potassium^{42}
Rhenium^{186}
Rubidium^{86}
Selenium^{75}
Gross Fission Products

Special Nuclear Material License No. SNM-344

1959 Initial issue date of license was in 1959, maximum quantities of 25 milligrams of U-233 and 315 micrograms of plutonium.

Byproduct Material License No. 012-02861-02

1966 Initial issue date of license was in 1966, four amendments apply. These were all located and are on file in the St. Louis District Office, Corps of Engineers. For use in the 11F3A Radiological Trainer Device on main post:

Bromine^{82}
Bromine^{80}
Potassium^{42}
Sodium^{24}

Interagency Agreement for Enriched Uranium No. 1003

1971 Initial issue date of license was in 1971. Includes three letter supplements to the agreement, dated 18 May 1967 thru 21 March 1968.

Interagency Agreement for Plutonium No. 3039

1971 Initial issue date of license was in 1971. Includes one letter supplement to the agreement, 2 May 1973 (two copies).

Materials License No. 01-02861-04

1996 Expiration date of license was 30 September 1996. For possession of residual surface contamination in the Hot Cell and to perform decontamination and decommissioning activities at the Hot Cell facility and surrounding grounds. Attachment is the Draft Regulatory Guide DG-0005, Applications for Licenses of Broad Scope, October 1994.

U.S. Nuclear Regulatory Commission License 01-02861-03

1973 Initial issue date of license was 26 July 1973, and it was obtained to cover radioactively contaminated facilities remaining on Fort McClellan after the Chemical School departed.

NOTE: This license is only listed in this report for reference information. It was cited in another document that is on file, Report Documentation No. DRXTH-ES-IA-77110, April 1977.

U.S. Atomic Energy Commission (AEC) Nuclear Material Transaction Report

Instructions to AEC and agreement state licensees for reporting nuclear material transfers on Form AED-741-Nuclear Material Transaction Report.

APPENDIX E

Site Visits

APPENDIX E – SITE VISITS

Memorandums for Record

Site Visit and Radiological Findings to date, 3 June 1999.

Site Visit Fort McClellan, Main Post and Pelham Range, 27 September 1999.

Site Visit Fort McClellan, Main Post and Pelham Range, 10 November 1999.

Memorandum for Record

Site Visit and Radiological Findings to date, 3 June 1999.

CELMS-ED-P (200-1c) 3 Jun 1999

MEMORANDUM FOR RECORD

SUBJECT: Site Visit & Radiological Findings to date

1. During 24-26 May the following radiological sites were visited:

   a. The area shown on the June 1967 Range Map as T-15 (USACMLS Area 15), negative results.

   b. The area shown on the June 1967 Range Map as B-1, negative results.

   c. Naylor Field (T-6), the old goat pen was found, no signs of radiological burials.

   d. Range 25, fencing used for testing of prototype actuators has been removed.

   e. Area behind the Anniston Community Center (FUDS), military pickets marking a path up a ravine. This may have been the first Rattlesnake Gulch radiological field survey area.

   f. Lima Pond Area, Range L, the two military tanks on the hill to the east were inspected. There is a sign on the ground "Contaminated, Keep Off." The crater area is fenced and was not entered.

   g. Range K Area, the old fenced area was walked as were areas outside the fence. Numerous pieces of ordnance, which had been vented, using shape charges were found. Along with partially buried bleach cans.

   h. Range I Area, original fenced area still exists. There is a small concrete marker just inside the gate and a man made mound in the rear. Out side the fence to the south were 5 metal posts space approximately 75' apart in a row. This may have been the Radiological Survey Area, which was part of the Chemical Officer Field Familiarization Course.

   i. Radiological Burial Area (north end of Battle Drill Area). This is the old Pelham Range Radiological burial ground. Two of the corner fence posts were still present. This area originally had a fence with a perimeter of 400 yards.

MEMORANDUM FOR RECORD 3 Jun 1999

SUBJECT: Site Visit & Radiological Findings to date

2. Findings to date for Main Post:

a. Hot Cell (Bldg. 3192): Building used from 1950's to 1973. Documented in the EBS. Initial decontamination of building in 1973. In 1995 additional soil removed and cleaned up. Building is locked and fenced.

b. Liquid Waste Disposal Pit: Located between Bldgs. 3192 and 3180. Use is from the 1950's to 1973. Documented in the EBS.

c. Storage Vault (Bldg. 3180): Used from the early 1950's to 1973. Documented in the EBS. Demolished in 1987. Debris removed. The site was scheduled for release in 1996.

d. Rad Lab (Bldg. 3182): Used from the early 1950's to 1973. Documented in the EBS. Tiles removed from floor 1995. Scheduled for release 1995.

e. Scaler Lab T (Bldg. 3181): Used from the early 1950's to 1973. Documented in the EBS. Scheduled for cleanup 1995-96. Some hot areas.

f. Isotope Lab (Bldg. 3181) Used from the early 1950's to 1973. Documented in the EBS. Scheduled for cleanup 1995-96. Some hot areas.

g. Isotope Lab Vault (Bldg. 3181) Used from the early 1950's to 1973. Documented in the EBS. Scheduled for cleanup 1995-96. Some hot areas.

h. Alpha Field: Located southeast of Bldg. 3192, site was used for Alpha surveys from around 1960 to 1972. Documented in the EBS. No leaks or contamination. Released for unrestricted use.

i. Bromine Field: located south of Bldg. 3192, used during the 1960's to train navy personnel. Documented in the EBS. No termination or closeout survey on file. No further action planned.

j. Bromine Tanks: Located next to the Bromine Field and used to hold contaminated, waste water until safe to drain. Documented in the EBS. Tanks now full of rusty water. No further action planned.

k. Building 228: Used as a radiological calibration facility for TMDE from the 1950's to the 1980's. Used from the early 1950's to 1973. Documented in the EBS. No indication of spills or releases. No further action planned.

l. Building T-812-1/2: Used as a Radium 226 storage vault from the early 1960's to 1973. Used from the early 1950's to 1973. Documented in the EBS. Results of 1995 wipe tests were clean. Unrestricted use.

m. Building 1081: Sibert Hall, current radiological lab. Used from the early 1950's to 1973. Documented in the EBS. Needs to be surveyed. No known releases or problems.

n. Building 2281: Reported used for the storage of radiological materials (Weston 1990). The EBS found no other documentation. Released by NRC for unrestricted use.

o. Building 4416: Reported used for the storage of radiological materials (Weston 1990). The EBS found no other documentation. Wipe tested clean. No record of release or problems.

p. Personnel Decontamination Center (Bldg. 3185): This building was used by students using the Bromine Pad. Students changed clothes here and after the exercise went through personal decontamination procedures in the various rooms of the building. Potential release of chlorine.

q. Old Rattlesnake Gulch Radiological Survey Area: Original Radiological Survey Area built in 1952 and moved in 1953. The area is believed to be just east of the community center in a small ravine.

r. New Rattlesnake Gulch Radiological Survey Area (Rad. Survey Area #1): This area replace the original Rattlesnake Gulch Radiological Survey Area. The area is believed to be close to the south side of Summerall Gate Road, between the old Chemical Demonstration Area and the Biological Warfare Area (T2).

s. Old Rattlesnake Gulch Burial Area: This is the original burial area associated with the Rattlesnake Gulch Radiological Survey Area. Minutes from the 1953 Isotope Committee indicate that all materials were removed and buried in a new burial ground.

t. New Rattlesnake Gulch Burial Area? Minutes from the 1953 Isotope Committee indicate that all materials were removed from the original Rattlesnake Gulch burial site. In 1959 a fence is placed around the area as certain materials are buried here.

u. School Radiological Burial Grounds (Iron Mountain?) This area was used for burials until 1959. Documents indicate that a granite marker may have been placed at the burial site. The 1995 CHPPM survey showed site is clean.

v. Range 25: On post area for testing of prototype actuators to be used at the new Radiological Survey Area at Pelham Range. Five prototypes were tested for a period of six weeks. Fencing was installed between the 300-yard and 400-yard firing lines.

MEMORANDUM FOR RECORD 3 Jun 1999

SUBJECT: Site Visit & Radiological Findings to date

3. Findings to date for Pelham Range:

a. CBR Field Familiarization Course (Rad. Survey Area #2?) This area is currently marked as Range I. Based upon previous investigations. Range I may be immediately to the north in what is now a large grassy field. Old reports indicate that up to 2 feet of topsoil was removed from the range, yet the entire fence and area is still at original grade. Five steel posts were found south of the fenced area, running in a generally straight line with about 75' between each post. These posts may have been used to support radiological sources during CBR field training in the 1950's.

b. CBR Tactical Training Course (Lima Pond): Much of Area 10B was used for the CBR Tactical Training Exercise course. The site known as Lima Pond was actually Station No. 5 (A-Bomb). Radiological sources were placed in the crater. Students had to monitor the radiation, take appropriate actions and continue on with the exercise. In the late 50's or early 60's the tactical exercise was discontinued and radiological sources removed. The crater may have been used to dispose of expended ordnance and other military materiel from other stations.

c. Old Radiological Survey Area (Rad. Survey Area #3): This is the first version of the large Radiological Survey Area at Pelham Range. The area contained 300 source wells, which were raised by use of a pulley system. The field was entirely north of Cane Creek.

d. New Radiological Survey Area: This is second version of the large Radiological Survey Area at Pelham Range. The field contained some 1,000-source wells, which were remotely controlled. The field was on the north and south side of Cane Creek.

e. Pelham Range Radiological Burial Ground: This area is on the north end of the Battle Drill area. Burials may include Cobalt 60 and other radiological waste.

/s/
THOMAS E. MURRELL, P.M.P.

Project Manager

Memorandum for Record

Site Visit Fort McClellan, Main Post and Pelham Range, 27 September 1999.

CELMS-ED-P (200-1c) 27 Sep 1999

MEMORANDUM FOR RECORD

SUBJECT: Site Visit Fort McClellan, Main Post & Pelham Range

1. During 20-23 Sep the following radiological sites were visited:

   a. Radiological Survey Area #1. One possible storage container for a 3.5" Rocket was found. All debris related to radiological survey training has been removed.

   b. T4. The biological training area was partially walked. One expended can of BG Simulant was found.

   c. The flat area just north of the top Iron Mountain was walked. Pin flags from the 1995 Radiological Survey were found. Evidence of radiological burial were not found.

   d. Part of the Anniston Community Center complex was walked. Two possible survey lanes were walked. At the end of the survey lanes approximately eight 4" pipes were found. Some of these were in a debris pile, which had been pushed up by a bulldozer.

   e. The area south of Range I was re-walked. No other signs of training other than the five 4" pipes were found.

   f. The road between Lima Pond and Range K was walked. Training aids such as expended smoke grenades and slap flares were found.

   g. The restricted area in area 9A was walked. No evidence of military use was found.

   h. The area in 2A near Peaceburg, where the 1953 Chemical Exercise partially took place was inspected. Two 3' triangles atop 20' phone poles were found. These may have been associated with the 1953 exercise or part of the Squad Attack Course which operated around 1960.

   i. Range J was inspected. This is the general location of two of the sites used in the 1953 Chemical Exercise. The fencing is around debris left from the exercise. More debris may be present along the wood line of the large open area. It was noted that no trees have grown in the large open area.

   j. Area 8E was inspected for possible use by Anniston Depot for shell tapping. No large open areas were found. If shell tapping did occur it was limited in scope.

/s/
THOMAS E. MURRELL, P.M.P.

Project Manager

Memorandum for Record

Site Visit Fort McClellan, Main Post and Pelham Range, 10 November 1999.

CELMS-ED-P (200-1c) 10 Nov 1999

MEMORANDUM FOR RECORD

SUBJECT: Site Visit Fort McClellan, Main Post & Pelham Range

1. During 1-4 Nov 1999 the following radiological sites were visited:

   a. T4. The west side of the biological training area was extensively walked. Two expended cans of BG Simulant were found. Numerous metal rods with station numbers were found. These rods were ½" in diameter and had a shelf for contaminates.

   b. The northeast corner of the Anniston Community Center complex was extensively walked. Two possible survey lanes were walked. At the end of the survey lanes numerous 4" pipes were found. Three debris piles were found with more 4" pipes sticking out of the pile. Two of the debris piles also had hog wire and barb fencing exposed. Site dynamics suggest that a bulldozer pushed up these piles.

   c. The area north of the grassy area at Range I was walked. Three more 4" pipes were found in a general east-west line. Two of the pipes were erect and one was near the edge of the road, on the west side of Range I.

   d. The eastern portion of Area 10B was walked. Some expended slap flares were discovered in the area.

   e. A Toxic Gas sign was discovered nailed to a tree on the north end of the western edge of Area 10A. The immediate area was walked, on evidence of CWM use was discovered.

   f. The service road between the Toxic Area (10A) and the Rideout Field (Area 24C) was inspected. All signage warning of Toxic Dangers or Radiological Dangers have been removed.

   g. The western end of Graham Drop Zone (Area 21) was inspected. On the northwest corner there is a checkered range limit marker still standing. This limit marker was either for the WWII tank range or the 1950's sub-caliber tank range. The general area that was the site of the WWII Jap Village was also inspected with negative results. On the southeast corner of Graham drop zone a cannibalization yard was inspected. M48 tank turrets and M151 jeeps are present in this area.

   h. Part of Area 5B where the 1953 Chemical Exercise took place was walked with negative results.

   i. The area west of the old landing field in Area 4C was inspected. This area was used as a firing line for a field range in WWII. The actually firing line was not found.

MEMORANDUM FOR RECORD 10 Nov 1999

SUBJECT: Site Visit & Radiological Findings to date

SUBJECT: Site Visit Fort McClellan, Main Post & Pelham Range

j. The area around the old water hole in Area 5C was walked. Training devices such as expended slap flares were discovered. Evidence of the disposal of CWM munitions being disposed of in the water hole could not be confirmed by the visual inspection.

k. Bivouac site B54 was inspected. Training aids such as expended rifle blanks were found.

l. ~~Area~~ 1A was walked for evidence of cratering from explosive ordnance with negative results.

/s/
THOMAS E. MURRELL, P.M.P.

Project Manager

APPENDIX F

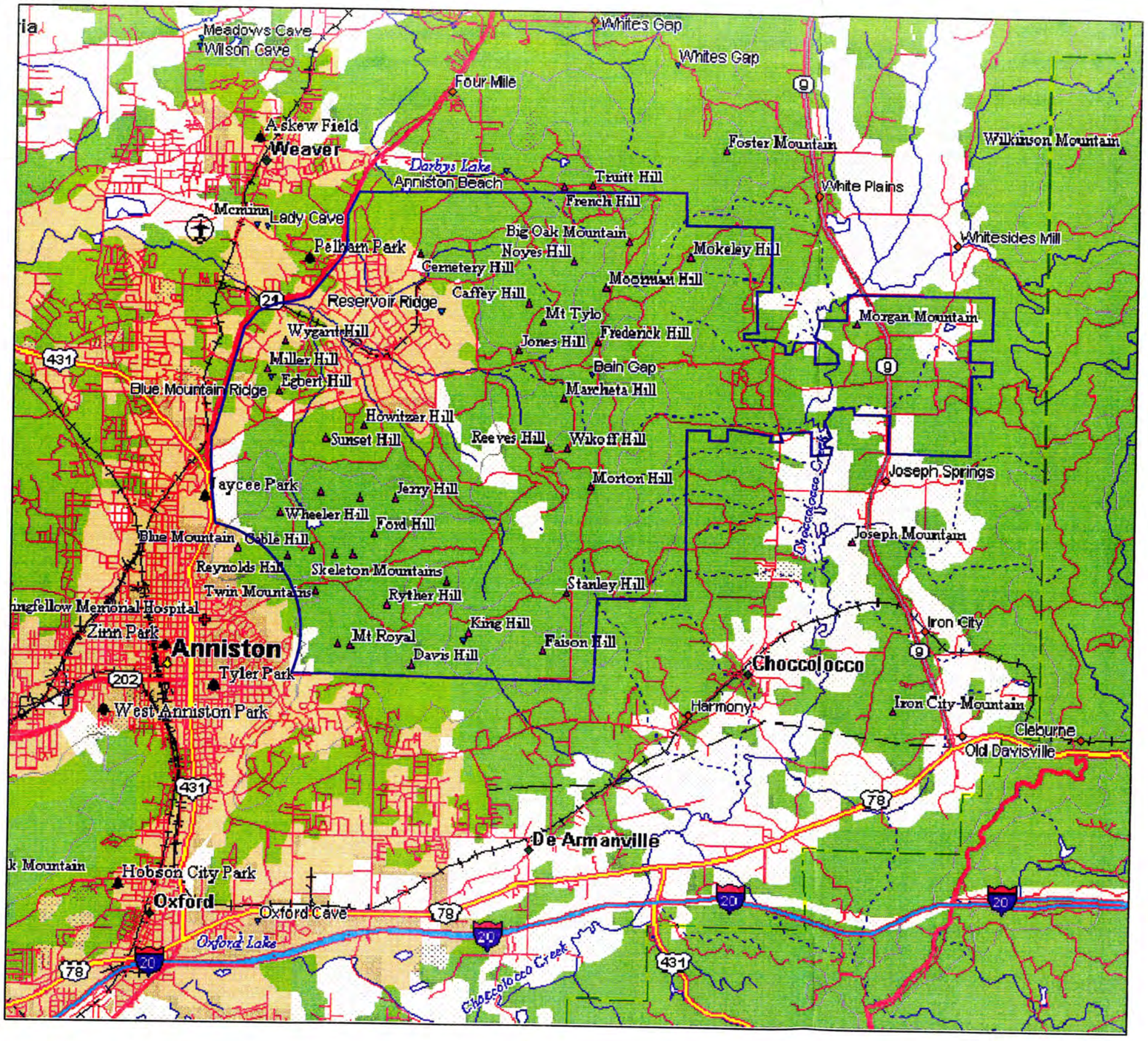
Report Distribution List

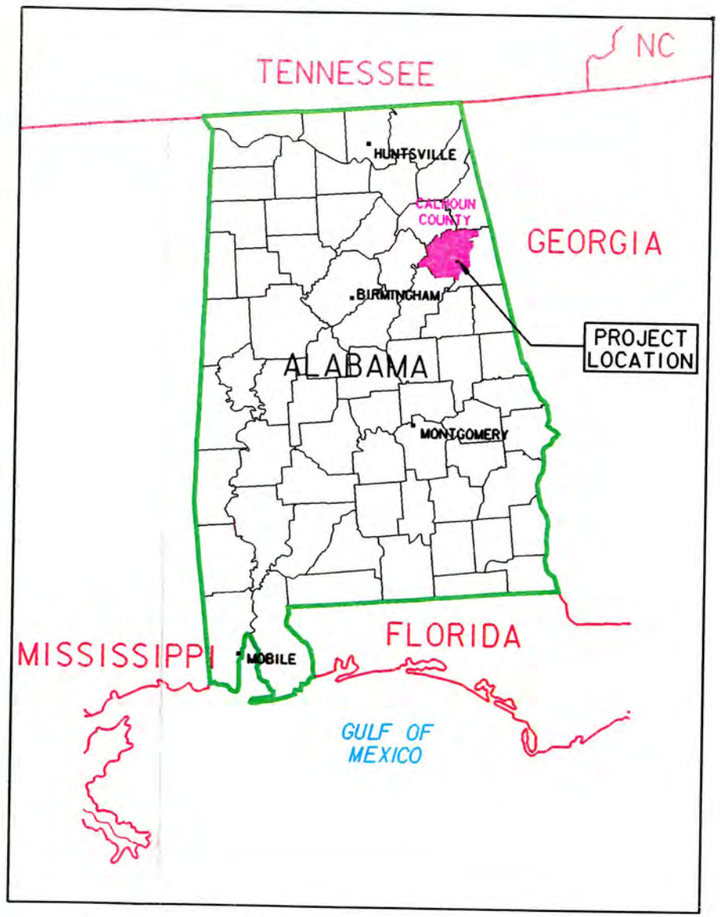
APPENDIX F

FINAL DISTRIBUTION LIST

Addressee	Copies
U.S. Army Garrison ATTN: ATZN-ENV Building 215, 15th Street Fort McClellan, Alabama 36205	13
Alabama Department of Environmental Management Hazardous Waste Branch, Land Division P.O. Box 301463 Montgomery, Alabama 36130-1463	1
Environmental Protection Agency Atlanta Federal Center 61 Forsyth Street, S.W. Atlanta, Georgia 30303-3104	1
U.S. Army Chemical School Health Physics Office ATTN: ATSC-CMA-HP 401 Engineer Loop, Suite 1843 Fort Leonard Wood, Missouri 65473-8926	1
U.S. Army Headquarters, Industrial Operations Command ATTN: AMSIO-DMW Rock Island, Illinois 61299	1
U.S. Nuclear Regulatory Commission Region II Radiation Specialist 61 Forsyth Street, S.W., Suite 23T85 Atlanta, Georgia 30303-3415	1
U.S. Environmental Protection Agency Radiation Specialist Atlanta Federal Center 61 Forsyth Street, S.W. Atlanta, Georgia 30303-3104	1
State of Alabama Department of Public Health Division of Radiation Control The RSA Tower 201 Monroe Street, Suite 700 Montgomery, Alabama 36130-3017	1

REPORT PLATES





LEGEND

SITE LOCATION

N

PLATE I

VICINITY LOCATION MAP

FORT McCLELLAN
CALHOUN COUNTY
ANNISTON, ALABAMA

PROJ. DATE: JUNE 1998	DATE OF MAP: 1995
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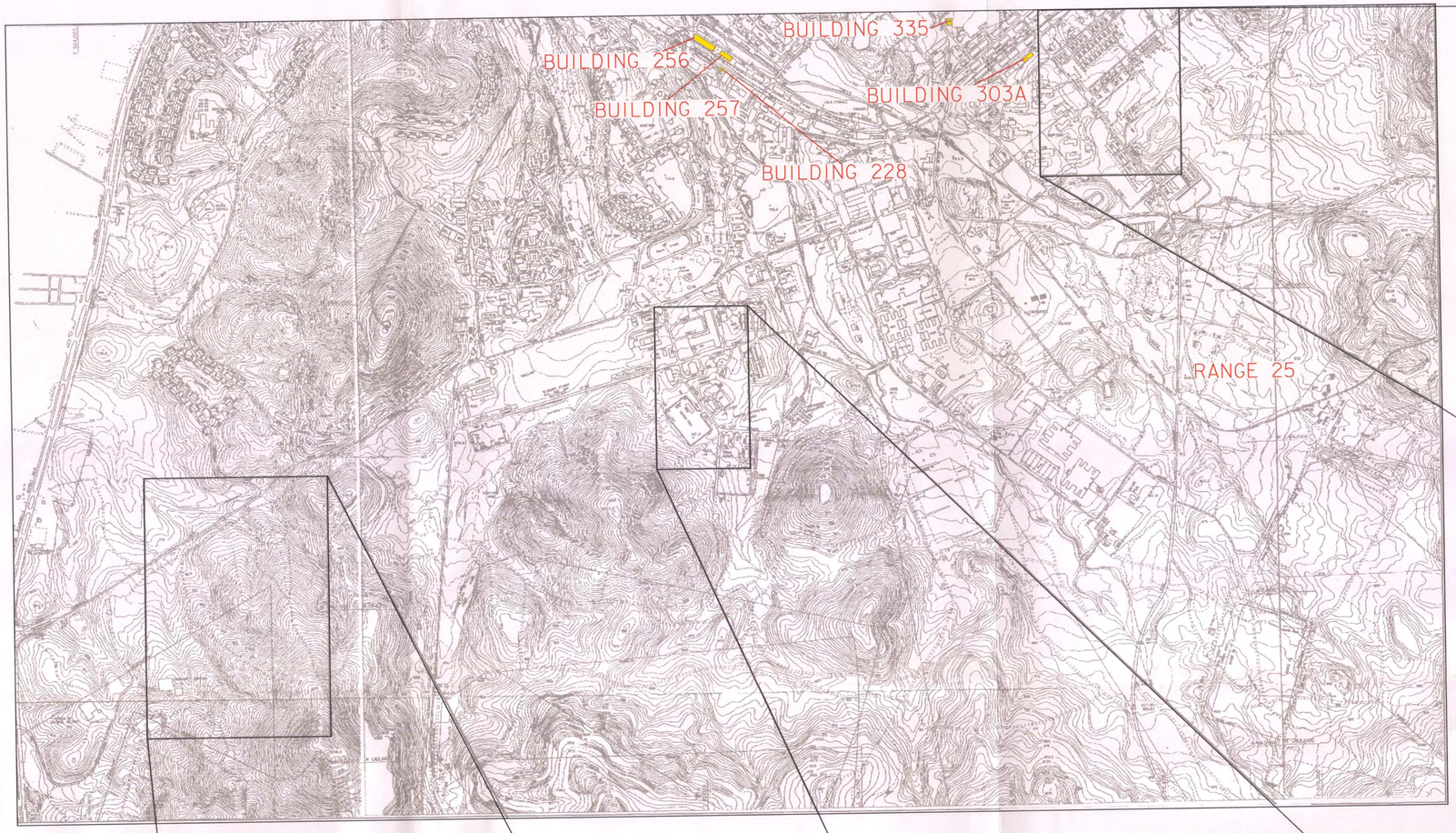

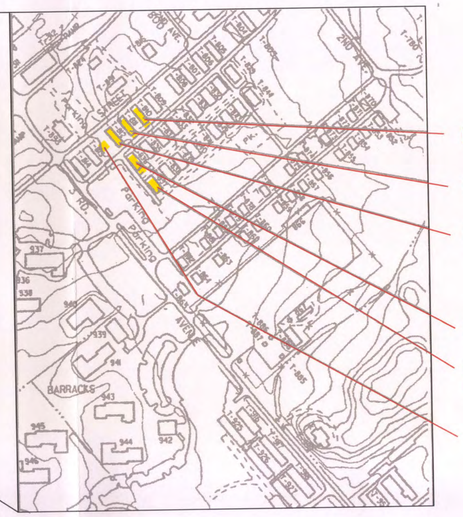

FIGURE 3

NOTE: BUILDINGS T-810, 811, 812, 836, AND 837 ARE "TEMPORARY LABS"

NOTE: BUILDING T-812½ (RADIOACTIVE STORAGE)

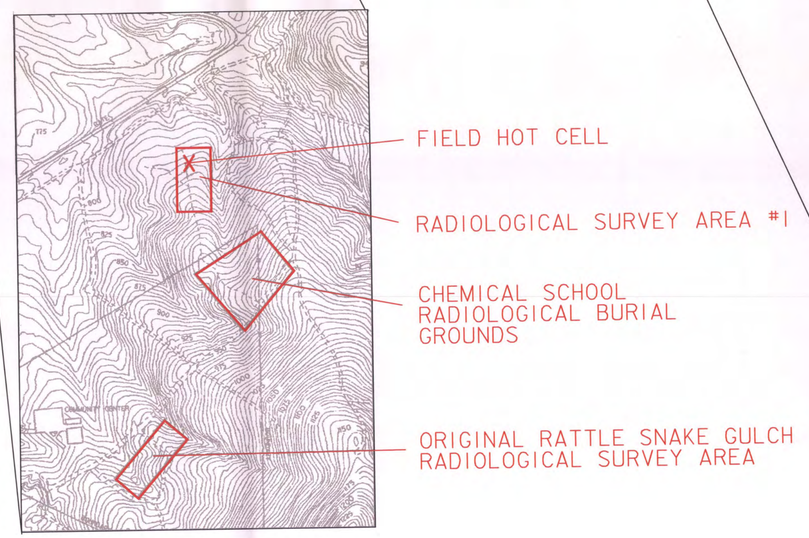

FIGURE 1

FIGURE 2

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NOT TO SCALE

FORT McCLELLAN
RADIOLOGICAL SITES
1951 TO 1999
ANNISTON, ALABAMA
CALHOUN COUNTY
PLATE 2

PROJ. DATE: NOV 1999 | DATE OF MAP: 1993

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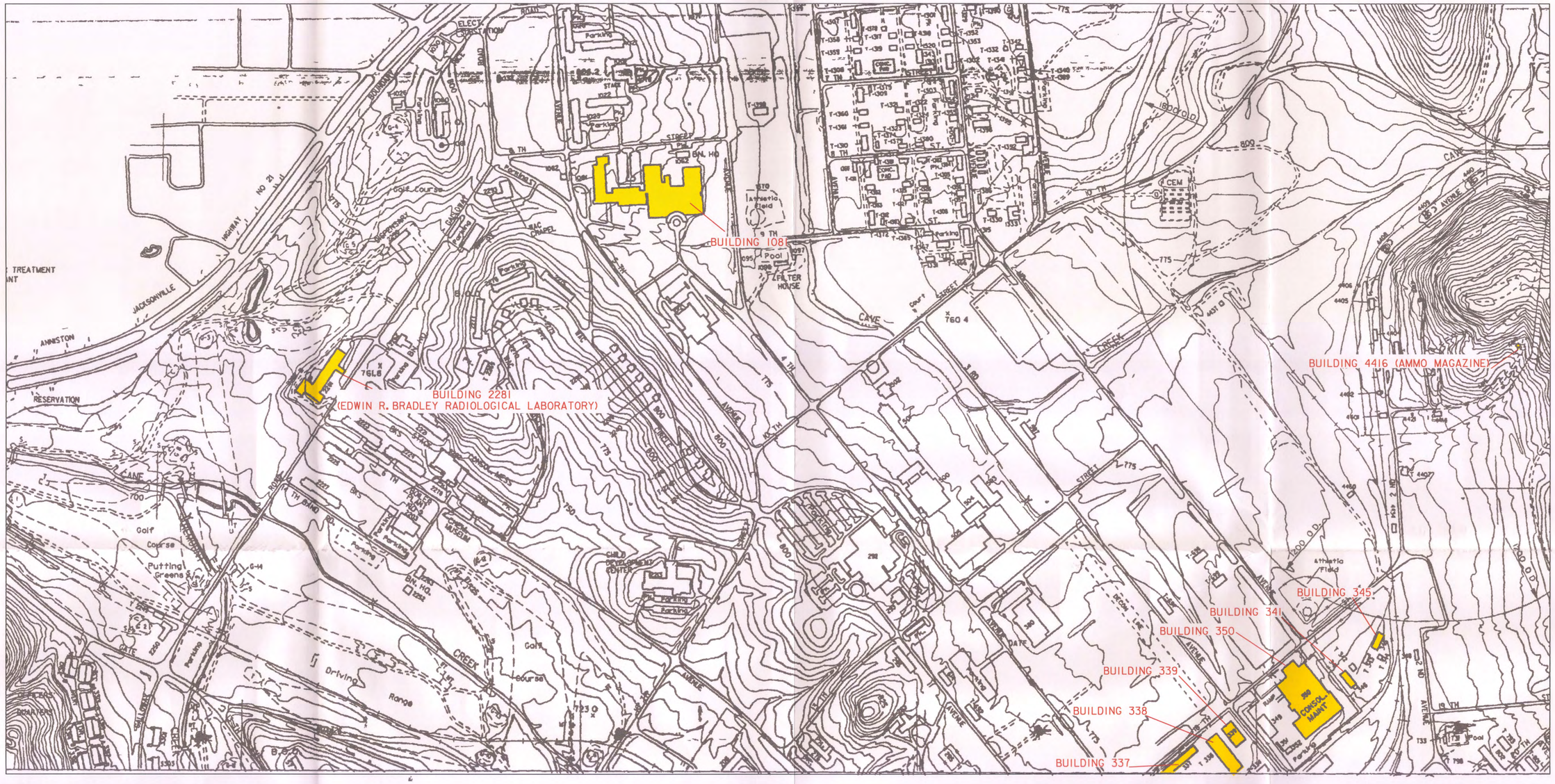

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NOT TO SCALE

FORT McCLELLAN
RADIOLOGICAL SITES
1951 TO 1999
ANNISTON, ALABAMA
CALHOUN COUNTY

PLATE 3

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