



APPLICATION FOR MATERIALS LICENSE

Estimated burden per response to comply with this mandatory collection request: 4.3 hours. Submittal of the application is necessary to determine that the applicant is qualified and that adequate procedures exist to protect the public health and safety. Send comments regarding burden estimate to the FOIA, Privacy, and Information Collections Branch (T-5 F53), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to Infocollections.Resource@nrc.gov, and to the Desk Officer, Office of Information and Regulatory Affairs, NEOB-10202, (3150-0120), Office of Management and Budget, Washington, DC 20503. If a means used to impose an information collection does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to, the information collection.

INSTRUCTIONS: SEE THE APPROPRIATE LICENSE APPLICATION GUIDE FOR DETAILED INSTRUCTIONS FOR COMPLETING APPLICATION. SEND TWO COPIES OF THE ENTIRE COMPLETED APPLICATION TO THE NRC OFFICE SPECIFIED BELOW. *AMENDMENTS/RENEWALS THAT INCREASE THE SCOPE OF THE EXISTING LICENSE TO A NEW OR HIGHER FEE CATEGORY WILL REQUIRE A FEE.

APPLICATION FOR DISTRIBUTION OF EXEMPT PRODUCTS FILE APPLICATIONS WITH:

OFFICE OF FEDERAL & STATE MATERIALS AND
ENVIRONMENTAL MANAGEMENT PROGRAMS
DIVISION OF MATERIALS SAFETY AND STATE AGREEMENTS
U.S. NUCLEAR REGULATORY COMMISSION
WASHINGTON, DC 20555-0001

ALL OTHER PERSONS FILE APPLICATIONS AS FOLLOWS:

IF YOU ARE LOCATED IN:

ALABAMA, CONNECTICUT, DELAWARE, DISTRICT OF COLUMBIA, FLORIDA, GEORGIA,
KENTUCKY, MAINE, MARYLAND, MASSACHUSETTS, NEW HAMPSHIRE, NEW JERSEY,
NEW YORK, NORTH CAROLINA, PENNSYLVANIA, PUERTO RICO, RHODE ISLAND, SOUTH
CAROLINA, TENNESSEE, VERMONT, VIRGINIA, VIRGIN ISLANDS, OR WEST VIRGINIA,

SEND APPLICATIONS TO:

LICENSING ASSISTANCE TEAM
DIVISION OF NUCLEAR MATERIALS SAFETY
U.S. NUCLEAR REGULATORY COMMISSION, REGION I
2100 RENAISSANCE BOULEVARD, SUITE 100
KING OF PRUSSIA, PA 19406-2713

IF YOU ARE LOCATED IN:

ILLINOIS, INDIANA, IOWA, MICHIGAN, MINNESOTA, MISSOURI, OHIO, OR WISCONSIN,
SEND APPLICATIONS TO:

MATERIALS LICENSING BRANCH
U.S. NUCLEAR REGULATORY COMMISSION, REGION III
2443 WARRENVILLE ROAD, SUITE 210
LISLE, IL 60532-4352

ALASKA, ARIZONA, ARKANSAS, CALIFORNIA, COLORADO, HAWAII, IDAHO, KANSAS,
LOUISIANA, MISSISSIPPI, MONTANA, NEBRASKA, NEVADA, NEW MEXICO, NORTH
DAKOTA, OKLAHOMA, OREGON, PACIFIC TRUST TERRITORIES, SOUTH DAKOTA, TEXAS,
UTAH, WASHINGTON, OR WYOMING,

SEND APPLICATIONS TO:

NUCLEAR MATERIALS LICENSING BRANCH
U.S. NUCLEAR REGULATORY COMMISSION, REGION IV
1600 E. LAMAR BOULEVARD
ARLINGTON, TX 76011-4511

PERSONS LOCATED IN AGREEMENT STATES SEND APPLICATIONS TO THE U.S. NUCLEAR REGULATORY COMMISSION ONLY IF THEY WISH TO POSSESS AND USE LICENSED MATERIAL IN STATES SUBJECT TO U.S. NUCLEAR REGULATORY COMMISSION JURISDICTIONS.

1. THIS IS AN APPLICATION FOR (Check appropriate item)

- ☐ A. NEW LICENSE
- ☒ B. AMENDMENT TO LICENSE NUMBER SUC-1593
- ☐ C. RENEWAL OF LICENSE NUMBER _____

2. NAME AND MAILING ADDRESS OF APPLICANT (Include ZIP code)

LTG David D. Halverson; Commander, US Army Installation
Management Command; ATTN: IMSO, 2405 Gun Shed Road,
Fort Sam Houston TX 78234-1223

3. ADDRESS WHERE LICENSED MATERIAL WILL BE USED OR POSSESSED

Fort Benning GA, Fort Bragg NC, Fort Campbell KY, Fort
Carson CO, Fort Gordon GA, Fort Greely AK, Fort Hood TX,
Fort Hunter Liggett CA, Fort Jackson SC, Fort Knox KY, Fort
Polk LA, Fort Riley KS, Fort Sill OK, Joint Base Lewis-
McChord/Yakima Training Center WA, Joint Base McGuire-
Dix-Lakehurst NJ, Schofield Bcks/Pohakuloa Tng Area, HI

4. NAME OF PERSON TO BE CONTACTED ABOUT THIS APPLICATION

Dr. Robert Cherry

BUSINESS TELEPHONE NUMBER

(210) 466-0368

BUSINESS CELLULAR TELEPHONE NUMBER

(210) 313-0352

BUSINESS EMAIL ADDRESS

robert.n.cherry.civ@mail.mil

SUBMIT ITEMS 5 THROUGH 11 ON 8-1/2 X 11" PAPER. THE TYPE AND SCOPE OF INFORMATION TO BE PROVIDED IS DESCRIBED IN THE LICENSE APPLICATION GUIDE.

5. RADIOACTIVE MATERIAL

- a. Element and mass number; b. chemical and/or physical form; and c. maximum amount
which will be possessed at any one time.

6. PURPOSE(S) FOR WHICH LICENSED MATERIAL WILL BE USED.

**7. INDIVIDUAL(S) RESPONSIBLE FOR RADIATION SAFETY PROGRAM AND THEIR
TRAINING EXPERIENCE.**

8. TRAINING FOR INDIVIDUALS WORKING IN OR FREQUENTING RESTRICTED AREAS.

9. FACILITIES AND EQUIPMENT.

10. RADIATION SAFETY PROGRAM.

11. WASTE MANAGEMENT.

**12. LICENSE FEES (Fees required only for new applications, with few exceptions*)
(See 10 CFR 170 and Section 170.31)**

FEE CATEGORY

**AMOUNT
ENCLOSED \$**

13. CERTIFICATION. (Must be completed by applicant) THE APPLICANT UNDERSTANDS THAT ALL STATEMENTS AND REPRESENTATIONS MADE IN THIS APPLICATION ARE BINDING UPON THE APPLICANT.

THE APPLICANT AND ANY OFFICIAL EXECUTING THIS CERTIFICATION ON BEHALF OF THE APPLICANT, NAMED IN ITEM 2, CERTIFY THAT THIS APPLICATION IS PREPARED IN CONFORMITY WITH TITLE 10, CODE OF FEDERAL REGULATIONS, PARTS 30, 32, 33, 34, 35, 36, 37, 39, AND 40, AND THAT ALL INFORMATION CONTAINED HEREIN IS TRUE AND CORRECT TO THE BEST OF THEIR KNOWLEDGE AND BELIEF.

WARNING: 18 U.S.C. SECTION 1001 ACT OF JUNE 25, 1948 62 STAT. 749 MAKES IT A CRIMINAL OFFENSE TO MAKE A WILLFULLY FALSE STATEMENT OR REPRESENTATION TO ANY DEPARTMENT OR AGENCY OF THE UNITED STATES AS TO ANY MATTER WITHIN ITS JURISDICTION.

CERTIFYING OFFICER - TYPED/PRINTED NAME AND TITLE

David D. Halverson, Lieutenant General, USA, Commanding General

SIGNATURE

DATE

20150601

FOR NRC USE ONLY

TYPE OF FEE	FEE LOG	FEE CATEGORY	AMOUNT RECEIVED	CHECK NUMBER	COMMENTS
			\$		
APPROVED BY				DATE	

Supporting Information for NRC Form 313 Application for Materials License

Item 5 Radioactive material:

Element and mass number: uranium (depleted)

Chemical and/or physical: any

Maximum amount that will be possessed at any time: 5700 kg as follows

Installation	Number of rounds	Reference	DU mass (kg) ^a
Fort Benning GA	9700 ^b	(USACE St Louis 2008a)	1843.0
Fort Bragg NC	4212 ^d	(USACE St Louis 2008b)	800.3
Fort Campbell KY	681 ^b	(USACE St Louis 2008c)	129.4
Fort Carson CO	1404 ^d	(USACE St Louis 2008d)	266.8
Fort Gordon GA	135 ^e	(USACE St Louis 2009b)	25.7
Fort Greely AK	93 ⁱ	(USACE St Louis 2008e)	17.7
Fort Hood TX	4038 ^b	(USACE St Louis 2008f)	767.2
Fort Hunter Liggett CA	135 ^f	(USACE St Louis 2009c)	25.7
Fort Jackson SC	135 ^e	(USACE St Louis 2009d)	25.7
Fort Knox KY	3956 ^b	(USACE St Louis 2008g)	751.6
Fort Polk LA	1923 ^c	(USACE St Louis 2008i)	365.4
Fort Riley KS	105 ^b	(USACE St Louis 2008j)	20.0
Fort Sill OK	585 ^d	(USACE St Louis 2009e)	111.2
Joint Base Lewis-McChord/Yakima Training Center WA	1756 ^b	(USACE St Louis 2008h)	333.6
Joint Base McGuire-Dix-Lakehurst NJ	50 ^h	(USACE St Louis 2009a)	9.5
Schofield Barracks/Pohakuloa Training Area HI	714 ^b	(USACE St Louis 2007)	135.7
Total	29622		5,628.2^g

^a Each M101 round contains (3180 ± 25) grains = $(0.2061 \pm .0015)$ kg of molybdenum-DU alloy (USACE St Louis 2011). The molybdenum-DU alloy is 92 percent DU, so each M101 round contains about 0.190 kg of DU.

^b Value based on actual number of rounds shipped to installation according to shipping records.

^c Shipping records were not available. Number of rounds is based on estimated size of training classes, number of years used, and training protocols.

Supporting Information for NRC Form 313 Application for Materials License

^d Shipping records were not available. Number of rounds is based on number of M28 squads present on the installation, number of years used, and training protocols.

^e The archive search report for this installation did not provide a value for the number of M101 rounds fired. However, it said that M101 rounds might have been fired during firepower demonstrations. Therefore, the estimated value is based on the estimated number of rounds used in firepower demonstrations at Fort Polk (USACE St Louis 2008i).

^f The Fort Hunter-Liggett archive search report says, "The Davy Crockett Weapon System fired at identified ranges were [sic] either brought there by Fort Ord units conducting firepower demonstrations for recruits or by other units training at Fort Hunter Liggett." [The main document for the archive search reports (USACE St Louis 2011) says, "...no evidence was found indicating that the 20mm M101 ... were fired at (Fort Ord)"] While the number of M101 rounds fired at Fort Hunter Liggett is unknown, an estimated value of 135 could be based on the estimated number of rounds used in firepower demonstrations at Fort Polk (USACE St Louis 2008i). However, since "other units" apparently may have brought these rounds from other installations, use of the number 135 for Fort Hunter Liggett likely is counting these rounds twice. Nevertheless, as a conservative measure, we use 135 as the estimated number of rounds fired at Fort Hunter Liggett.

^g Discrepancy is due to round off.

^h The Fort Dix archive search report (USACE St Louis 2009a) says, "Less than 50 Cartridges, 20mm Spotting M101 were fired at Fort Dix."

ⁱ A 1962 Lake City Army Ammunition Plant document said that 39.0 pounds of DU "in the form of finished XM101 cartridges" were at Fort Greely. This is equivalent to 17.7 kg DU or about 93 M101 spotting rounds.

Item 6 Purposes(s) for which licensed material will be used:

Activities necessary for the possession and management of depleted uranium (DU) M101 spotting rounds and fragments as a result of previous use of depleted uranium at US Army installations. These activities include:

- Activities necessary to maintain the facilities in a safe condition and to prevent the unauthorized removal of licensed material from the authorized places of use;
- Activities necessary to determine the presence of licensed material at US Army facilities;
- Activities necessary to monitor the radiological environmental conditions in and around the authorized places of use to determine if licensed material is being transported in the environment; and
- Activities necessary for the packaging, transport and disposal of incidentally identified licensed material to a licensed/permitted disposal facility.

Item 7 Individual(s) responsible for radiation safety program and their training experience:

The License Radiation Safety Officer will have the following education, training, and experience:

- A Bachelors degree in the physical sciences, industrial hygiene, or engineering from an accredited college or university or an equivalent combination of training and relevant experience in radiological protection. Two years of relevant experience are generally considered equivalent to one year of academic study.

- At least one year of work experience in applied health physics, industrial hygiene, or similar work relevant to radiological hazards associated with site remediation. This experience should involve actually working with radiation detection and measurement equipment, not strictly administrative or “desk” work.
- A thorough knowledge of the proper application and use of all health physics equipment used for depleted uranium and its progeny, the chemical and analytical procedures used for radiological sampling and monitoring, methodologies used to calculate personnel exposure to depleted uranium and its daughters, and a thorough understanding of how the depleted uranium was used at the location and how the hazards are generated and controlled.

Item 8 Training for individuals working in or frequenting restricted areas

See Section 20 of the Radiation Safety Plan, which is attachment 1.

Item 9 Facilities and equipment

See attachment 2 for the location of each M101 spotting round impact area on the sixteen installations listed in item 3. The impact areas are in Army training ranges. Army training ranges are open areas with no habitable structures but may contain training materials, such as targets and associated supporting materials.

Item 10 Radiation Safety Program

Attachment 1 contains the Radiation Safety Plan that will apply for all sites.

Item 11 Waste management

See Section 18 in the Radiation Safety Plan, which is attachment 1.

Other supporting information

Attachment 3 Decommissioning Funding Plan for Davy Crockett M101 Depleted Uranium Impact Areas at M101 DU-affected Ranges with “Statement of Intent”

This includes cost estimates for all M101 DU-affected installations individually and collectively. It also includes the signed “Statement of Intent” to request funding.

Attachment 4 Programmatic Approach for Preparation of Site-Specific Environmental Radiation Monitoring Plans

Installation-specific environmental radiation monitoring plans will be prepared in accordance with the programmatic approach contained in this document.

Attachment 5 Bounding Calculations Using RESRAD 7.0 and RESRAD-OFFSITE 3.1

This document contains results of calculations that support assertions in attachment 4. We include output files for these calculations separately in electronic form.

Attachment 6 Physical Security Plan

This plan applies to all licensed sites.

Attachment 7 Proposed Changes to Conditions of NRC License #SUC-1593

NRC approval of this license amendment application will require changes to existing license conditions.

Attachment 8 Arguments against Air Sampling During HE Fire into RCAs

The Army requests the NRC not to require air sampling during Army use of high explosives (HE) in RCAs. We provide four mostly independent arguments supporting this request. (In preparing other documents, such as attachments 1, 4, and 7, the Army assumed that the NRC accepts this request and puts no restraints on Army use of HE in RCAs.)

Attachment 9 Fort Carson Titus and Sergeants Roads Target Zones/Impact Areas

This document contains our request that the NRC not include Fort Carson Titus and Sergeants Roads Target Zones/Impact Areas on the license as an RCA. It also explains why the Army makes this request.

Bibliography

Douglas, Thomas A., Marianne Walsh, Jay Clausen, and Charles M. Collins. *Quantification of trace metals in soils at the Colorado, KD, and Georgia Small Arms Ranges on Donnelly Training Area East, Alaska*. Cold Regions Research and Engineering Laboratory, U.S. Army Engineer Research and Development Center, Fort Wainwright, Alaska: U.S. Army Engineer Research and Development Center, 2014.

USACE St Louis. *Installation Specific Archive Search Report on the Use of Cartridge, 20MM Spotting M101 Davy Crockett Light Weapon M28 at Fort Benning, Georgia*. St Louis, Missouri: US Army Corps of Engineers, St Louis District, 2008a.

USACE St Louis. *Installation Specific Archive Search Report on the Use of Cartridge, 20MM Spotting M101 Davy Crockett Light Weapon M28 at Fort Bragg, North Carolina*. St Louis, Missouri: US Army Corps of Engineers, St Louis District, 2008b.

USACE St Louis. *Installation Specific Archive Search Report on the Use of Cartridge, 20MM Spotting M101 Davy Crockett Light Weapon M28 at Fort Campbell, Kentucky*. St Louis, Missouri: US Army Corps of Engineers, St Louis District, 2008c.

USACE St Louis. *Installation Specific Archive Search Report on the Use of Cartridge, 20MM Spotting M101 Davy Crockett Light Weapon M28 at Fort Carson, Colorado*. St Louis, Missouri: US Army Corps of Engineers, St Louis District, 2008d.

USACE St Louis. *Installation Specific Archive Search Report on the Use of Cartridge, 20mm Spotting M101 Davy Crockett Light Weapon M28 at Fort Dix, New Jersey*. St Louis, Missouri: US Army Corps of Engineers, St Louis District, 2009a.

USACE St Louis. *Installation Specific Archive Search Report on the Use of Cartridge, 20mm Spotting M101 Davy Crockett Light Weapon M28 at Fort Dix, New Jersey*. St Louis, Missouri: US Army Corps of Engineers, St Louis District, 2009.

USACE St Louis. *Installation Specific Archive Search Report on the Use of Cartridge, 20MM Spotting M101 Davy Crockett Light Weapon M28 at Fort Gordon, Georgia*. St Louis, Missouri: US Army Corps of Engineers, St Louis, 2009b.

USACE St Louis. *Installation Specific Archive Search Report on the Use of Cartridge, 20mm Spotting M101 Davy Crockett Light Weapon M28 at Fort Greely, Alaska*. St Louis, Missouri: US Army Corps of Engineers, St Louis District, 2008e.

USACE St Louis. *Installation Specific Archive Search Report On the Use of Cartridge, 20MM Spotting M101 Davy Crockett Light Weapon M28 at Fort Hood, Texas*. St Louis, Missouri: US Army Corps of Engineers, St Louis District, 2008f.

USACE St Louis. *Installation Specific Archive Search Report on the Use of Cartridge, 20MM Spotting M101 Davy Crockett Light Weapon M28 at Fort Hunter Liggett, California*. St Louis, Missouri: US Army Corps of Engineers, St Louis District, 2009c.

USACE St Louis. *Installation Specific Archive Search Report on the Use of Cartridge, 20MM Spotting M101 Davy Crockett Light Weapon M28 at Fort Jackson, North Carolina*. St Louis, Missouri: US Army Corps of Engineers, St Louis District, 2009d.

USACE St Louis. *Installation Specific Archive Search Report on the Use of Cartridge, 20MM Spotting M101 Davy Crockett Light Weapon M28 at Fort Knox, Kentucky*. St Louis, Missouri: US Army Corps of Engineers, St Louis District, 2008g.

USACE St Louis. *Installation Specific Archive Search Report on the Use of Cartridge, 20MM Spotting M101 Davy Crockett Light Weapon M28 at Fort Lewis and Yakima Training Center, Washington*. St Louis, Missouri: US Army Corps of Engineers, St Louis District, 2008h.

USACE St Louis. *Installation Specific Archive Search Report on the Use of Cartridge, 20MM Spotting M101 Davy Crockett Light Weapon M28 at Fort Polk, Louisiana*. St Louis, Missouri: US Army Corps of Engineers, St Louis District, 2008i.

USACE St Louis. *Installation Specific Archive Search Report on the Use of Cartridge, 20MM Spotting M101 Davy Crockett Light Weapon M28 at Fort Riley, Kansas*. St Louis, Missouri: US Army Corps of Engineers, St Louis District, 2008j.

USACE St Louis. *Installation Specific Archive Search Report on the Use of Cartridge, 20MM Spotting M101 Davy Crockett Light Weapon M28 at Fort Sill, Oklahoma*. St Louis, Missouri: US Army Corps of Engineers, St Louis District, 2009e.

USACE St Louis. *Installation Specific Archive Search Report: Use of Cartridge, 20mm Spotting M101 at Schofield Barracks and Associated Training Areas*. St Louis, Missouri: US Army Corps of Engineers, St Louis District, 2007.

USACE St Louis. *Project Archive Search Report: Use of Cartridge, 20mm Spotting M101*. St Louis, Missouri: US Army Corps of Engineers, St Louis District, 2011.

Attachments

1. Radiation Safety Plan
2. M101 Impact Areas (Radiation Control Areas)
3. Decommissioning Funding Plan for Davy Crockett M101 Depleted Uranium Impact Areas at M101 DU-affected Ranges with "Statement of Intent"
4. Programmatic Approach for Preparation of Site-Specific Environmental Radiation Monitoring Plans
5. Bounding Calculations Using RESRAD 7.0 and RESRAD-OFFSITE 3.1
6. Physical Security Plan
7. Proposed Changes to Conditions of NRC License #SUC-1593
8. Arguments against Air Sampling During HE Fire into RCAs
9. Fort Carson Titus and Sergeants Roads Target Zones/Impact Areas

Attachment 1

Radiation Safety Plan

Radiation Safety Plan for IMCOM Ranges Affected by M101 Davy Crockett Spotting Round Depleted Uranium

27 May 2015

Contents

1 Introduction	1-1
1.1 Background	1-1
1.2 Purpose	1-2
1.3 Scope	1-2
1.4 Applicability	1-2
1.5 The unexpected and the unanticipated	1-2
2 Radiation Safety Organization and Responsibilities	2-4
2.1 US Army Installation Management Command Commander	2-4
2.1.1 Duties	2-4
2.1.2 Change of the IMCOM commander	2-4
2.2 US Army Garrison Commander	2-4
2.3 License Radiation Safety Officer	2-4
2.3.1 Qualifications	2-5
2.3.1.2. Health physics experience	2-5
2.3.1.3. Specialized knowledge	2-5
2.3.2 Duties	2-5
2.3.3 Authority	2-6
2.3.4 Change of the License RSO	2-7
2.4 Garrison RSO	2-7
2.4.1 Qualifications	2-7
2.4.2 Duties	2-8
2.4.3 Authority	2-9
2.4.4 Change of the Garrison RSO	2-9
2.5 Personnel in the RCA	2-9
2.5.1 Training	2-9
2.5.2 Responsibilities	2-9
2.5.3 Authority	2-10
2.6 Authorized visitors	2-10
3 Radiation Control Areas	3-1
3.1 Identification	3-1
3.2 Changes to RCAs	3-1
3.3 DU removal	3-1
4 Range Activities Authorized in RCAs	4-1
4.1 Unexploded ordnance in RCAs	4-1
4.2 Unauthorized range activities	4-1
5 Radiation Safety Principles	5-1
5.1 Justification	5-1
5.2 Optimization	5-1
5.3 Individual dose and risk limits	5-1
6 Radiation Safety Standards	6-1
6.1 Individuals entering the RCA	6-1
6.2 Surface contamination	6-1
6.3 Declared pregnant worker	6-1
6.4 Dose to individual members of the public	6-2

Radiation Safety Plan for IMCOM Ranges Affected by M101 Davy Crockett Spotting
Round Depleted Uranium

7 Dosimetry.....	7-1
8 Bioassay	8-1
9 Personnel Protective Equipment.....	9-1
10 Respiratory Protection	10-1
11 Contamination Surveys.....	11-1
11.1 Instrument scanning.....	11-1
11.1.1 Personnel	11-1
11.1.2 Equipment and vehicles	11-1
11.2 Documentation	11-1
11.3 Swipe tests.....	11-2
11.4 Reporting results to workers.....	11-2
12 Environmental Monitoring	12-1
12.1 Environmental radiation monitoring.....	12-1
12.2 Drinking water	12-1
13 Inventory	13-1
14 Posting Requirements.....	14-1
14.1 "CAUTION, RADIOACTIVE MATERIAL" signs	14-1
14.2 Radiation area.....	14-1
14.3 NRC-required postings.....	14-1
14.3.1 NRC Form 3, "Notice to Employees"	14-2
14.3.2 Other notices to workers	14-2
14.3.3 Notices of violation	14-2
15 Access Control.....	15-1
15.1 RCA access	15-1
15.2 Installation training area access	15-1
16 Markings on Containers and Equipment.....	16-1
17 Instrumentation	17-1
17.1 Essential instruments	17-1
17.2 Instrument calibration and maintenance.....	17-1
17.3 Minimum detectable concentrations.....	17-1
17.3.1 Static minimum detectable concentrations	17-1
17.3.2 Scan minimum detectable concentrations	17-2
18 Radioactive Waste	18-1
19 Program Audits	19-1
19.1 Purpose of annual audit	19-1
19.2 Guide for annual audit.....	19-1
19.3 Sample checklist	19-3
20 Training.....	20-1
20.1 Frequency of Training	20-1
20.2 Training Topics.....	20-1
20.2.1 General Radiation Safety Topics.....	20-1
20.2.2 RCA-Specific Radiation Safety Topics	20-2
20.3 Training Documentation	20-2
21 Recordkeeping.....	21-1
21.1 Garrison Documentation	21-1
21.2 Radioactive Material License Documentation	21-1

Radiation Safety Plan for IMCOM Ranges Affected by M101 Davy Crockett Spotting Round Depleted Uranium

22 Emergency Planning	22-1
22.1 General	22-1
22.2 Radiological Emergencies	22-1
22.3 Non-Radiological Emergencies	22-1
23 Standard Operating Procedures	23-1

Table

Table 6-1 Acceptable surface contamination levels	6-1
Table 6-2 Comparison of regulatory standards to corresponding calculated maximum value using RESRAD 7.0 and RESRAD-OFFSITE 3.1	6-2

Figures

Figure 1-1 Davy Crockett M101 spotting round	1-3
Figure 14-1 "CAUTION, RADIOACTIVE MATERIAL" sign	14-2
Figure 17-1 Ludlum Model 44-9 Pancake G-M Detector.....	17-3

Abbreviations and Acronyms

²³⁴ U	uranium-234
²³⁵ U	uranium-235
²³⁸ U	uranium-238
AEC	US Army Environmental Command
ALARA	as low as reasonably achievable
CFR	Code of Federal Regulations
cm	centimeter
dpm	disintegration per minute
DPW	declared pregnant worker
DU	depleted uranium
EOD	explosive ordnance disposal
EPA	US Environmental Protection Agency
h	hour
IMCOM	US Army Installation Management Command
m	meter
MDC	minimum detectable concentration
MEDCOM	US Army Medical Command
mL	milliliter
mrem	millirem
NRC	US Nuclear Regulatory Commission
PPE	personal protective equipment
RCA	Radiation Controlled Area
RSO	Radiation Safety Officer
RSP	Radiation Safety Plan
SOP	standard operating procedures

Radiation Safety Plan for IMCOM Ranges Affected by M101 Davy Crockett Spotting Round Depleted Uranium

TEDE	total effective dose equivalent
USAG	US Army Garrison
UXO	unexploded ordnance
μCi	microcurie

1 Introduction

This Radiation Safety Plan (RSP) is for use when personnel enter, work in, and leave areas on IMCOM ranges that Davy Crockett M101 spotting rounds may have affected (Figure 1-1). This RSP provides guidance and instructions to help assure compliance with US Nuclear Regulatory Commission (NRC) regulations and license conditions.

The M101 spotting round contains depleted uranium (DU). The License Radiation Safety Officer (RSO) controls the affected areas as radiation control areas (RCAs)¹ for radiation safety purposes. See Section 3.

The License RSO can make changes to this RSP only with prior NRC approval, except that the License RSO may correct minor typographical and grammatical errors.

1.1 Background

Depleted uranium is a byproduct of uranium enrichment, part of the process of manufacturing fuel for nuclear power plants. When uranium is *enriched* in the fissile² uranium-235 (²³⁵U) isotope, the leftover uranium is *depleted* in ²³⁵U.³ DU is useful in certain commercial and military applications because of its high density, which is about twice the density of lead. It is slightly radioactive, but it also poses some chemical toxicity danger to the kidneys if ingested in sufficient quantities, for example, by inhaling DU-laden dust or drinking DU-contaminated water.

The M101 spotting round was a 20-millimeter low-speed projectile, weighing approximately one pound⁴ that the Army used as part of the M28 Davy Crockett weapon system from 1960 to 1968. The M28 Davy Crockett weapon system was classified to some extent in the 1960s, and early records of its use were guarded.

In 2005, the Army discovered tail assemblies from the M101 spotting round during range clearance before construction of a Battle Area Complex at the Schofield Barracks training range in Hawaii. The Army then began investigating various sites where the M101 spotting round may have been used. Characterization studies have determined

¹ The Army's intends that an RCA is the same as what the NRC calls a "restricted area." Title 10 CFR Part 20, §20.1003 defines "restricted area" as an area, access to which is limited by the licensee for the purpose of protecting individuals against undue risks from exposure to radiation and radioactive materials.

² A *fissile* nuclide is a nuclide that is capable of undergoing fission after capturing low-energy thermal (slow) neutrons. This definition excludes natural uranium and DU that have not been irradiated or have only been irradiated in thermal reactors.

³ Uranium-234 (²³⁴U) is enriched or depleted as well in enriched uranium and DU, respectively, but it is not fissile.

⁴ The DU content in a single M101 spotting round was 0.190 kilogram.

that NRC-licensable quantities of DU in the form of M101 fragments exist at several IMCOM sites.⁵

1.2 Purpose

NRC regulations required the US Army Installation Management Command (IMCOM) to submit a license application for the possession of DU. The NRC has stated, "Routine Army activities that would occur within the radiation control area of any of the Davy Crockett DU sites ... require the operation of a radiation safety program approved by the NRC via a license."⁶ This RSP meets that requirement for an NRC-approved radiation safety program.

The purpose of this RSP is to address radiation safety during performance of routine range activities in RCAs and other activities involving M101 DU on IMCOM ranges. The goals are to protect the health and safety of Army personnel and the public; protect the site environment; and meet all applicable Federal, Department of Defense, and Army regulations.

1.3 Scope

This RSP describes the RCA, defines the roles and responsibilities of supporting radiation safety personnel, and explains the radiation safety controls for use during performance of routine range activities in RCAs and performance of any other activities involving M101 DU on IMCOM ranges.

1.4 Applicability

The requirements of this plan are applicable to all personnel, including members of the public, who enter an RCA.

Requirements of this plan are in addition to, not in lieu of, any and all other safety requirements, especially those related to unexploded ordnance (UXO) in or around RCAs.

1.5 The unexpected and the unanticipated

While all radiation safety contingencies are intended to be addressed by this plan, something unexpected or unanticipated may arise. If this occurs, the Garrison RSO will promptly establish appropriate procedures and then inform the License RSO.

⁵ These sites are on training ranges at Schofield Barracks/Pohakuloa Training Area HI, Fort Knox KY, Joint Base Lewis-McChord/Yakima Training Center WA, Fort Riley KS, Fort Polk LA, Fort Benning GA, Fort Campbell KY, Fort Bragg NC, Fort Carson CO, Fort Gordon GA, Fort Hood TX, Fort Hunter Liggett CA, Fort Jackson SC, Fort Sill OK, Fort Dix NJ, and Fort Greeley AK.

⁶ "Meeting Report, November 16, 2010." Rockville, Maryland, US Nuclear Regulatory Commission, 2010 (ADAMS accession number ML103360437).

Radiation Safety Plan for IMCOM Ranges Affected by M101 Davy Crockett Spotting Round Depleted Uranium

The License RSO will inform the NRC as Title 10, Code of Federal Regulations (CFR), Part 20, Subpart M, requires.

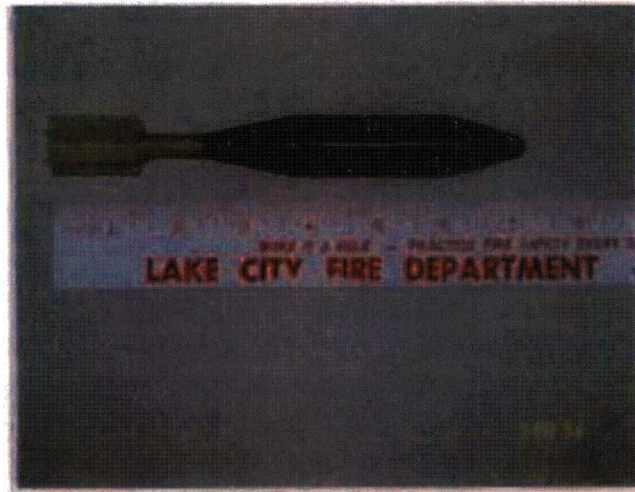


Figure 1-1 Davy Crockett M101 spotting round

2 Radiation Safety Organization and Responsibilities

2.1 US Army Installation Management Command Commander

2.1.1 Duties

As the NRC M101 DU license holder, the IMCOM Commander is responsible for:

- Radiation safety for, security of, and control of M101 spotting round DU
- Completeness and accuracy of the radiation safety records and all information provided to the NRC
- Knowledge about the contents of the license and application
- Compliance with current NRC regulations and the licensee's operating and emergency procedures
- Commitment to provide adequate resources (including space, equipment, personnel, time, and, if needed, contractors) to the radiation safety program to ensure that the public and personnel that enter an RCA are protected from radiation hazards and meticulous compliance with regulations is maintained
- Selection and assignment of a qualified individual to serve as the License RSO with responsibility for the overall radiation safety program
- Prohibition against discrimination of employees engaged in protected activities
- Commitment to provide information to employees regarding the NRC's employee protection and deliberate misconduct provisions
- Obtaining NRC's prior written consent before transferring control of the license

2.1.2 Change of the IMCOM commander

The License RSO will inform the NRC whenever a change of the IMCOM commander (that is, the "certifying officer" in item 13 of NRC Form 313, "Application for Material License") occurs by submitting a new NRC Form 313.

2.2 US Army Garrison Commander

The Garrison Commander is responsible to the IMCOM Commander for assuring compliance with requirements of NRC regulations and license conditions (including this RSP) in RCAs on the garrison.

The Garrison Commander will select and assign a qualified individual to serve as the Garrison RSO with responsibility to both the Garrison Commander and the License RSO for garrison compliance with NRC regulations and license conditions regarding M101 DU on installation ranges.

2.3 License Radiation Safety Officer

The License RSO is responsible to the IMCOM Commander for the development, implementation, and overall administration of this RSP. He is also responsible to both the IMCOM Commander and the NRC for assuring and monitoring compliance with NRC regulations and license conditions for M101 DU on IMCOM ranges.

2.3.1 Qualifications

The License RSO will have the following education, training, and experience:

2.3.1.1. Education

A Bachelors degree in the physical sciences, industrial hygiene, or engineering from an accredited college or university or an equivalent combination of training and relevant experience in radiological protection. Two years of relevant experience are generally considered equivalent to one year of academic study.

2.3.1.2. Health physics experience

At least one year of work experience in applied health physics, industrial hygiene, or similar work relevant to radiological hazards associated with site remediation. This experience should involve actually working with radiation detection and measurement equipment, not strictly administrative or “desk” work.

2.3.1.3. Specialized knowledge

A thorough knowledge of the proper application and use of all health physics equipment used for DU and its progeny, the chemical and analytical procedures used for radiological sampling and monitoring, methodologies used to calculate personnel exposure to DU and its progeny, and a thorough understanding of how DU was used at the location and how the hazards are generated and controlled.

2.3.2 Duties

The License RSO will:

- Coordinate with appropriate personnel as necessary to assure that routine range activities in RCAs comply the requirements of this RSP
- Provide recommendations to the Garrison RSO and other appropriate personnel for the control and, if possible, elimination of existing and potential radiological hazards
- Maintain documentation that demonstrates that the dose to individual members of the public does not exceed the limit specified in 10 CFR Part 20, § 20.1301
- Ensure security of radioactive material
- Ensure proper posting of documents required by 10 CFR Part 19, § 19.11 and by 10 CFR Part 21, § 21.6
- Ensure that radiation exposures are as low as reasonably achievable (ALARA)
- Oversee all activities involving DU, including monitoring and surveys
- Act as liaison with NRC and other regulatory authorities
- Provide necessary information on all aspects of radiation safety to personnel at all levels of responsibility, pursuant to 10 CFR Parts 19 and 20, and any other applicable regulations
- Conduct training and otherwise instruct personnel in the proper procedures
- Supervise and coordinate the radioactive waste disposal program, including recordkeeping on waste storage and disposal records.
- Oversee the storage of radioactive waste

Radiation Safety Plan for IMCOM Ranges Affected by M101 Davy Crockett Spotting Round Depleted Uranium

- Maintain an inventory of all radioisotopes possessed under the license⁷
- Immediately terminate any unsafe condition or activity that is found to be a threat to public health and safety or property
- Maintain other records not specifically designated above, for example, records of receipts, transfers, and surveys as required by 10 CFR Part 20, Subpart L, "Records"
- Hold periodic meetings with, and provide reports to, licensee management
- Perform periodic audits of the radiation safety program to ensure that the licensee is complying with all applicable NRC regulations and the terms and conditions of the license, the content and implementation of the radiation safety program to achieve occupational doses⁸ and doses to members of the public that are ALARA in accordance with 10 CFR Part 20, § 20.1101, and required records are maintained.
- Ensure that the results of audits, identification of deficiencies, and recommendations for change are documented, maintained for at least 3 years, and provided to management for review; ensure that prompt action is taken to correct deficiencies
- Ensure that the audit results and corrective actions are communicated to all affected personnel
- Ensure that all incidents, accidents, and personnel exposure to radiation in excess of ALARA or Part 20 limits are investigated and reported to NRC and other appropriate authorities, if required, within the required time limits
- Maintain understanding of and up-to-date copies of NRC regulations, the license, revised licensee procedures, and ensure that the license is amended whenever there are changes in licensed activities, responsible individuals, or information or commitments provided to NRC during the licensing process

2.3.3 Authority

The License RSO has authority to:

- Directly contact personnel of IMCOM Headquarters, IMCOM Regions, IMCOM garrisons, and the Army Environmental Command (AEC) in the performance of the License RSO duties⁹

⁷ The amount of DU in any particular RCA is not known. The Army provided conservative estimates to the NRC in its license application documents.

⁸ From 10 CFR Part 20, § 20.1003, *occupational dose* means the dose received by an individual in the course of employment in which the individual's assigned duties involve exposure to radiation or to radioactive material from licensed and unlicensed sources of radiation, whether in the possession of the licensee or other person. Occupational dose does not include doses received from background radiation, from any medical administration the individual has received, from exposure to individuals administered radioactive material and released under 10 CFR Part 35, § 35.75, from voluntary participation in medical research programs, or as a member of the public.

⁹ HQ IMCOM Operations Order 11-302, Delegation of Authority to Nuclear Regulatory Commission (NRC) License Radiation Safety Officer (RSO) (U), 132138Z Apr 11

- Task personnel of IMCOM Headquarters, IMCOM Regions, IMCOM garrisons, and the AEC within their capabilities and resources in order to maintain compliance with NRC regulations and license conditions⁹
- Immediately stop any operation involving the use of source material in which health and safety may be compromised or may result in non-compliance with NRC requirements
- Temporarily suspend individuals from field activities for infractions against the RSP pending consideration by the Garrison Commander

2.3.4 Change of the License RSO

The IMCOM Commander will notify the NRC within 30 days by sending NRC Form 313, "Application for Material License," when he or she appoints a new License RSO. The appointment is subject to the approval of the NRC.

2.4 Garrison RSO

The Garrison RSO represents both the Garrison Commander and the License RSO in the day-to-day radiation safety operations and oversight during routine range activities. The Garrison RSO will maintain records of radiation safety activities in the RCAs for review by the License RSO and by NRC inspectors.

2.4.1 Qualifications¹⁰

The Garrison RSO shall have completed a formal course of instruction addressing the following topics:

- Basic radiation interactions
- Radioactivity
- Terms and units
- Biological effects
- Radiation detection and measurement
- Radiation and contamination control
- Radiation dosimetry

The US Army Chemical School, US Army Medical Command, the National Guard Bureau, and US Army Materiel Command offer acceptable formal courses for garrison RSOs. The License RSO may provide this training (and document it) if time or resources do not allow a Garrison RSO to attend one of the formal courses on a timely basis.

In addition, the Garrison RSO shall receive specific training from the License RSO on his or her duties and responsibilities related to M101 spotting rounds on his or her installation. This training will be documented and will include:

¹⁰ The License RSO cannot allow any activities within any garrison RCA until he has determined that the Garrison RSO meets the training qualifications in Section 2.4.1.

- Viewing of the Army's DU awareness training video for soldiers, TVT 3-120 Tier I Depleted Uranium (DU) General Awareness Training, a copy of which the License RSO will provide
- How to use and maintain radiation safety instruments
- How to perform Garrison RSO duties described in this RSP
- How to perform procedures in RSP-supporting SOPs (see Section 23)

2.4.2 Duties

The Garrison RSO, as necessary, will:

- On behalf of the Garrison Commander and License RSO, assure implementation of and compliance with this RSP and applicable NRC regulations and license conditions
- Discuss deviations from routine range activities that affect radiation safety with appropriate personnel and the License RSO
- Maintain a log of routine range activities in RCAs as they occur¹¹
- Routinely report on radiation safety activities in RCAs at Garrison Radiation Safety Committee meetings (with appropriate documentation in the minutes of these meetings)
- Perform audits as necessary to verify compliance with provisions of this RSP and of NRC regulations and license conditions
- Advise personnel as they carry out their radiation safety responsibilities
- Stop work if conditions indicate that a potential exists for an unanticipated or excessive radiation exposure to range personnel or the general public, or if an individual violates the radiation safety rules, regulations, or procedures in a manner that may adversely affect personnel at the RCA or the general public
- Train personnel in the proper use of radiological instruments for monitoring personnel and equipment leaving the RCA
- Implement, audit and validate instrument calibrations and the appropriateness of calibration sources, methods, records and procedures
- Ensure that radiation exposures are maintained ALARA
- Implement and maintain records of radiological surveys and evaluations
- Ensure appropriate radiation safety training is provided to all personnel who enter an RCA and maintain documentation of this training
- Arrange maintenance and calibration service and maintain associated records for radiation survey instruments
- Review planned RCA activities and implement radiation safety procedures to ensure safe performance and completion of work
- Perform any other activities as directed by the License RSO in order to maintain compliance with NRC regulations and license conditions

¹¹ This log may be in the form of check boxes on the access control log. Each check box will correspond to a routine authorized range activity as shown in Chapter 4.

2.4.3 Authority

The Garrison RSO has authority to:

- Immediately stop any operation involving the use of source material in which health and safety may be compromised or may result in non-compliance with NRC requirements (the License RSO will be notified as soon as possible if this occurs)
- Temporarily suspend individuals from field activities for infractions against this RSP pending consideration by the Garrison Commander and License RSO

2.4.4 Change of the Garrison RSO

The Garrison Commander (directly or through the garrison safety manager) will notify the License RSO as soon as possible when the current Garrison RSO departs and when he or she appoints a new Garrison RSO. The appointment is subject to the concurrence of the License RSO, who will verify that Garrison RSO candidate meets the qualifications in Section 2.4.1.

The License RSO will notify the NRC, by telephone or email within 30 days of a change in the Garrison RSO. The notification will include the name and contact information of the new Garrison RSO. The License RSO will follow up the rapid notification with formal notification by letter.

The License RSO and the Garrison RSO will maintain documentation that demonstrates Garrison RSO compliance with training qualifications and make this documentation available to NRC inspectors upon request.

2.5 Personnel in the RCA

2.5.1 Training

Personnel entering the RCA are not occupationally exposed to ionizing radiation. However, they will receive radiation safety and DU awareness training (essentially on provisions of this RSP applicable to them) from the Garrison RSO at a level commensurate with their activities in the RCA as the Garrison RSO determines and documents.

2.5.2 Responsibilities

Each person who enters the RCA is responsible for demonstrating familiarity with the provisions of this RSP applicable to them, for strict adherence to radiation safety rules and regulations, and for minimizing radiation exposure to a level ALARA.

Responsibilities of personnel who enter the RCA include:

- Understanding and abiding by the policies and procedures specified in this RSP and in other applicable safety policies, and clarifying those areas where understanding is incomplete

- Providing feedback to health and safety management relating to errors, deficiencies or omissions and modifications in the RSP or in other safety policies

2.5.3 Authority

The health and safety authority of each person assigned to the RCA includes the following:

- The right to refuse to work and/or stop work authority when the person feels that the work conditions are unsafe (including subcontractors or team contractors), or where specified safety precautions are not adequate or fully understood
- The right to refuse to work on any task or operation where the safety procedures specified in this RSP or other safety policies are not being followed
- The right to contact the Garrison Commander, the Garrison RSO, the License RSO, or the NRC at any time to discuss potential concerns

2.6 Authorized visitors

All visitors to the RCA will comply with the requirements of this RSP. Depending on the areas to be accessed and the nature of the visit, the Garrison RSO, as necessary, will escort visitors in order to assure safe radiation safety practices.

The Garrison RSO will brief authorized visitors requiring entry to the RCA on the presence of DU in the RCA. Visitors will be escorted at all times in the RCA and will be responsible for compliance with health and safety policies. The Garrison RSO will maintain records of the briefings and the visits for later License RSO and NRC review.

Unauthorized visitors, and visitors not meeting the specified qualifications, may not enter the RCA.

3 Radiation Control Areas

3.1 Identification

Figures that show the location of all IMCOM M101 DU RCAs are in the NRC license amendment application. The License RSO will provide the figures pertinent to each installation to that installation's Garrison RSO, who will attach those figures to this RSP.

3.2 Changes to RCAs

The Garrison RSO and License RSO will be notified if M101 spotting round debris (or any other heretofore-unknown radioactive material) is discovered on any IMCOM range outside of known RCAs.

The License RSO will establish a new or extended RCA to address this discovery. The License RSO will notify the NRC about the new or extended RCA within 30 days and arrange for the preparation of revisions that add the new RCA to the existing set of M101 DU impact area figures and documents, including this RSP.

Only the NRC can authorize area reduction of an RCA once the RCA is established in the license.

3.3 DU removal

Deliberate searches for and removal of DU are not authorized within an RCA except for explosive ordnance disposal (EOD) UXO blow-in-place activities (see Section 4.1). However, unintended discovery of M101 DU debris in an RCA and its location will be reported immediately to the Garrison RSO. The Garrison RSO, in consultation with the EOD personnel and the License RSO, will determine whether it is more reasonable to pick up the DU and hold it for appropriate disposal (see Section 18) than it is to leave it in place.

4 Range Activities Authorized in RCAs

The NRC license to IMCOM allows for possession only of M101 DU on IMCOM ranges. Therefore, the NRC has limited the types of activities in the RCA that the Army may perform to those that do not move around or otherwise disturb the DU. The intent of this section is related to deliberate movement or disturbance of DU by personnel in the RCA using equipment. The normal use of the range for training, for example, using HE munitions, is allowed.

4.1 Unexploded ordnance in RCAs

If UXO is encountered in an RCA, EOD personnel will determine the appropriate disposition in accordance with EOD policies and procedures.

If EOD personnel decide to remove the UXO, then the UXO will be checked for DU contamination before it leaves the RCA.

If EOD personnel decide to blow the UXO in place, then:

- Prior knowledge and approval of the Garrison RSO and the License RSO is required.
- Before the detonation, the immediate area (blast zone) will be checked for and cleared (to the maximum reasonable extent possible) of DU using appropriate radiological instrumentation under the joint supervision of the Garrison RSO and EOD personnel.

4.2 Unauthorized range activities

Casual visits within an RCA are not authorized.

Eating, drinking, smoking, and applying of cosmetics are not allowed in an RCA. Drinking water to maintain hydration and health is allowable, but water bottles, cups, and glasses must be clean of any apparent dirt or soil.

Excavations and building construction within an RCA are not allowed.¹²

Cleanup of DU within an RCA is not allowed unless the Army has applied for and received an NRC license amendment for decommissioning that RCA in accordance with 10 CFR 20, Subpart E.

¹² Upon request of garrison personnel, the License RSO will ask the NRC for case-by-case exemptions to allow construction of new targets, access roads, and other projects related to the normal use of the RCA for training.

5 Radiation Safety Principles

The following are general radiation safety principles that guide radiation safety policies in the RCA.

5.1 Justification

No one will be exposed to ionizing radiation needlessly. This means that only essential personnel will be in the RCA at any time.

5.2 Optimization

All personnel radiation exposure will be ALARA, considering technological and socioeconomic factors.

“ALARA” will be implemented using the following:

- Training of personnel in appropriate radiation safety practices and work procedures
- Good housekeeping practices
- Engineering controls
- Use of personal protective equipment (PPE) as necessary

5.3 Individual dose and risk limits

No one will exceed regulatory dose limits. This will be achieved through the implementation of the ALARA program and contamination control within NRC limits (Table 6-1).

6 Radiation Safety Standards

Title 10 CFR, Part 20, Subpart C contains the NRC occupational and public dose limits, which will not be exceeded under any circumstances.

6.1 Individuals entering the RCA

All reasonable conservative estimates of the maximum annual total effective dose (TEDE) equivalent due to Davy Crockett DU in impact areas on IMCOM ranges show that no one will exceed ten percent of the NRC annual public dose limit of 0.100 rem.

6.2 Surface contamination

Table 1 in NRC Regulatory Guide 1.86 provides NRC acceptable surface contamination levels. Table 6-1 is an extract relevant for DU from that table. Decontamination will always be to surface contamination levels that are below those in Table 6-1 and that are ALARA.

Table 6-1 Acceptable surface contamination levels

NUCLIDE ^a	AVERAGE ^{bcd}	MAXIMUM ^{bcd}	REMOVABLE ^{bcef}
U-natural, ²³⁵ U, ²³⁸ U, and associated decay products	5,000 dpm alpha/100 cm ²	15,000 dpm alpha/100 cm ²	1,000 dpm alpha/100 cm ²

^a Where surface contamination by both alpha and beta-gamma emitting nuclides exists, the limits established for alpha and beta-gamma emitting nuclides should apply independently.

^b As used in this table, dpm (disintegrations per minute) means the rate of emission by radioactive material as determined by correcting the counts per minute observed by an appropriate detector for background, efficiency, and geometric factors associated with the instrumentation.

^c Measurements of average contamination level should not be averaged over more than 1 square meter. For objects of less surface area, the average should be derived for each object.

^d The maximum contamination level applies to an area of not more than 100 square centimeters (cm²).

^e The amount of removable radioactive material per 100 cm² of surface area should be determined by wiping that area with dry filter or soft absorbent paper, applying moderate pressure, and assessing the amount of radioactive material on the wipe with an appropriate instrument of known efficiency. When removable contamination on objects of less surface area is determined, the pertinent levels should be reduced proportionally and the entire surface should be wiped.

^f The average and maximum radiation levels associated with surface contamination resulting from beta-gamma emitters should not exceed 0.2 millirad per hour at 1 centimeter and 1.0 millirad per hour at 1 centimeter, respectively, measured through not more than 7 milligrams per square centimeter of total absorber.

6.3 Declared pregnant worker

Because of the radiosensitivity of the embryo/fetus, the NRC sets the dose limit to the embryo/fetus of a declared pregnant worker (DPW) at 0.5 rem TEDE for the period of gestation. The NRC determined that this limit provides an adequate margin of safety for the embryo/fetus. However, no one can exceed even a small percentage of this limit for all reasonable scenarios (see paragraph 6.1). Therefore, a written declaration of pregnancy and required subsequent actions are not expected to be necessary.

However, in the event a worker informs the Garrison RSO that she is a DPW, the Garrison RSO will take the following actions:

- Acknowledge receipt of the declaration and maintain a record of it

Radiation Safety Plan for IMCOM Ranges Affected by M101 Davy Crockett Spotting Round Depleted Uranium

- Provide the worker with a copy of NRC Regulatory Guide 8.13, "Instruction Concerning Prenatal Radiation Exposure," for her information
- Consult with the License RSO

6.4 Dose to individual members of the public

Documents provided to the NRC during the license amendment application demonstrate that the dose to individual members of the public does not exceed the limit specified in 10 CFR Part 20, § 20.1301(a)(1) (100 mrem in a year). These documents incorporate calculations using RESRAD 7.0 and RESRAD-OFFSITE 3.1 and show that the maximum possible annual dose to anyone in an RCA is less than about 0.3 mrem and to anyone outside the training range complex is less than about 0.04 mrem. The following table summarizes the results of the RESRAD calculations.

Table 6-2 Comparison of regulatory standards to corresponding calculated maximum value using RESRAD 7.0 and RESRAD-OFFSITE 3.1

Situation	Maximum Value			
	Average Annual Dose (mrem)	Water Concentration		Air Concentration (pCi/m ³ ²³⁸ U)
		Effluent (pCi/L ²³⁸ U)	Drinking water (µg/L total U)	
Regulatory standard (NRC; EPA for drinking water)	100	3000	30	0.06
Typical: 1000 rounds, 1 km ² , default parameters	0.029	0.13	0.43	0.0000065
Maximum reasonable: 9700 rounds, 1 km ² , default parameters	0.28	1.3	3.7	0.0000065
Maximum bounded: 9700 rounds, 1 km ² , several changed defaults	0.33	0.63	1.8	0.00013
Maximum reasonable 1 km offsite: 9700 rounds, 1 km ² , default parameters	0.035	0.23	0.66	0.000000088

7 Dosimetry

Dosimetry is not required for entry into the RCA. See Section 6.1 and Section 6.4.

8 *Bioassay*

Bioassay is not required for anyone who enters the RCA. See Section 6.1 and Section 6.4. The Garrison RSO will consult with the License RSO if an uptake of DU may have occurred (see Section 22.1).

9 Personnel Protective Equipment

Normal work clothing provides adequate protection for radiation safety purposes from M101 DU on IMCOM ranges for authorized routine range activities (see Section 4.2).

Wear disposable gloves at all times when handling DU.

10 Respiratory Protection

Respiratory protection is not required for entry into the RCA. See Section 6.1 and Section 6.4.

11 Contamination Surveys

11.1 Instrument scanning

When necessary, the Garrison RSO will establish access control points ("hotlines") for entry and exit to the RCA. The Garrison RSO will assure that appropriate instruments and supplies (for example, soap and water for decontamination, if necessary) are available at the hotlines.

The Garrison RSO will assure¹³ that instrument scanning on all personnel, vehicles, and equipment occurs at the hotline as they exit the RCA. The Garrison RSO will notify the License RSO as soon as possible if contamination is discovered.

11.1.1 Personnel

All personnel exiting an RCA will be monitored for contamination as they leave the RCA. If DU contamination is detected, they will be completely decontaminated if possible. The Garrison RSO will contact the License RSO for instructions if decontamination measures are ever necessary. (Usually, washing with soap and water will achieve complete DU decontamination.)

See Section 17 for instrumentation requirements.

11.1.2 Equipment and vehicles

All equipment and vehicles will be monitored for contamination as they leave the RCA. If DU contamination is detected, the equipment item or vehicle will be decontaminated to meet the requirements in Table 6-1 (which includes the requirement to decontaminate to levels ALARA). The Garrison RSO will contact the License RSO for instructions if decontamination measures are ever necessary. (Usually, washing with soap and water will achieve complete DU decontamination.)

11.2 Documentation

The Garrison RSO will document all contamination surveys of personnel, equipment, and vehicles to include:

- Description of instrument used, along with its calibration date and calibration due date
- Identification of person, equipment item, or vehicle
- Location of contamination or a notation that no contamination was detected
- Initial contamination found, if any, in units of dpm/100 cm² or dpm over smaller area

¹³ Normally, the Garrison RSO will perform these measurements. However, when the Garrison RSO cannot be present and work must proceed, the Garrison RSO may designate a worker to perform the hotline functions once the Garrison RSO is confident the worker is able to do so accurately, correctly, and in accordance with this RSP. The Garrison RSO will maintain records of such designations and the means by which the Garrison RSO confirmed the designated worker's ability.

- Decontamination method(s) used, if necessary
- If initial decontamination efforts are not fully successful, interim contamination in units of dpm/100 cm² or dpm over smaller area
- Final contamination status
- Name and signature of person performing monitoring

See Section 17 for instrumentation requirements.

11.3 Swipe tests

Swipe tests generally are not necessary. However, if instrument scanning detects contamination, the Garrison RSO will take swipe tests to verify that subsequent decontamination efforts were adequate. The License RSO will provide instructions on how to analyze the swipes.

11.4 Reporting results to workers

The Garrison RSO will provide results of swipe tests and scanning to any RCA personnel who ask for them, as it is a right of workers to know the potential hazards to which they are exposed.

12 Environmental Monitoring

The License RSO will provide the NRC with details and results of any environmental monitoring, sampling, or testing for DU that may be relevant for an RCA.

12.1 Environmental radiation monitoring

The License RSO and garrison RSOs will assure that environmental radiation sampling and measurements are performed in accordance with the site-specific Environmental Radiation Monitoring Plan for each installation.

12.2 Drinking water

Records of routine analysis for uranium to meet requirements of US Environmental Protection Agency (EPA) drinking water regulations (40 CFR Part 141) will be maintained for NRC review. The Garrison RSO will coordinate with the Garrison Department of Public Works personnel, who perform these tests, to obtain and maintain copies of the records pertaining to uranium.

If the EPA drinking water maximum contaminant level for uranium (30 micrograms per liter) is exceeded, the Garrison RSO will notify the License RSO, who then will notify NRC.

13 Inventory

The Garrison RSO will inventory and control all check sources associated with instrumentation used at the RCA. No other radioactive sources, other than M101 DU itself, are expected to be at the RCA. (Also, see Section 18.)

The Garrison RSO will maintain a log of all M101 DU found on the installation. The log will show the location of each find, an estimate of the amount of DU (for example, two mostly intact rounds, three fragments, evidence of soil contamination, and so on) and whether the DU was left in place or removed for proper disposal.

14 Posting Requirements

A radiation control area (RCA) is an area controlled for the purpose of radiation safety (see Section 3). The Garrison RSO, in coordination with range personnel, will establish each M101 DU impact area on the installation as an RCA.

The License RSO will provide the Garrison with maps showing the location of each RCA on the garrison. The Garrison RSO will assure that all range operations and training personnel are aware of the RCAs.

14.1 "CAUTION, RADIOACTIVE MATERIAL" signs

Title 10 CFR Part 20, Subpart J, § 20.1902(e) says:

Posting of areas or rooms in which licensed material is used or stored.

The licensee shall post each area or room in which there is used or stored an amount of licensed material exceeding 10 times the quantity of such material specified in appendix C to part 20 with a conspicuous sign or signs bearing the radiation symbol and the words "CAUTION, RADIOACTIVE MATERIAL(S)" or "DANGER, RADIOACTIVE MATERIAL(S)."

The Garrison RSO, in coordination with range operations and training personnel and, as required, EOD personnel, will conspicuously post these signs (see Figure 14-1) at a sufficient number of locations around the RCA to ensure that individuals entering the RCA are aware of the presence of DU. The signs may be placed at the perimeter of the range impact areas if posting them at the Radiation Control Area boundary is unsafe due to the presence of UXO.

Signs will be made of weather-resistant material.

14.2 Radiation area

A radiation area is an area, accessible to individuals, in which radiation levels could result in an individual receiving a dose equivalent in excess of 0.005 rem in 1 hour at 30 centimeters from the radiation source or from any surface that the radiation penetrates.

M101 DU on IMCOM ranges **cannot** produce a radiation area.

14.3 NRC-required postings

Documents, notices, or forms posted under this section shall appear in a sufficient number of places to permit individuals engaged in NRC-licensed or regulated activities to observe them on the way to or from any particular licensed or regulated activity location to which the document applies, shall be conspicuous, and shall be replaced if defaced or altered.

At a minimum, the Garrison RSO will post these documents, notices, and forms in control towers for DU-affected ranges, in his or her office, and with documents that are required reading for range personnel.

14.3.1 NRC Form 3, "Notice to Employees"

Current copies of NRC Forms 3 will appear in a sufficient number of places to permit personnel to observe them on the way to or from any particular work location to which the document applies, will be conspicuous, and will be replaced if defaced or altered.

14.3.2 Other notices to workers

The Garrison RSO shall post or make available current copies of

- Title 10 CFR, Part 19, "Notices, Instructions and Reports To Workers: Inspection And Investigations"
- Title 10 CFR, Part 20, "Standards for Protection against Radiation"
- Title 10 CFR, Part 21, "Reporting of Defects and Noncompliance"
- The license, license conditions, and documents incorporated into the license by reference, and amendments thereto
- The operating procedures applicable to licensed activities (specifically, this RSP)

If posting of any of these documents specified in this sub-section is not practicable, the Garrison RSO instead may post a notice that describes the document and states where it may be examined.

14.3.3 Notices of violation

The Garrison RSO shall post or make available current copies of any notice of violation involving radiological working conditions, proposed imposition of civil penalty, or order from the NRC and any IMCOM response.



Figure 14-1 "CAUTION, RADIOACTIVE MATERIAL" sign

15 Access Control

15.1 RCA access

Personnel access to an RCA is not authorized except with the knowledge and approval of the Garrison RSO. This is because the Garrison RSO must make appropriate arrangements to assure compliance with NRC regulations and license conditions as implemented in this RSP. The Garrison RSO will assure that all appropriate range operators and trainers are aware of this requirement. This requirement is in addition to and not in lieu of any other approvals for access that may be required.

Whenever personnel access to the RCA is required, the Garrison RSO will establish access control points on the RCA's perimeter for entry and exit (except in an emergency).

Other than official visitors, no one may enter the RCA unless he or she meets all radiation safety training requirements (see Section 20). The Garrison RSO will maintain documentation to show that these requirements have been met.

Personnel qualified to enter the RCA will escort official visitors.

The Garrison RSO will control access to the RCA in accordance with the above instructions and with the "Physical Security Plan for US Army Installation Management Command Ranges Affected by Depleted Uranium in M101 Davy Crockett Spotting Rounds," which is a part the license. The Garrison RSO will refer to the License RSO for additional guidance as necessary.

15.2 Installation training area access

Restrictions on RCA access (see Section 15.1) are in addition to, not in place of, any other access restrictions.

16 Markings on Containers and Equipment

Title 10 CFR Part 20, § 20.1904 requires that all containers that contain more than 100 microcuries of ^{238}U or natural uranium¹⁴ be properly labeled with a "CAUTION—RADIOACTIVE MATERIALS" sign or label. The label will also provide information, such as the radionuclides present (DU), an estimate of the quantity of radioactivity, the date for which the activity is estimated, radiation levels, and kinds of materials, to permit individuals handling or using the containers, or working in the vicinity of the containers, to take precautions to avoid or minimize exposures.

The specific activity of DU is about 0.4 μCi per gram, so 100 μCi of DU has a mass of about 250 grams. A single, intact M101 spotting round contains about 190 grams of DU.

The only containers of M101 DU on the installations, if any, shall be containers awaiting disposal as radioactive waste (see Section 18).

¹⁴ The activity in DU is mostly due to ^{238}U . The activity in natural uranium is mostly due to ^{234}U and ^{238}U in equilibrium with each other. Table C in Appendix C to 10 CFR Part 20 does not list DU, but the inference is taken that the labeling requirement for an activity of more than 100 microcuries should also apply for DU.

17 Instrumentation

17.1 Essential instruments

The Garrison RSO will assure that appropriate calibrated instruments are available for use by appropriately trained personnel before allowing personnel access to the RCA.

The Garrison RSO will possess at least two Geiger-Mueller pancake detectors for alpha-beta-gamma surveys for contamination and frisking [for example, a Ludlum Model 44-9 Pancake G-M Detector (see Figure 17-1) with appropriate meter or an AN/PDR-77 with a pancake probe].

17.2 Instrument calibration and maintenance

All instruments will be calibrated by a qualified calibration/repair facility at least annually in accordance with manufacturers' instructions. The Garrison RSO will retain calibration records for each instrument for at least three years.

Each instrument shall be checked before first use each day with check sources to verify that its response is within ± 20 percent of the value established by the calibration laboratory (or the Garrison RSO immediately upon receipt of a newly calibrated instrument) for that instrument/check source/geometry combination.

Each item of survey equipment shall meet function response requirements before, during, and at the end of the workday. If survey equipment requires routine maintenance (such as battery replacement, spot painting of Mylar® window, etc.) during a workday, its proper function will be verified before it is returned to use.

Instruments that require other than routine maintenance will be re-calibrated after repair before being returned to use.

17.3 Minimum detectable concentrations

The following sections describe how minimum detectable concentrations (MDCs) will be determined for field equipment. The MDC will be calculated and documented for each field instrument put into use. The Garrison RSO will maintain this documentation and make it available to the License RSO and NRC personnel upon request.

After completing background measurements outside of but nearby the RCA, MDCs will be calculated using RCA-specific variables (reference activity/instrument efficiencies) to verify that all MDCs are significantly below the regulatory limits that correspond to the instruments' uses.

17.3.1 Static minimum detectable concentrations

According to the *Multi-Agency Radiation Survey and Site Investigation Manual* (MARSSIM), the *critical level* (L_C) is the level, in counts, at which there is a 5 percent statistical probability of incorrectly identifying a measurement-system background value as greater than background. Any response above this level is considered greater than background. The *detection limit* (L_D) is the *a priori* estimate of the detection capability of

a measurement system and is reported in units of counts. The MDC is the detection limit (counts) multiplied by an appropriate conversion factor to give units consistent with a site guideline, such as dpm/100 cm². In other words, the MDC is the *a priori* net activity level above the critical level that an instrument can be expected to detect 95 percent of the time,

MARSSIM explains how to calculate L_C , L_D , and MDC and arrives at the following result (MARSSIM Equation 6-7) for the static MDC:

$$\text{Static MDC} = C(3 + 4.65\sqrt{B}).$$

C represents total detection and efficiency and other constants or factors needed to put the static MDC into appropriate units and B is the number of background counts that are expected to occur while performing an actual measurement. The equation assumes that static counts are taken in 1 minute. If different times are used, the License RSO will adjust the calculations accordingly.

For the present purposes,

$$C = \frac{1}{A\varepsilon_i\varepsilon_s} \times \frac{100 \text{ cm}^2}{100 \text{ cm}^2}.$$

A is the effective area of the probe, ε_i is the instrument or detector efficiency, ε_s is the efficiency of the contamination source (surface efficiency),¹⁵ and the final factor, which equals 1, helps put the units of scan MDC into dpm/100 cm².

17.3.2 Scan minimum detectable concentrations

The minimum detectable concentration of a scan survey (scan MDC) depends on the intrinsic characteristics of the detector (such as efficiency and physical probe area), the nature (type, abundance, and energy) of emissions, the relative distribution of the potential contamination (point versus distributed source and depth of contamination), scan rate, and personal characteristics of the surveyor. MARSSIM Section 6.7.2.1 discusses the basis for estimating scanning MDCs and arrives at the following equation for scan MDC:

$$\text{Scan MDC} = \frac{\text{MDCR}}{\sqrt{p}A\varepsilon_i\varepsilon_s} \times \frac{100 \text{ cm}^2}{100 \text{ cm}^2}.$$

¹⁵ The ISO-7503-1 standard on the evaluation of surface contamination for beta-emitters and alpha emitters recommends an ε_s value of 0.5 for betas (maximum beta energy greater than 0.4 megaelectron volts (MeV)) and an ε_s value of 0.25 for alpha and betas (maximum beta energy between 0.15 MeV and 0.4 MeV).

Radiation Safety Plan for IMCOM Ranges Affected by M101 Davy Crockett Spotting Round Depleted Uranium

MDCR is the minimum detectable count rate (interpolated from MARSSIM Table 6.6), p is surveyor efficiency (assumed to be 0.5), and other parameters are shown above. The final factor, which equals one, helps put the units of scan MDC into dpm/100 cm².



INDICATED USE: Alpha beta gamma survey; Frisking
DETECTOR: Pancake type halogen quenched G-M
WINDOW: $1.7 \pm 0.3 \text{ mg cm}^{-2}$ mica
WINDOW AREA: Active – 15 cm²; Open – 12 cm²
EFFICIENCY (4 π geometry): Typically 5 percent – ¹⁴C; 22 percent – ⁹⁰Sr/⁹⁰Y; 19 percent – ⁹⁹Tc; 32 percent – ³²P; 15 percent – ²³⁹Pu
SENSITIVITY: Typically 3300 cpm (mR h⁻¹)⁻¹ (¹³⁷Cs gamma)
ENERGY RESPONSE: Energy dependent
DEAD TIME: Typically 80 microseconds
COMPATIBLE INSTRUMENTS: General purpose survey meters, ratemeters, and scalars
OPERATING VOLTAGE: 900 volts
CONNECTOR: Series C (*others available*)
CONSTRUCTION: Aluminum housing with beige polyurethane enamel paint
TEMPERATURE: –4 °F (–20 °C) to 122 °F (50 °C)
SIZE: 1.8 inches (4.6 cm) height × 2.7 inches (6.9 cm) width × 10.7 inches (27.2 cm) length
WEIGHT: 1 pound (0.5 kg)

Source: www.ludlums.com

Figure 17-1 Ludlum Model 44-9 Pancake G-M Detector

18 Radioactive Waste

The Garrison RSO, in coordination with EOD personnel, will double-bag in plastic bags all M101 DU that is picked up and removed from the RCA (see Section 3.2). Anyone handling DU will use tools or gloved hands to handle it. The bagged DU will be stored in sturdy containers with appropriate markings (see Section 16).

The Garrison RSO will secure these containers in a locked storage facility with access limited to personnel appropriately trained in radiation safety and security.

The Garrison RSO, in coordination with the License RSO, will contact Chief, Army Low-Level Radioactive Waste Disposal Division, US Army Joint Munitions Command, ATTN: AMSJM-SF, Rock Island Arsenal, Rock Island, IL 61299-6500, who will arrange for appropriate disposal of the DU.

19 Program Audits

The Garrison RSO will continuously monitor activities in an RCA when personnel are in the RCA and maintain appropriate documentation of those activities.

The License RSO will review radiation safety program content and implementation and will document the results of this review at least annually to ensure the following:

- Compliance with NRC and the terms and conditions of the license
- Occupational doses and doses to members of the public are ALARA (10 CFR Part 20, § 20.1101)
- Records of audits and other reviews of program content are maintained for 3 years

19.1 Purpose of annual audit

An audit is conducted, in part, to fulfill the requirements of 10 CFR Part 20, § 20.1101 for an annual review of the content and implementation of the radiation safety program. It should also identify program weaknesses and allow licensees to take early corrective actions (before an NRC inspection). During an audit, the auditor needs to keep in mind not only the requirements of NRC's regulations, but also the licensee's commitments in its applications and other correspondence with NRC. The auditor should also evaluate whether the licensee is maintaining exposures to workers and the general public ALARA and, if not, make suggestions for improvement.

19.2 Guide for annual audit

The form in this section is for documentation of the annual audit of the radiation safety program. Guidance follows on completing each section of the form. In the "remarks" portions of the form, note any deficiencies that were identified and the corrective actions taken (or to be taken).

- Section 1, Audit History. Enter the date of the last audit, whether any deficiencies were identified, and whether actions were taken to correct the deficiencies.
- Section 2, Organization and Scope of Program. Give a brief description of the organizational structure, noting any changes in personnel. Describe the scope of licensed activities at the audited location. Check whether the RSO is the person identified in the license and fulfills the duties specified in the license.
- Section 3, Training, Retraining, and Instructions to Workers. Ensure that workers have received the training required by 10 CFR Part 19, § 19.12. Be sure that, before being permitted to enter an RCA, the worker has received training. Note whether refresher training is conducted annually. Ensure by interview and/or observation of selected workers that they can implement the licensee's procedures.
- Section 4, Audits. Verify that audits fulfill the requirements of 10 CFR Part 20, § 20.1101, are conducted in accordance with licensee commitments, and are properly documented.

Radiation Safety Plan for IMCOM Ranges Affected by M101 Davy Crockett Spotting Round Depleted Uranium

- Section 5, Facilities. Verify that the licensee's facilities are as described in its license documents.
- Section 6, Radiation Surveys.
 - Verify that the licensee has appropriate, operable and calibrated survey instruments available, that the instruments are calibrated (at the required frequency) in accordance with license conditions and in accordance with 10 CFR Part 20, § 20.2103. Calibration records must be retained for 3 years after the record is made.
 - Check that radiation levels in areas adjacent to use are within regulatory limits and in accordance with 10 CFR Part 20, § 20.2103.
 - Verify compliance with 10 CFR Part 20, § 20.1301. Records of surveys must be retained for 3 years after the record is made.
- Section 7, Transfer of Radioactive Material for Waste Disposal. Ensure that transfers are performed in accordance with 10 CFR Part 40, § 40.51. Records of surveys, receipt, and transfer must be maintained in accordance with 10 CFR Part 20, § 20.2103 and Part 40, § 40.51.
- Section 8, Personnel Radiation Safety. Evaluate the licensee's determination that unmonitored personnel are not likely to receive more than 10 percent of the allowable limits. If any worker declared her pregnancy in writing, evaluate the licensee's compliance with 10 CFR Part 20, § 20.1208. Check whether records are maintained as required by 10 CFR Part 20, §§ 20.2101, 2102, 2103, 2104 and 2106.
- Section 9, Auditor's Independent Measurements (If Made). The auditor should make independent survey measurements and compare the results with those made or used by the licensee.
- Section 10, Notification and Reports. Check on the licensee's compliance with the notification and reporting requirements in 10 CFR Parts 19, 20, and 30. Ensure that the licensee is aware of the telephone number for NRC's Emergency Operations Center: (301) 816-5100.
- Section 11, Posting and Labeling. Check for compliance with the posting and labeling requirements of 10 CFR Part 19, § 19.11; Part 20, §§ 20.1902 and 20.1904; and Part 21, § 21.6.
- Section 12, Recordkeeping for Decommissioning. Check to determine compliance with 10 CFR Part 40, § 40.36(f).
- Section 13, Bulletins and Information Notices. Check to determine if the licensee is receiving bulletins, information notices, NMSS Newsletters, and so on from the NRC. Check whether the licensee took appropriate action in response to NRC mailings.
- Section 14, Special License Conditions or Issues. Verify compliance with any special conditions on the licensee's license. If the licensee has any unusual aspect of its work, review and evaluate compliance with regulatory requirements.
- Section 15, Continuation of Report Items. This section is self-explanatory.
- Section 16, Problems or Deficiencies Noted; Recommendations. This section is self-explanatory.

- Section 17, Evaluation of Other Factors. Evaluate licensee management's involvement with the radiation safety program, whether the RSO has sufficient time to perform his/her duties, and whether the licensee has sufficient staff to handle the workload and maintain compliance with regulatory requirements.

19.3 Sample checklist

The following pages provide a sample checklist based on NUREG-1556, volume 7, appendix L.

Radiation Safety Plan for IMCOM Ranges Affected by M101 Davy Crockett Spotting
Round Depleted Uranium

Audit Report No. _____ License No. _____

Licensee's Name and Mailing Address:

Audit of Activities at (Address):

Contact at Audit Location: _____ Telephone No. _____

Date of this Audit: _____

Summary of Findings and Action:

☐ No deficiencies

☐ Deficiencies

☐ Action on previous deficiencies

Recommendations:

Auditor: _____ Date: _____
(Signature)

Radiation Safety Plan for IMCOM Ranges Affected by M101 Davy Crockett Spotting
Round Depleted Uranium

1. AUDIT HISTORY [] N/A (N/A means "Not applicable" – Initial Audit

A. Last audit of this location conducted _____

B. Problems/ deficiencies identified during last two audits or two years,
whichever is longer ☐ Y ☐ N

C. Open problems/deficiencies from previous audits:

Status Requirement	Prob/Def	Corrective Action Taken (Y/N)	Open/Closed

D. Any previous problem/deficiency not corrected or repeated ☐ Y ☐ N ☐ N/A

2. ORGANIZATION AND SCOPE OF PROGRAM

A. Briefly describe organizational structure

1. Structure is as described in license documents ☐ Y ☐ N
2. Multiple authorized locations of use ☐ Y ☐ N
3. Briefly describe scope of activities involving source material, frequency
of use, staff size, etc. ☐ Y ☐ N

B. Radiation Safety Officer ☐ Y ☐ N

1. Authorized on license ☐ Y ☐ N
2. Fulfills duties as RSO ☐ Y ☐ N

C. Use only by authorized individuals ☐ Y ☐ N

Remarks:

Radiation Safety Plan for IMCOM Ranges Affected by M101 Davy Crockett Spotting
Round Depleted Uranium

3. TRAINING, RETRAINING, AND INSTRUCTIONS TO WORKERS

- A. Instructions to workers per [10 CFR Part 19.12] ☐ Y ☐ N
- B. Training program required ☐ Y ☐ N
- C. Training records maintained ☐ Y ☐ N
- D. Evaluation of individuals' understanding of procedures and regulations based on interviews, observation of selected workers ☐ Y ☐ N

Adequate understanding of:

- Current safe use procedures ☐ Y ☐ N
- Emergency procedures ☐ Y ☐ N

E. Part 20

Workers cognizant of requirements for:

1. Radiation Safety Program [20.1101] ☐ Y ☐ N
2. Annual dose limits [20.1301, 20.1302] ☐ Y ☐ N
3. 10 percent monitoring threshold [20.502] ☐ Y ☐ N
4. Dose limits to embryo/fetus and declared pregnant women [20.1208] ☐ Y ☐ N

Remarks:

4. INTERNAL AUDITS, REVIEWS, OR INSPECTIONS

- A. Audits are conducted ☐ Y ☐ N
1. Audits conducted by _____
2. Frequency _____
- B. Content and implementation of the radiation safety program reviewed annually [20.1101(c)] ☐ Y ☐ N
- C. Records maintained [20.2102] ☐ Y ☐ N

5. FACILITIES

- Facilities as described in license application ☐ Y ☐ N

Remarks:

Radiation Safety Plan for IMCOM Ranges Affected by M101 Davy Crockett Spotting
Round Depleted Uranium

6. RADIATION SURVEYS

- A. Instruments and Equipment: ☐ Y ☐ N
- 1. Appropriate operable survey instrumentation possessed or readily available ☐ Y ☐ N
 - 2. Calibrated as required [20.1501] ☐ Y ☐ N
 - 3. Calibration records maintained [20.2103(a)] ☐ Y ☐ N
- B. Briefly describe survey requirements [20.1501(a)]:
- C. Performed as required [20.1501(a)] ☐ Y ☐ N
- 1. Radiation levels within regulatory limits ☐ Y ☐ N
 - 2. Corrective action taken and documented ☐ Y ☐ N
- D. Records maintained [20.2103] ☐ Y ☐ N
- E. Protection of members of the public
- 1. Adequate surveys made to demonstrate either (a) that the TEDE to the individual likely to receive the highest dose does not exceed 100 mrem in a year, or (b) that if an individual were continuously present in an unrestricted area, the external dose would not exceed 2 mrem in any hour and 50 mrem in a year [20.1301(a)(1), 20.1302(b)] ☐ Y ☐ N
 - 2. Unrestricted area radiation levels do not exceed 2 mrem in any one hour [20.1301(a)(2)] ☐ Y ☐ N
 - 3. Records maintained [20.2103, 20.2107] ☐ Y ☐ N

Remarks:

7. TRANSFER OF RADIOACTIVE MATERIAL FOR WASTE DISPOSAL

- A. Transfer(s) for "disposal" performed per [40.51] ☐ Y ☐ N ☐ N/A
- B. Records of transfer maintained [20.2103(a), 40.51] ☐ Y ☐ N

Remarks:

Radiation Safety Plan for IMCOM Ranges Affected by M101 Davy Crockett Spotting
Round Depleted Uranium

8. PERSONNEL RADIATION SAFETY

- A. ALARA considerations are incorporated into the Radiation Safety Program [20.1101(b)] ☐ Y ☐ N
- B. Adequate documentation of determination that unmonitored individuals are not likely to receive more than 10 percent of allowable limit [20.1502(a)] ☐ Y ☐ N ☐ N/A
- C. Worker declared her pregnancy in writing during inspection period (review records) ☐ Y ☐ N ☐ N/A
- If yes, determine compliance with [20.1208] ☐ Y ☐ N
- Check for records per [20.2106(e)] ☐ Y ☐ N
- F. Records of exposures, surveys, monitoring, and evaluations maintained [20.2102, 20.2103, 20.2106, L/C] ☐ Y ☐ N

Remarks:

9. AUDITOR'S INDEPENDENT MEASUREMENTS (IF MADE)

- A. Survey instrument Serial No. _____ Last calibration

- B. Auditor's measurements compared to licensee's ☐ Y ☐ N
- C. Describe the type, location, and results of measurements:

10. NOTIFICATION AND REPORTS ☐ N/A

- A. Licensee in compliance with [19.13, 30.50] (reports to individuals, public and occupational, monitored to show compliance with Part 20) ☐ Y ☐ N ☐ N/A
- B. Licensee in compliance with [20.2201, 40.60] (theft or loss) ☐ Y ☐ N ☐ None
- C. Licensee in compliance with [20.2202, 40.60] (incidents) ☐ Y ☐ N ☐ None
- D. Licensee in compliance with [20.2203, 40.60] (overexposures and high radiation levels) ☐ Y ☐ N ☐ None
- E. Licensee aware of telephone number for NRC Emergency Operations Center [(301) 816-5100] ☐ Y ☐ N

Radiation Safety Plan for IMCOM Ranges Affected by M101 Davy Crockett Spotting
Round Depleted Uranium

11. POSTING AND LABELING

- A. NRC-Form 3 "Notice to Workers" is posted [19.11] ☐ Y ☐ N
- B. Parts 19, 20, 21, Section 206 of Energy Reorganization Act, procedures adopted pursuant to Part 21, and license documents are posted, or a notice indicating where documents can be examined is posted [19.11, 21.6] ☐ Y ☐ N
- C. Other posting and labeling per [20.1902, 1904] and the license is not exempted by [20.1903, 1905] ☐ Y ☐ N

Remarks:

12. RECORD KEEPING FOR DECOMMISSIONING (if needed) ☐ N/A

- A. Records of information important to the safe and effective decommissioning of the facility maintained in an independent and identifiable location until license termination ☐ Y ☐ N
- B. Records include all information outlined in [40.36(f)] ☐ Y ☐ N

Remarks:

13. BULLETINS AND INFORMATION NOTICES

- A. Receipt of NRC Bulletins, NRC Information Notices, NMSS Newsletters, and so on ☐ Y ☐ N
- B. Appropriate action taken in response to Bulletins, Information Notices, etc. ☐ Y ☐ N

Remarks:

14. SPECIAL LICENSE CONDITIONS OR ISSUES ☐ N/A

- A. Review special license conditions or other issues, and describe findings:
- B. Problems/deficiencies identified at licensee facilities other than at audit location:
- C. Evaluation of compliance:

15. CONTINUATION OF REPORT ITEMS ☐ N/A

(If more space is needed, use separate sheets and attach to report.)

Radiation Safety Plan for IMCOM Ranges Affected by M101 Davy Crockett Spotting
Round Depleted Uranium

16. PROBLEMS OR DEFICIENCIES NOTED; RECOMMENDATIONS ☐ N/A

Note: Briefly state (1) the requirement and (2) how and when violated. Provide recommendations for improvement.

17. EVALUATION OF OTHER FACTORS

- A. Senior licensee management is appropriately involved with the radiation safety program and/or RSO oversight ☐ Y ☐ N
- B. RSO has sufficient time to perform his/her radiation safety duties and is not too busy with other assignments ☐ Y ☐ N
- C. Licensee has sufficient staff ☐ Y ☐ N

Remarks/recommendations:

20 Training

Before RCA entry, all personnel; except one-time visitors (see Section 2.6), will receive and acknowledge training on the requirements of this RSP. The Garrison RSO will conduct this training.

20.1 Frequency of Training

Personnel who enter an RCA will receive radiation safety training:

- Before assuming duties that involve entry into an RCA
- Whenever there is a significant change in duties, regulations, or the terms of the license
- Annually (refresher training)

20.2 Training Topics

The Garrison RSO will tailor training for personnel wanting to enter an RCA to be commensurate with the type of work they will perform. These personnel are not occupationally exposed to radiation and, so, only require a minimum of awareness and familiarization training that will assure compliance with this RSP.

20.2.1 General Radiation Safety Topics

General RCA worker radiation safety training may include the following topics at the discretion of the Garrison RSO:

- Fundamentals of radiation safety
- Characteristics of radiation
- Units of radiation dose (rem) and radioactivity (curie)
- Significance of radiation dose
- Radiation safety standards
- Biological effects of radiation
- Levels of radiation from sources of radiation
- Methods of controlling radiation dose
 - Time
 - Distance
 - Shielding
- Radiation safety practices, including prevention of contamination and methods of decontamination
- Discussion of internal exposure pathways
- Radiation detection instrumentation to be used
- Radiation survey instruments
 - Operation
 - Calibration
 - Maintenance
 - Limitations
- Survey techniques

- Individual monitoring devices
- Equipment to be used
- Handling equipment and remote handling tools
- Sources of radiation
- Storage, control, disposal, and transport of equipment and sources of radiation
- Requirements of pertinent federal and state regulations
- Written operating, safety, and emergency procedures
- Recordkeeping procedures

20.2.2 RCA-Specific Radiation Safety Topics

RCA-specific radiation safety training will include the following topics:

- Provisions of this RSP
- Radiological characteristics of DU and its biological effects
- Estimates of expected total effective dose equivalents
- Contamination control
- Decontamination, techniques, methods, procedures and management practices
- Worker rights and responsibilities
- Emergency procedures for events such as personnel injury, fire, RCA evacuation, lightning, and so on
- Reporting of incidents
- Stop work procedures
- Special training and rights of declared pregnant workers

20.3 Training Documentation

The Garrison RSO will establish and maintain the following training documentation:

- Attendance rosters that include each attendee's name, signature, and organization for each class
- The time, date, and location of the training for each class
- The name of the instructor for each class
- The lesson plans for the RCA-specific radiation safety training

21 Recordkeeping

21.1 Garrison Documentation

The Garrison RSO will maintain the following documentation, which will be provided to the License RSO in electronic form and, upon request, made available to the NRC:

- Minutes of Garrison Radiation Safety Committee meetings
- Records of radiation surveys, monitoring and disposal
- RCA-specific radiation safety training records
- Instrument inventory and calibration records
- RCA personnel entry logs to include reason for entry
- Notification of incidents
- Program audits
- Reports of overexposure and excessive levels and concentrations
- Notification and reports to individuals
- Any other records generated for the purposes of radiation safety during licensed activities

21.2 Radioactive Material License Documentation

The License RSO will maintain a copy of each of the documents listed in Section 21.1 in license files.

22 Emergency Planning

The Garrison RSO will provide radiation safety support to supporting emergency medical personnel as necessary and upon request. The Garrison RSO will notify the License RSO as soon as possible when an emergency occurs within an RCA.

22.1 General

Range control maintains emergency response standard operating procedures (SOP). Information in that SOP includes:

- DIAL "911" for all emergencies.
- Contact information for local emergency care (emergency room, ambulances, etc.)

Army Medics are always present during training. Army air ambulances are available when needed.

22.2 Radiological Emergencies

Although unlikely, significant acute ingestion or inhalation of DU-contaminated dust could occur and is the only credible radiological emergency at the RCA. In such an event, the worker will be evacuated to the local supporting military medical facility for evaluation.

22.3 Non-Radiological Emergencies

Life-saving and limb-saving emergency treatments always take priority over all radiation safety concerns, including decontamination. (Note that removal of outer clothing will remove most surface contamination.)

23 Standard Operating Procedures

The License RSO will produce and maintain the following SOPs for implementing this RSP.

Section	Topic
2.4.1	License-specific training of the Garrison RSO
2.5.1, 20	DU awareness and license requirement training for personnel who enter an RCA
17	Instrument use, maintenance, and calibration
9, 11, 15	Exit monitoring

Attachment 2

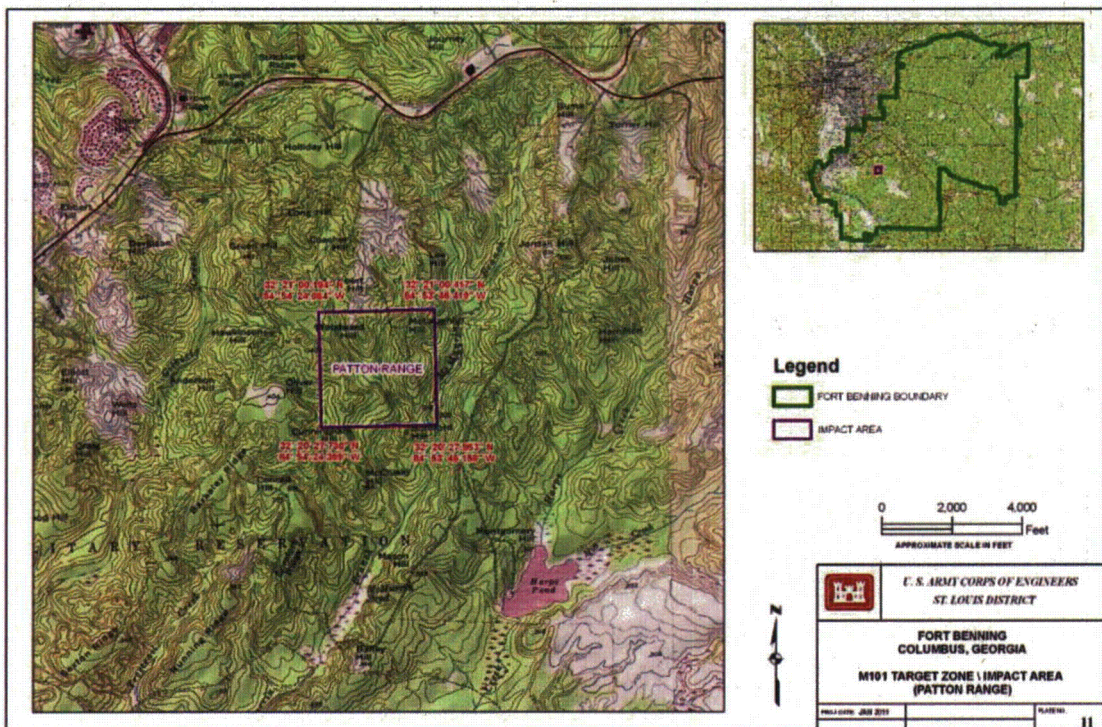
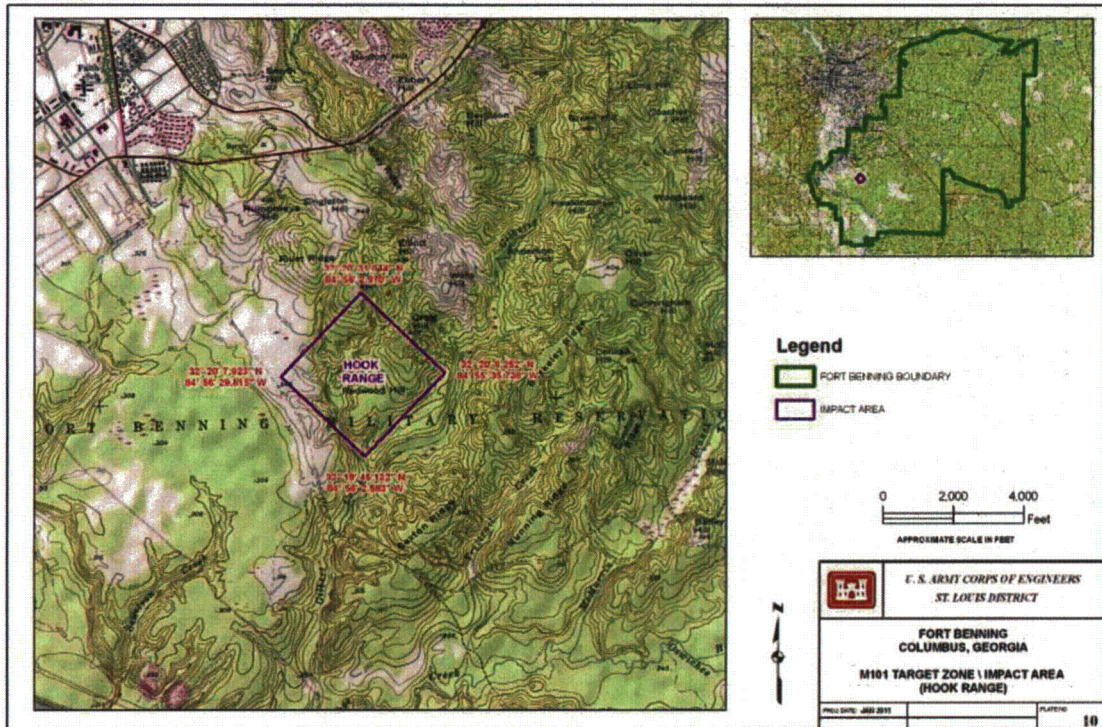
M101 Impact Areas (Radiation Control Areas)

Contents

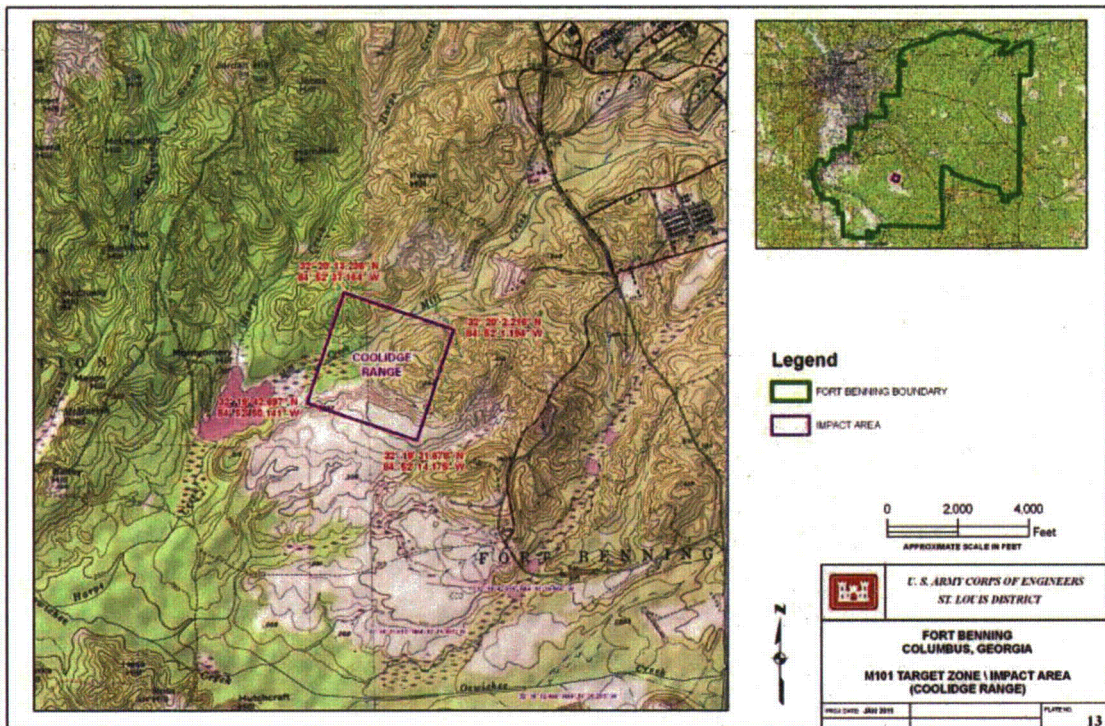
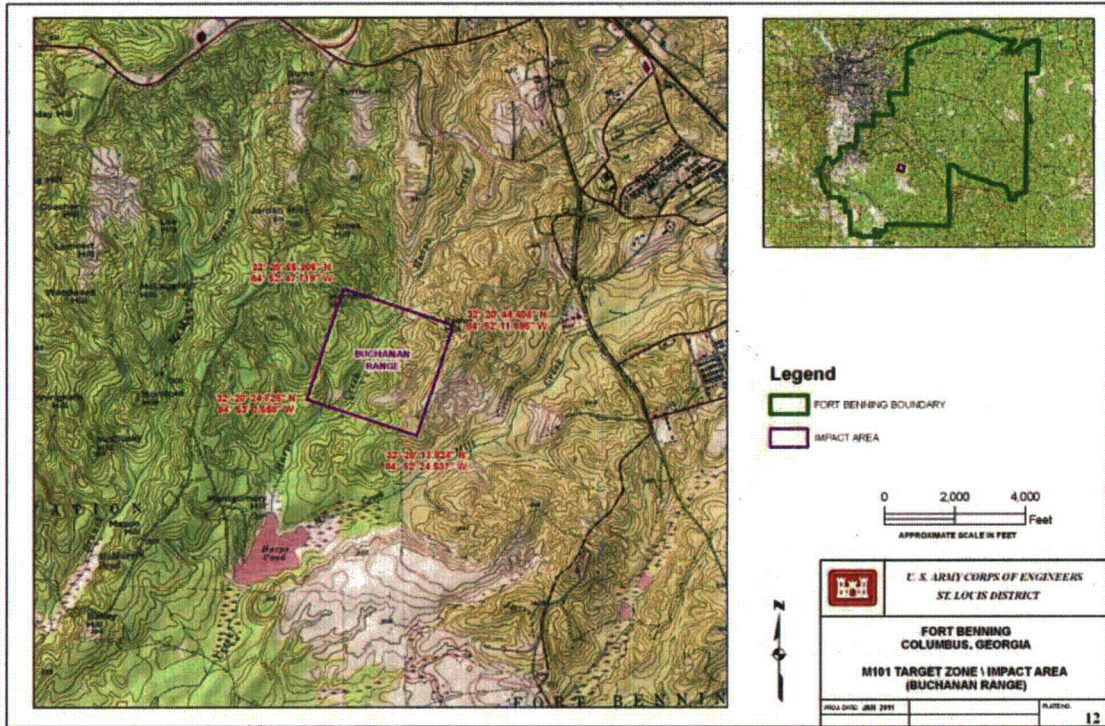
Fort Benning.....	2
Fort Bragg	7
Fort Campbell.....	8
Fort Carson	10
Fort Gordon.....	11
Fort Greely	12
Fort Hood	13
Fort Hunter Liggett	14
Fort Jackson.....	16
Fort Knox.....	17
Fort Polk.....	19
Fort Riley.....	20
Fort Sill.....	21
Joint Base Lewis-McChord/Yakima Training Center	22
Joint Base McGuire-Dix-Lakehurst.....	23
Schofield Barracks/Pohakuloa Training Area	24

M101 Impact Areas

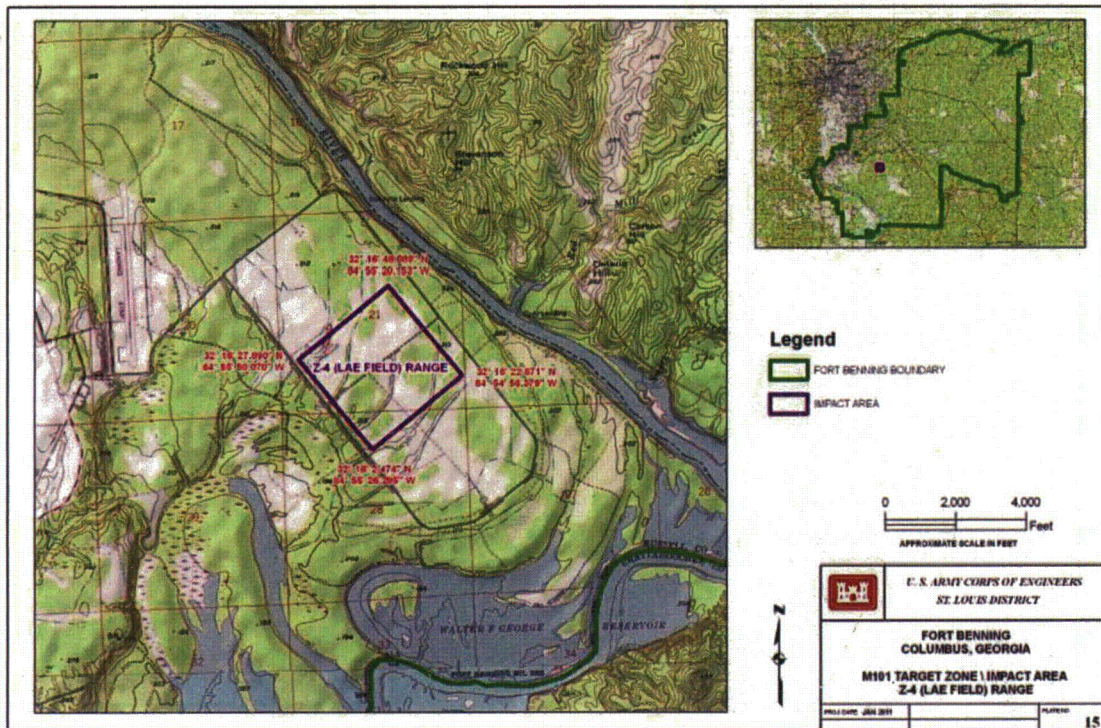
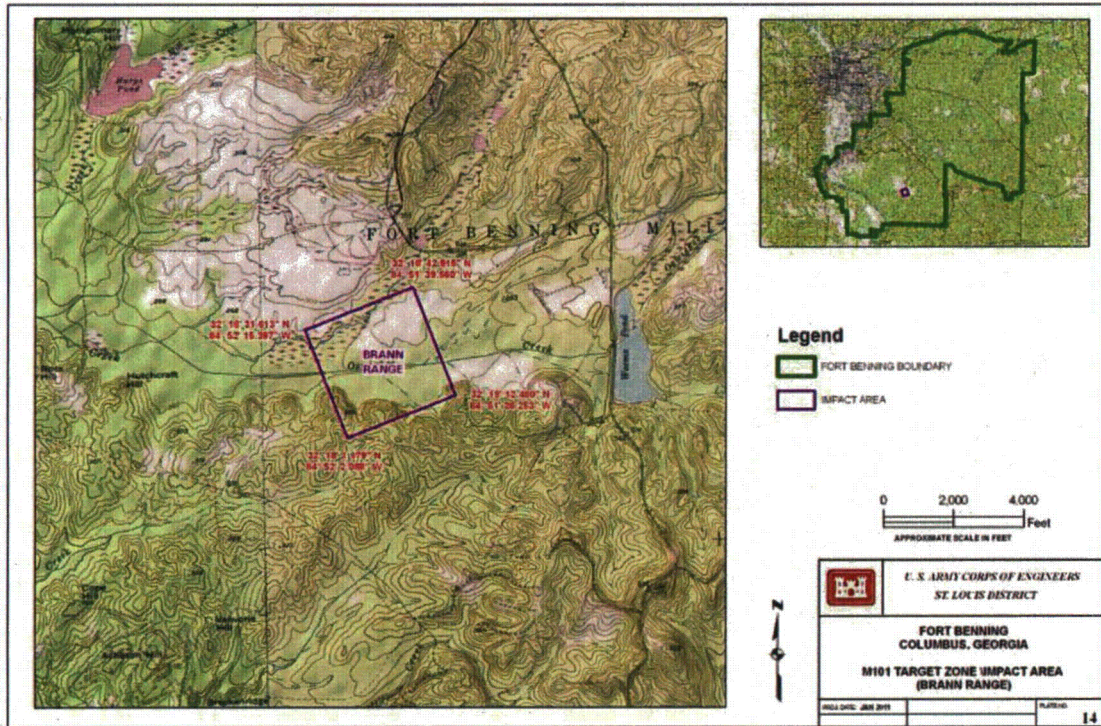
Fort Benning



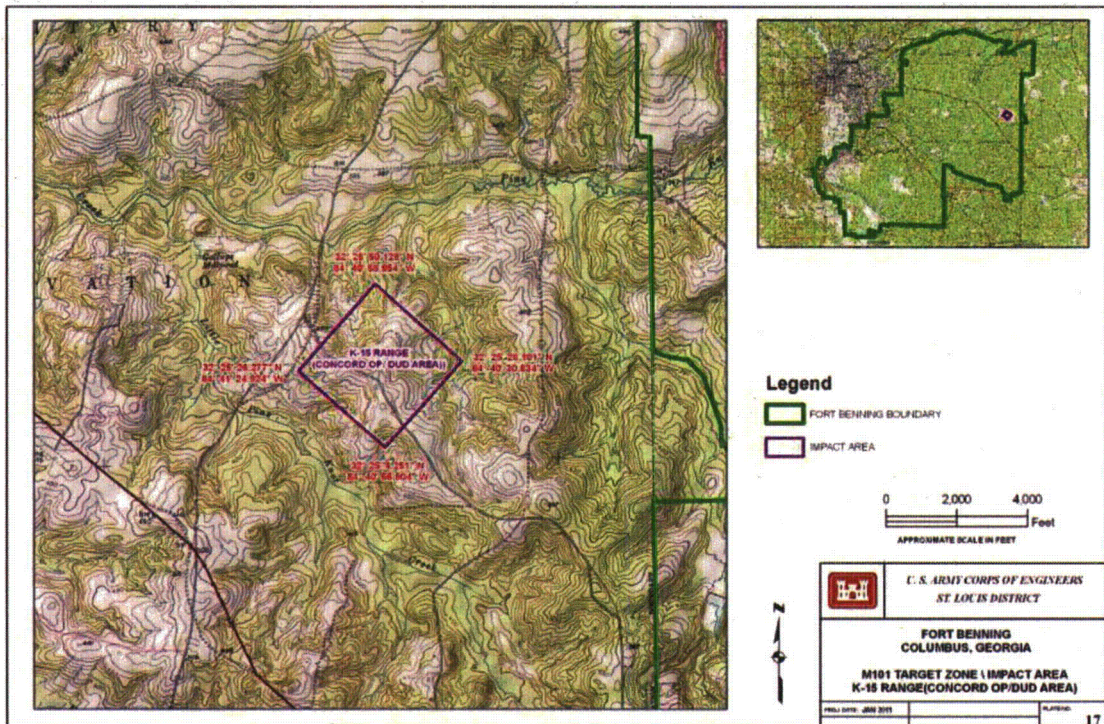
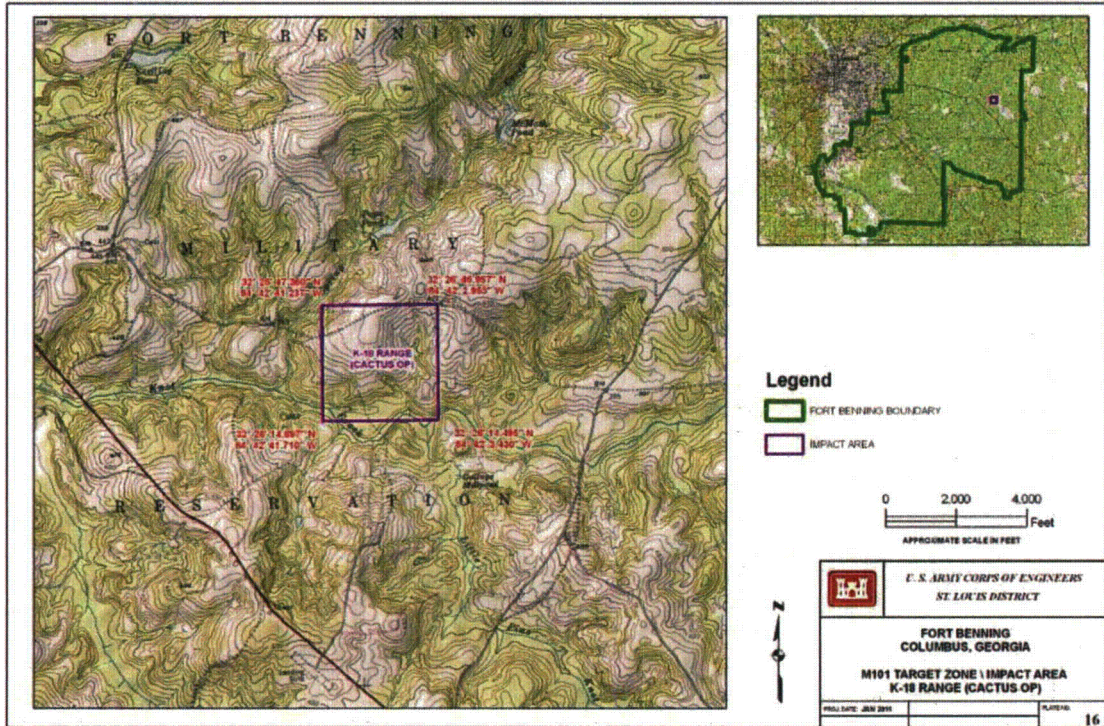
M101 Impact Areas



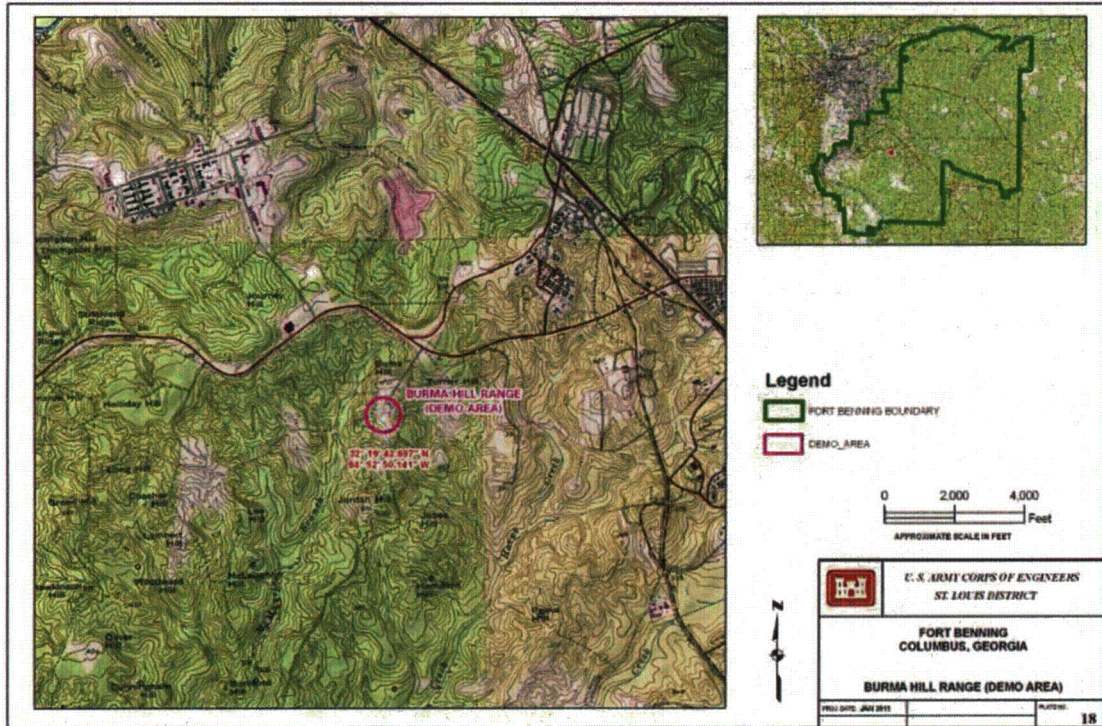
M101 Impact Areas



M101 Impact Areas

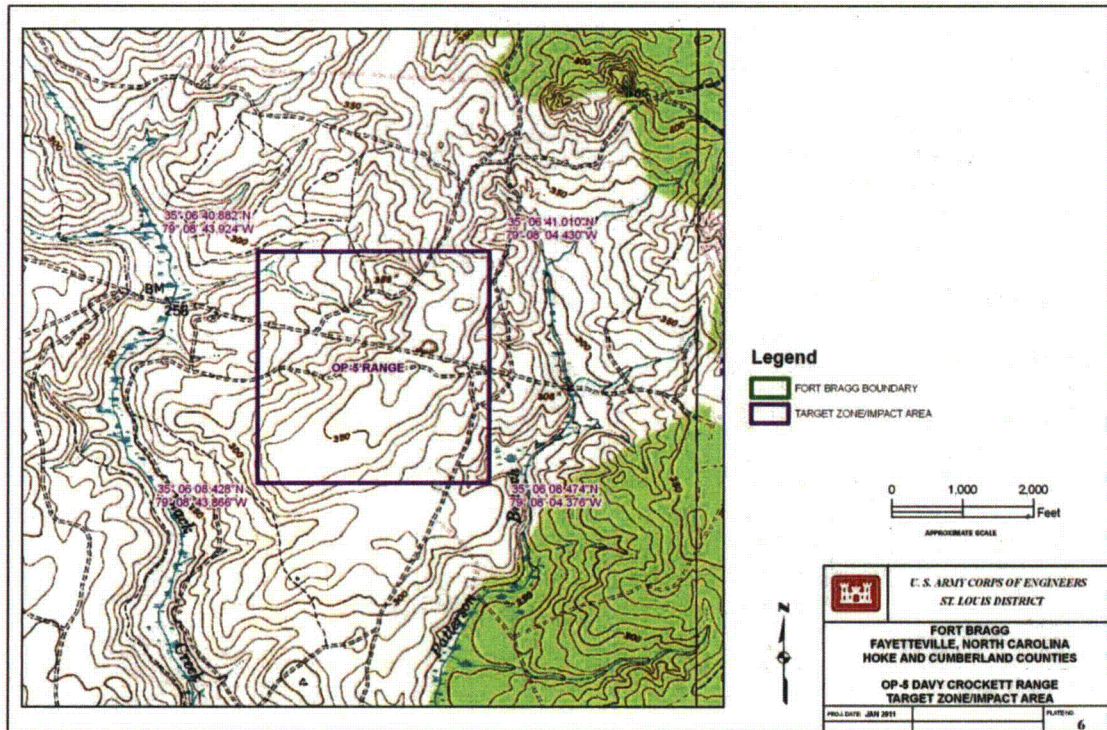


M101 Impact Areas



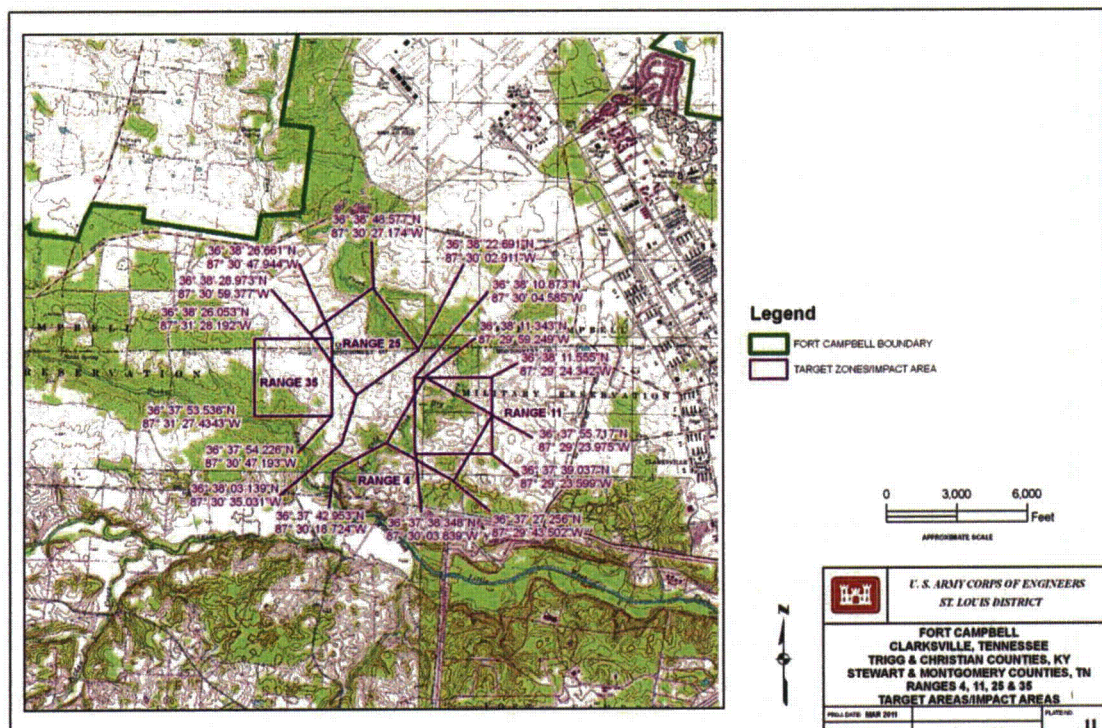
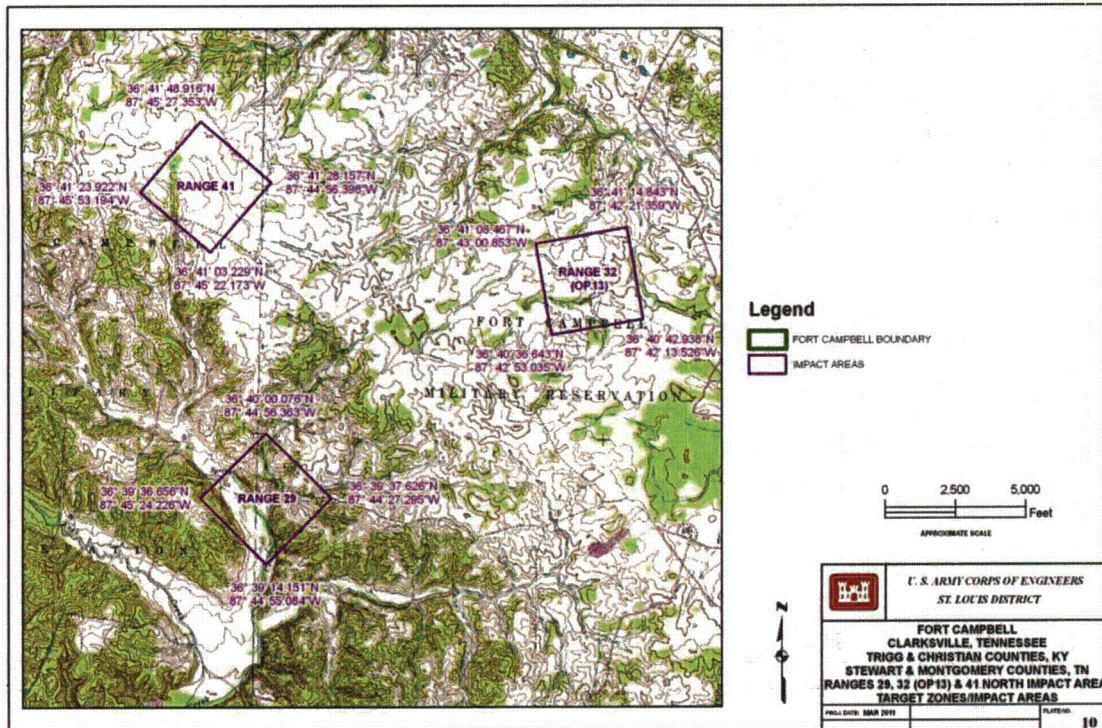
M101 Impact Areas

Fort Bragg

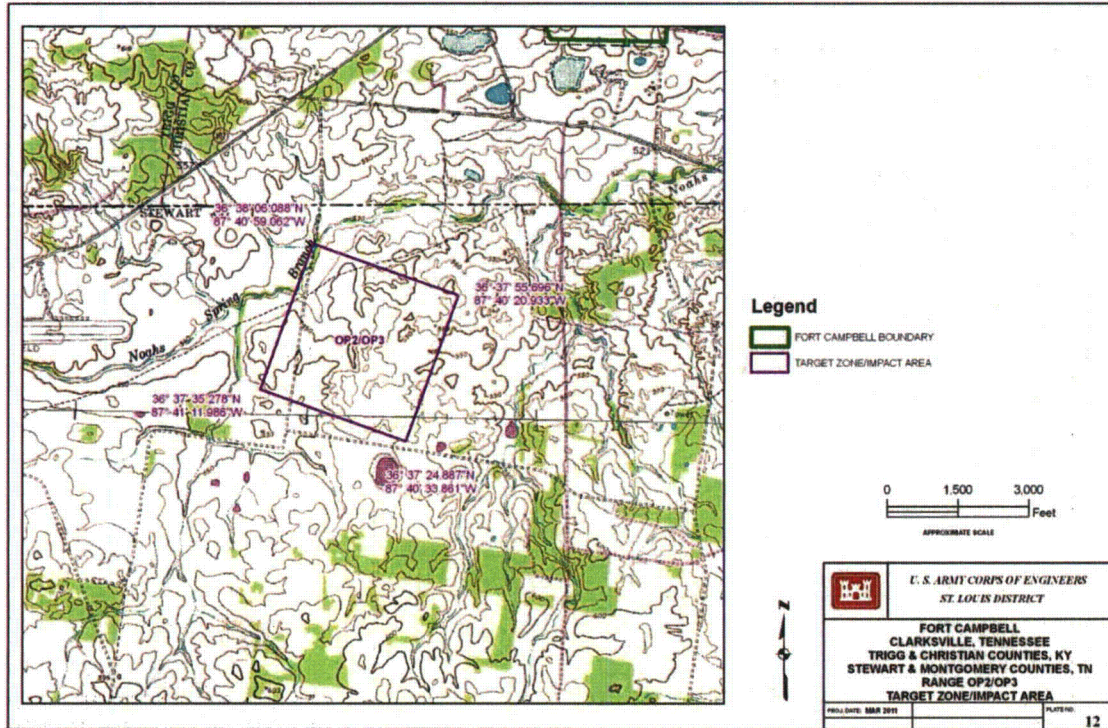


M101 Impact Areas

Fort Campbell

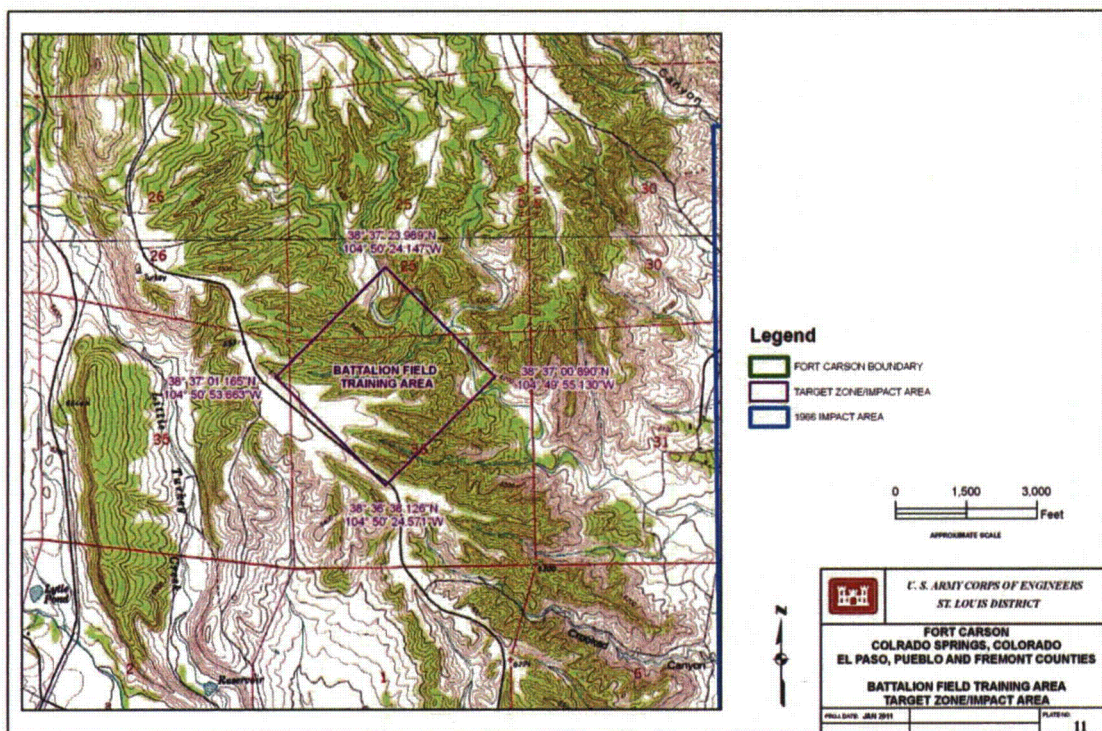
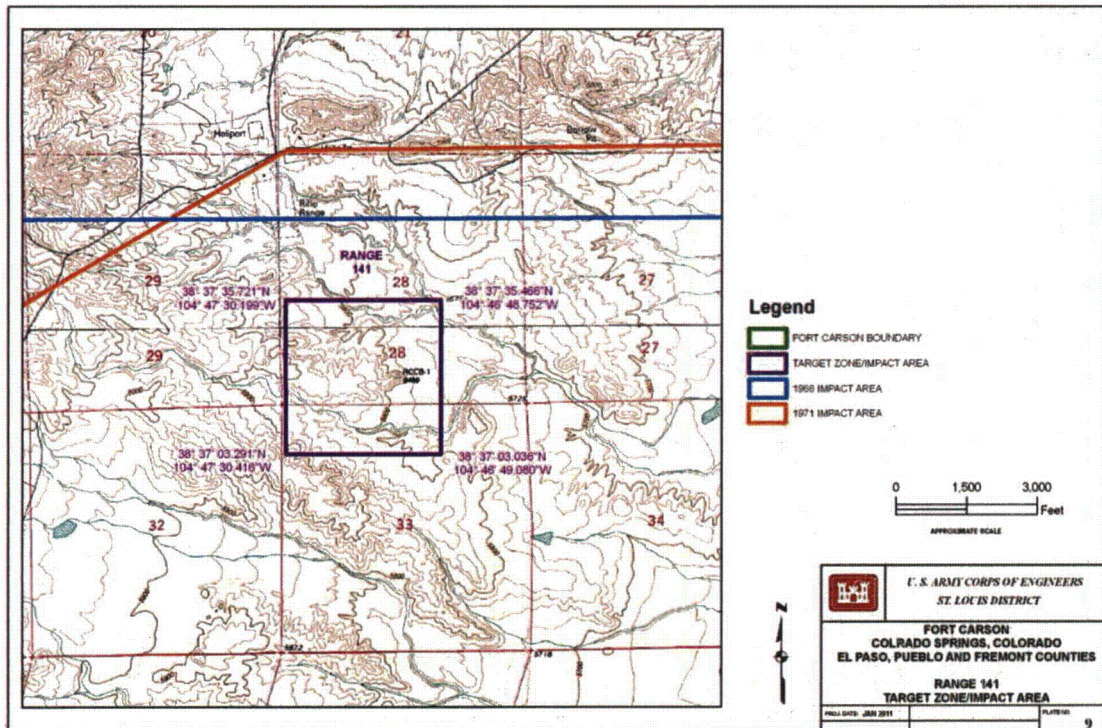


M101 Impact Areas



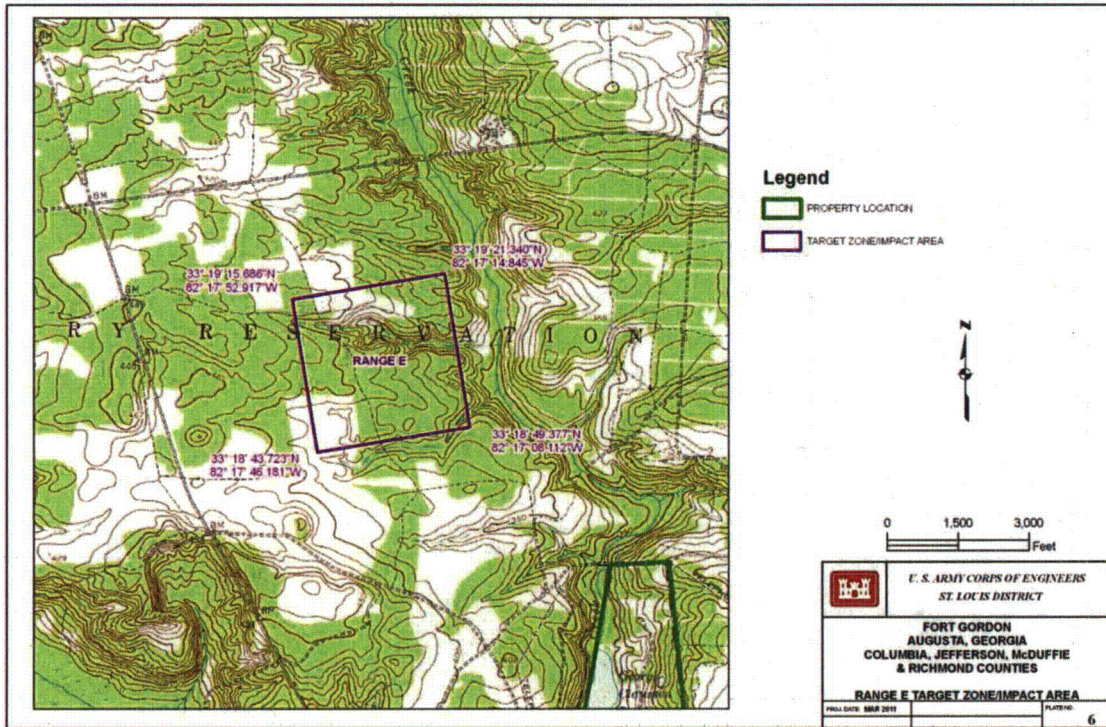
M101 Impact Areas

Fort Carson

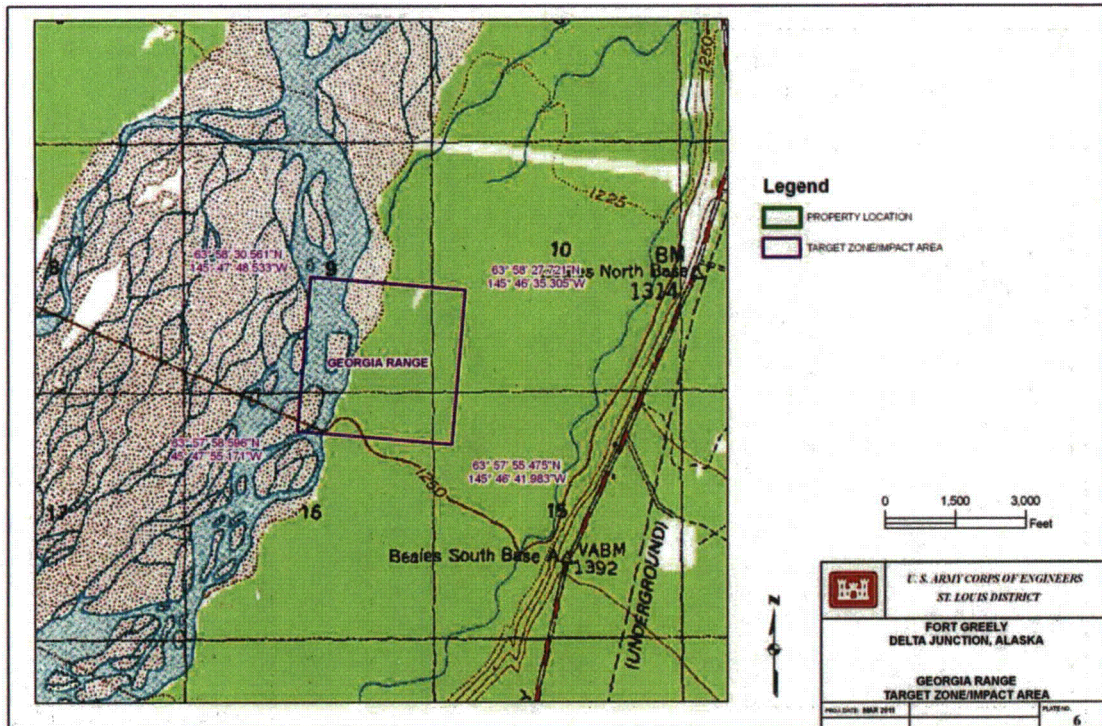


M101 Impact Areas

Fort Gordon

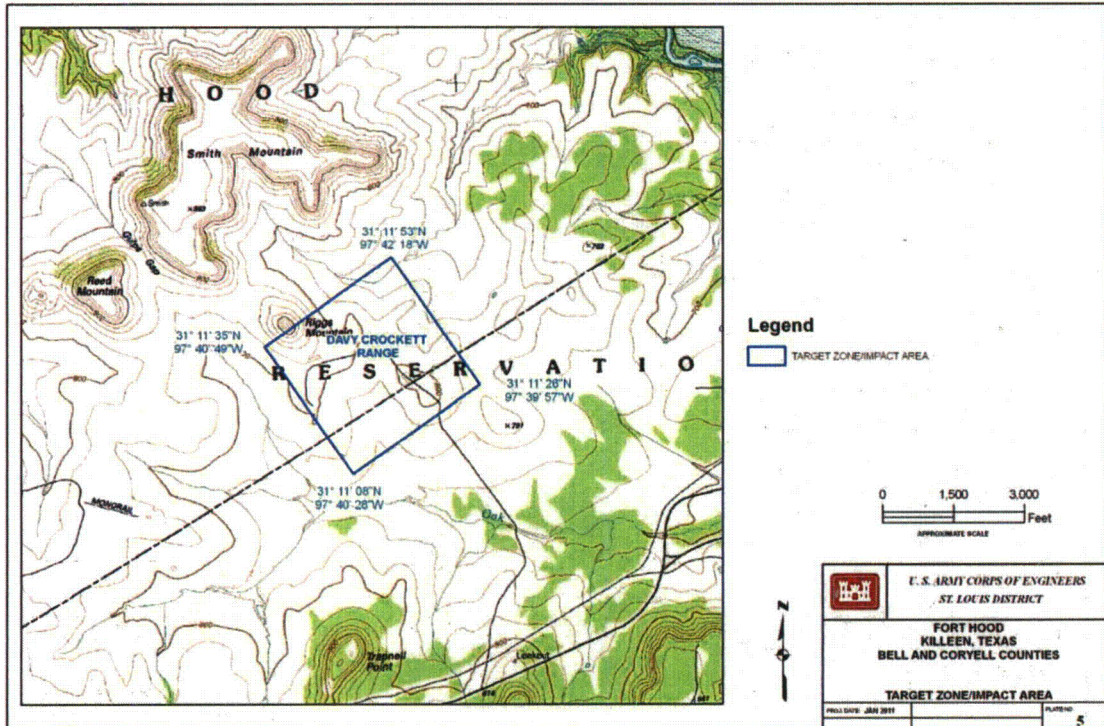


Fort Greely



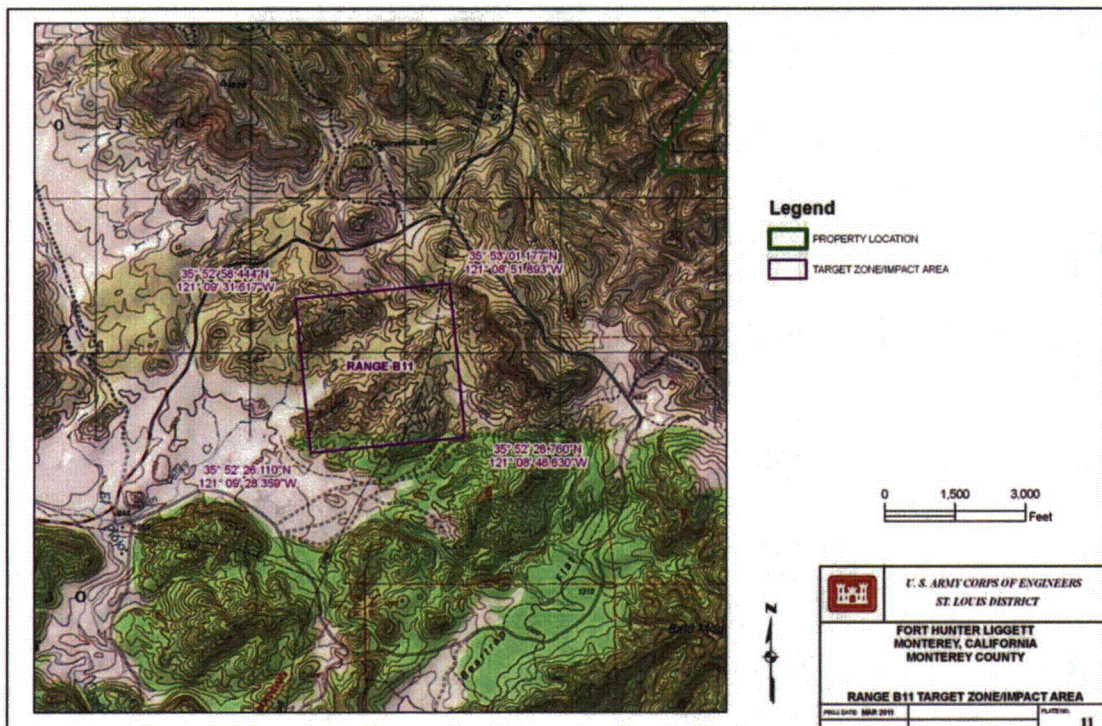
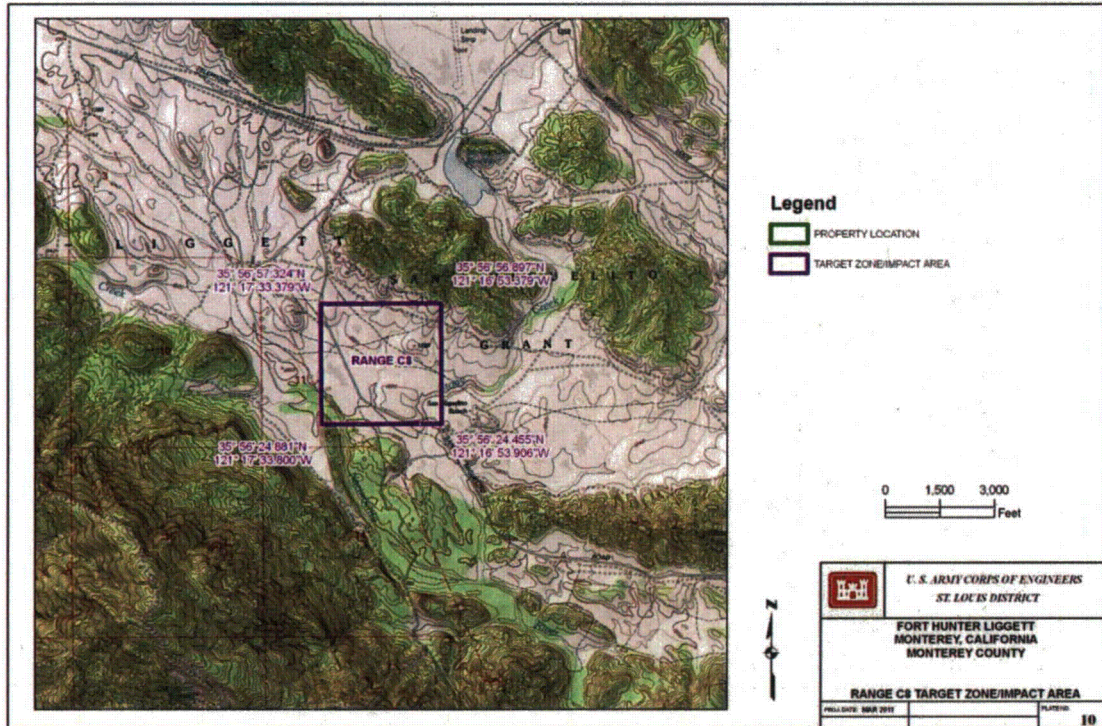
M101 Impact Areas

Fort Hood

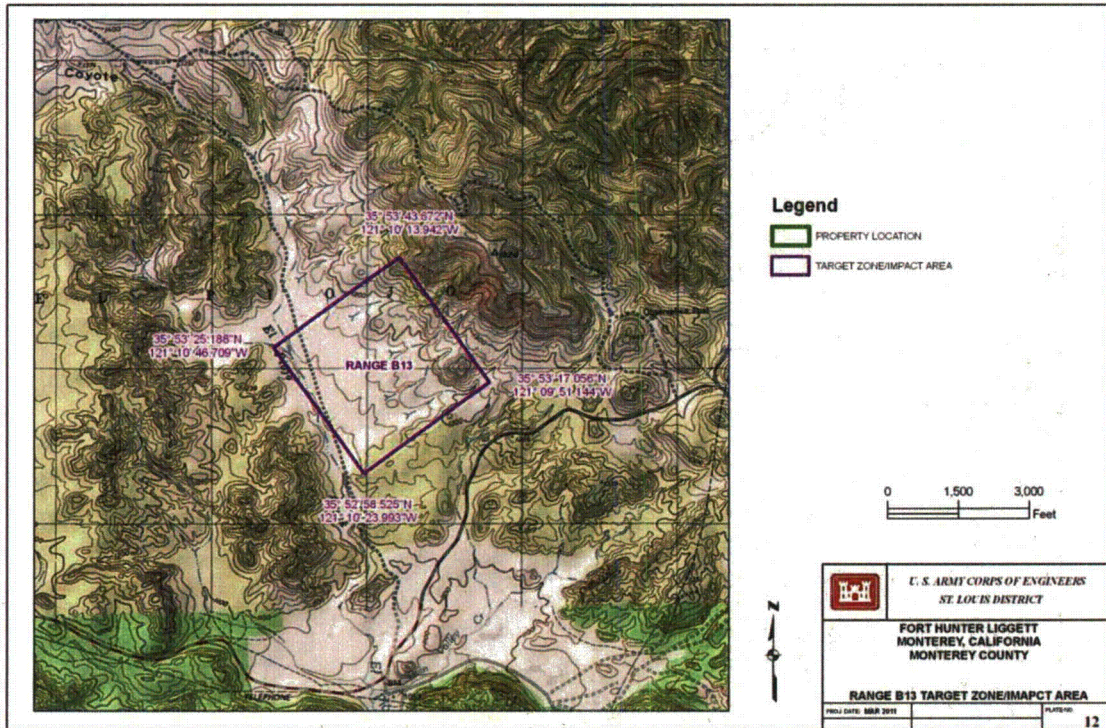


M101 Impact Areas

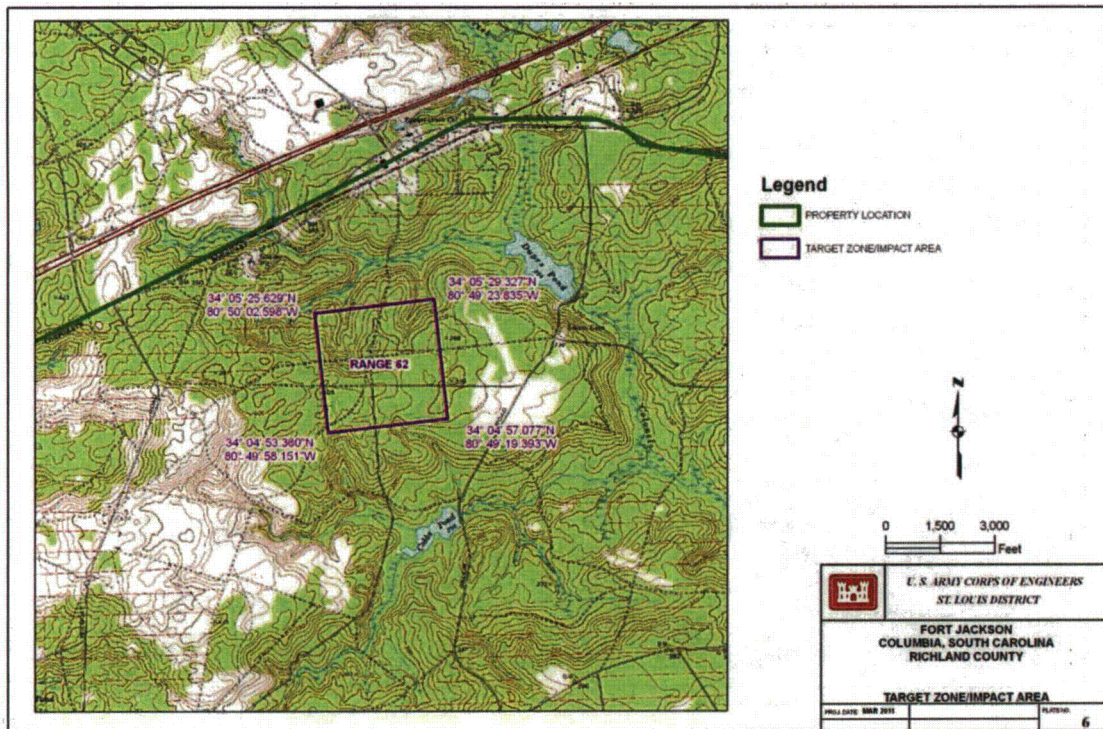
Fort Hunter Liggett



M101 Impact Areas

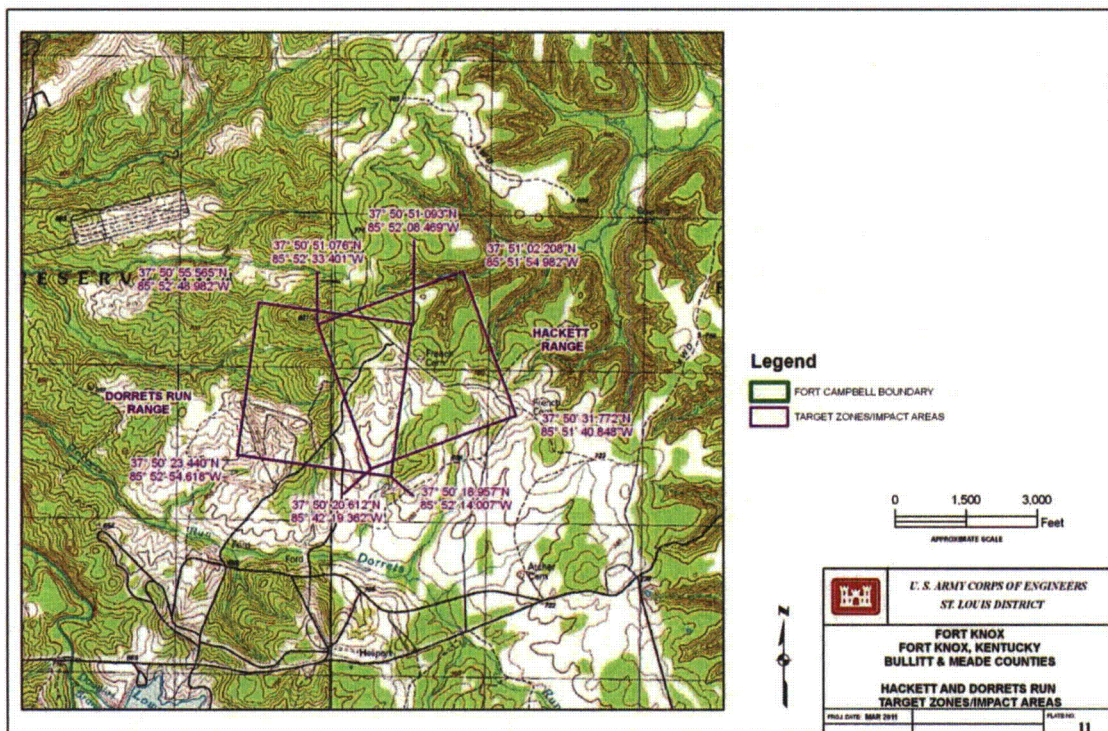
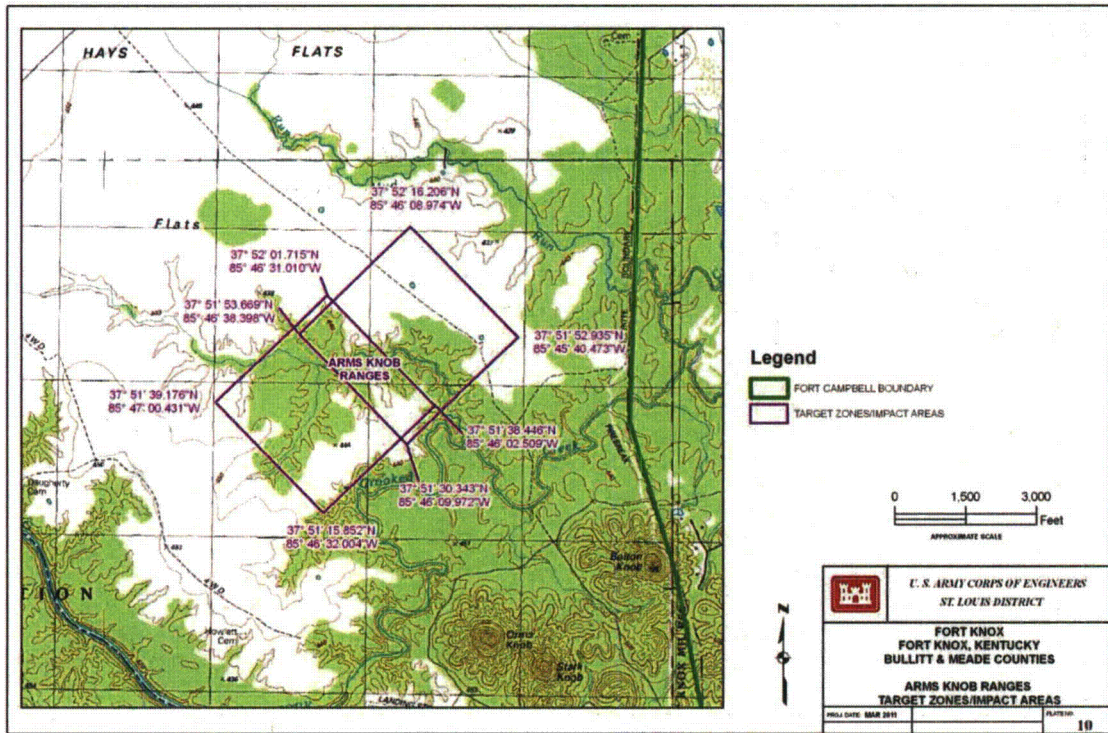


Fort Jackson

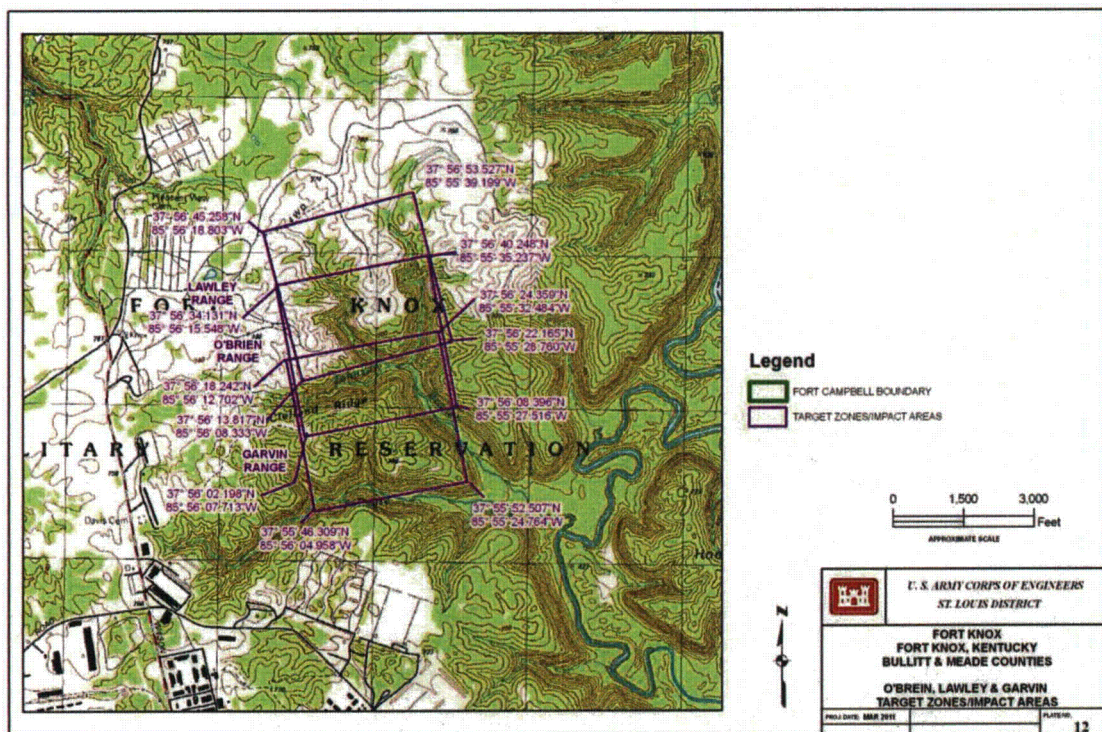


M101 Impact Areas

Fort Knox

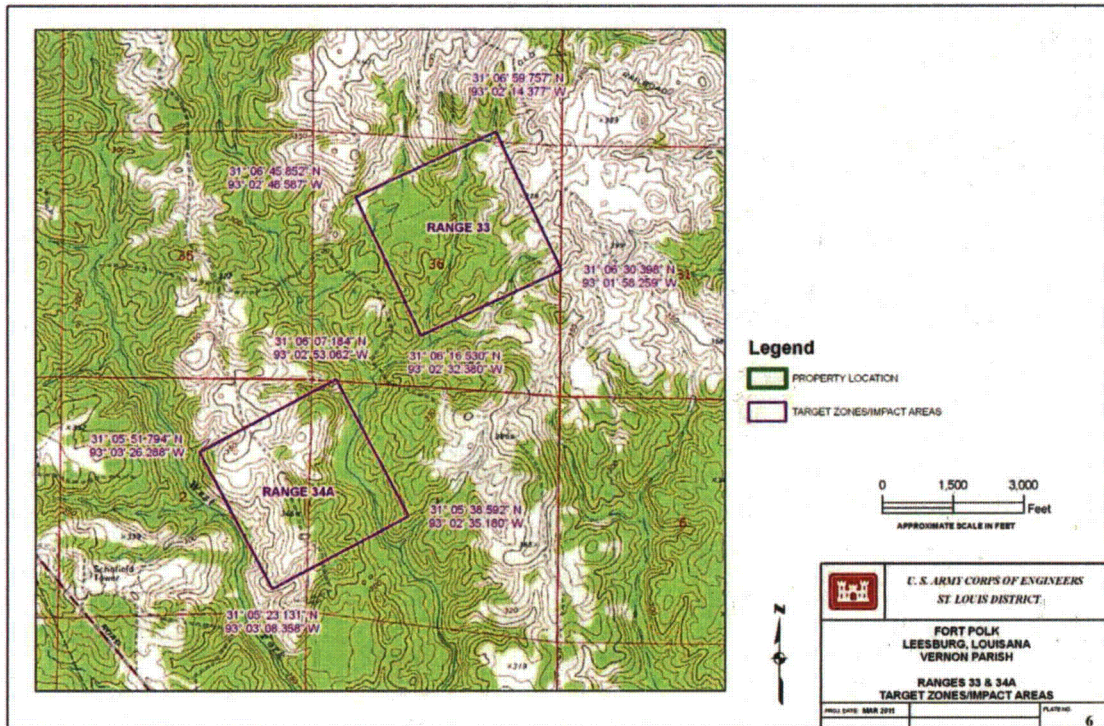


M101 Impact Areas



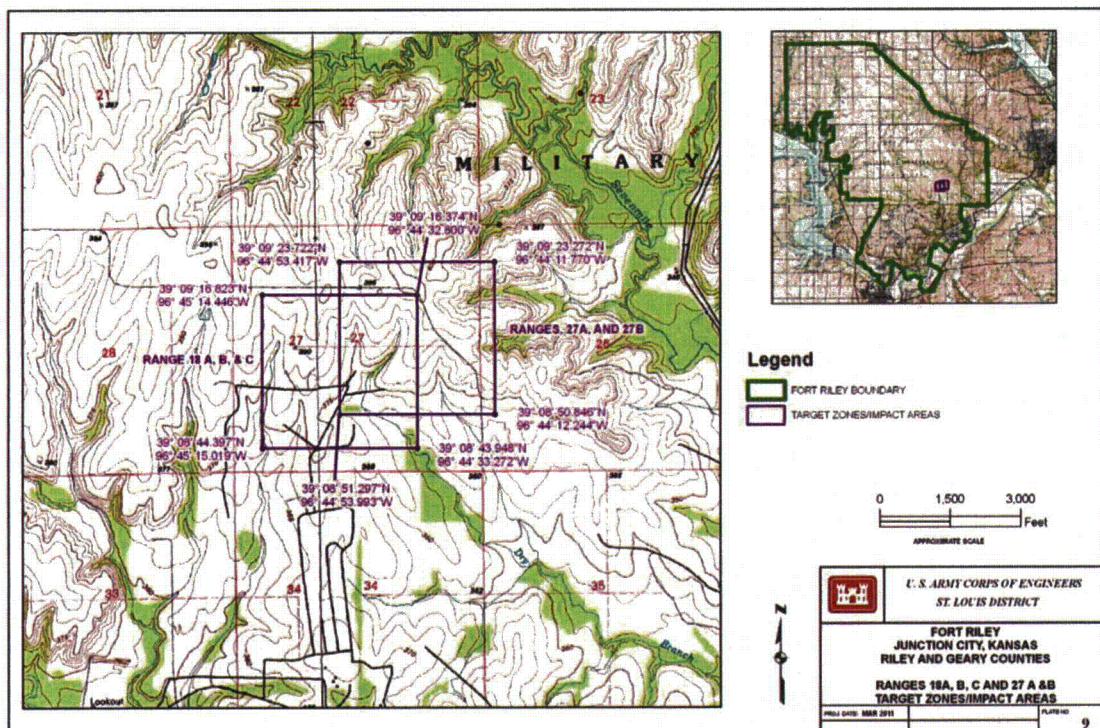
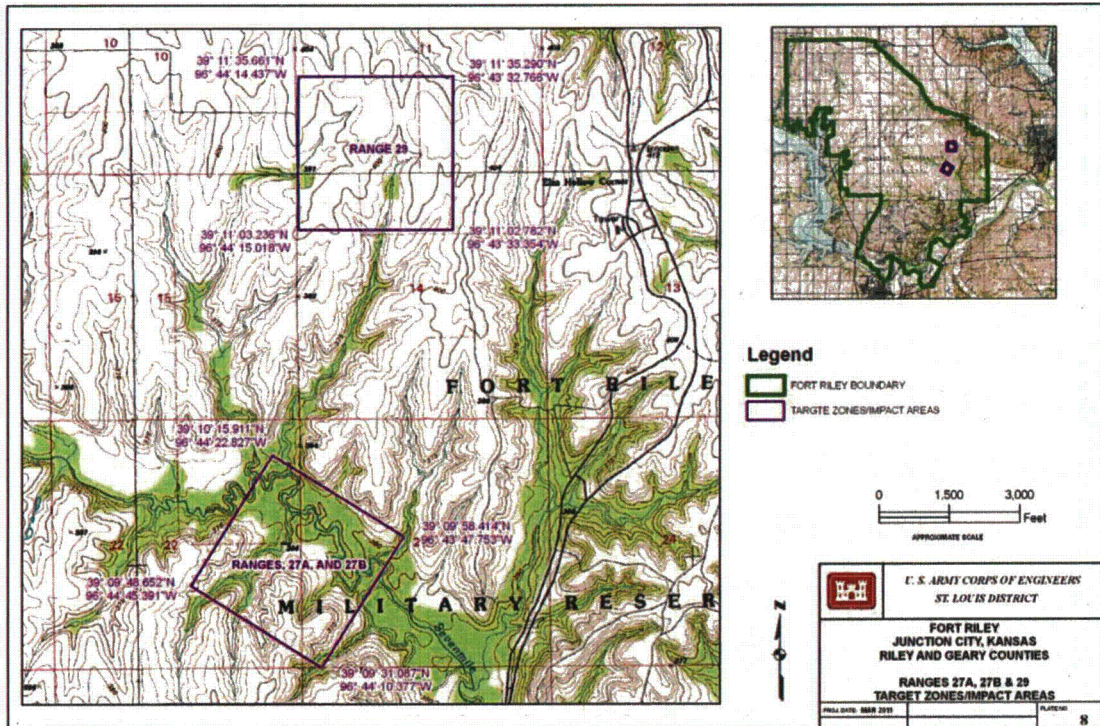
M101 Impact Areas

Fort Polk



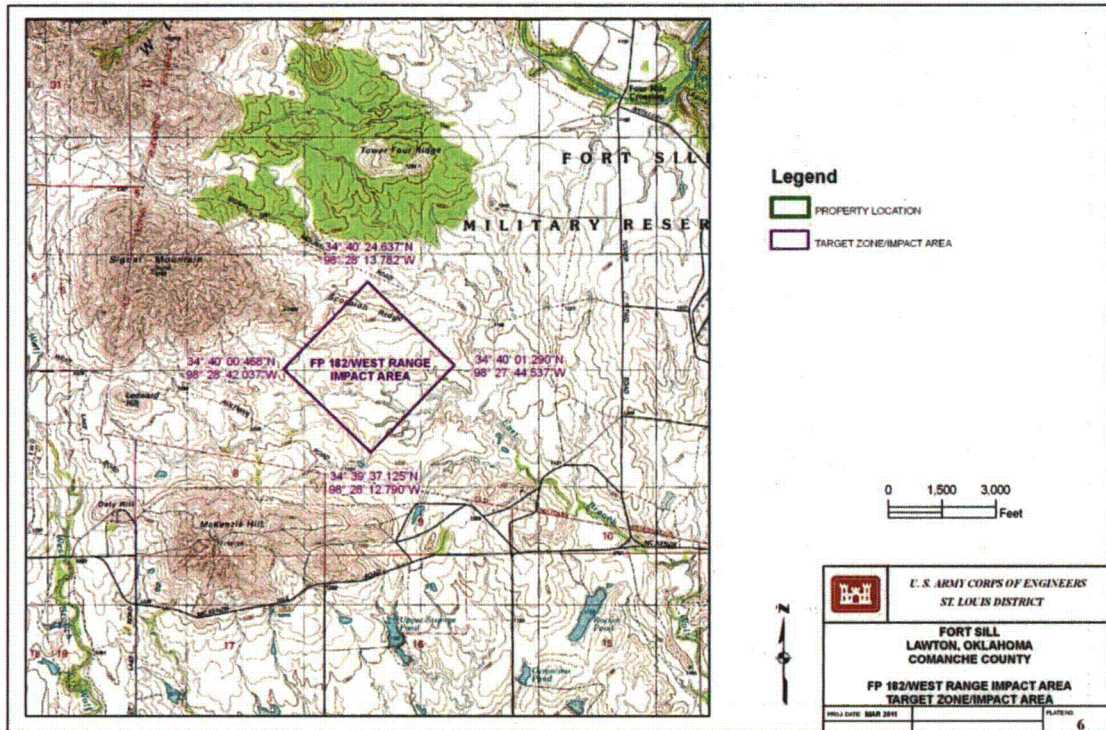
M101 Impact Areas

Fort Riley



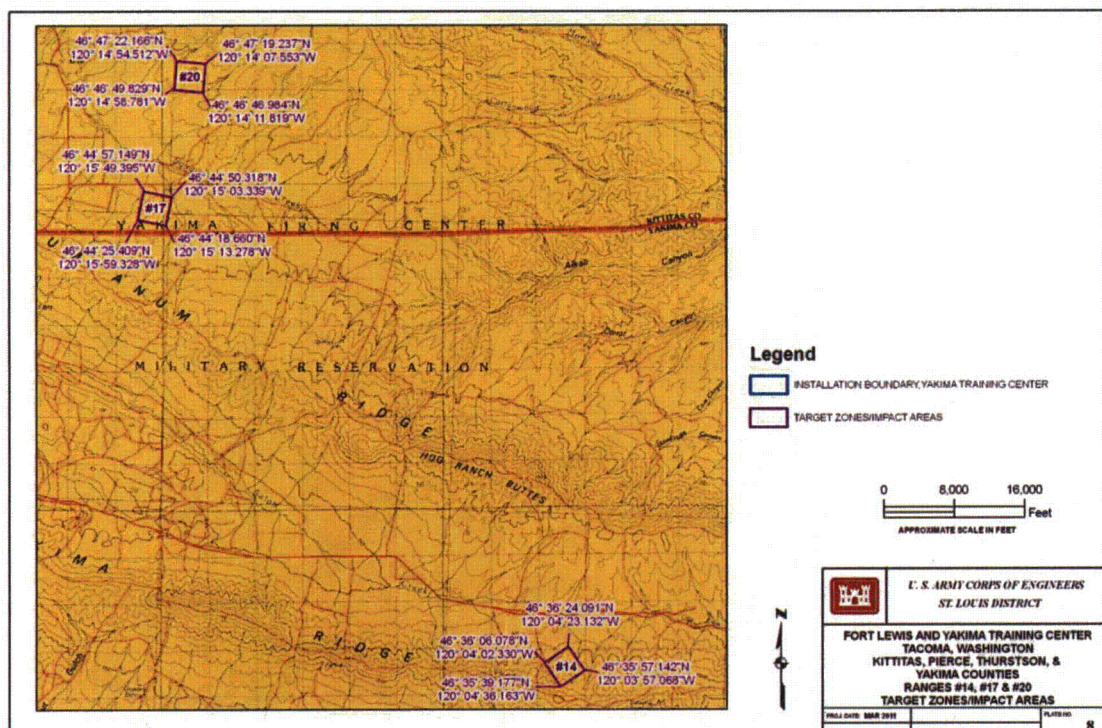
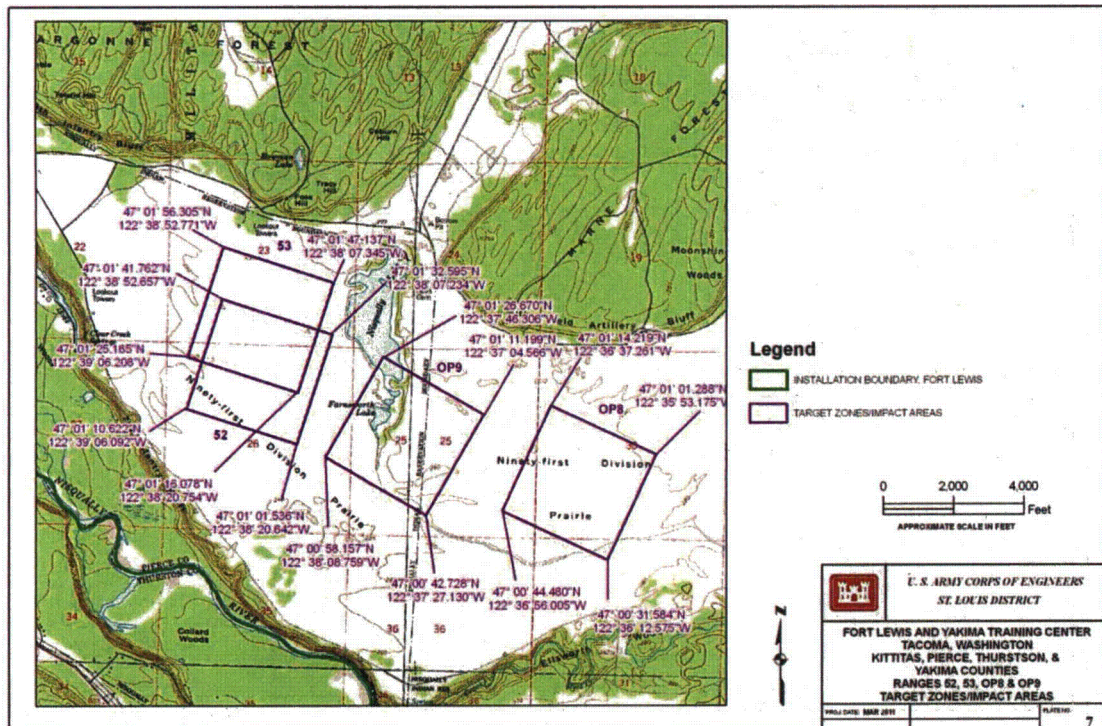
M101 Impact Areas

Fort Sill

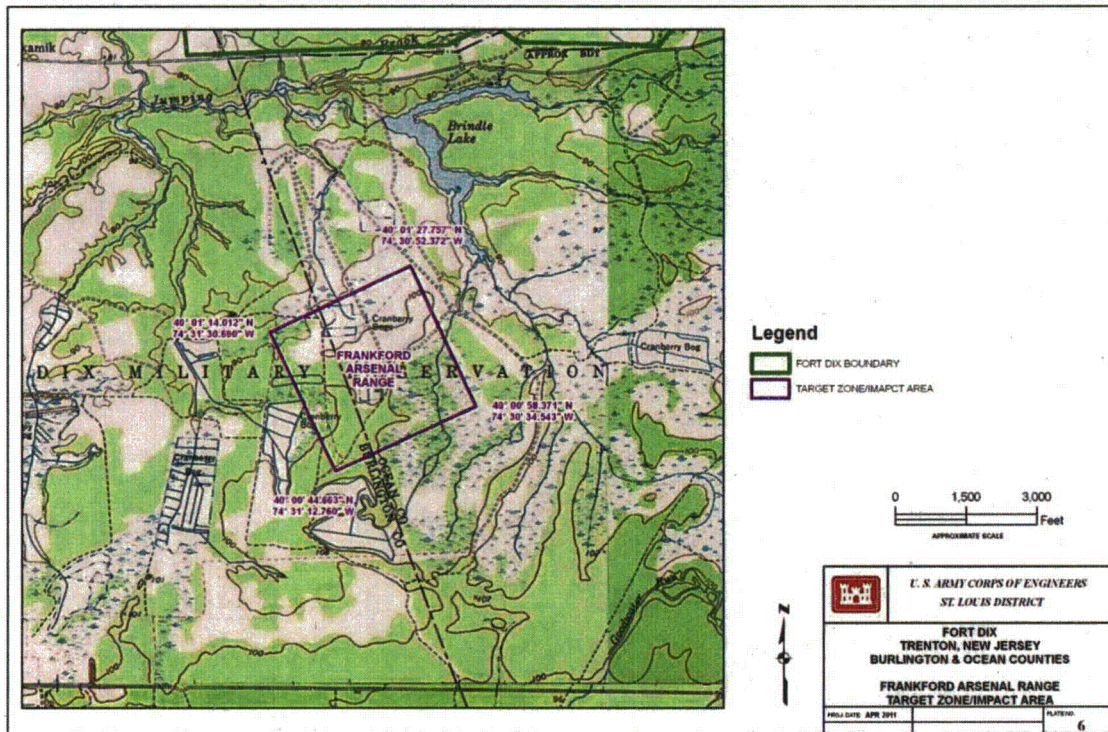


M101 Impact Areas

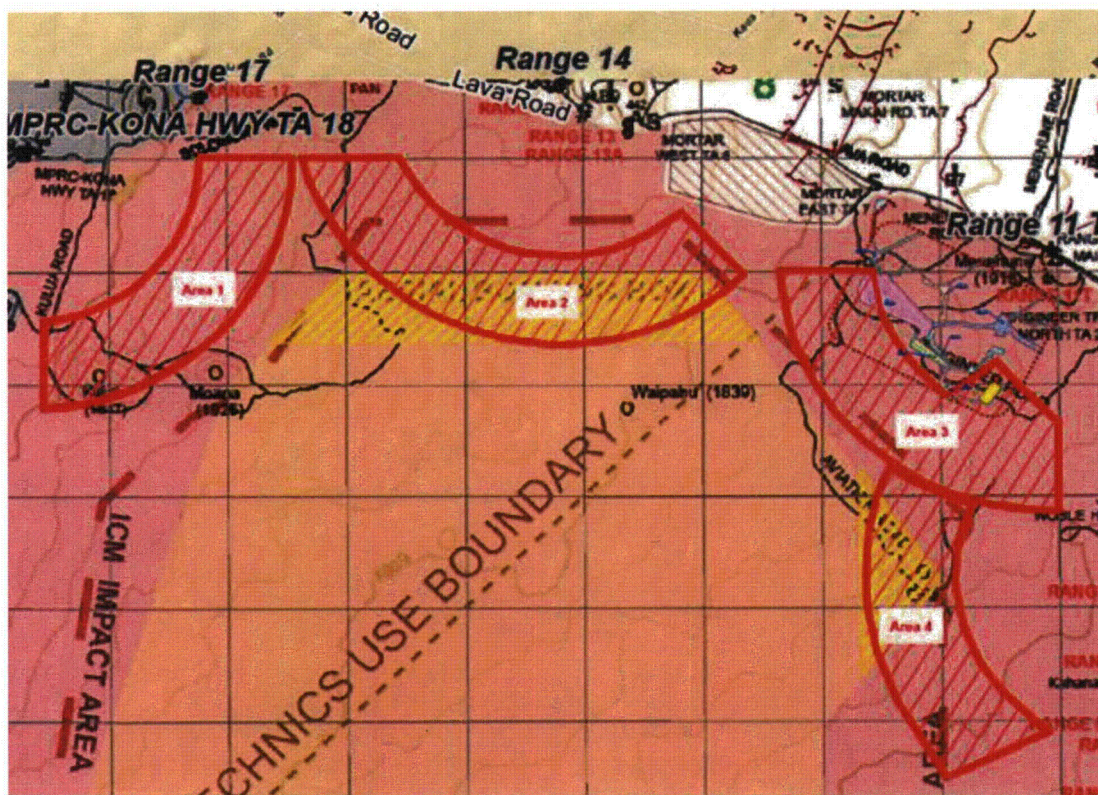
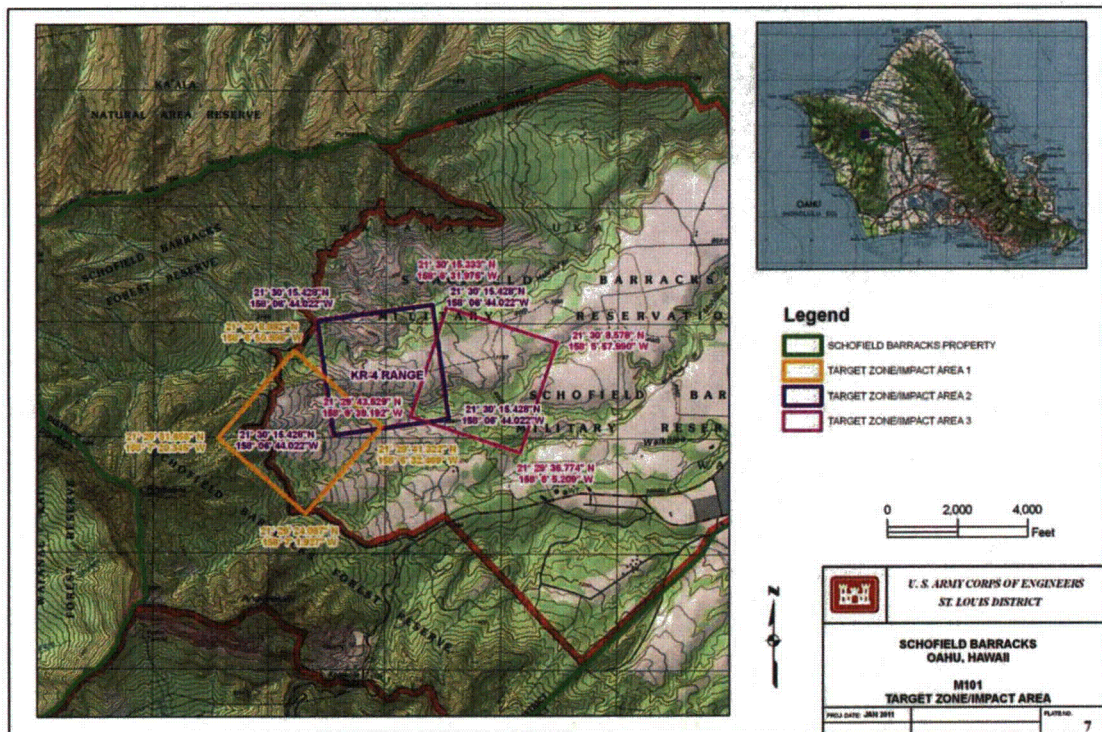
Joint Base Lewis-McChord/Yakima Training Center



Joint Base McGuire-Dix-Lakehurst



Schofield Barracks/Pohakuloa Training Area



Attachment 3

Decommissioning Funding Plan for Davy Crockett M101 Depleted Uranium Impact Areas at M101 DU-affected Ranges with "Statement of Intent"

US Army Decommissioning Funding Plan for License Number SUC-1593

Introduction

The purpose of this document is to provide updated costs associated with the decommissioning of the possession-only Source Material License No. SUC-1593 (ML13259A062, 10OCT2013). Originally, License No. SUC-1593 authorized the possession of up to 125 kg of depleted uranium (DU) at Schofield Barracks HI and at Pohakuloa Training Area HI. A condition of this license also required the Army to seek license amendments to include other Army sites containing DU related Davey Crockett M101 spotting rounds.

As the Army has increased its knowledge of Army sites containing or suspected of containing DU related to Davy Crockett M101 spotting rounds, the Army is requesting an amendment to this license. Further, a license condition requires the Army to "... submit an updated site/installation specific decommissioning cost estimate and financial assurance instrument for each Army installation listed in License Condition 10 on a tri-annual basis, by December 31 of each year or, if applicable, in accordance with the requirements of 10 CFR 40.36(c)5." Therefore, the Army is updating the Decommissioning Funding Plan (DFP) to reflect changes in the number of sites and the amount of DU licensed. License Number SUC-1593, as amended (Date), will authorize the US Army to possess up to 5700 kg of DU located at multiple US Army training sites. These locations include the following:

- Fort Benning GA
- Fort Bragg NC
- Fort Campbell KY
- Fort Carson CO
- Fort Gordon GA
- Fort Greely AK
- Fort Hood TX
- Fort Hunter Liggett CA
- Fort Jackson SC
- Fort Knox KY
- Fort Polk LA
- Fort Riley KS
- Fort Sill OK
- Joint Base Lewis-McChord/Yakima Training Center WA
- Joint Base McGuire-Dix-Lakehurst NJ
- Schofield Barracks/Pohakuloa Training Area HI (original license)

A cost estimate for all phases of the decommissioning of License Number SUC-1593 follows. Cost estimates are primarily based on analyses performed using RACER 11.2™,¹ which draws primarily from the Unit Price Book (UPB) developed by the Tri-Services Cost Engineering Group. The estimate is itemized by each of the major decommissioning tasks and activities. It distinguishes between labor and non-labor costs as described in Appendix A of NUREG-1757

¹ The Remedial Action Cost Engineering and Requirements (RACER™) software is a Microsoft Windows-based environmental remediation/corrective action cost-estimating system. RACER™ is commercial off-the-shelf software developed and maintained by AECOM.

Volume 3. This cost estimate also explicitly incorporates a 25 percent contingency factor per section A.3.1.2.3, NUREG-1757 Volume 3.

A.3.4 Facility Description Summary

<u>NRC license numbers and types (i.e., Parts 30, 40, 70, and 72)</u>

License number: SUC-1593

License type: Part 40

<u>Types and quantities of materials authorized under the licenses listed above</u>

Material type: depleted uranium

Material quantity: 5700 kg (pending)

<u>Description of how licensed materials are used</u>

Possession only

<u>Description of facility, including buildings, rooms, grounds, and description of where particular types of materials are used</u>
--

A separate document in the license amendment application shows the location of each M101 spotting round impact area. The number of impact areas is 29 on the 16 installations listed above. The impact areas are on Army training ranges. Army training ranges are open areas with no habitable structures but may contain training materials, such as targets and associated supporting materials.

Unexploded ordnance (UXO) may be present in the impact areas at all ranges. Because of the presence of UXO, ordnance and explosives safety staff support may be required for activities within the impact areas.

<u>Quantities of materials or waste accumulated before shipping or disposal</u>

Generally, each garrison will accumulate no materials or waste before shipping or disposal. Occasionally, an M101 spotting round or two may be picked up by happenstance on a range and held for disposal in accordance with the Radiation Safety Plan.

The Department of Defense (DOD) Executive Agency for Low-Level Radioactive Waste (LLRW) Disposal has primary responsibility for DOD LLRW disposal. The Agency conducts periodic waste removals from installations worldwide. If the Army collects any DU, the Army will secure and hold it for the next scheduled pick up. The Executive Agency will properly dispose of it in accordance with all applicable Federal and DOD regulations and with all disposal site conditions.

<u>Volume of contaminated material, including that in the subsurface, containing residual radioactivity that will require remediation</u>

In preparing this DFP, the Army estimated that 4191.7 m³ of Davy Crockett rounds, fragments and contaminated soil will require disposal. The Army estimates that an additional 176 m³ of contaminated Personal Protective Equipment (PPE) and other items will require disposal. The sum of these values is 4367.7 m³.

Labor Costs (A.3.1.2.1)

Planning and Preparation

Cost assumptions are presented in Table A.3.1.2.1.a (labor hours) and Table A.3.1.2.1.g (labor cost schedule). We assume that these costs are the same for each site.

Decontamination or dismantling of Radioactive Facility Components

Cost assumptions are presented in Table A.3.1.2.1.b (labor hours) and Table A.3.1.2.1.g (labor cost schedule). We assume that these costs are the same for each site.

Restoration of Contaminated Areas on Facility Grounds

Cost assumptions are presented in Table A.3.1.2.1.c (labor hours) and 3.1.2.1.g (labor cost schedule). We assume that these costs are the same for each site.

Final Radiation Survey

Cost assumptions are presented in Tables A.3.1.2.1.d (labor hours) and A.3.1.2.1.g (labor cost schedule) for a 1 km² site. We assume that these costs scale linearly with the area for each site.

Site Stabilization and Long-term Surveillance

Cost assumptions are presented in Tables A.3.1.2.1.e (labor) and A.3.1.2.1.g (labor cost schedule) for a 1-km² site. We assume that these costs scale linearly with the area for each site.

Non-Labor Costs (A.3.1.2.2)

Packing Materials

Cost assumptions are presented in Table A.3.1.2.2.a.1 and Table A.3.1.2.2.a.2. We assume that these costs scale linearly to volume of DU contaminated material at each site.

Shipping Costs

Cost assumptions are presented in Table A.3.1.2.2.b. Unit costs were evaluated separately for each site and linearly scaled to the volume of DU contaminated material at each site. Costs were derived from shipping cost schedules evaluated within RACER. Transportation miles were estimated from Google Maps (<https://www.google.com/maps/>).

Waste Disposal Costs

Cost assumptions are presented in Table A.3.1.2.2.c. These costs are scaled to match the amount of material at each site.

Equipment and Supplies Costs

Cost assumptions are presented in Table A.3.1.2.2.d. These costs are assumed the same for each of the range training sites.

Laboratory Costs

Cost assumptions are presented in Table A.3.1.2.2.e. These costs are assumed to scale linearly to volume of DU contaminated material at each site.

Contingency Factor (A.3.1.2.3)

The Army includes a 25 percent contingency factor applied to all estimated costs associated with decommissioning.

Total Cost

The total estimated cost, including contingency costs, to decommission Source Material License No SUC-1593 at all sites is \$349.2 million.

Key Assumptions (A.3.1.3)

This cost estimate does not take credit for any salvage value that the Army might realize from the sale of potential assets (for example, recovered materials or decontaminated equipment) during or after decommissioning.

This cost estimate represents the cost to the Army if all decommissioning activities were performed by an independent contractor.

This cost estimate assumes that during the decommissioning of individual sites, training operations would be suspended at decommissioning sites to ensure the safe and timely completion of decommissioning activities.

Sites operated under License SUC-1593 reside within operational training areas and have currently existing institutional controls. These controls are in place to prevent unauthorized access to Army training (live fire training, military equipment exercises and UXO). Institutional controls include security fences, signage (UXO, live fire and radioactive material), as well as monitored access control for training range entry. It is assumed that if license decommissioning with restrictions occurs, institutional controls will remain in place for safety related to Army training activities, ensuring that annual dose to the average member of the critical group will not exceed 0.25 mSv (25 mrem).

An average volume of contaminated soil and fragments requiring removal and remediation is estimated to be 0.138 m³ per Davy Crockett M101 spotting round. This estimate is based on the following assumptions.

- The DU containing portion the Davy Crockett M101 spotting round is estimated to be 8.255 cm in length and 2 cm in diameter.
- High density and subsequent low spatial mobility of Davy Crockett M101 spotting DU fragments and DU weathered components result in material localization near the original impact sites.
- As a conservative but lower bounding volume per M101 spotting round, it is assumed that for intact, deformed or nearly intact M101 spotting rounds, DU fragments and DU contaminated soil requiring remediation would be located within 10 cm of the original impact site. A cylindrical volume of 0.011 m³ of material is thus assumed as a lower bounding volume, based on a 22 cm diameter, 28.255 cm length cylinder.
- As a conservative but upper bounding volume per M101 spotting round, it is assumed that the Davy Crockett M101 spotting round is significantly fragmented and extensively oxidized from weathering and the DU fragments and DU contaminated soil requiring remediation would be located within 0.75 m of the original impact site. However,

because the M101 spotting round was not penetrator-type munitions and was unlikely to have pierced the ground surface to a large depth, it is assumed that M101 spotting round, fragments and contaminated soils generally lay within the top 15 cm of the surface. A cylindrical volume of 0.265 m³ is thus assumed as an upper bounding volume, based on a 1.5 m diameter, 15 cm height cylinder.

- Experience at multiple Army training sites has shown that M101 spotting rounds exist in a wide array of conditions ranging from intact with little degradation to highly fragmented and corroded, an average of the upper (0.265 m³) and lower (0.011 m³) volumes is assumed to be a reasonable estimate of the volume of DU fragments and soil requiring remediation for each Davy Crockett M101 spotting round. The average of this volume is 0.138 m³.

In estimating shipping cost, distances to disposal sites were estimated as follows, assuming waste is less than five percent by weight DU.

- The US Ecology site at Richland, WA is the disposal site for Fort Greely, Fort Carson, and Joint Base Lewis-McChord/Yakima Training Center only.
- The EnergySolutions site at Barnwell, SC is the disposal site for Fort Jackson only.
- The EnergySolutions site at Clive, UT is the disposal site for all other installations.

As simplifying but conservative assumption, this cost estimate assumes that sites containing M101 spotting rounds have been previously used as ranges for artillery, grenades, high explosive bombs, medium caliber munitions (20mm, 25mm, and 30mm), large caliber munitions (37mm and larger), mortars, and other small arms. This assumption requires the presence of UXO safety staff during site operations, which would not otherwise be required.

As a simplifying but conservative assumption, this cost estimate assumes that sites containing M101 spotting rounds have a vegetative cover that is predominantly heavy scrubs and small trees. This assumption results in increased time (and labor) estimates for Davy Crockett M101 spotting round recovery.

Adjusting the Cost Estimate (A.3.2)

The following is a description of the means the Army will use to adjust the site-specific cost estimates and associated funding levels periodically over the life of the facilities.

The Army will follow the regulatory guidance in NUREG-1757, Volume 3. On a three-year cycle or when the amount or types of materials substantially change, the Army will evaluate and adjust the decommissioning cost estimates to ensure costs accurately reflect changes in material inventory and possession limits, soil or groundwater contamination, facility modifications, remediation costs, and disposal costs. Additionally, the Army will ensure that financial assurance for revised decommissioning costs are updated to account for inflation, for other changes in the prices of goods and services, for changes in facility conditions or operations, and for changes in expected decommissioning procedures.

The Army has no plans to change facility conditions or operations at the M101 spotting round impact in a way that would require a license amendment.

Submitting the Required Documentation (A.3.3)

In accordance with NRC financial assurance regulations (10 CFR 40.36(d)), the Army submits, as a Federal Agency, the following to the NRC.

- A detailed site-specific cost estimate for decommissioning
- A description of the means that will be used to adjust the site specific cost estimate and associated funding levels periodically over the life of the facility
- A Statement of Intent and proof of authority to commit funds

The Army will continue to use updated versions of RACER TM.

Table A.1 Total Estimated Cost

Garrison	Range/Target Zones/Impact Areas	Estimated Area (km ²)	Estimated Cost	
Previously Submitted (estimate includes 25 percent contingency)				
Hawaii	Pohakuloa Training Area	8.9	\$66,864,608	
	Schofield Barracks	3.7	\$42,470,781	
Generic (estimate includes 25 percent contingency)				
Generic 1 km ² area proportional cost		1.0	\$3,280,749	
Specific M101 DU Impact Areas (estimate includes 25 percent contingency)				
Training Area	Range Name	Area (km ²)	Cost	Shipping and Disposal Costs
Fort Benning	Hook	1.0	\$3,280,749	\$36,826,178
	Patton	1.0	\$3,280,749	
	Buchanan	1.0	\$3,280,749	
	Coolidge	1.0	\$3,280,749	
	Brann	1.0	\$3,280,749	
	Z-4 (Lae Field)	1.0	\$3,280,749	
	K-18	1.0	\$3,280,749	
	K-15	1.0	\$3,280,749	
	Burma Hill	0.073	\$3,280,749	
Fort Bragg	OP-5	1.0	\$3,280,749	\$16,185,326
Fort Campbell	OP2/OP3	1.0	\$3,280,749	\$2,859,269
Fort Carson	141	1.0	\$3,280,749	\$5,556,470
	Battalion Field Training Area	1.0	\$3,280,749	
Fort Gordon	E	1.0	\$3,280,749	\$808,668
Fort Greely	Georgia Range	1.0	\$3,280,749	\$657,123
Fort Hood	[no name]	1.0	\$3,280,749	\$15,429,839
Fort Hunter Liggett	C8	1.0	\$3,280,749	\$801,403
	B11	1.0	\$3,280,749	
	B13	1.0	\$3,280,749	
Fort Jackson	[no name]	1.0	\$3,280,749	\$797,161
Fort Knox	Arms Knob	1.8	\$5,905,348	\$15,261,799
	O'Brein, Lawley and Garvin	1.9	\$6,233,423	
Fort Polk	33 & 34A	2.0	\$6,561,498	\$10,152,710
Fort Riley	27A, 27B, and 29	2.0	\$6,561,498	\$692,381
Fort Riley	18A, B, and C and 27A and B	1.6	\$5,249,198	
Fort Sill	FP 182/West	1.0	\$3,280,749	\$2,488,258
Joint Base Lewis-McChord	Fort Lewis 52, 53, OP8 and OP9	3.5	\$11,482,621	\$6,828,345
	Yakima Training Center 14, 17, and 20	3.0	\$9,842,246	
Joint Base McGuire-Dix-Lakehurst	Frankford Arsenal Range	1.0	\$3,280,749	\$494,728
Subtotal			\$124,012,310	\$115,839,655
Total (without Hawaii sites)			\$239,851,965	
Total			\$349,187,354	

Table A.3.1.2 Estimated Decommission Costs (per km²)

Task/Component	Cost
Planning and Preparation (From Table A.3.1.2.1)	\$221,229
Decontamination and/or Dismantling of Radioactive Facility Components (From Table A.3.1.2.1 (b))	\$159,900
Restoration of Contaminated Areas on Facility Grounds (From Table A.3.1.2.1(c))	\$-
Final Radiation Survey (From Table A.3.1.2.1 (d))	\$1,026,363
Site Stabilization and Long-Term Surveillance (From Table A.3.1.2.1(e))	\$36,505
Laboratory Costs (TOTAL from Table A.3.1.2.2(e))	\$701,190
Miscellaneous Costs (TOTAL from Table A.3.1.2.2 (f))	\$479,412
SUBTOTAL	\$2,624,599
25% Contingency	\$656,150
TOTAL	\$3,280,749

Table A.3.1.2.1 Total Labor Costs by Major Decommissioning Task (per km²)

Task	IMCOM RSSO	Installation RSO	Army Oversight HP	Army Oversight Safety	Project Manager	Project Engineer	Project CHP	Project Safety	Clerical	Project UXO	CADD	Field Supervisor	Field HP	Field Safety/UXO	Field HP Tech	Field UXO Tech	Laborer
Planning and Preparation	\$41,726	\$4,764	\$36,921	\$13,044	\$11,556	\$35,232	\$44,032	\$5,275	\$5,364	\$5,136	\$4,680	\$3,708	\$4,479	\$3,312	\$1000	\$1000	\$-
Decontamination or Dismantling of Radioactive Facility Components	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$50,000	\$50,000	\$59,900
Restoration of Contaminated Areas on Facility Grounds	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-
Final Radiation Survey	\$32,304	\$5,955	\$47,640	\$43,480	\$6,420	\$9,909	\$23,392	\$5,275	\$3,576	\$5,136	\$31,980	\$44,496	\$53,748	\$79,488	\$306,000	\$306,000	\$21,564
Site Stabilization and Long-Term Surveillance	\$6,730	\$5,955	\$23,820	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-
Total	\$80,760	\$16,674	\$108,381	\$56,524	\$17,976	\$45,141	\$67,424	\$10,550	\$8,940	\$10,272	\$36,660	\$48,204	\$58,227	\$82,800	\$357,000	\$357,000	\$81,464

US Army Decommissioning Funding Plan for License Number SUC-1593

Table A.3.1.2.1 (a) Planning and Preparation (Work Days and per km²)

	IMCOM RSSO	Installation RSO	Army Oversight HP	Army Oversight Safety	Project Manager	Project Engineer	Project CHP	Project Safety	Clerical	Project UXO	CADD	Field Supervisor	Field HP	Field Safety UXO	Field HP Tech	Field UXO Tech	Laborer
Preparation of Documentation for Regulatory Agencies	10	1	10	5	2				5								
Submittal of Decommissioning Plan to NRC when required by 10 CFR 30.36(g)(1), 40.42(g)(1), 70.38(g)(1), or 72.54(g)	10	1	10	1	5	20	20	2	2	1	2	1	1	1			
Development of Work Plans	10	2	10	6		10	10	2	2	1	4	1	1	1			
Procurement of Special Equipment					1	2	1			1							
Staff Training	1		1		1		1	1		1		1	1	1	1	1	
Characterization of Radiological Condition of the Facility (including sampling, soil and tailings analysis, or groundwater analysis, if applicable)																	
Other (specify)																	
TOTALS	31	4	31	12	9	32	32	5	9	4	6	3	3	3	1	1	0

Table A.3.1.2.1 (b) Decontamination or Dismantling of Radioactive Facility Components (Work Days and per km²)

	IMCOM RSSO	Installation RSO	Army Oversight HP	Army Oversight Safety	Project Manager	Project Engineer	Project CHP	Project Safety	Clerical	Project UXO	CADD	Field Supervisor	Field HP	Field Safety/UXO	Field HP Tech	Field UXO Tech	Laborer
Glove Boxes																	
Fume Hoods																	
Lab Benches																	
Sinks																	
Drains																	
Floors																	
Walls																	
Ceilings																	
Ventilation/ Ductwork																	
Hot Cells																	
Equipment/ Materials																	
Soil Plots (field management in FSS)															50	50	100
Storage Tanks																	
Storage Areas																	
Radioactive Waste Areas																	
Scrap Recovery Areas																	
Maintenance Shop																	
Equipment Decontamination Areas																	
Other (specify)																	
TOTALS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	50	50	100

Table A.3.1.2.1 (c) Restoration of Contaminated Areas on Facility Grounds (Work Days and per km²)

Activity	IMCOM RSSO	Installation RSO	Army Oversight HP	Army Oversight Safety	Project Manager	Project Engineer	Project CHP	Project Safety	Clerical	Project UXO	CADD	Field Supervisor	Field HP	Field Safety/UXO	Field HP Tech	Field UXO Tech	Laborer
Backfill and Restore Site	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

US Army Decommissioning Funding Plan for License Number SUC-1593

TOTALS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
--------	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

Table A.3.1.2.1 (d) Final Radiation Survey (Work Days and per km²)

	IMCOM RSSO	Installation RSO	Army Oversight HP	Army Oversight Safety	Project Manager	Project Engineer	Project CHP	Project Safety	Clerical	Project UXO	CADD	Field Supervisor	Field HP	Field Safety/UXO	Field HP Tech	Field UXO Tech	Laborer
First Pass Gamma Walkover															165	165	33
Re-survey of Decontaminated Areas															17	17	3
Sample Collection															124	124	0
Field Effort Oversight and Management	4	4	36	36	4	4	7	4	4	4	36	36	36	72			
Reporting	20	1	4	4	1	5	10	1	2		5						
TOTALS	24	5	40	40	5	9	17	5	6	4	41	36	36	72	306	306	36

Table A.3.1.2.1 (e) Site Stabilization and Long-term Surveillance (Work Days and per km²)

	IMCOM RSSO	Installation RSO	Army Oversight HP	Army Oversight Safety	Project Manager	Project Engineer	Project CHP	Project Safety	Clerical	Project UXO	CADD	Field Supervisor	Field HP	Field Safety/UXO	Field HP Tech	Field UXO Tech	Laborer
Five year review	5	5	20														
TOTALS	5	5	20	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Table A.3.1.2.1 (f) Total Work Days by Labor Category (per km²)

	IMCOM RSSO	Installation RSO	Army Oversight HP	Army Oversight Safety	Project Manager	Project Engineer	Project CHP	Project Safety	Clerical	Project UXO	CADD	Field Supervisor	Field HP	Field Safety/UXO	Field HP Tech	Field UXO Tech	Laborer
Planning and Preparation (TOTALS from Table A.3.6)	31	4	31	12	9	32	32	5	9	4	6	3	3	3	1	1	0
Decontamination and/or Dismantling of Radioactive Facility Components (Sum of TOTALS from all copies of Table A.3.7)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	50	50	100
Restoration of Contaminated Areas on Facility Grounds (TOTALS from Table A.3.8)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Final Radiation Survey (TOTALS from Table A.3.9)	24	5	40	40	5	9	17	5	6	4	41	36	36	72	306	306	36
Site Stabilization and Long-Term Surveillance (TOTALS from Table A.3.10)	5	5	20	0	0	0	0	0	0	0	0	0	0	0	0	0	0

US Army Decommissioning Funding Plan for License Number SUC-1593

Table A.3.1.2.1 (g) Worker Unit Cost Schedule (per km²)

Labor Cost Component	IMCOM RSSO	Installation RSO	Army Oversight HP	Army Oversight Safety	Project Manager	Project Engineer	Project CHP	Project Safety	Clerical	Project UXO	CADD	Field Supervisor	Field HP	Field Safety/UXO	Field HP Tech	Field UXO Tech	Laborer
Salary & Fringe (\$/year)	\$137,800	\$121,900	\$121,900	\$111,300	\$148,400	\$127,200	\$159,000	\$121,900	\$68,900	\$148,400	\$90,100	\$142,835	\$213,325	\$157,675	\$142,835	\$142,835	\$85,701
Overhead Rate (%)	154%	154%	154%	154%	125%	125%	125%	125%	125%	125%	125%	125%	82%	82%	82%	82%	82%
Total Cost Per Year	\$350,012	\$309,626	\$309,626	\$282,702	\$333,900	\$286,200	\$337,500	\$274,275	\$155,025	\$333,900	\$202,725	\$321,379	\$388,252	\$286,969	\$259,960	\$259,960	\$155,976
Total Cost Per Work Day*	\$1,346	\$1,191	\$1,191	\$1,087	\$1,284	\$1,101	\$1,376	\$1,055	\$596	\$1,284	\$780	\$1,236	\$1,493	\$1,104	\$1000	\$1000	\$599

Notes: * Based on 260 workdays per year (e.g., 260 days). Field personnel salary based on 60 hour work weeks.

Table A.3.1.2.2 Total Non-labor Costs (per km²)

Category	Cost
Equipment/Supplies	\$174,000
Laboratory	\$661,500
Miscellaneous	\$993,457
TOTAL	\$1,828,957

Table A.3.1.2.2 Total Non-labor Costs (Packaging, Shipping, and Disposal)

Category	Cost
Packaging Material	\$2,132,100
Shipping	\$1,141,710
Disposal	\$91,865,827
TOTAL	\$95,139,637

Table A.3.1.2.2.a.1 Packing Materials for Spotter Rounds, Fragments and Contaminated Soil

Location	Volume (m ³)	Number of containers	Type of Container	Unit Cost of Container	Total Packaging Costs
Fort Benning	1338.6	6,693	55 gallon drum	\$100	\$669,300
Fort Bragg	581.3	2,906	55 gallon drum	\$100	\$290,600
Fort Campbell	94.0	470	55 gallon drum	\$100	\$47,000
Fort Carson	193.8	969	55 gallon drum	\$100	\$96,900
Fort Gordon	18.6	93	55 gallon drum	\$100	\$9,300
Fort Greely	12.8	65	55 gallon drum	\$100	\$6,500
Fort Hood	557.2	2,786	55 gallon drum	\$100	\$278,600
Fort Hunter Liggett	18.6	93	55 gallon drum	\$100	\$9,300
Fort Jackson	18.6	93	55 gallon drum	\$100	\$9,300
Fort Knox	549.9	2,730	55 gallon drum	\$100	\$273,000
Fort Polk	365.4	1,327	55 gallon drum	\$100	\$132,700
Fort Riley	14.5	72	55 gallon drum	\$100	\$7,200
Fort Sill	80.7	404	55 gallon drum	\$100	\$40,400
Joint Base Lewis McChord/Yakima Training Center	242.3	1,212	55 gallon drum	\$100	\$121,200
Joint Base McGuire-Dix-Lakehurst	6.9	35	55 gallon drum	\$100	\$3,500
Schofield Barracks/Pohakuloa Training Area	98.5	493	55 gallon drum	\$100	\$49,300
Total	4191.7	20,341			\$2,044,100
Total (without Hawaii sites)	4093.2	19,848			\$1,994,800

Table A.3.1.2.2.a.2 Packing Material for Personal Protective Equipment

Location	Volume (m ³)	Number of containers	Type of Container	Unit Cost of Container	Total Packaging Costs
Fort Benning	11	55	55 gallon drum	\$100	\$5,500
Fort Bragg	11	55	55 gallon drum	\$100	\$5,500
Fort Campbell	11	55	55 gallon drum	\$100	\$5,500
Fort Carson	11	55	55 gallon drum	\$100	\$5,500
Fort Gordon	11	55	55 gallon drum	\$100	\$5,500
Fort Greely	11	55	55 gallon drum	\$100	\$5,500
Fort Hood	11	55	55 gallon drum	\$100	\$5,500
Fort Hunter-Liggett	11	55	55 gallon drum	\$100	\$5,500
Fort Jackson	11	55	55 gallon drum	\$100	\$5,500
Fort Knox	11	55	55 gallon drum	\$100	\$5,500
Fort Polk	11	55	55 gallon drum	\$100	\$5,500
Fort Riley	11	55	55 gallon drum	\$100	\$5,500
Fort Sill	11	55	55 gallon drum	\$100	\$5,500
Joint Base Lewis McChord/Yakima Training Center	11	55	55 gallon drum	\$100	\$5,500
Joint Base McGuire-Dix-Lakehurst	11	55	55 gallon drum	\$100	\$5,500
Schofield Barracks/Pohakuloa Training Area	11	55	55 gallon drum	\$100	\$5,500
Total	176	880			\$88,000
Total (without Hawaii sites)	165	825			\$77,000

Table A.3.1.2.2.b Shipping Costs for Spotter Rounds, Fragments, Contaminated Soil and PPE

Location	Number of containers	Number of Shipments	Distance(mi)	Unit cost (\$/shipment x mile)	Total Shipping Costs
Fort Benning	6,748	85	2055	\$2.29	\$400,006
Fort Bragg	2,961	38	2233	\$2.29	\$194,316
Fort Campbell	525	7	1650	\$2.29	\$26,450
Fort Carson	1,024	13	1183	\$2.29	\$35,218
Fort Gordon	148	2	2087	\$2.29	\$9,558
Fort Greely	120	2	2863	\$2.29	\$13,113
Fort Hood	2,841	36	1320	\$2.29	\$108,821
Fort Hunter-Liggett	148	2	818	\$2.29	\$3,746
Fort Jackson	148	2	77	\$2.29	\$353
Fort Knox	2,785	35	1666	\$2.29	\$133,530
Fort Polk	1,382	18	1629	\$2.29	\$67,147
Fort Riley	127	2	1062	\$2.29	\$4,864
Fort Sill	459	6	1163	\$2.29	\$15,980
Joint Base Lewis McChord/Yakima Training Center	1,267	16	227	\$2.29	\$8,317
Joint Base McGuire-Dix-Lakehurst	90	2	2247	\$2.29	\$10,291
Schofield Barracks/Pohakuloa Training Area	270				\$110,000
Total					\$1,141,710
Total (without Hawaii sites)					\$1,031,710

Table A.3.1.2.2 (c) Disposal Costs

Packing Material Costs (Spotter rounds, fragments and contaminated soil)				
Location	Volume (m³)	Unit Cost(\$/m³)	Surcharge	Disposal Costs
Fort Benning	1349.6	\$21,033	-	\$28,386,136
Fort Bragg	592.3	\$21,033	-	\$12,457,845
Fort Campbell	105.0	\$21,033	-	\$2,208,465
Fort Carson	204.8	\$21,033	-	\$4,307,558
Fort Gordon	29.6	\$21,033	-	\$622,576
Fort Greely	23.8	\$21,033	-	\$500,585
Fort Hood	568.2	\$21,033	-	\$11,950,950
Fort Hunter-Liggett	29.6	\$21,033	-	\$622,576
Fort Jackson	29.6	\$21,033	-	\$622,576
Fort Knox	560.9	\$21,033	-	\$11,797,409
Fort Polk	376.4	\$21,033	-	\$7,916,821
Fort Riley	25.5	\$21,033	-	\$536,341
Fort Sill	91.7	\$21,033	-	\$1,928,726
Joint Base Lewis McChord/Yakima Training Center	253.3	\$21,033	-	\$5,327,659
Joint Base McGuire-Dix-Lakehurst	17.9	\$21,033	-	\$376,491
Schofield Barracks/Pohakuloa Training Area	109.5	\$21,033	-	\$2,303,113
Total	4367.7			\$91,865,827
Total (without Hawaii sites)	4258.2			\$89,562,714

Table A.3.1.2.2 (d) Equipment and Supplies (per km²)

Equipment/supply Costs (Excluding Containers)			
Equipment/Supplies	Quantity	Unit Cost	Total Equipment/Supply Cost
Monthly facility cost	2	\$5,000	\$10,000
Monthly instrument cost	2	\$45,000	\$90,000
Monthly consumable cost	2	\$15,000	\$30,000
Monthly vehicle cost	2	\$20,000	\$40,000
Monthly PPE cost	2	\$2,000	\$4,000
TOTAL			\$174,000

Table A.3.1.2.2 (e) Laboratory Costs (per km²)

Activity	Total Cost
Sampling	
Transport of samples	\$33,390
Testing and analysis	\$667,800
Other (specify)	
Total	\$701,190

Table A.3.1.2.2 (f) Miscellaneous Expenses (per km²)

Cost Item	Total Cost
License Fees	\$50,000
Government Contract Acquisition	\$75,000
Taxes	
Air fare	\$25,000
Per diem	\$29,412
Contractor fee	\$300,000
Other (specify)	
Total	\$479,412



REPLY TO
ATTENTION OF

DEPARTMENT OF THE ARMY
US ARMY INSTALLATION MANAGEMENT COMMAND
2405 GUN SHED ROAD
JOINT BASE FORT SAM HOUSTON, TX 78234-1223

JUN 01 2015

U.S. Nuclear Regulatory Commission
Washington, DC 20555

STATEMENT OF INTENT

As Commanding General of the US Army Installation Management Command, I exercise express authority and responsibility to request from Headquarters, Department of the Army, funding for decommissioning activities associated with operations authorized by US Nuclear Regulatory Commission Material License No. SUC-1593. This authority is established by Department of Defense Financial Management Regulation 7000.14-R. Within this authority, I intend to request that funds be made available, if a decision is made to engage in decommissioning activities, in the amount of \$350,000,000 to decommission license activities in their entirety. (The Decommissioning Funding Plan includes a partition of this amount by Army installation should decommissioning activities not occur at all installations.) I intend to request and obtain these funds sufficiently in advance of decommissioning to prevent delay of required activities.

A copy of Department of the Army Orders 052-02, dated February 21, 2014, is enclosed as evidence that I am authorized to represent the US Army Installation Management Command in this transaction.

Sincerely,

A handwritten signature in black ink, reading "David D. Halverson", is positioned above the typed name.

David D. Halverson
Lieutenant General, US Army
Commanding

Enclosure

DEPARTMENT OF THE ARMY
OFFICE OF THE CHIEF OF STAFF
200 ARMY PENTAGON
WASHINGTON, DC 20310

ORDERS 052-02

21 February 2014

HALVERSON, DAVID D.
Virginia 23605

LTG United States Army Training and Doctrine Command (W3YTAA) Joint Base Langley-Eustis,

You will proceed on permanent change of station as shown.

Assigned to: Office of the Assistant Chief of Staff for Installation Management, United States Army (W089AA) Washington, DC 20310-0600

Position: Assistant Chief of Staff for Installation Management/Commanding General, Installation Management Command

Reporting date: 8 April 2014 with early report authorized

Additional instructions:

- (a) Family members: Yes. Concurrent travel of family members is authorized.
- (b) Travel by privately owned conveyance is authorized as more advantageous to the government.
- (c) You are authorized to ship your household goods and unaccompanied baggage at government expense. If you plan to ship personal property at government expense, contact your local transportation office to arrange for shipment, and contact the transportation office of your new duty station immediately after arrival to arrange for delivery.
- (d) Individually billed account authorized. IAW paragraph U3110-A of the Joint Federal Travel Regulation (JFTR) you are authorized to personally procure travel and transportation for yourself and your dependents. All travel purchased must be on American Flag carriers and you may use a Commercial Travel Office (CTO) if available. IAW paragraph U2415 of the JFTR, if a CTO is available and you do not use it, transportation costs will be limited to the amount the government would have paid if the arrangements had been made directly through a CTO. Reimbursement will be limited to the Government's cost for travel from the old duty station to the new duty station.
- (e) Termination of access forms for special access programs from your current assignment should be completed prior to permanent change of station. All classified information, including copies, generated or obtained while in your current position, is the property of the United States Government and must be returned to your document control officer.
- (f) You are authorized to transport your unloaded government-owned handgun (Pistol, 9mm, automatic; SN: GO-3361) in connection with your assigned duties. If transportation involves aircraft, the carrier must be notified at time of check-in. Weapon will be unloaded and packed in baggage for stowage in the cargo compartment of the aircraft. The baggage in which weapon is carried must be locked and only the carrier checking the baggage retains the combination or key. If traveling with a firearm, whether government issued or a privately owned, traveler must contact the airline carrier regarding its firearm and ammunition policies.
- (g) Contact the installation housing office at your new duty station to determine the availability of quarters before entering into any housing agreement. To obtain information on housing at your new duty station, visit the office of the Assistant Chief of Staff for Installation Management website. The website address is <http://www.acsim.army.mil/isd/armyhousing.html>. Helpful links are located at the bottom right of the page.
- (h) The medical PCS transition for you and your family will be managed the OTSG Executive Medicine team. To begin the process, please contact , Mon-Fri, 0800-1600 (EST). The team will assist you with new provider selection, prepare a medical transition brief for your new provider and provide you a PCS quick reference contact sheet should emergencies arise in transit.

FOR ARMY USE

MDC: 3AO4

SDN-HAL1089PE05202

Format: 410

BY ORDER OF THE SECRETARY OF THE ARMY:



JOSEPH R. CALLOWAY

COL, GS

Chief, General Officer
Management Office

DISTRIBUTION:

LTG HALVERSON United States Army Training and Doctrine Command, Joint Base Langley-Eustis, Virginia 23605

Office of the Assistant Chief of Staff for Installation Management, United States Army, Washington, DC 20310-0600

General Officer Management Office

Telephone

if you have any questions reference this order