DEPARTMENT OF THE ARMY

MATERIEL DEVELOPMENT AND READINESS COMMAND

ARMAMENT RESEARCH AND DEVELOPMENT COMMAND

ENVIRONMENTAL IMPACT ASSESSMENT

KINETIC ENERGY PROJECTILE LETHALITY TEST

NEW MEXICO INSTITUTE OF MINING AND TECHNOLOGY

JULY 1978

REVISED AUGUST 1978

BALLISTIC RESEARCH LABORATORY

ABERDEEN PROVING GROUND, MARYLAND 21005

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PROTECTIVE COVER SHEET

The material contained in the attached Environmental Impact Assessment is for internal coordinating use only and may not be released to non-Department of Defense agencies or individuals until coordination has been completed and the material has been cleared for public release by appropriate authority.

PROTECTIVE COVER SHEET

A. INTRODUCTION.

1. Project Description

This proposed project consists of a contractual effort by the Terminal Effects, Research and Analysis Group (TERA) of the New Mexico Institute of Mining and Technology (NMT) to develop experimental data to provide reliable estimates of the lethality of kinetic energy (KE) penetrators fired against several current and hypothetical future threat armored vehicles.

There are two major types of KE penetrators involved, tungsten alloy and depleted uranium (DU). The tungsten alloy penetrators pose no environmental problems other than those normally associated with experimental research firing of weapons. This assessment will therefore address the effects of experimental research firing of depleted uranium projectiles.

Depleted uranium is a by-product of the nuclear industry and differs from natural uranium only in having an appreciably lower uranium-235 (U-235) isotope content. DU is the waste product left after natural uranium has gone through the gaseous diffusion process removing most of the fissionable isotope U-235. Natural uranium contains approximately 0.7% U-235 with 50-75% of this U-235 removed during the gaseous diffusion process. The term "depleted" refers to the fact that most of the U-235 has been extracted. The only significant difference between depleted uranium and natural uranium is that the depleted uranium no longer has significant economic value with respect to recovery of U-235. Other than a lower U-235 content, the nuclear, chemical and metallurgical properties of depleted and

natural uranium are essentially identical. DU and tungsten alloys both have good penetration capabilities with the DU penetrator possibly having some advantage. Depleted uranium in addition, is a pyrophoric material. At the present time, because DU is a waste by-product, the cost is appreciably lower than for tungsten alloy. The primary disadvantage of DU is that it presents a limited low level radiation hazard.

This action will consist of firing both DU and tungsten KE penetrators against target plate and various armored test vehicles. Impacting armor with DU will result in a partial disintegration and burning of the DU with some of the material deposited in the armor, some exiting as various size fragments and some being vaporized and becoming airborne. In addition to being radioactive, DU is also a heavy metal exhibiting toxic effects similar to lead.

2. Environmental Setting

a. Location

The New Mexico Institute of Mining and Technology is a land grant college located just West of Socorro, New Mexico (figures 1 and 2). The property on which it is located including the Blue Canyon range area west of the institute, is owned by the State of New Mexico. The campus area of the institute is located within the city limits of Socorro. The remainder of the property including the Blue Canyon area is located in Socorro County

adjacent to the city of Socorro.

The Blue Canyon range area consists of approximately ten square miles of arid, mountainous terrain ranging between 5000 and 7000 feet above sea level. The proposed site for conducting this project is the Upper X-Ray Pad (figure 3), located in the Blue Canyon area

Socorro (population 6500) is the county seat of Socorro County (population 12000) and is located 70 miles South of Albuquerque, New Mexico adjacent to Interstate Highway 25 and the Rio Grande River.

b. Topography

The TERA testing area is located in the Blue Canyon near the base of Socorro Peak on the southern flank of the Socorro-Lemitar Range in west-central New Mexico. The Socorro-Lemitar Range is part of the western boundary of the Rio Grande Valley. The Upper X-Ray Pad on the south side of the Canyon is at an elevation of approximately 5440 feet above sea level. The features of this area were developed through volcanic action.

c. Soils

There is no true soil in the Blue Canyon area. The surface consists of a white or gray vesicular rhyolite lava and red clay or black basalt and white rhyolite tuff (ash).

d. Water

Average annual rainfall in this area is 8.74 inches. Ground water below the proposed test site is 450 feet below the surface.

e. Climate

Socorro has an arid continental climate. Summers are moderately warm with cool nights; winters have moderate daytime temperature, cool nights and little precipitation.

f. Vegetation

The lack of adequate rainfall combined with the absence of any true soil in the Blue Canyon area yield only sparce vegetation consisting mainly of various varities of cacti and Arizona cypress (scrub pine).

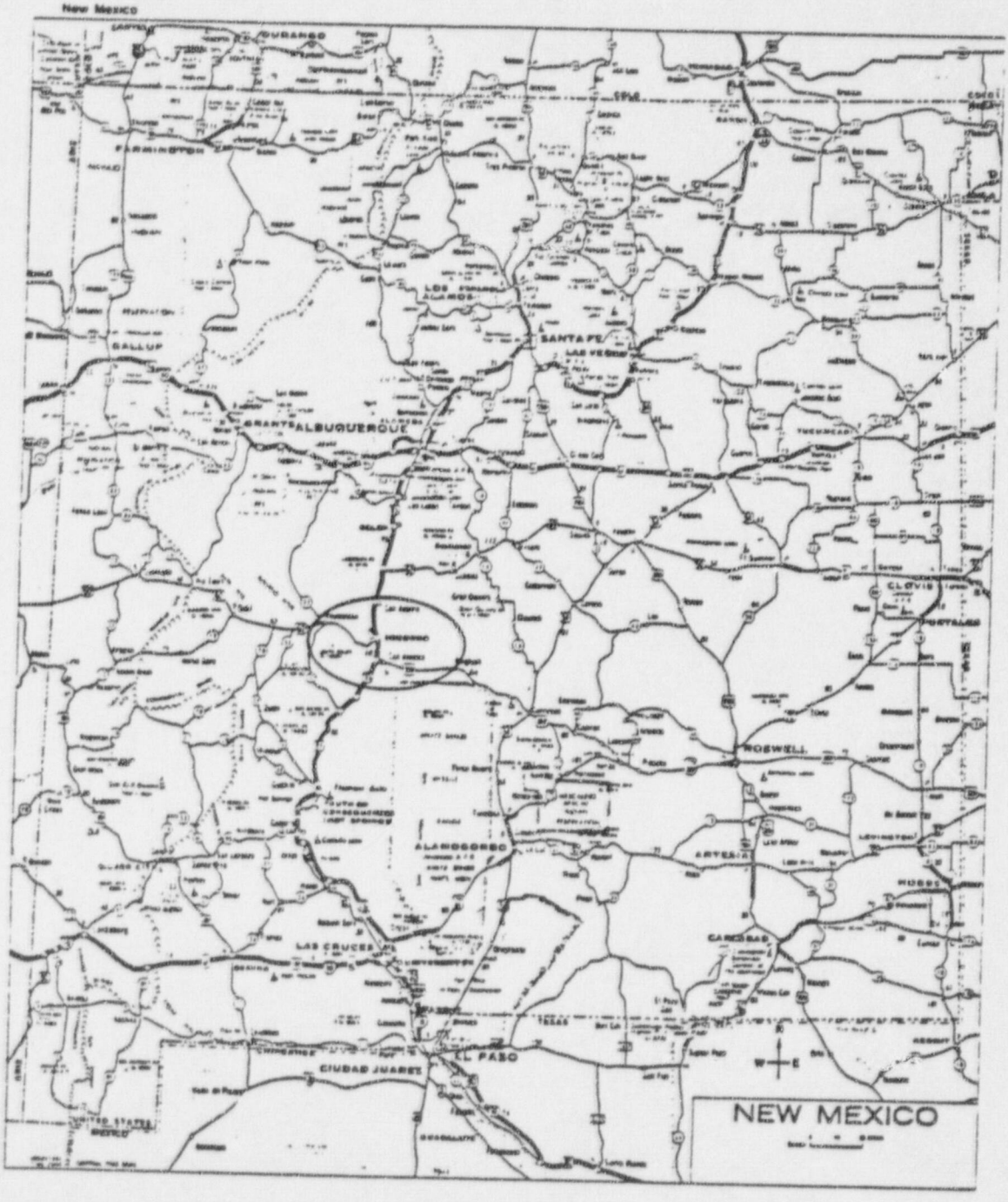
New Mexico
DURANGO
FARMINGTON
GALLUP
LOS ALAMOS
SANTA FE
LAS VEGAS
GRANTS
ALBUQUERQUE
CLOVIS
ROSWELL
ALAMOGORDO
ARTESIA
HOBBS
CARLSBAD
LAS CRUCES
EL PASO
CIUDAD JUAREZ
NEW MEXICO

FIGURE 1

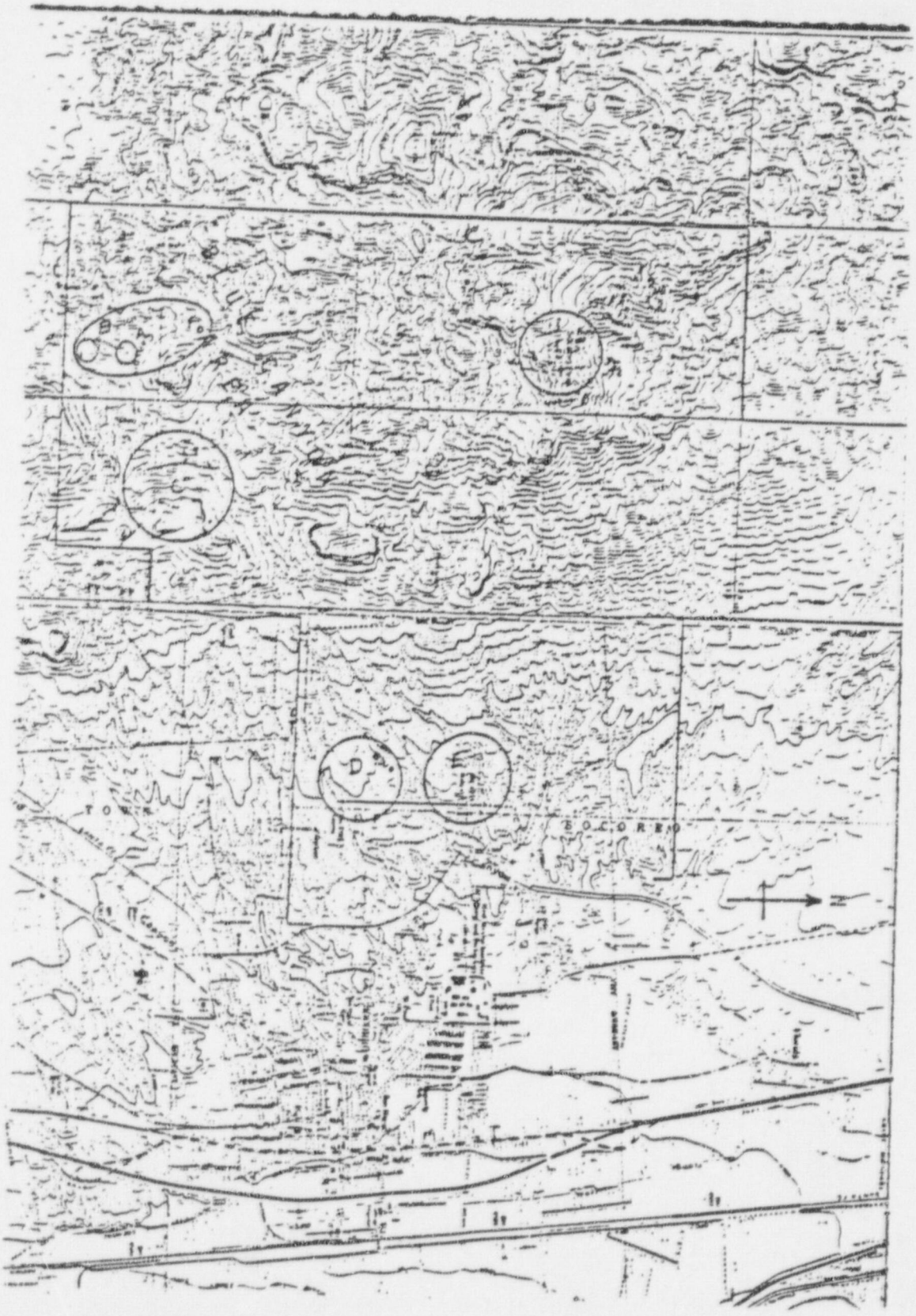

FIGURE 2

Blue Canyon Test Area
NMT

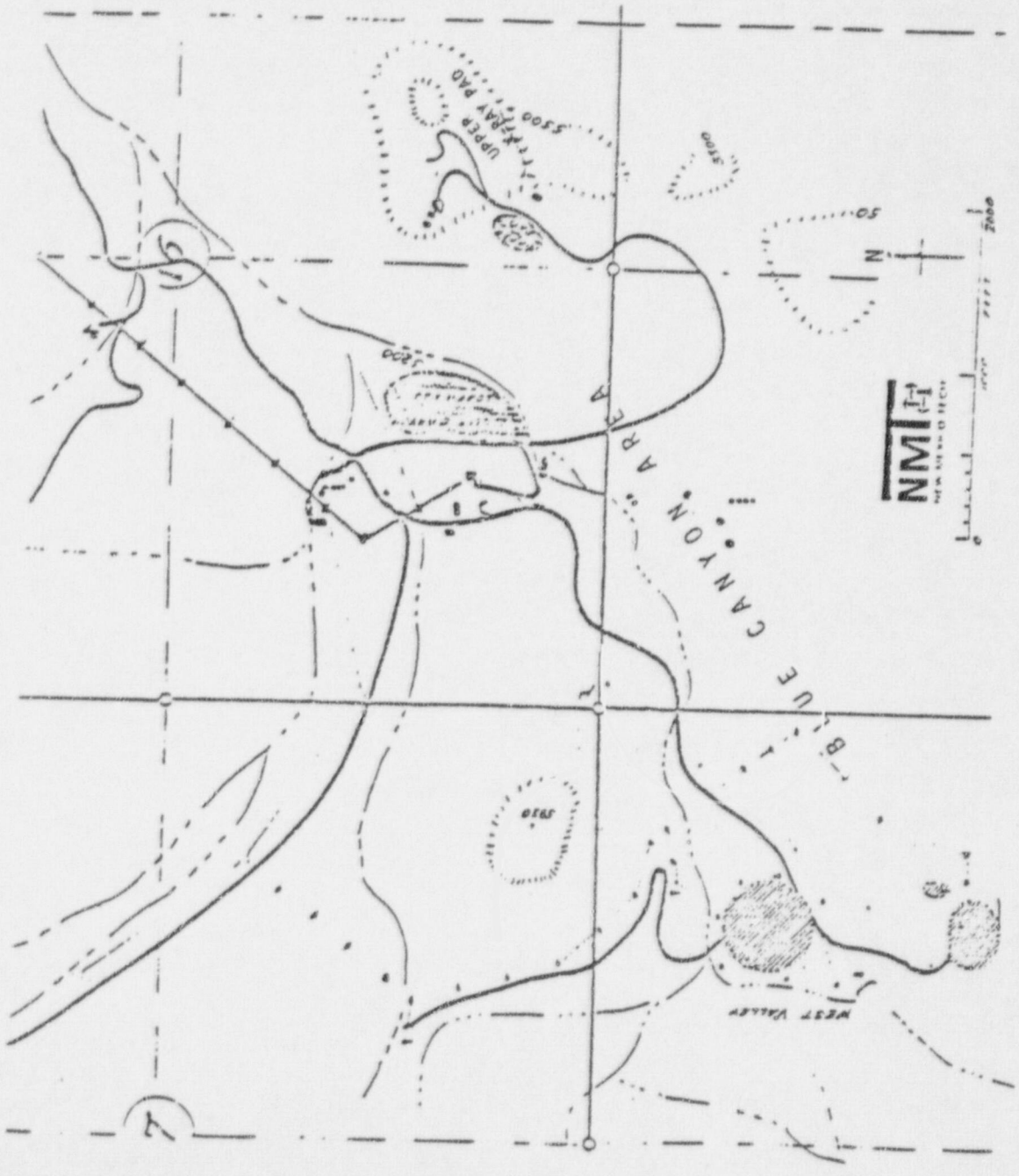

FIGURE 3. BLUE CANYON AREA NMT
Upper X-Ray Pad

B. LAND-USE RELATIONSHIPS.

As previously stated, the proposed site is situated on a ten square mile tract of state owned land which is a part of the New Mexico Institute of Mining and Technology. This site as well as a number of other sites have been used for weapon and explosive experimentation since 1949. This Blue Canyon area has been dedicated to this use since that date and present plans call for continuing that use indefinitely.

The Upper X-Ray Pad and a portion of the target area of the 1000 meter range have been used for DU penetrator experimentation since 1970.

The terrain of the Blue Canyon area is very rugged with little vegetation. A major part of the surface and subsurface consists of a dense combination rock and dry clay with bed rock and red clay rock encountered at various levels below the surface.

The proposed test area, along with the remainder of the Blue Canyon area, is presently considered not suitable for any use other than the current use as a test range. In view of the current trend in some parts of the country to construct dwellings in areas of difficult accessibility, this could be considered as a possible future use.

This proposed project is to be conducted at a test pad that has previously, and is currently used for DU penetrator experimentation. Continuation of DU experimentation at this location is considered to be compatible with state and local land use plans and no conflicts are anticipated with performing this contract.

The TERA group of the New Mexico Institute of Mining and Technology is licensed by the New Mexico Environmental Improvement Agency to receive, store and use up to 91 kilograms of uranium (license No. NM-INT-UR-00). These test areas are periodically inspected and surveyed by the Environmental Improvement Agency and the Ballistic Research Laboratory. Continuous monitoring is performed by TERA. The proposed project will be performed under the NMT License.

C. PROBABLE IMPACT OF THE PROPOSED ACTION ON THE ENVIRONMENT.

1. Direct Effect

As stated earlier the Blue Canyon area has been dedicated to weapon and explosive experimentation since 1949. Weapon testing has involved depleted uranium firing for the past eight years at the proposed Upper X-Ray Pad in addition to the 1000 meter range. These two areas are considered contaminated with DU. DU contamination at the proposed experimentation site has been limited to one target area of the site where DU impact is conducted. Much of the DU is deposited in the target material, some fragments fall to the ground around the target or impact into the hillside behind the target, the remainder is vaporized. Air contamination from the gun firing consists of the combustion products of the propellant. This is kept to a minimum because of the nature of the program in that only one or two rounds are fired per day. Airborne contamination from the DU will be closely monitered and exposures kept below maximum permissible concentrations as specified in Appendix B CFR 20. Noise is confined for the most part to the Blue Canyon area where operator protection is easily afforded. The canyon provides natural shielding of any inhabited areas several miles away.

For the proposed project most of the DU will be caught by the target material. Additional shielding will be erected as necessary to confine the DU to a small area where contamination can easily be removed.

Contaminated armor plate and other target material used for test purposes is removed from the area and disposed of when experimentation is completed.

2. Indirect Effects

Because of the limited magnitude of this proposed project no significant indirect impact is anticipated but will be as follows:

(a) The use of small quantities of electrical power.

(b) Heating of facilities will require some combustion of hydrocarbon fuels.

(c) Test facilities require the use of vehicles and related combustion of hydrocarbon fuels.

(d) General scrap and waste materials generated in the machine shops and office in support of this project.

(e) Impact associated with transporting personnel to and from work.

D. ALTERNATIVES TO THE PROPOSED ACTION.

Because of the possibility of DU contamination, the only areas considered are areas where DU testing is already being conducted. BRL has one such location at Aberdeen Proving Ground, Maryland. Because of the existing work load at the BRL facility and the urgency for the test data to strengthen lethality models the NMT site at Socorro appears to be most appropriate and have minimum environmental effect. The current approach to evaluation of the lethality of various KE penetrators is by computer modeling techniques. This program involves generation of data to provide a basis for a computer model and is considered to be a viable and environmentally sound alternate to full-scale research testing.

E. PROBABLE ADVERSE ENVIRONMENTAL EFFECTS WHICH CANNOT BE AVOIDED.

1. Adverse and unavoidable impacts

a. Air Quality - Dynamic firing of depleted uranium penetrators will introduce substances, including low level radioactive material, into the atmosphere.

b. Soil - Some contamination of soil will occur from this project. This will be confined to previously contaminated areas.

c. Water - Some contamination of surface water will occur through runoff of rain water.

d. Noise - Some noise will be produced but because of the location of the proposed site very little will reach any inhabited areas.

e. Some target material will be consumed or contaminated with DU.

2. Mitigation of adverse impacts

a. Air - Because the DU particles that do become airborne are a heavy metal, they will settle out fairly rapidly and become a soil contaminate.

b. Soil - Many of the proposed tests involve firing into closed armored target vehicles. This will contain almost all of the DU inside the vehicle. ~~Where tests involves firing into armor plate, additional armor backstops and shields will be positioned to contain the DU fragments to a very small area.~~ Removal of DU from this area will be accomplished by removing the top layer of earth (several inches) for disposal through burial in a Nuclear Regulatory Commission (NRC) approved burial site.

c. Water - Dams will be constructed around the test site to prevent runoff of rain water. Primary decontamination of the target vehicles will include washing with high pressure water spray. This water will also be trapped by dams to prevent runoff or spread. The water in both instances will be allowed to evaporate affording easy collection and removal of contamination.

d. Noise - The remote location of the proposed test site will effectively mitigate the effect of the noise from the gun firing in any inhabited areas. Operator protection will be afforded through personal protective equipment.

e. Target material including the test vehicles will be decontaminated by removal of contaminated section. Again, this contaminated material will be disposed of through burial as with the contaminated earth. Loss of an entire vehicle is not anticipated. Experience at BRL has shown that an armored vehicle can be decontaminated. Some other target material, as with the vehicles, will be recycled or reused.

f. Personnel exposure to the uranium will be continuously monitored through film badges, dosimeters, and periodic physicals.

g. None of the above effects are expected to exceed any applicable regulatory standards.

3. More complete calculations of environmental effects are given in the Addendum at the end of this assessment.

F. RELATIONSHIP BETWEEN LOCAL SHORT-TERM USES OF THE ENVIRONMENT AND MAINTENANCE AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY.

It is believed that implementation of this action will have no serious long-term effects on the environment, except for the consumption of small quantities of non-renewable resources, e.g., hydrocarbon fuels and uranium.

What productivity that existed in the area has only suffered a minor intrusion by the test activities conducted since 1949. Implementation of this program would have little if any effect on future productivity.

G. IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES.

A total of twelve to fifteen civilian and military personnel will be committed for several months time for completion of this project. Although this represents an irretrievable expenditure of energy, material, and labor, it is not considered excessive in view of the knowledge to be gained. Performing this project at NMT is not expected to contaminate any new areas or create any irreversible conditions that do not already exist. Small quantities of hydrocarbon fuel will be expended as will small quantities of uranium.

H. NATIONAL DEFENSE CONSIDERATIONS THAT MUST BE BALANCED AGAINST THE ADVERSE ENVIRONMENTAL EFFECTS OF THE PROPOSED ACTION.

The Ballistic Research Laboratory is the Army's Lead Laboratory for Ballistic Technology and for Vulnerability Analysis and Vulnerability Reduction Technology. As such, it is BRL's responsibility to develop and maintain a capability to determine the effectiveness of current and future weapons against threat targets.

The data obtained from this project will provide a basis for evaluation of the lethality of several kinetic energy penetrators against tanks and light armored vehicles.

I. CONCLUSIONS.

1. This project is not considered a major action significantly affecting the quality of the human environment.

2. Implementation of this action will not have a significant impact on the environment.

3. Environmental controversy is not expected to result from this action.

4. Based on the above conclusions an Environmental Impact Statement will not be prepared for this project.

SUBJECT: Supplemental Information to Environmental Impact Assessment (EIA) for Kinetic Energy Projectile Lethality Test, New Mexico Institute of Mining and Technology, July 78.

A. The Objective is to analyze and quantify the environmental impact of the proposed tests with respect to radioactive contamination with emphasis given to airborne contamination.

B. Areas of impact to be considered are as follows:

1. Exposure of test crew to airborne radioactive contamination.

2. Exposure of other TERA personnel working on nearby ranges to airborne radioactive contamination.

3. Exposure of the general population outside of the NMT, Blue Canyon Range Area.

4. Soil contamination.

C. The proposed project involves firing DU KE penetrators into M48 Tanks and M59 APC's. Vehicles will be effectively closed to the extent that all parts and openings will be secured as in combat condition. A total of 80 rounds are proposed. Approximately half of the rounds will be expended in penetrating the vehicle armor and will not exit from the vehicle. When firing into the M59 APC, the penetrator is expected to exit from the far side of the vehicle into a soft recovery medium, positioned immediately behind the target vehicle. The over pressure created inside the vehicles from DU penetrator impact is unknown at this time. The first series of tests is to determine over pressure and temperature and this data will be used to verify calculations presented in this document.

D. Calculations of DU aerosol generated at the target.

1. Based on previous BRL tests in an enclosed range and an average armor thickness for impact points,[1] 56% to 70% of the penetrator will still be intact

after penetrating the first vehicle armor. This will then impact various internal components and then impact a second armor wall. In about 50% of the tests an average of 15% to 20% of the round will exit from the vehicle in the form of a solid rod. A soft recovery system has been chosen to recover this part of the round rather than armor plate in order to reduce airborne particulate.

2. Aerosol release will consist of three main parts:

a. Aerosol produced in front of the target at the point of initial entry.

b. Aerosol produced inside the vehicle which is made up of the aerosol produced on the exit side of the first armor penetration, impacting interior components and the aerosol produced on the entry side of the second armor penetration.

c. Aerosol produced outside of the vehicle on the exit side of the second armor penetration when complete vehicle penetration does occur.

3. Calculations:

weight of DU penetrator is approximately 1.86 kg, velocity 1128 m/s and 1432 m/s.

average mass consumed on initial penetration	≃ 690 grams.
average mass consumed on second penetration	800 grams
average mass remaining intact	370 grams

Based on Los Alamos Report[2]

a. From .006% to .058% of a consumed round is observed as an aerosol on the entry side of the target.

b. From .048% to .15% of a consumed round is observed as an aerosol on the exit side of the target.

Using the maximum observed percentages, the predicted aerosol from the proposed test is as follows:

	Mass Consumed	Aerosol Produced Entry	Exit
Initial Penetration	690 g	.40 g	1.04 g
Final Penetration	800 g	.46 g	1.20 g

Aerosol produced (per round)		% of projectile weight
Outside test vehicle	1.6 g	.09%
Inside test vehicle	1.5 g	.08%
Total	3.1 g	.17%

Test data[2] shows that a maximum of 60% of the aerosol produced is of respirable size.

The 1.5 gram of DU predicted as internal aerosol correlates to measurements made during the first 4 minutes after impact of a similar penetrator in an M48 Tank at BRL[3]. In that test the measured aerosol was 1.29 grams.

E. Protection of Operating Personnel:

All operating personnel will be included in a radiation protection program that involve periodic physicals and the use of personal monitoring equipment. Primary protection from the initial radioactive aerosol cloud will be provided by limiting firing to periods when the wind is blowing away from the personnel bombproof, located about 150 meters from the target vehicle. Any personnel required to approach the target vehicle during the first thirty minutes after firing will be required to wear full protective clothing, consisting of "Anti-C" suits, hood, gloves, booties and respirator. All personnel entering a contaminated

target vehicle for assessment purposes will also wear protective clothing as above. Additional specific requirements and precautions will be included in a Standing Operating Procedure (SOP) prior to beginning tests.

Additional restraints of wind speed to be imposed are minimum wind speed at the personnel bombproof of 4 miles per hour and maximum of 15 miles per hour.

F. Protection of Other Range Personnel:

The minimum exclusion area based on weapon safety considerations is 700 yards[4]. All ranges and test areas within one mile of the impact area are in the same general direction from the target as the personnel bombproof and restricting firing based on wind direction toward that bombproof will also afford these other personnel sufficient protection from the contaminated aerosol.

G. Protection of the General Population Outside of the NMT, Blue Canyon Range Area. (off-post release).

Because of the location of the upper X-Ray pad at NMT no attempt has been made to predict the fallout or settling of the aerosol produced. Because of the rugged terrain, we believe air shears and turbulence on all sides of the test area will diffuse the cloud to below permissible release limits[5] prior to reaching the range boundary or any other ranges. Air samples, down wind from the test, will be taken during early tests to verify the effectivenss of this diffusion.

H. In addition to the initial aerosol cloud some aerosol will escape from the test vehicle (penetration holes and leaks around ports). We believe this to be small and will be released slowly and will not add appreciably to the concentration of the initial cloud.

Decontamination of the vehicle will be performed as with the M48 Tank fired into at BRL which shows that decontamination can be achieved[3].

A recent survey conducted at Aberdeen Proving Ground indicates that the major potential transport pathway from a DU impact rnage is the airborne pathway[6]. This report also indicated that no vertical migration of DU in to the soil had occurred beyond the top three inches. This study showed areas of localized contamination with no indication that any contamination has spread off-site.

An additional release will occur when the assessment begins. This also will be minor compaired to the initial release and will be more gradual.

Prepared by:

ROGER A. HERRON
BRL Environmental Quality
Coordinator
August 1978

REFERENCES:

1. W. H. Jack and P. J. Brainard, "Test Plan for the Lethality Evaluation of the 75mm Kinetic Energy Penetrator Against Tanks and Light Armored Vehicles", BRL.

2. W. C. Hanson, J. C. Elder, H. J. Ettinger, L. W. Hantel and J. W. Owens, "Particle Size Distribution of Fragments from Depleted Uranium Penetrators Fired Against Armor Plate Targets", Los Alamos Scientifc Laboratory Report LA-5654, October 1974.

3. Earl G. Wright and Richard A. Markland, "Radiological Survey and Assessment of Potential Radiation and Chemical Effects of Depleted Uranium (DU) Alloy Penetrators on Research Personnel Using an M-48 Tank as Test Vehicle", U. S. Army Ballistic Research Laboratories, Aberdeen Proving Ground, MD, BRL Report No. 1969, March 1977.

4. Aberdeen Proving Ground Pamphlet No. 385-2, February 1969.

5. Code of Federal Regulations, Title 10, Part 20.

5. D. A. Waite, G. A. Stoetzel and R. L. Gilchrist, (DRAFT) Release of Depleted Uranium From Firings of 105mm Ammunition, Battelle Pacific Northwest Laboratories, Richland, Washington, May 1978.

RADIOLOGICAL PERMIT APPLICATION SUPPLEMENT

NAME: _____
(Last) (First) (Middle)

TENANT ACTIVITIES WILL SUBMIT THRU INTERNAL CHANNELS.

LIST BELOW YOUR TRAINING AND EXPERIENCE WITH RADIOISOTOPES AND OTHER SOURCES OF IONIZING RADIATION (use supplemental sheets if necessary)

1. TRAINING (To be completed by Responsible Investigator, Radiation Protection Supervisor)

	WHERE TRAINED	DURATION OF TRAINING	ON THE JOB (Circle answer)		FORMAL COURSE (Circle answer)	
a. Principles and practice of radiation protection.			Yes	No	Yes	No
b. Radioactivity measurement standardization and monitoring techniques and instruments.			Yes	No	Yes	No
c. Mathematics and calculations basic to the use and measurement of radioactivity.			Yes	No	Yes	No
d. Biological effects of radiation.			Yes	No	Yes	No

2. EXPERIENCE

ISOTOPE OR OTHER SOURCE	MAXIMUM AMT OR DESCRIPTION OF SOURCE	LOCATION	DURATION	TYPE OF USE

EAP Form 1115R, 1 Feb 81 (APGR 385-3)
(Previous editions will be used until exhausted.)

Question 3

*AR 385-11

ARMY REGULATION
No. 385-11

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, DC, *1 May 1980*

SAFETY

IONIZING RADIATION PROTECTION
(Licensing, Control, Transportation, Disposal, and Radiation Safety)

Effective 1 May 1980 in accordance with 32 CFR 655.10

This regulation consolidates four Army publications on radiation protection. It supplements the US Nuclear Regulatory Commission (NRC) Rules and Regulations (Title 10, Code of Federal Regulations (CFR)) and transfers the control and licensing of Army radioactive materials from Deputy Chief of Staff for Logistics (DCSLOG) to the US Army Materiel Development and Readiness Command (DARCOM). It also incorporates the reporting requirements deleted from AR 725-1 and cancels the interim guidance in DRCSF-P letter, 15 May 1978.

Local limited supplementation of this regulation is permitted but is not required. If supplements are issued, Army Staff agencies and major Army commands will furnish five copies to Cdr, DARCOM, ATTN: DRCSF-P, Alexandria, VA 22333; other commands will furnish one copy of each to the next higher headquarters. In addition, supplements pertaining only to chapter 4 will be sent to HQDA(DAPE-HRS), WASH DC 20310.

Interim changes to this regulation are not official unless they are authenticated by The Adjutant General. Users will destroy interim changes on their expiration dates unless sooner superseded or rescinded.

*This regulation supersedes AR 55-55, 12 November 1970; AR 700-32, 22 May 1968; AR 755-15, 4 November 1966; and TM 3-260, 2 August 1968, including all changes. It rescinds DA Form 2791-R, October 1970 and DA Label 135, October 1970. RCS NRC-1009 supersedes RCS AMC-191; RCS DRC-192 supersedes RCS AMC-192.

CHAPTER 1
GENERAL

Section I. INTRODUCTION

1-1. Purpose. This regulation establishes policies and responsibilities for the licensing, control, transportation, and disposal of radioactive material, and ionizing-radiation-producing devices and their related hazards.

1-2. Applicability. *a.* This regulation applies to—

(1) All Department of the Army (DA) agencies, commands, and installations, (including the Army National Guard and the US Army Reserve) that procure, produce, use, store, handle, maintain, or dispose of radioactive materials or ionizing-radiation-producing devices.

(2) Civil Defense and Corps of Engineers Civil Works radioactive material when used or stored on an Army installation.

(3) Any non-Army organization wanting to store or use radioactive material or ionizing-radiation-producing devices on property under Army control.

b. This regulation does not apply to radioactive materials for—

(1) Medical use (see AR 40-47).

(2) Nuclear weapons (see AR 50-5).

(3) Nuclear reactor fuel and items made radioactive (activated) during reactor operation while under the direct control of the nuclear reactor staff. This regulation does apply, however, to activated material when transferred and to the nuclear reactor facility after the fuel has been removed.

1-3. Explanation of terms. *a.* Terms that apply to this regulation are found in the glossary.

b. Terms used by the Department of Transportation (DOT) are in 49 CFR 171-179. Those specifically related to transporting radioactive materials are in 49 CFR 171.8 and 173.389. Title 49 CFR is available at transportation offices under the title of R.M. Graziano's Tariff, as amended.

1-4. Code of Federal Regulations (CFR). Throughout this regulation reference is made to the CFR, which consists of 120 volumes, divided into 50 titles. Each title represents a broad area that is subject to Government control (for example, 49 CFR 170-190 refers to Title 49, Parts 170-190). These documents may be obtained from the Superintendent of Documents, US Government Printing Office, Washington, DC 20402. If there is a discrepancy between the CFR and this regulation, the more restrictive will be used.

1-5. Objective. The primary objectives of this regulation are to ensure—

a. Radiation protection responsibilities are given ample priority.

b. Plans and resources exist to cope with radiation emergencies.

c. Commitments made in obtaining licenses and radioactive material authorizations are fulfilled.

1-6. Policy. *a.* Military and civilian employees within the United States or overseas will be afforded radiation safety at least equal to that required by 10 CFR 19 and 20.

b. Federal, State, and local transportation laws, ordinances, and regulations apply to military shipments within or returning to the United States. Safety procedures for moving radioactive cargo will require protection equal to, or greater than, that required in interstate commerce.

c. Overseas, the standards of a nation a shipment moves through apply. The level of protecting a shipment will be the same as that required in the United States.

1-7. Waivers and exceptions. Except as otherwise noted, requests for waivers to this regulation and exceptions to Federal regulations will be sent through command channels to HQDA(DAPE-HRS), WASH DC 20310, with a copy to Cdr, DARCOM, ATTN: DRCSF-P, Alexandria, VA 22333.

Section II. RESPONSIBILITIES

1-8. US Army Materiel Development and Readiness Command (DARCOM). CG DARCOM will—

a. License and control radioactive material and ionizing radiation sources (chap. 2).

(1) Issue Army approval of DA radiation permits, DA radioactive material authorizations, and applications for Nuclear Regulatory Commission (NRC) licenses.

(2) Ensure subordinate elements fulfill their responsibilities as managers, suppliers, and users of radioactive items.

b. Provide technical support, develop policy guidance, and coordinate with DA on the safe movement of Army radioactive material.

c. Formulate policies and procedures for restoring or disposing of radioactive material and waste.

d. Provide technical assistance for special radiological disposal problems.

e. Resolve differences of opinion between supply points (listed in table 3-2) and other Army elements.

1-9. US Army Armament Materiel Readiness Command (ARRCOM). CG ARRCOM will—

a. Provide, on request, technical escorts to guard unwanted shipments of radioactive material.

b. Maintain records for DA on the type and quantity of radioactive items disposed.

c. Ensure Army contracts are fulfilled safely and economically.

d. Manage the Army contracts for burial of radioactive waste at licensed land burial sites in the United States.

e. Arrange for disposal of classified radioactive waste at land burial sites operated by the US Department of Energy.

1-10. DARCOM major subcommands. (MSCs) Commanders of DARCOM MSCs will—

a. Make sure enough testing has been done to determine if the radioactive product is militarily useful and the life cycle instructions are adequate.

b. Establish realistic life cycle controls equal to the hazards.

c. Publish guidance in supply and technical publications on protecting people, materiel, and property from radiation hazards. This is to comply with Federal and Army regulations.

d. Obtain and monitor licenses and permits required for assigned radioactive items.

e. Maintain records on the number of radioactive items procured, bulk stored, leak tested, and disposed of, as well as keep records required by the NRC license or Service authorization.

f. Ensure receiving agencies are permitted to accept the material under the terms of the license or Service authorization.

g. Ensure the purchase of radioactive material does not exceed the use, quantity, or limitations imposed on an activity by the license or Service authorization. Licenses and authorizations must be obtained before procurement is initiated.

h. Collect and keep data to identify items as radioactive. This data will be combined with item management data and issued through the supply cataloging system.

i. Provide published technical guidance and advice to all Army elements on obtaining, using, handling, disposing of, accounting for, and coping with the hazards of assigned radioactive items.

j. Maintain records of individually controlled radioactive items (para 3-5).

k. Coordinate transfers of responsibility for individually controlled radioactive items between—

(1) Contractors, depots, radiation material control points (RMCPs) and radioactive material disposal facilities.

(2) Various RMCPs.

l. Monitor the life cycle program for radioactive items to ensure compliance with the terms of the NRC license or Service authorization.

m. Ensure licensed or authorized material is not sent to unauthorized persons or organizations.

n. Fulfill the function of RMCP and assign a radiation control officer (RCO) to control radioactive items listed in table 3-1.

1-11. National Guard Bureau (NGB). NGB will—

a. Ensure that each National Guard installation or activity needing individually controlled radioactive items has an effective radiation protection program.

b. Use the DARCOM subordinate commands (see table 3-2) as its RMCP, if formal support agreements exist; if not, set up its own RMCP with an RCO.

c. Implement this regulation by following the necessary leak test, control, and reporting procedures required by references in table 3-1. T[illegible] copies of the leak test results will be sent [illegible] responsible DARCOM MSCs listed in table [illegible]

1-12. The Surgeon General (TSG). TGS will—

a. Provide Cdr, DARCOM with comments and recommendations on health hazards of programs described in applications for licenses, authorizations, and permits.

b. Perform periodic radiological hygiene surveys at least once every 3 years at each Army installation or activity that has an NRC license or DA authorization or permit. A summary ((RCS NRC-1009) Summary of Army Ionizing Radiation Program Reviewing for CY 1[illegible]) of each preceding calendar year's key findings and recommendations will be sent to Cdr, DARCOM, ATTN: DRCSF-P, Alexandria, VA 22333 and to HQDA staff elements by 31 January of each year.

c. Conduct technical review of materiel, equipment, and facilities for the presence of health hazards.

d. Give medical advice, guidance, and assistance on health hazards connected with the disposal of unwanted radioactive materials. Requests for medical advice and assistance will be sent through command channels to The Surgeon General, HQDA(DASG-PCP-E), WASH DC 20310.

1-13. The Director of Safety (DAPE-HRS). The Director of Safety has staff responsibility for—

a. Supporting all Army safety activities.

b. Coordinating with Army staff agencies and commanders of major Army commands on all safety policy matters related to the transportation of radioactive materials.

1-14. Military Traffic Management Command (MTMC). Cdr, MTMC is the authorized representative of the military services in getting Department of Transportation special permits to move radioactive materials. MTMC monitors, evaluates, and guides the movement of radioactive materials (AR 55-162).

1-15. Federal regulatory agencies. The Federal agencies that govern the movement of radioactive materials in the United States are—

a. Nuclear Regulatory Commission (NRC). The NRC approves procedures and performance standards for packaging fissile materials and licensed quantities of radioactive materials. NRC regulations are in 10 CFR. NRC transportation requirements are in 10 CFR 20, 71, 72, and 73.

b. Department of Transportation (DOT). DOT regulates the shipment or movement of radioactive material in interstate commerce by rail, water, air, and public highway (except the US mail). DOT regulations are covered in 49 CFR.

c. US Postal Service (USPS). USPS regulates the transit of radioactive materials in the US mail. Postal requirements are published in the US Postal Manual (available at Military or US Post Offices).

1-16. Transportation, Energy and Troop Support Agency. The Director for Transportation, Energy, and Troop Support gives staff supervision and policy guidance for the movement and safety (AR 385-10) of radioactive material.

1-17. Major Army commands. Commanders of major Army commands will—

a. Establish at least one RMCP at the major command or commodity command level.

b. Appoint an RCO in writing for each control point and send 10 copies of the appointment with the appointeee's qualifications to Cdr, DARCOM, ATTN: DRCSF-P, Alexandria, VA 22333.

c. Implement this regulation by following the necessary leak test control, and reporting procedures required by references in table 3-1. Two copies of the leak test results will be sent to each of the appropriate DARCOM MSCs (see table 3-2).

d. Ensure each installation or activity needing individually controlled items has an effective radiation protection program. This program will consist of qualified users, a radiation protection officer (RPO), required radiac equipment, and adequate procedures and facilities.

It is the commander's prerogative to assign this mission and function organizationally within the command. This function may be assigned to the Logistics Office, Industrial Hygiene Activity, Chemical Office, Directorate for Industrial Operations, Safety Office, and so forth.

e. Ensure commands and installations have plans and resources for handling credible emergencies involving radioactive items including those listed in table 3-1.

1-18. Major field commands. Major field commanders will—

a. Prepare administrative procedures consistent with this regulation.

b. Designate in writing a command RPO.

c. Ensure that subordinate commanders they control have adequate radiation safety resources and take proper safety precautions.

d. Ensure that annual inspections are done to determine compliance with—

(1) Terms of NRC licenses.

(2) DA authorizations and permits.

(3) Federal and Army regulations.

e. Provide CG, DARCOM, on request, information needed for controlling and licensing radioactive material.

f. Establish command plans and resources to cope with credible emergencies, such as fires, floods, or thefts, involving radioactive items owned or used by their commands.

1-19. Major oversea commands. Major commanders overseas will—

a. Establish procedures for disposing unwanted radioactive material.

b. Ship radioactive waste for disposal to authorized land burial sites within the United States or to land burial sites overseas authorized by CG, DARCOM(DRCSF-P). For safety, economy, or other valid reasons, major oversea commanders will operate radioactive material processing facilities to consolidate waste shipment.

c. Publish procedures that list the command channels for coordination between activities wanting to dispose of radioactive waste and CG, ARRCOM. Offices selected as the go-between for this coordination will provide fiscal, transportation, and radiation safety guidance to subordinate activities.

d. Provide qualified escorts (para 4-5) for shipments of unwanted radioactive material within the oversea theater.

e. Conduct annual command inspections of radioactive material processing facilities and major storage areas within their respective areas.

1-20. Local commands. Local commanders that produce, handle, use, or dispose of radioactive material will—

a. Establish a formal radiation safety program consistent with Federal and Army regulations and with Status of Forces Agreements (SOFA). It is the commander's prerogative to assign this mission and function within the command. This function may be assigned to the Logistics Office, Industrial Hygiene Activity, Chemical Office, Directorate for Industrial Operations, Safety Office, and so forth.

b. Provide and maintain adequate resources to ensure safety of personnel, property, and the environment.

(1) Trained personnel

(2) Proper equipment, facilities, and procedures to handle emergencies

c. Obtain required licenses, authorizations, or permits before purchase, receipt, use, transfer, or disposal of radioactive materials.

d. Designate in writing an RPO, an alternate RPO and, when required, an ionizing radiation control committee (IRCC). A part-time duty assignment as an RPO has priority over normal duty assignments.

e. Provide a technical and administrative review and sign each application for an NRC license, DA authorization or permit, and every plan to use radioactive material and ionizing radiation sources. This ensures the adequacy and completion of each application and plan.

f. Enforce steps prescribed by the NRC and DA for the safe use, control, and disposal of radioactive materials, and report and correct safety defects and noncompliances (10 CFR 19, 20, and 21). If the provisions of each license, permit, or authorization are not followed, violations could—

(1) Cause grave risk to the health and safety of the public and personnel of the installation or activity.

(2) Lead to loss of license or to other restraints (including fines).

g. Advise all non-Army agencies wanting to use radioactive materials on Army property of the requirements of this regulation. This includes the need to acquire an Army permit. All Army contracts and leases will contain the requirement to restore Army property to NRC unrestricted use criteria. This regulation will be referenced as the authority.

h. Maintain an inventory of radioactive materials and of ionizing radiation producing devices under their command.

i. Continue to fulfill obligations of NRC licenses until relief is given through an amendment to the license. Licensed applicants will coordinate applications with involved major Army commands or specific field activities to inform them of the responsibilities the amended license will impose.

1-21. Point of origin commander. The commander at the point of origin for a radioactive shipment will—

a. Ensure the consignee is authorized by a proper NRC or Agreement State license (if required) to receive the shipment.

b. Arrange the movement of radioactive material (see AR 55-16, AR 55-162, and AR 55-355).

c. Coordinate with civil law enforcement agencies when help is needed to move and route radioactive shipments.

d. Comply with host nation transportation requirements or transportation SOFAs, whichever is more stringent.

e. Arrange for technical escorts, when required.

f. Inspect and survey vehicles and cargo.

g. Package, label, mark, block, and brace radioactive material for shipment and prepare the shipping documents.

1-22. Receiving activity commander. The commander of the receiving activity will—

a. Accept, off-load, survey, inspect, and acknowledge receipt of shipment.

b. Arrange for receipt or quick pickup of packages containing amounts of radioactive materials in excess of Type A quantities (see 49 CFR 173.389-173.390).

c. Pick up incoming packages of radioactive material within 3 hours of notification by the carrier, when practicable.

d. Monitor each package of radioactive material within 3 hours after receipt (except packages exempt by 10 CFR 20.205) during normal working hours or within 18 hours if received after normal working hours and document the results. Even though 10 CFR 20.205 exempts certain packages from immediate monitoring, all packages of radioactive materials should be monitored before they are opened.

e. Notify at once the carrier delivering the materials if external radiation or radioactive contamination in excess of that specified in 10 CFR 20.205 or in 49 CFR 173.397 is detected.

f. Inform the NRC regional office (see table 4-2) by telephone or telegraph when the external radiation or radioactive contamination exceeds that listed in 10 CFR 20.205.

g. Notify the appropriate Army command (see table 4-1) when—

(1) A radiological accident happens in transit, which is reportable under AR 385-40.

(2) A host nation, Federal or State agency, or delivering carrier must be notified of radioactive contamination caused in shipment or by an incident involving the transport of radioactive materials. (See 10 CFR 20.205, 20.403, 20.405, 73.30, 73.36; 46 CFR 171.15 and 171.16; and 29 CFR 1910.96(1); and appropriate host nation or agreement state requirements.)

h. Notify the NRC licensee of radiation incidents occurring in transit if the licensee must report them to the NRC. (See 10 CFR 20.205, 20.403, 20.405, 71.61, 73.31, and 73.36.)

1-23. Commanders responsible for radioactive material logistics. Commanders or managers logistically responsible for radioactive items will—

a. Ensure the technical literature on the item includes—

(1) Amount and type of radioactive material contained

(2) Safe handling, storing, and disposal procedures

(3) Ways of preventing enemy use

b. Prepare a security plan for disposing of classified radioactive material. The plan will—

(1) Be a part of the technical literature for the item.

(2) Provide security protection equal to the level of security classification involved.

(3) Furnish procedures for declassification.

1-24. Commanders having unwanted radioactive material. Commanders of organizations, units, and activities having unwanted radioactive material will—

a. Ensure, when property is contaminated by radiation, all practical efforts are made to decontaminate the items before disposal (see TM 3-220 and AR 700-64). If it is not economically sound to decontaminate the property or if the contamination cannot be reduced to a safe level, then the property will be treated as radioactive waste.

b. Report through command channels all surplus radioactive material to be screened for further use or disposal.

c. Declassify radioactive waste, if possible. If declassification is impossible, the classified waste must be processed, stored, packaged, and reported separately from all unclassified radioactive waste.

d. Obtain disposal instructions for radioactive waste to be buried at sites in the United States from Cdr, ARRCOM, (ATTN: DRSAR-MAD-GC), Rock Island, IL 61299. Oversea activities will route their requests for disposal instructions as directed by the major Army commander in that area.

e. Provide for local storage and shipment of unwanted radioactive material.

1-25. Ionizing Radiation Control Committee (IRCC). *a.* The IRCC is an advisory body to the commander in fulfilling his or her responsibilities. The committee should consist of the—

(1) Commander

(2) Radiation protection officer

(3) Medical officer (if one is assigned)

(4) Safety officer, or

(5) Representatives of the officers in (1) through (4) above

(6) Representatives of an employee organization

(7) Other personnel knowledgeable in radiation safety

b. The committee should establish the local rules and procedures for procurement, storage, and safe use of radiation sources. Additional responsibilities of the committee are to—

(1) Review proposals to use or procure radioactive items, such as SOPs and applications for licenses and authorizations.

(2) Study reports of incidents and adverse findings.

(3) Make recommendations for improvements.

Quarterly meetings are usually necessary because of program and regulatory changes.

1-26. Radiation Protection Officer (RPO). The RPO is responsible for the radiation safety program. Specifically, the RPO will—

a. Provide guidance on creating working conditions and operating procedures that comply with applicable regulations and directives.

b. Instruct personnel in safe working practices, emergency procedures, harmful effects of radiation overexposures, and other topics required by 10 CFR 19 and 29 CFR 1910.

c. Evaluate and document hazards related to specific operations involving production, storage, use, transportation, disposal, or loss of control of radioactive material to ensure adequate control and safeguards are used. This evaluation includes physical measurements or calculations of radiation levels present, a prediction of potential hazards resulting from changes in materials or operations and proposed corrective actions.

d. Review equipment, materials, facilities, operations, and procedures involving radioactivity.

e. Advise in writing the commander, the licensee, and other responsible officers of any unsafe practices, defects, or noncompliances under 10 CFR 21.

1-27. Radiation Control Officer (RCO). The RCO will—

a. Manage and operate the RMCP.

b. Review and approve in writing the selection of each local radiation protection officer (LRPO) in the command's geographical area.

c. Take action, when a qualified LRPO is not available to control radioactive sources to—

(1) Stop requisition for the material.

(2) Stop use of on-hand material until someone can be qualified by training. Training can be—

(a) Attendance at a formal course approved by the DARCOM MSC responsible for the item, or

(b) On-the-job training given by the RCO.

While training the LRPO, the RCO will be responsible for radiation safety, to include performing leak test and recording the results.

(3) Transfer radioactive items to an installation or activity that has the proper radiac equipment and qualified personnel.

d. Maintain records listed in paragraph 3-5.

e. Ensure controlled items are properly handled according to DA and NRC regulations.

f. Evaluate and validate records periodically of accountable commands, installations, and activities.

g. Notify the proper DARCOM element (table 3-2) within 60 days of the permanent transfer between major commands of an individually controlled item.

h. Submit the Radiation Incident Report. RCS DD (AE) 1168 by electrical means (by phone, if possible) to the appropriate licensee (telephone number and address are in table 3-2) immediately after the incident is discovered. This report will include data on—

(1) Personnel overexposure to radiation.

(2) Damaged or leaking radioactive sources or items.

(3) Loss or theft of individually controlled radioactive items. The telephone report will be followed by a written radioactive incident report giving the details of the incident and the corrective action taken. This written report will be sent to the licensee within 25 days after the incident is discovered and to other addressees (listed in AR 385-40) within 60 days.

i. Combine and send Radioisotope Inventory and Leak Test Report, RCS DRC-192 to the proper licensee (table 3-2) at least twice a year (31 January and 31 July). Quarterly reporting is required when the leak test cycle is every three months (table 3-1).

j. Have a scientific or engineering background and should have educational training in (1) or (2) below. (GS 1306 and MOSs 7330, 551, 52A, and 52 with A51 S5 are exempt from those requirements.)

(1) Radiological Safety Course 7K-F3, US Ordnance Center and School.

(2) A total of 80 hours of formal training in the following areas:

(a) Principles and practices of radiation protection.

(b) Radiological monitoring techniques.

(c) Radiac instrumentation (including operation, calibration, and limitations).

(d) Mathematics (enough to do calcluations to measure radioactivity and evaluate real or potential hazards).

(e) Biological effects of radiation.

(f) Applicable Federal and Army regulations.

1-28. Local radiation protection officer (LRPO). The LRPO appointed by the local installation or activity commander will—

a. Ensure that controlled items under his or her jurisdiction are properly used and stored.

b. Ensure that records (para 3-5) are maintained for each individually controlled item.

c. Advise the RMCP of any proposed change in—

(1) Accountability of an item.

(2) Local radiation protection offices.

(3) Installation relocation of an individually controlled item. An individually controlled item will not be relocated or released from accountability until the receiving RMCP evaluates and approves the—

(a) Qualifications of the LRPO at the receiving installation.

(b) Effectiveness of the radiation protection program at the receiving installation.

d. Submit a Radiation Incident Report to the RMCP by electrical means to report—

(1) A theft, loss of controlled destruction, or leakage.

(2) Damage of individually controlled items and suspected radiological overexposures (CFR 19, 20, 21, 30, 40, and 70 and AR 385-40). Items possibly damaged will not be used until their safety is confirmed and reuse has been approved by the RPO at the RMCP.)

e. Send a written follow-up of the electrical report giving the details of the incident and the corrective action taken to the RMCP within 15 days after the incident.

f. Establish radiation control areas where the use or storage of radioactive materials may—

(1) Create dose rates in excess of 2 millirads per hour.

(2) Cause personnel to receive 100 or more millirads in 7 consecutive days or 300 or more millirads in a calendar quarter.

g. Post—

(1) NRC Form 3 (fig. 1-1) required by 10 CFR 19.11, which will be reproduced locally on 10½ by 16 inch paper.

(2) Radiation warning signs required by AR 385-30, and

(3) Other notices required by 10 CFR 19 and 20.

h. Ensure procedures state that controlled items must be stored in a fire-resistant building and must be used as prescribed in applicable publications.

(Locate fig 1-1, a fold-in page, at the end of the regular size pages)

1-29. Licenses. Commanders of organizations and activities that are issued DA authorizations or NRC licenses will—

a. Comply fully with applicable provisions of 10 CFR, terms of the license, and this regulation.

b. Ensure that licensed or authorized material under their control is not transferred to unauthorized persons or organizations.

(3) Make recommendations for improvements.

Quarterly meetings are usually necessary because of program and regulatory changes.

1-26. Radiation Protection Officer (RPO). The RPO is responsible for the radiation safety program. Specifically, the RPO will—

a. Provide guidance on creating working conditions and operating procedures that comply with applicable regulations and directives.

b. Instruct personnel in safe working practices, emergency procedures, harmful effects of radiation overexposures, and other topics required by 10 CFR 19 and 29 CFR 1910.

c. Evaluate and document hazards related to specific operations involving production, storage, use, transportation, disposal, or loss of control of radioactive material to ensure adequate control and safeguards are used. This evaluation includes physical measurements or calculations of radiation levels present, a prediction of potential hazards resulting from changes in materials or operations and proposed corrective actions.

d. Review equipment, materials, facilities, operations, and procedures involving radioactivity.

e. Advise in writing the commander, the licensee, and other responsible officers of any unsafe practices, defects, or noncompliances under 10 CFR 21.

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a. Manage and operate the RMCP.

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(a) Attendance at a formal course approved by the DARCOM MSC responsible for the item, or

(b) On-the-job training given by the RCO.

While training the LRPO, the RCO will be responsible for radiation safety, to include performing leak test and recording the results.

(3) Transfer radioactive items to an installation or activity that has the proper radiac equipment and qualified personnel.

d. Maintain records listed in paragraph 3-5.

e. Ensure controlled items are properly handled according to DA and NRC regulations.

f. Evaluate and validate records periodically of accountable commands, installations, and activities.

g. Notify the proper DARCOM element (table 3-2) within 60 days of the permanent transfer between major commands of an individually controlled item.

h. Submit the Radiation Incident Report, RCS DD (AE) 1168 by electrical means (by phone, if possible) to the appropriate licensee (telephone number and address are in table 3-2) immediately after the incident is discovered. This report will include data on—

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i. Combine and send Radioisotope Inventory and Leak Test Report, RCS DRC-192 to the proper licensee (table 3-2) at least twice a year (31 January and 31 July). Quarterly reporting is required when the leak test cycle is every three months (table 3-1).

j. Have a scientific or engineering background and should have educational training in (1) or (2) below. (GS 1306 and MOSs 7330, 551, 52A, and 52 with A51 S5 are exempt from those requirements.)

(1) Radiological Safety Course 7K-F3, US Ordnance Center and School.

(2) A total of 80 hours of formal training in the following areas:

(a) Principles and practices of radiation protection.

(b) Radiological monitoring techniques.

(c) Radiac instrumentation (including operation, calibration, and limitations).

(d) Mathematics (enough to do calcluations to measure radioactivity and evaluate real or potential hazards).

(e) Biological effects of radiation.

(f) Applicable Federal and Army regulations.

1-28. Local radiation protection officer (LRPO). The LRPO appointed by the local installation or activity commander will—

a. Ensure that controlled items under his or her jurisdiction are properly used and stored.

b. Ensure that records (para 3-5) are maintained for each individually controlled item.

c. Advise the RMCP of any proposed change in—

(1) Accountability of an item.

(2) Local radiation protection offices.

(3) Installation relocation of an individually controlled item. An individually controlled item will not be relocated or released from accountability until the receiving RMCP evaluates and approves the—

(a) Qualifications of the LRPO at the receiving installation.

(b) Effectiveness of the radiation protection program at the receiving installation.

d. Submit a Radiation Incident Report to the RMCP by electrical means to report—

(1) A theft, loss of controlled destruction, or leakage.

(2) Damage of individually controlled items and suspected radiological overexposures (CFR 19, 20, 21, 30, 40, and 70 and AR 385-40). Items possibly damaged will not be used until their safety is confirmed and reuse has been approved by the RPO at the RMCP.)

e. Send a written follow-up of the electrical report giving the details of the incident and the corrective action taken to the RMCP within 15 days after the incident.

f. Establish radiation control areas where the use or storage of radioactive materials may—

(1) Create dose rates in excess of 2 millirads per hour.

(2) Cause personnel to receive 100 or more millirads in 7 consecutive days or 300 or more millirads in a calendar quarter.

g. Post—

(1) NRC Form 3 (fig. 1-1) required by 10 CFR 19.11, which will be reproduced locally on 10½ by 16 inch paper.

(2) Radiation warning signs required by AR 385-30, and

(3) Other notices required by 10 CFR 19 and 20.

h. Ensure procedures state that controlled items must be stored in a fire-resistant building and must be used as prescribed in applicable publications.

(Locate fig 1-1, a fold-in page, at the end of the regular size pages)

1-29. Licenses. Commanders of organizations and activities that are issued DA authorizations or NRC licenses will—

a. Comply fully with applicable provisions of 10 CFR, terms of the license, and this regulation.

b. Ensure that licensed or authorized material under their control is not transferred to unauthorized persons or organizations.

CHAPTER 2

LICENSING AND CONTROL OF IONIZING RADIATION SOURCES

2-1. NRC specific licenses. *a.* NRC licenses are required within the United States, its territories, and possessions to produce, transfer, receive, own, possess, use, and dispose of byproduct, source, and special nuclear material in excess of license-exempt quantities in 10 CFR 30-34, 40 and 70. (For other quantities, specific licenses must be obtained, unless they are authorized by an NRC general license under parts 31 or 40.)

b. The NRC requires licenses for materials activated in an Army reactor when transferred beyond the direct control of the reactor staff.

c. Decommissioned Army nuclear reactor facilities are subject to either—

(1) DA radiation authorizations (DARAs) or

(2) NRC licensing, unless the facility is license exempt under Section 91B of the Atomic Energy Act.

d. Procedures for applying for NRC licenses are discussed in paragraph 2-4.

2-2. DA radiation authorizations (DARAs). *a.* DARAs are required to produce, transfer, receive, own. possess, or use—

(1) Radioactive materials—

(a) Excluding items having radioactivity in excess of the quantities shown in 10 CFR 30.71, Section B and items

(b) Exempt from NRC specific license control.

(2) Byproduct, source, and special nuclear material used, stored, or disposed of outside the United States, its territories, and possessions. This includes items irradiated during weapons test that emit a dose rate over 0.4 millirads per hour at any distance.

b. Commodity managers must get a DA authorization for items of issue (see AR 700-64) containing radioactive material if the item is—

(1) An electron tube containing more than 10 microcuries, or

(2) A smoke detector containing more than 10 microcuries.

(3) Not exempt from the requirements in *a* above.

(4) Exceeding the NRC license-exempt quantity of 0.1 microcurie of radium or 1.0 microcurie of any other radionuclide.

c. DARAs are granted for 3 years. Renewals or amendments to an authorization will be requested in the same manner as the original application. Requests for renewal should be submitted through command channels to the Cdr, DARCOM, ATTN: DRCSF-P, Alexandria, VA 22333, no later than 30 days before the expiration date. A request for an amendment can be submitted to reach DARCOM at any time up to 30 days before the date the authorization expires. Requests for amendment or renewal will be submitted on DA Form 3337 (Application for Department of the Army Radioactive Material Authorization or Permit). Four copies are required.

d. If a DA element already has a proper NRC license, it does not require a DARA for radionuclides and uses covered in the NRC license.

e. DARAs will be requested by submitting completed copies of DA Form 3337 through command channels to the Cdr, DARCOM, ATTN: DRCSF-P, 5001 Eisenhower Avenue, Alexandria, VA 22333.

f. Copies of DA Form 3337 (Application for Department of the Army Radiation Authorization Permit) can be obtained from Letterkenny Army Depot, Chambersburg, PA 17201.

2-3. DA radiation permits. *a.* DA radiation permits are required for use, storage, possession, and disposal of radiation sources by non-Army agencies (including civilian contractors) on an Army installation. Concurrence of the installation commander and HQDA is required to obtain a DA permit.

(1) If an NRC license already permits use or storage of radioactive sources at unspecified Army installations, the non-Army agency still needs a DA permit. The non-Army requestor will send six copies of DA Form 3337 to the installation commander. The commander will then send four copies of DA Form 3337 to Cdr, DARCOM, ATTN: DRCSF-P, Alexandria, VA 22333.

(2) A DA permit is not required for temporary use or storage (less than 15 consecutive calendar days) if the local commander determines that adequate safety exists.

b. Local commanders may approve temporary use or storage of sealed radioactive sources by users with a proper NRC license or agreement State license (see glossary). A copy of the user's request and local commander's approval will be sent through command channels to Cdr, DARCOM within 3 days of the approval. In all cases, approvals will require users to restore the property to NRC unrestricted use criteria.

2-4. Transfer and export of radioactive material. *a.* Transfer of byproduct, source, and special nuclear material will not be made, except under 10 CFR 30, 40, and 70.

b. Applications to transfer to authorized agencies or to export to non-Army agencies an amount exceeding that listed in 10 CFR 30.71 will be made through command channels to Cdr, DARCOM, ATTN: DRCSF-P, Alexandria, VA 22333.

c. DA permits are required for transfer or export of radioactive materials beyond Army's control, except for domestic recipients having the proper NRC or Agreement State license. Requests will be by letter and must—

(1) Describe the item, radioactivity, and radiation levels,

(2) Give special handling instructions, if needed, and

(3) Identify the recipient.

2-5. Application for NRC specific license. *a. General.*

(1) Procedures for requesting and processing specific licenses are discussed in *b* through *d* below.

(2) Specific licenses are issued to an installation or activity commander who has met these requirements of Title 10 CFR—

(a) Part 20, Standards of Protection Against Radiation

(b) Part 30, Rules of General Applicability for Licensing of Byproduct Material

(c) Part 31, General Licensing for Certain Quantities, etc.

(d) Part 32, Specific Licenses to Manufacture, Distribute, etc.

(e) Part 33, Specific Licenses of Broad Scope

(f) Part 34, Licenses for Radiography and Radiation Safety, etc.

(g) Part 35, Human Uses of Byproduct Material

(h) Part 36, Export and Import of Radioactive Materials

(i) Part 40, Licensing of Source Material

(j) Part 70, Special Nuclear Material

(k) Part 71, Packaging Radioactive Materials for Transport, and

(l) Pertinent Army Regulations.

(3) The signer attests, under threat of criminal penalty, that the information contained in the application for a specific license is correct to the best of his or her knowledge. The application must be signed by the commander if commitments are made affecting more than one command element.

(4) Emergency processing of applications is neither desirable nor necessary and normally will be limited to unexpected operational requirements. Processing may take 2 months for simple, well prepared applications to one year or more if significant environmental or personnel risk is involved. Leadtime for HQDA and NRC reviews requires that applicants allow 90 days for processing simple, routine requests and up to 180 days for complex or controversial actions.

(5) Licensing requests before the NRC requiring legal action will be referred to HQDA(DAJA-RL), Falls Church, VA 22041.

b. Byproduct material license. Application for a specific license for byproduct material will be made on NRC Form 313 (Application for Byproduct Material). Application for a license to

use sealed sources in radiography will be submitted on NRC Form 313R. Six signed and dated copies of the application will be sent to Cdr, DARCOM (see *f* below). Of the six, three must have original signatures.

c. Source material license. Application for a specific license for source material will be submitted on NRC Form 2 (Application for Source Material). Eight signed and dated copies will be sent to Cdr, DARCOM (see *f* below). Three of the copies must have original signatures.

d. Special nuclear material license. Application for a special nuclear material license will be made by letter under NRC requirements in 10 CFR 70. Ten signed and dated copies of the application will be sent through command channels to Cdr, DARCOM (*f* below).

e. Application forms. Application forms may be obtained by direct request to Director, Division of Materials Licensing, US Nuclear Regulatory Commission, Washington, DC 20555. NRC rules and regulations are available from the Superintendent of Documents, Government Printing Office, Washington, DC 20402.

f. Submitting and processing applications.

(1) Applications for byproduct, source, and special nuclear material (except for human use) will be submitted through command channels to Cdr, DARCOM, ATTN: DRCSF-P, Alexandria, VA 22333. Applications should arrive at DARCOM at least 60 days before the time of expected use. Radioactive items cannot be procured until the license is issued.

(2) Application for radioactive material for medical purposes (human use) will be submitted through command channels to HQDA(DASG-HCH), WASH DC 20310, under AR 40-37. Applications from medical units, except for human use or diagnosis, will be sent through command channels for review and transmittal to Cdr, DARCOM.

(3) When emergency processing is needed, an appointment will be obtained from Cdr, DARCOM (DRCSF-P) and the application will be hand-carried by a person authorized to approve the application.

(4) Commanders will consolidate license requests when practical.

(5) Approved licenses will be sent to the applicant through command channels.

g. License amendments. Applications for amendment to a license will be submitted in the same way as the original application. If this requirement is not met, it is possible that a valid license covering the amendment will not be issued until after the desired date.

h. License renewals. Applications for the renewal of an existing license will be processed like the original application and will not cite previously submitted material. If the renewal application is made under this paragraph, then the program or activity is considered covered by the previous license even though the renewal is not granted by the NRC before the expiration date. CG, DARCOM will notify the applicant when the renewal application is sent to the NRC. If a renewal application is not filed with DARCOM(DRCSF-P) 60 days before the expiration date, then all use and handling of the radioactive material must stop on the expiration date, since no valid license exists. If a request for renewal cannot be submitted in time, contact DARCOM by telephone (AUTOVON 284-9340, cml (202) 274-9340) or by telegraph and request that a storage license be obtained from the NRC.

2-6. Direct communication with the NRC. *a.* Major commanders may authorize direct communication with the NRC in cases involving inquiry initiated by the NRC or by Cdr, DARCOM (DRCSF-P). In all other cases, direct communication must be approved by DARCOM (DRCSF-P).

b. Three copies of all communications, including records of phone calls, between the licensee or applicant and the NRC will be sent to Cdr, DARCOM, ATTN: DRCSF-P, 5001 Eisenhower Avenue, Alexandria, VA 22333.

c. The purpose of these communication constraints is to—

(1) Reduce the number of questions on the same subject reaching the NRC.

(2) Ensure that decisions are dispersed throughout the Army.

2-7. Radioactive material controls. *a.* Radioactive material will be secured against unauthorized use.

b. When radioactive materials are received, procured, used, transferred, exported, distributed, or disposed of outside the United States, it's territories, or possessions, controls set by the NRC and DA for radioactive items will be observed, subject to the requirements of the host country. If a conflict exists, the most restrictive regulations will be followed. In a National emergency, this requirement will not prevent tactical deployment of units with mission-essential equipment. AR 700-64 contains additional controls specific to items of issue, such as those items that have been type classified.

c. Unless specifically exempted by a DA authorization or an NRC license, all sealed sources exceeding the quantities in 10 CFR 30.71, Schedule B will be leak tested at least every 6 months. Alpha sources exceeding these quantities will be tested every 3 months, unless otherwise exempted.

2-8. Disposal. Commanders are responsible for disposing of radioactive material (see chap. 5).

2-9. Technical advice. *a.* Technical advice about the health hazards of ionizing radiation devices and radioactive materials may be obtained on request from The Surgeon General (TSG). This includes specific advice on eliminating possible health hazards and incorporating protective health measures. Requests should be sent through channels to HQDA(DASG-PSP), WASH DC 20310. In emergencies requiring quick action by TSG, requests may be directed to HQDA(DASG-PSP-E), WASH DC 20310.

b. Technical advice and guidance on the safe movement of nuclear and nuclear radioactive material are staff functions of The Director of Safety. Written requests should be sent to HQDA(DAPE-HRS), WASH DC 20310. Radioactive materials will be transported under chapter 4 and Federal, State, and local regulations, where applicable.

2-10. Radiation health surveys. *a.* On request of an installation or activity TSG will—

(1) Provide personnel to do on-site surveys.

(2) Make recommendations to meet the requirements of this regulation and NRC regulations.

b. Requests for assistance will be sent through command channels. While the US Army Environmental Hygiene Agency does periodic surveys, the local commander should conduct enough periodic on-site surveys to ensure safety and compliance with applicable procedures and directives.

2-11. Inventory of radioactive materials. *a.* The commander of each installation or activity (except combat zones) with radioactive items in excess of the quantities in 10 CFR 30.71, Schedule B will select someone (preferably the RPO) to physically inventory the radioactive material on hand. This should be done at least every 12 months and a record of the results of each survey kept for 5 years.

b. Inventory records will contain the—

(1) Specific items of equipment or radioisotope

(2) Serial number

(3) Location of the items

(4) Radiaton levels

(5) Radioactivity

(6) NRC or DA authorization numbers

(7) Receipts, transfers, and local disposals

(8) Date of inventory and name of person making the inventory

c. Commanders of the Army NICPs, commodity and spare parts storage locations, and maintenance and repair locations also will maintain inventory records for retail and wholesale assets (AR 710-1 and AR 740-26).

d. The inventory will be the subject of periodic command inspections.

2-12. Emergency planning. Each installation and activity needs to preplan and train for credible emergencies that may occur. If the emergency exceeds local capability or resources, the parent major commander must provide assistance. While expert assistance is available from TSG and CG, DARCOM, time and distance

dictate that the parent major commands be able to assist their own installations. Past emergencies have demonstrated that 24 hours may elapse before outside assistance is furnished. Installations should test their emergency plans at least annually. Emergency plans will be incorporated as part of applicable Disaster Control Plans.

2-13. Establishing an IRCC. An IRCC is required at installations and activities where the following are used:

a. Radioactive material in excess of the quantities in 10 CFR 30.71, Schedule B

b. Accelerators

c. Unsealed radioactive materials

d. Mobile or portable industrial X-ray equipment.

A committee is not required to store, use, or maintain type classified items of issue.

2-14. Reporting of incidents, accidents, and noncompliances. See AR 385-40 and 10 CFR 19, 20, and 21.

CHAPTER 3

INDIVIDUALLY CONTROLLED RADIOACTIVE ITEMS OF SUPPLY

3-1. General. Army installations and activities may acquire and use the radioactive supply items listed in table 3-1 without getting their own NRC specific license or DA authorization (AR 700-64).

3-2. Controls. *a.* Both NRC and DA require control of all operations involving radioactive items to ensure safety of personnel and property. Army activities having licensed radioactive sources and the agencies that control them are subject to inspections by the NRC and under AR 20-1 and AR 1-200. Normally, Army activities having unlicensed radioactive items will only be subject to inspection under AR 20-1 and AR 1-200.

b. When practical, the same logistics procedures applied to other Army supplies will be used for radioactive items. Army administrative, safety, or regulatory requirements unique to radioactive items will be published in control literature-supply and technical manuals or bulletins. AR 700-64 prescribes the type of information to be discussed in control literature. Drafts of such publications should be coordinated with affected commands to ensure the field will be able to comply.

c. DARCOM MSCs will visit or inspect non-DARCOM elements only in the following unusual cases:

(1) To investigate an incident (AR 385-40).

(2) To provide emergency onsite support.

(3) By invitation.

(4) By direction.

d. The normal procedure for overseeing compliance with controls is monitoring reports of inventories, leak tests, incidents, and equipment improvements by—

(1) Feedback from logistics assistance and inspection teams.

(2) Liaison with RCMPs. Commanders, DARCOM MSCs may, on determination of a problem, perform annual liaison/inspection visits to monitor major Army command RCMPs, depots, and/or users for compliance with pertinent Army regulations.

e. Failure of any element to fulfill its responsibilities in controlling radioactive items could—

(1) Pose undue risk to personnel.

(2) Cause adverse public relations.

(3) Jeopardize broad privileges the NRC has granted to Army licensees.

(4) Result in severe penalties (10 CFR 21).

f. Most of the radioactive products in the Army are safe unless taken apart, damaged, or unless large quantities are stored in one place (bulk storage). To ensure safety—

(1) The maintenance and disposal of bulk storage material will be controlled.

(2) The individually controlled radioactive items of supply shown in table 3-1 are too dangerous for untrained persons to handle. Controls, therefore, will be imposed so that only trained and experienced persons will use them. Adequate safety equipment will be available to support the safe use of these items.

(3) Periodic inventory and testing will be performed to ensure that controlled items remain safe and at authorized locations only.

3-3. Requisitioning, transfer, and disposal. *a. Requisitioning controlled items.*

(1) All requisitions for individually controlled items (table 3-1) will be sent through channels to the appropriate DARCOM commodity command through channels set by major Army commanders under AR 725-50.

(2) Commanders will ensure that all requests are channeled through the RMCP. Each request will include the following certification:

"Sufficient safety equipment, facilities, and trained personnel are available at this installation for the safe handling, use, and storage of radioactive material ordered on this requisition."

The certification must have the signature and typed name and grade of the LRPO.

(3) Controlled items, other than individually controlled items (table 3-1), need no certification from the LRPO.

b. Transfer.

(1) Individually controlled items will not be transferred without the approval of the RMCP. Approval for transfer will be given when the RMCP determines that the receiving installation has an effective radiation protection program.

(2) Controlled items, other than individually controlled items, can be transferred without approval from the RMCP.

(3) An RMCP wanting to transfer all individually controlled items outside the major command will request shipping permission from the receiving control point. After approval, the shipping RCO will send a copy of the records on all items to the receiving RCO and notify the appropriate DARCOM subcommand (table 3-2) of the shipment. After the items are received, the receiving LRPO will notify his or her RMCP within 5 days after receipt.

(4) Transfer of radioactive material beyond the control of the Army must receive prior approval from HQ, DARCOM (chap. 2).

c. Disposal. Requests to dispose of unwanted radioactive supply items will be routed through the RMCP.

(1) Serviceable unwanted radioactive items will be screened by the RMCP or DARCOM MSC for further use.

(2) Unserviceable items will be reported to the appropriate DARCOM MSC for disposal. The DARCOM MSC will either give instructions to ship the item to a licensed repair facility or to an NRC approved land burial site.

3-4. Reports. DA Form 2352-R (Punch Card Transmission Worksheet- Radioisotope Inventory and Leak Test Report) (fig 3-1)) will be prepared according to instructions in figure 3-2. Installations with the capability to punch computer cards may send punched cards. If there is no capability, then DA Form 3252-R will be used. A copy will be sent to each appropriate DARCOM MSC listed in table 3-2. DA Form 3252-R will be reproduced locally on 8½ × 11 inch paper.

(Locate fig 3-1, a fold-in page, at the end of the regular size pages.)

3-5. Records. *a. Records of individually controlled items.* For each individually controlled item, the responsible DARCOM MSC and each RMCP will record information as follows:

(1) National stock number (NSN)

(2) Description

(3) Serial number

(4) Radionuclide, source activity, and date radioactivity was determined

(5) Dates and results of leak tests

(6) Shipment number

(7) Shipped from

(8) Shipped to

(9) Date shipped

(10) Date of manufacture (if available)

(11) Name of manufacturer (if available)

(12) Name and qualification of each LRPO (maintained by RMCP only)

b. Supplementary records. In addition to the records lised in *a* above, license managers at DARCOM MSCs will maintain the following records:

(1) Correspondence related to assigned NRC licenses and DA authorizations

(2) Reports of surveys, tests, inspections, equipment improvements, studies, and investigations made on assigned items

(3) Inventory and leak test summaries

All of the above records will be maintained for 5 years.

Table 3-1. Radioactive Sources

Description and NSN	*Use*	*Isotope and activity*	*Sealed Source*	*Half-life*	*Individually controlled items*	*Smear or leak test frequency (months)*	*References*
Radioactive Source Set, M3A1 6665-00-856-8235	Gamma source for calibrating instruments.	Co 60, 100 millicuries	Yes	5.3 yrs	Yes	6	TM 3-6665-214-13&P
Radiac Calibrator, AN/UDM-6 6665-00-767-7497	Alpha check source for AN/PDR 60 and AN/PDR 54.	1.4×10^{8} dpm Pu-239	No	24,360 yrs	Yes	3	TM 9-6665-203-10
Radiac Calibrator, TS1230A 6665-00-973-1123	Calibrate 3 ranges of *Juno* meter IM-156/PD.	Pu 239 4×10^{6} cpm	No	24,360 yrs	Yes	3	TM 3—6665-202-10
Radiac Calibrator, AN/UDM-2 6665-00-176-9037	Calibrates radiac meters IM-93( )/UD, IM-147( )/PD, IM-9E/PD, Radiac Meter IM-174( )/PD, Radiac Set AN/PDR-27( ), Radiac Set AN/PDR-60, and Aerial Radial System AN/ADR-6.	Sr90-Y90, 100 millicuries	Yes	27.7 yrs	Yes	6	TM 11-6665-227-12
Radiac Calibrator, AN/UDM-1 6665-00-669-0077	Gamma source for calibrating instruments.	Co 60, 10.0 curies	Yes	5.26 yrs	Yes	6	TM 11-6665-217-15
Radiac Calibrator Set, AN/UDM-1A 6665-00-556-8825	Gamma source for calibrating instruments.	Cs 137, 12.0 curies	Yes	30.0 yrs	Yes	6	TM 11-6665-217-15
Radiac Calibrator Set, AN/UDM-7B 6665-00-400-5388	Alpha source for calibrating instruments.	Pu 239, two sources 10^{7} dpm and 10^{5} dpm	No	24,360 yrs	Yes	3	
Tester, Density & Moisture Nuclear Method Cambell Pacific Model No. MC-1 6635-01-030-6896	Gamma source for soil Asphalt density and moisture testing.	Cs 137, 10 millicuries Am 241, 60 millicuries	Yes	26.6 yrs 458 yrs	Yes	6	TB 385-103

Warning: The above items are all sources of radioactivity and can be extremely dangerous. Consult references for safety precautions, warning signs, and storage limitations.

Table 3-2. Licenses, Licensees, and Control Points

NSN	*NRC (AEC) License No.*	*Report incidents to these licensees–*	*Send movement reports and consolidated leak test inventory reports to–*	*When installation lacks ability to evaluate, send leak test samples to–*
6665-00-400-5388 6665-00-767-7497 6665-0056-8235 6665-00-973-1123 6665-00-715-5141 6665-00-618-1348	SNM 1745 SNM 1745, Amend .01 CSL EML 19-01826-02 SNM 1745, Amend .01 C3L SUB-865 CSL SUB-865	Commander US Army Armament Materiel Readiness Command ATTN: DRSAR-SF Rock Island, IL 61299 Telephone: Commercial (309) 794-6989/6982 AUTOVON 793-3383/5019 During nonduty hours call: Commercial (309) 794-6001 AUTOVON 793-6001	Commander US Army Armament Materiel Readiness Command ATTN: DRSAR-MM Rock Island, IL 61229	The address prescribed by major Army commanders or to nearest primary nucleonic: Commander Lexington-Blue Grass Army Depot Activity ATTN: SDSRR-L-QND Lexington, KY 40507
6665-00-669-0077 6665-00-556-8825	Specific license required. Outside US, its territories, and possessions, a DA radiation authorization is needed.	Using activity must obtain its own NRC license or, if located outside the United States, a DA radiation authorization. These items are not covered by broad licenses issued to TARCOM MSCs.	Commander US Army Materiel Development and Readiness Command ATTN: DRCSF-P Alexandria, VA 22333	Commander Sacramento Army Depot ATTN: SDSSA-QMD-1 Sacramento, CA 95813
6665-00-176-9037 6665-00-832-6159 6665-00-526-8648	BML 29-01022-08 BML 29-01022-11 BML 19-1826-2/ BML 29-01022-11 BML 29-01022-12	Commander US Army Communications and Electronics Materiel Readiness Command ATTN: DRSEL-SF Fort Monmouth, NJ 07703 Telephone: Commercial (201) 532-3493/4452 AUTOVON 992-3493/4452 During nonduty hours call: Commercial (201) 532-1100/1492 AUTOVON 992-1100/1492	Commander US Army Communications and Electronics Materiel Readiness Command ATTN: DRSEL-SF Fort Monmouth, NJ 07703	Commander Lexington-Blue Grass Army Depot Activity ATTN: SDSRR-L-QND Lexington, KY 40507
6635-01-030-6896	21-0122-05	Commander US Army Tank-Automotive Materiel Readiness Command ATTN: DRSTA-CZ Warren, MI 48090 Telephone: Commercial (313) 573-2194/2121 AUTOVON 273-2194/2121 During nonduty hours call: Commercial (313) 573-1511 AUTOVON 273-1511	Commander US Army Tank-Automotive Materiel Readiness Command ATTN: DRSTA-CZ Warren, MI 48090	Commander Lexington-Blue Grass Army Depot Activity ATTN: SDSRR-L-QND Lexington, KY 40507

Instructions for Preparing Radioisotope Inventory and Leak Test Report (RCS DRC-192) (DA Form 3252-R)

Card Column	*Instruction*
1-6	Enter the unit identification code (UIC) of unit or activity. Show as six letters or numbers.
7-17	Enter 11-digit NSN. Do not use dashes. Use NSN for the radioactive source rather than the one for ?s or sets having a radiation source with a separate NSN.
18-22	Enter 5-digit serial number. If serial number has less than 5 digits, fill blank spaces with zeros.
23-26	Enter one of the following codes for determined source activity. (The activity of these sources may vary considerably and should be reported as indicated on the source at date of manufacture.)

UDM-1	010K (10 curies)
UDM-1A	120K (120 curies)
TS-1230A	40C5 (4 × 106 counts per min)
M3A1	126- (126 millicures)
MC-1	070- (70 millicures)
UDM-6	14C5 (1.4 × 106 counts per min)
UDM-2	100- (100 millicures)
UDM-7B	10C6 (1.0 × 107 counts per min)

27-30	Enter year and month source activity (colms 23-26) was determined. If this date is not known, enter "UNK" in the first three spaces and leave column 30 blank. Show the year in the first 2 digits and the month in the last two. Examples: February 1980 would be "8002" December 1978 would be "7812"
31-33	Enter 3 digit number for year and date installation received item. Example: December 1979 would be "912". If date is not known, enter "UNK."
34-35	Leave blank.
36-43	Enter one letter and 7 numbers to indicate shipment number or Government bill of lading (GBL). The GBL must appear on all reports deleting an item from the inventory or adding an item to it.
44-45	Leave blank.
46-50	Units reporting an item received, enter the UIC or the Army location code (ARLOC) from where the source was shipped. Units deleting an item from the inventory, enter the UIC of the receiving unit or activity if transferred; or enter the ARLOC to which an item was shipped for disposal. (See columns 73-77.)

Figure 3-2

Card Column — *Instruction*

51–52 ..... Leave blank

53–56 ..... Enter the Julian date the item was shipped for transfer or disposal.

57–58 ..... Leave blank.

59 ..... Enter one of these numbers:

1—Reports on NSN 6665-00-973-1123
2—Reports on NSN 6665-00-856-8235
3—Reports on NSN 6635-01-030-6898
4—Reports on NSN 6665-00-767-7497
5—Reports on NSN 6665-00-618-1348

Leave blank for reports on all other NSNs.

60–62 ..... Give date of last leak test. Use 3 digits. (See colms 31–33.)
Enter "NOW" for the M8 Uranium Test Sample NSN 6665-00-618-1348

63–65 ..... Enter 3-digit number to show results of the leak test made on the date shown in columns 60–62 (showing microcurie × 10 – 5) for example: 0.002 microcuries would be "200." If an activity exceeds .005 microcuries, put device into safe storage, and check area and personnel for contamination. Request guidance from the licensee (table 3-2) by priority teletype. Round off wipe test results to the nearest 10^{-5} microcuries. Examples:

0.001700 microcuries would be "170"
0.000030 microcuries would be "003"
0.000005 microcuries would be "001"
Less than 0.000005 would be "–1"

66–68 ..... Enter one of these codes in column 66:

N—Wipe test checked locally and is free of detectable contamination.
Follow this code with the proper abbreviation of the activity (colms 67 and 68) to which the wipe test was sent for a more accurate analysis:

SD—Sacramento Army Depot
LX—Lexington Blue Grass Depot Activity
MD—Laboratory designated by major Army commander

D—Analysis reported.
Follow this code with the proper abbreviation of the activity making the wipe test analysis. Abbreviations are given above.

NXX—Analysis performed with locally available measuring equipment of the required sensitivity. (AN/PDR-27 is not adequately sensitive.)

Figure 3-2—Continued

Card Column *Instruction*

LEK—Source was leaking. Example: A wipe test checked locally with AN/PDR-27 was free of detectable contamination. The wipe test was mailed to the Lexington Blue Grass Depot Activity for more accurate analysis. Test results were not received in 30 days; therefore, the report was submitted with "UNK" in columns 63–65 and "NLK" in columns 66–68. When the report was received, the radiation protection officer requested that the wipe test report be transmitted. When received, the wipe test results of .003 were then reported as "300" in columns 63–65 and "DLX" in columns 66–68.

69 ..... Choose one of these alpha characters to indicate type of report:

I— Initial or recurring semiannual inventory

W—Change in date of last wipe test.

K—Correction of erroneous information reported previously. This letter code must be used with both transaction codes (colm 80). Example: "Delete previously reported data" and "add new corrected data". Two cards are required to make the correction.

E—The item is excess to the needs of the unit or activity having custody of the source. Report excess sources only as separate items, not as physical components of other sets.

L—A change to the unit or activity having custody of the source. Columns 1–6 must also be changed, and columns 46–50 and 53–56 filled in.

D—Completion of disposal actions, and item is to be deleted from the inventory. Columns 36–43, 46–50, and 53–56 must also be filled in.

70–72 ..... Indicate date of report.
Enter the year in the first digit and the month in the last two digits. Example: February 1980 would be "002."

73–77 ..... Enter ARLOC identifier from Pam 525–12 and Pam 525–13 that best represents the actual source location.

78–79 ..... Leave blank.

80 ..... Enter one of these transaction codes:

A—Add

D—Delete. If "delete" card has a "K" in column 69, also prepare an "add" card. If an "L" or "D" is in column 69, then columns 36–43 and columns 46–50 also must be completed.

C—Change. Use with "W" in column 69.

Figure 3–2—Continued

CHAPTER 4

TRANSPORTATION OF RADIOACTIVE AND FISSILE MATERIALS OTHER THAN WEAPONS

4-1. Transportation procedures. The following procedures will be followed when transporting radioactive materials other than nuclear weapons. They are over and above those required by Federal, local government, or host nation regulations. See TM 55-315 for guidance.

a. The RCO or a designated alternate will survey outgoing shipments and packages and give the local transportation officer the written results. The license numbers of the consignor and the consignee will be indicated on the survey report. A copy will be a part of the shipping records.

b. The RCO or a designated alternate will also survey incoming shipments and document his or her survey of the shipment.

c. The receiving transportation officer will submit a report of arrival by electrical means to the shipping installation when shipments are received in excess of quantities in 10 CFR 30.71, Schedule B. This report of shipment (REPSHIP) will give the time, date of arrival, and the physical condition of packages. If a shipment has not arrived within 24 hours after ETA, the consignee will notify the consignor by electrical means. The consignor will take immediate steps to trace the shipment.

d. Shipments of radioactive material that require technical escorts (para 4-5) will be carefully planned, scheduled, and coordinated by the shipper with the—

(1) Host nation,

(2) State and local traffic authorities,

(3) Escort personnel, before the move.

e. Radioactive materials may be loaded with other compatible cargo to save available space. No radioactive materials, however, will be loaded in the same vehicle or compartment of an aircraft or of a ship with—

(1) Vegetables, fruits, bagged grain, or other contaminable foodstuffs

(2) Live animals

(3) Passengers

f. Before radioactive materials are unloaded at a receiving installation, the packages will be carefully monitored for excessive external radiation or contamination. If excessive radiation is present, the vehicle will be isolated and proper measures will be taken to ensure minimum exposure to personnel unloading the shipment. Any contamination or excessive exposure that could have occurred en route must be checked at once. In case of possible overexposure or contamination, commanders will require all military personnel to be medically examined. Civilian personnel possibly over-exposed will be encouraged to be medically examined at military medical facilities, where possible.

g. All vehicles or aircraft (military or commercial) transporting radioactive materials will be monitored for radioactive contamination immediately after unloading. This will be done under the supervision of the installation health physicist or the RPO. The vehicle or aircraft, if needed, must be decontaminated before release. Before opening, packages will be monitored for contamination within 3 hours of receipt during normal duty hours; within 18 hours after normal duty hours (10 CFR 20.205). Radioactive guidelines are listed in table 4-3.

4-2. Special permits and exemptions. *a.* Federal regulations exempt certain shipments of radioactive material from specification packaging, marking, and labeling (49 CFR 173.391). Army packages containing radioactive material, however, must be marked and labeled according to MIL-STD-1458.

b. If circumstances require that a shipping activity get relief from certain DOT requirements, a request for a special permit should be made. Requests will be submitted through command channels to HQDA(DAPE-HRS) WASH DC 20310, with a copy to Cdr, DARCOM, ATTN:

DRCSF-P, Alexandria, VA 22333 to be sent to Cdr, MTMC. Guidance for preparing special permit requests is in section V, chapter 216, AR 55-355.

4-3. US mail and parcel post. *a.* The use of US mail or parcel post for shipping radioactive material is prohibited except as prescribed in applicable postal regulations (39 CFR 14 and 15).

b. Shipment of radioactive materials by US mail or parcel post will be coordinated with the transportation officer and RPO to ensure compliance with postal regulations.

c. Radioactive material shipped by mail should be certified and return receipt requested.

d. Shipment of plutonium by mail or air is prohibited.

4-4. On-post movement by military vehicle. *a.* Radioactive materials will be loaded and transported according to AR 55-355. The dose rate in any occupied area of the vehicle should be less than 2 milliroentgen per hour based on the amount of time en route. No one will receive more than 100 millirem in any 7 consecutive days, or 0.5 rem in any calendar year.

b. Film badges and radiac survey instruments will be given to personnel who accompany the shipment, if the dose rate in the occupied areas of the transport vehicle exceeds 0.4 milliroentgen per hour.

c. Unless prohibited by an NRC license, radioactive materials may be moved in packages not approved by DOT if—

(1) The move is within installation boundaries, and

(2) Under the immediate supervision of radiation protection personnel preparing the shipment.

4-5. Technical escorts. *a.* In special situations, material will be escorted. This is done when—

(1) The material can not be packaged and shipped without waiver of DOT requirement.

(2) Security considerations require an escort.

(3) Special nuclear material, other than weapons, is to be transported (according to 10 CFR 73.30 through 73.36).

(4) The commanding officer of the shipping agency decides an escort is in the best interest of the Government from the standpoint of—

(a) Public relations

(b) Economics

(c) Degree of hazard involved

b. Technical escorts are supplied by the US Army Technical Escort Center (USATEC), Aberdeen Proving Ground, MD 21010 (AR 740-32) or are qualified and responsible DA military or civilian personnel. Escorts will have a security clearance equal to the highest security clearance of the material they are to escort. Radiation training and experience of the escort personnel and radiac equipment must be equal to the radiological hazard of the material being shipped.

c. When needed, the originating installation is responsible for supply provisions and funds for using technical escorts (as opposed to military guards) and vehicles.

d. In addition to film badges and radiation safety devices, technical escorts will include as part of their equipment (one each)—

(1) A fire extinguisher with a minimum Underwriter Laboratories (UL) rating at 4 A 30 B: C.

(2) A multipurpose fire extinguisher with a minimum UL rating of 10 A 40 B: C. In highway movement, the 10 A 40 B: C (multipurpose) fire extinguisher will be carried on the escort vehicle; the 4 A 30 B: C fire extinguisher on the commodity transport vehicle, within reach. In rail shipment, the firefighting equipment will be carried in the railway cars the escorts travel in. Escort personnel will be able to operate all firefighting equipment issued.

4-6. Procedures for obtaining technical escort service from the USATEC. *a.* Furnish quarterly schedules (to cover subsequent 2 quarters) to Cdr, ARRCOM, ATTN: DRSAR-SR, Rock Island Arsenal, IL 61229 for all known or expected moves. (Include data required by AR 740-32.)

b. Details should be sent to reach Cdr, USATEC, Aberdeen, Proving Ground, MD 21010—

(1) A minimum of 7 days before the desired shipping date, for CONUS shipments.

(2) A minimum of 60 days before the shipping date, outside CONUS. Emergency requests should be made by the quickest means, followed by confirmation in writing.

4-7. Accidents and incidents. *a.* The prime objectives of emergency action are preservation of life and limb and the protection of personnel from the hazards of radiation.

b. The next consideration is confinement of the contamination to the local area of the accident. If possible, people who may have been contaminated or overexposed should be found and given decontamination and medical assistance. It may be necessary to obtain the aid of the local authorities to find people along the shipping route who may have been contaminated or overexposed. State and local civil authorities have an inherent right to respond to accidents or incidents on public roads.

c. If radioactive materials are exposed or if contamination is suspected, establish an exclusion area to prevent exposure to the general public. Local authorities may be asked to help control the area.

d. If people are seriously injured, all other problems (except fire) become secondary until first aid is given (FM 21-11) and help for rescue and evacuation, if needed, are summoned. Some cities have special rescue teams on call to help in these emergencies.

e. The accident or incident should be reported to the shipping installation and help obtained by calling the—

(1) Nearest Army element listed in table 4-1,

(2) Nearest NRC regional office listed in table 4-2,

(3) Local police or health department, or

(4) DOT (Commercial (202) 426-1830). (The US Coast Guard will answer.)

After receiving the report, the shipping installation will give guidance and assistance and submit the follow-on reports to the above agencies.

f. Federal interagency radiological assistance can be obtained by calling the Joint Nuclear Accident Coordinating Center (JNACC) at Kirtland Air Force Base, Albuquerque, NM 87115 (Commercial (505) 264-8279 or AUTOVON 964-8279).

Table 4-1. Army Addresses and Emergency Telephone Numbers

*Emergency Point of Contact**	*Address*	*Office**	*Telephone No. AUTOVON*	*AC*	*Cml*
Deputy Chief of Staff for Operations and Plans	Washington, DC 20310	Army Opr Ctr	225-7769 225-2314 227-0218 851-1800	202 202 202	695-7769 695-2314 697-0218
Deputy Chief of Staff for Personnel	Washington, DC 20310	Dir Army Safety	225-7293	202	695-7293
Deputy Chief of Staff for Logistics	Washington, DC 20310	Duty Officer	227-2116	202	697-2116
The Surgeon General	Washington, DC 20310	Duty Officer (Call TAGO's Duty Officer)	227-0218	202	697-0218
		Radl Hygiene Consulant	697-2796	202	697-2796
US Army Environmental Hygiene Agency	Aberdeen, MD 21010	Health & Evn Health Physics Ofc Duty Officer	227-2796 584-3526 584-4375	202 301 301	697-2796 671-3526 671-4375
Joint Nuclear Accident Coordinating Center	Kirtland AFB Albuquerque, NM 87115	Operations Ctr	964-8279	505	244-8279
US Army Development and Readiness Command	Alexandria, VA 22333	Duty Officer Health Physics Ofc	284-9223 284-9340	202 202	274-9223 274-9340
Military Traffic Management Command	Washington, DC 20315	Duty Officer Transportation Safety Officer	289-1926 289-1952/1951	202 202	756-1926 756-1952/1951
US Army Military District of Washington	Washington, DC 20319	Duty Officer NBC Officer**	223-1193 223-1443	202 202	693-1193 693-1443
US Army Training and Doctrine Command	Ft. Monroe, VA 23651	RCO Officer Duty Officer	680-4319 680-2772	804 804	727-4319 727-2772
US Army Forces Command	Ft. McPherson, GA 30330	Operations Ctr NBC Officer RCO Officer	588-3222 588-3840 588-4169	404 404 404	752-3222 752-3840 752-4169
US Army Health Services Command	Ft. Sam Houston, TX 78234	Duty Officer	471-6319/6827	512	221-6319
		Radl Hygiene Staff Officer	471-3168/3167	512	221-6319
1st Army	Ft. Meade, MD 20755	Duty Officer	923-4805/4827	301	677-4805/4827
		NBC Officer	923-4101 4192	301	677-4101/4129

*Emergency Point of Contact**	*Address*	*Office**	*Telephone No.*		
			AUTOVON	*AC*	*Cml*
5th Army	Ft. Sam Houston, TX 78234	Duty Officer	471-2901/ 3018	512	221-2901/ 3018
		Operations Ctr	471-4513/ 2171	512	221-4513/ 2171
6th Army	Presidio, San Francisco, CA 94129	Duty Officer	586-2497	415	561-2497
		Operations Ctr	586-2661/ 4247/ 2780	415	561-2661 4247/ 2780
Chief, National Guard Bureau	Washington, DC 20310	RCO Officer	225-3220	202	695-3220
		Duty Officer	227-2430	202	697-2430

*During normal duty hours, call the appropriate office listed for the various emergency points of contact. After normal duty hours and on holidays, call the listed Duty Officers.

**Nuclear, Biological, and Chemical Officer.

Table 4-2. United States Nuclear Regulatory Commission Regional Offices
(10 CFR 20 Appendix D)*

	Address	*Telephone*
Region I		
Connecticut, Delaware, District of Columbia, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, and Vermont	Region I, Office of Inspections and Enforcement, USNRC 631 Park Avenue King of Prussia, PA 19406	(215) 337-5000
Region II		
Alabama, Florida, Georgia, Kentucky, Mississippi, North Carolina, Panama, Puerto Rico, South Carolina, Tennessee, Virginia, Virgin Islands, and West Virginia	Region II, Office of Inspection and Enforcement, USNRC Suite 3180 101 Marietta St., NW Atlanta, GA 30303	(404) 221-4503
Region III		
Illinois, Indiana, Iowa, Michigan, Minnesota, Missouri, Ohio, and Wisconsin	Region III, Office of Inspection and Enforcement, USNRC 799 Roosevelt Road Glen Ellyn, IL 60137	(312) 932-2500
Region IV		
Arkansas, Colorado, Idaho, Kansas, Louisiana, Montana, Nebraska, New Mexico, North Dakota, Oklahoma, South Dakota, Texas, Utah, Wyoming	Region IV, Office of Inspection and Enforcement, USNRC Suite 1000 611 Ryan Plaza Drive Arlington, TX 76612	(817) 334-2841
Region V		
Alaska, Arizona, California, Hawaii, Nevada, Oregon, Washington, and territories and possessions in the Pacific	Region V, Office of Inspection and Enforcement, USNRC Suite 202 1990 N. California Blvd. Walnut Creek Plaza Walnut Creek, CA 94596	(415) 943-3700

*The States serviced by the above regional offices vary for 10 CFR 73 (Shipment of Special Nuclear Materials). See 10 CFR 73, Appendix A.

Table 4-3. Radioactive Contamination Guides

Contaminated Items and Indications for Actions	Fixed or Removable	Contamination Level				Method of Measurement
		Alpha		Beta-gamma[1]		
		dpm per 100 cm2	dpm per 100 cm2	mrad/hr @ 1 In.	dpm per 100 cm2	
1. Clothing, including shoes:						
a. Personal. Should be replaced, decontaminated, or stored for decay if above.	F	200		.05		Probe
	R		None		None	Smear[3]
b. Anticontamination.[2]						
(1) General. Should be replaced and/or decontaminated if above.	F	1000		0.2		Probe
	R		200		1000	Smear[3]
(2) Respirators. Should be decontaminated or replaced after use, if above.	F	200		1.0[4]		Probe
	R		None		None	Smear[3]
2. Containers. Before nonradioactive use, should be decontaminated if above.	F	200		0.2		Probe
	R		None		100	Smear[3]
3. Work Areas and Equipment.[5 6]						
a. Uncontrolled. Requires decontamination if above.	F	1000		0.05		Probe
	R		100		100	Smear[3]
b. Controlled:						
(1) Areas.	F	1000		0.02		Probe
	R		200		400	Smear[3]
(2) Hoods.	F	1000		2.0		Probe
	R		200		2000	Smear[3]
(3) Glove Boxes.	F	5000		2.5		Probe
	R		1000		5000	Smear[3]
(4) Workbench Surface.	F	1000		2.00		Probe
	R		2000		400	Smear[3]
(5) Other Equipment Items.	F	1000		2.00		Probe
	R		200		2000	Smear[3]
4. Skin:						
a. Body. Continue decontamination if above.	F	200		0.06		Probe
	R		None		None	Smear[3]
b. Hands. Continue decontamination if above.	F	400		0.06		Probe
	R		None		None	Smear[3]

[1] Measured through not more than 7 milligrams per square centimeter of total absorber and averaged not more than 1 square meter.

F Fixed

R Removable.

[2] Contaminated clothing should be released to a licensed laundry only.

[3] Smears analyzed with a calibrated counting system.

[4] In contact with any surface of the mask.

[5] For natural uranium, U-depleted, and U-238; levels for alpha contamination should be increased by a factor of 5 (according to NRC guidelines).

[6] If Radium-226 is a contaminant, levels for alpha contamination should be reduced by a factor of 2.

CHAPTER 5

DISPOSAL OF UNWANTED RADIOACTIVE MATERIAL

5-1. General. *a.* Radioactive material will be sold, donated, or transferred to authorized persons only.

b. In the United States, land burial disposal is permitted only at NRC approved sites. Oversea land burial sites set aside by foreign governments can be used when approved by the State Department and CG, DARCOM. Radioactive waste will not be buried at sea.

5-2. Security. *a.* Areas where unwanted radioactive material is stored will be designated, posted, and protected as radiation-controlled areas. Physical safeguards that are equal to the degree of hazard or security classification involved will be used (AR 380-20). Oversea commanders will use AR 380-20 as a guide in providing area protection and physical safeguards for radioactive material in storage.

b. Radioactive waste will be declassified before shipment, if possible. Liquid waste that cannot be declassified will be solidified before shipment.

c. Activities preparing to ship classified radioactive material will notify the consignee of the security classification before shipment as well as physical security requirements after the material is received.

5-3. Budgeting and funding. *a.* The disposal of unwanted radioactive material will be budgeted and reported under account 728012.21000 according to AR 37-100-XX.

b. Operations to be funded by the generating installation or activity include—

(1) Handling, processing, packaging, escorting, and transporting unwanted radioactive material.

(2) Establishing and operating radioactive material processing facilities.

c. Cost for land burial services/ultimate disposal will be borne by the command administering the unwanted radioactive waste disposal mission.

d. Oversea commanders are responsible for the administrative and operational costs to process, ship, escort, and return radioactive waste to the burial sites.

5-4. Special problems. Special radioactive material disposal problems requiring logistical assistance will be directed to Cdr, DARCOM, ATTN: DRCMM, Alexandria, VA 22333. Unusual disposal problems involving licensing, regulation, decontamination, or radiation safety, which cannot be resolved locally, will be referred to CG, DARCOM.

5-5. Procedures to prevent enemy use. *a.* In combat, Army units are authorized to use the most expeditious means available to dispose of any radioactive item that cannot be evacuated normally or that cannot be transported with the unit. When possible, follow the guidance in paragraph *b* below.

b. Commanders of combat zone supply and operational units should preplan to prevent devices containing large amounts of radioactive material individually or collectively (bulk storage) from falling into enemy hands. When items cannot be evacuated, they will be destroyed. Radioactive materials will be disposed of to prevent enemy use as much as the circumstances permit. Devices containing low activity sources will be destroyed by crushing and burying or by scattering over an area large enough to make salvaging impossible. Items may be crushed in place by using vehicles exerting enough ground pressure over a firm terrain so the items will be crushed rather than just pressed into the ground. High activity radioactive sources, including high activity calibration or radiographic devices, will be placed in their shielded containers and buried to make enemy detection unlikely. Because of radiation hazard, do not destroy radioactive material with explosives or dump into water areas. Contaminated areas other than burial sites will be posted as radioactive areas. To aid decontamination and recovery of buried items when the area is reclaimed, commanders will—

(1) Record actions taken

(2) Send reports to higher headquarters, to include—

(a). Exact location.

(b). Types and quantities of devices and material involved.

5-6. Consolidation. Activities having unwanted radioactive material, including waste, will place the material in a secure local storage area pending shipment to a land burial site or to an authorized recipient. It is more economical to process large amounts of radioactive material for ultimate disposal than to process small quantities. Therefore, installations able to store and safely consolidate radioactive waste are encouraged to do so about 30 days before requesting shipping instructions.

5-7. Storage. *a*. A radiation-controlled area will be designated to store accumulated radioactive material. This area will be posted to restrict entry (AR 385-30). Adequate security will be provided to prevent unauthorized access or removal of the radioactive material until it is shipped to a land burial facility or to an authorized recipient. Safety of the material is the responsibility of the Army element that has the material.

b. When practical, material will be segregated as follows:

(1) *Combustible*—

(a). Liquid

(b). Solid

(c). Gas

(2) *Noncombustible*.—

(a). Liquid

(b). Solid

(c). Gas

c. The local fire department will be kept advised of—

(1) The location and types of stored radioactive material.

(2) Procedures for fighting fires next to or involving radioactive material.

5-8. Disposal of radioactive waste. Items that cannot be decontaminated or repaired will be disposed of as radioactive waste. Protective clothing and equipment marked with radiation warning symbols will also be disposed of as radioactive waste when no longer needed. Surplus items containing radioactive material will be disposed of as radioactive waste when—

a. Licenses or Service authorizations require disposal as radioactive waste.

b. The inventory control point (ICP) or owning activity decides that another method of disposal is not in the best interest of the Government.

5-9. Excess, serviceable or economically repairable items. *a*. Radioactive property that is excess, serviceable, or economically repairable within major Army commands will be reported through command channels to the national ICP (NICP) for disposal instructions, unless the technical literature applicable to the radioactive item instructs otherwise.

b. Electron tubes and major end items of equipment containing installed license-exempt items will be disposed of by normal transfer, donation, or sales procedures. Serviceable, uncontaminated radioactive products of major end items, such as gages and other instruments, will not be removed from surplus or excess equipment, if the technical literature applicable to the major end item does not direct removal. When these end items or surplus radioactive components are donated or sold—

(1) The donation document will show the "CAUTION" statement in chapter VI, DOD 4160.21-M.

(2) The sales contract will show the "Radioactive Material" article in chapter XI, DOD 4160.21-M.

c. When not put into major end items or equipment, license-exempt items (except electron tubes) will be subjected to normal Federal agency use screening procedures under DOD 4140.34-M and DOD 4160.21-M. These items will not be physically moved to a property disposal activity or be donated or reported for sale. Unused items not used by other DOD components or Federal civil agencies will be disposed of as radioactive waste.

d. The following items are not authorized for donation or sale and can only be transferred within DOD or disposed of as radioactive waste—

(1) Microwave receiver protector tubes.

(2) Marine navigation devices (containing tritium gas).

(3) Radium sources (except those used for light production).

The command having logistical responsibility will screen items for transfer within DOD.

e. Useable licensed items containing radioactive materials may be transferred, donated, or sold only to persons having the proper license to have them. Only the item manager of the owning activity will screen these items for use and donation. Sales assistance can be requested from defense property disposal offices and regional offices, as needed. If the items cannot be transferred, donated, or sold, they will be disposed of as radioactive waste. During the disposal phase these items will not be physically moved to a property disposal activity, nor will they be transferred to defense property disposal office accounts.

f. When notified that an item is excess, NICP will take one of the following actions:

(1) Direct that the property be transferred for further use to another Army installation or agency authorized to receive the material.

(2) Authorize sale or donation if the material is surplus and if the sale or donation is permitted by the governing license or authorization. The NICP will not report radioactive items to defense property disposal officers (DPDOs) for sale or donation unless the product is known to be safe for military and public use. Radioactive items will not be physically transferred to the DPDO until shipping instructions are received from the DPDO (DOD 4160.21-M).

(a) If the item is NRC licensed-controlled, the disposal release order will state that transfer, sale, or donation of the item is limited to licensed recipients.

(b) The Services and agencies will ensure that radioactive items to be transferred, sold, or donated are free from contamination and labeled according to MIL-STD-1458.

(3) Request authority through command channels from Cdr, DARCOM, ATTN: DRCSF-P to transfer this property to authorized agencies outside of DA control. (After a policy has been established for a particular type of equipment, further coordination is unnecessary for transfer of items covered by that policy.)

(4) Direct the owner of the property to decontaminate it or to process it for ultimate disposal as radioactive waste.

5-10. Empty radioactive material containers. Radiation warning labels will be removed from uncontaminated, empty containers in which radioactive material was stored or shipped. The sale or disposal of empty, uncontaminated containers with intact warning labels can cause public alarm. Likewise, reuse of the containers for other purposes causes people to ignore the warnings on properly labeled containers. Radiation warning labels will be obliterated or removed when the labels are no longer required on the containers.

5-11. Requests for disposal of radioactive waste. *a.* Requests for disposal instructions should be submitted as follows:

(1) Installations and activities located in the United States and Greenland and oversea radioactive waste processing facilities will send disposal requests to Cdr, ARRCOM ATTN: DRSAR-MAD-~~CO~~, Rock Island, IL 61299.

(2) Army installations and activities (except those cited in (1) above) will send disposal request per instructions of the theater commander.

b. Requests for disposal instructions should contain the following information for each container:

(1) Nomenclature, NSN, and serial numbers

(2) Physical descriptions of items, to include—

(a) Solid, liquid, or gas

(b) Quantity per stock number and, if gas, the volume under standard pressure and temperature

(c) Shipping weight (pounds) and volume (cubic feet) (Volume needs to be accurately reported to nearest cubic foot)

(d) Number of shipping containers

(e) Shipping permit or waiver number

(f) Transport group

(g) Package specification

(h) Labels used

(3) Chemical and radioisotope description, to include—

(a) Hazardous chemicals present

(b) For liquids, the solvent present

(c) Radioisotopes present

(4) Radioactivity and radiation measurement, to include—

(a) Millicuries of activity of each radioisotope For special nuclear material, give number of grams. For source material, list the quantity in pounds.

(b) Maximum radiation dose rates (mrem/hr) at the surface and (mrem/hr) at 1 meter from the surface of the package

(c) Classification and basis for classification and procedures for declassification

(d) Special instructions or requests for unique service, such as return of the containers

(e) Name and telephone number to get additional information

(f) Remarks

5-12. Replies to requests for land burial service. Replies to ultimate disposal requests will include—

a. Name and address of authorized land burial facility.

b. Preferred date and time for receiving shipment at the burial site.

c. Any special instructions to be followed.

5-13. Shipment. Chapter 4 and TM 55-315 give requirements and guidance on shipping radioactive material.

5-14. Identification of radioactive commodities. Presence of radioactive items can be determined by—

a. A radiometer.

b. The markings on the items.

c. Information contained in the technical literature governing the item, and

d. Guidance in TB 43-0116, TB 43-0122, TB 43-0141, TB 43-0197, TB 55-1500-314-24, and the Army Master Data File.

5-15. Disposal locally authorized. a. Unless banned by local policy, regulation, or SOFA, defective electron tubes (small quantities) will be disposed of as normal waste if—

(1) The radiation level at 1 centimeter from the tubes' surface is less than 1 millirad per hour as measured with an AN/PDR-27 ( ) radiometer or equivalent.

(2) Each tube is exempt from license or contains less than 0.01 microcurie of radium (Ra-226). Defective tubes exceeding the above amounts per tube will be disposed of as radioactive waste (para 5-11). Electron tubes handled as normal waste should not be segregated and piled up before disposal, but should be disposed of as they become defective to avoid a radiation hazard.

b. Unless prohibited by SOFA, Federal, or local regulation, installations and activities may make local disposal as follows:

(1) Dispose of specific types and quantities of radioactive commodities according to disposal instructions in applicable technical publications.

(2) Dispose of effluents (liquids and gases) in unrestricted areas under 10 CFR 20.106, if not prohibited by local government.

(3) Dispose of liquids in the sanitary sewage under 10 CFR 20.303, unless prohibited by local government.

c. Burning NRC-licensed radioactive material is not authorized, except by units having a valid NRC license or authorization to do so. Request for such a license or authorization will be prepared according to chapter 2.

d. Conventional disposal of radioactive waste is authorized if radioactive decay is controlled to less than the amounts listed in Schedule A, 10 CFR 30.70. This procedure is recommended for facilities with adequate local storage and for materials containing radioisotopes with half-lives of less than 30 days to decay to background level. It is also used by some hospitals and laboratories

where short half-life radioisotopes are used in tracer techniques. The resulting waste contains low level activity in items such as excreta, laboratory animals, infectious waste, absorbent tissue, and sputum. The amount of radioactivity released locally should be kept to the lowest level practicable.

e. Waivers to the requirements in *a* through *d* above will be granted only under unusual circumstances. Requests for waivers will be addressed to Cdr, DARCOM, ATTN: DRCSF-P, Alexandria, VA 22333.

5-16. Disposal at designated land burial facilities. Radioactive waste that cannot be disposed of locally (para 5-15) must be returned to authorized domestic land burial facilities for disposal.

5-17. Interservice agreements. An Army command or activity (except ARRCOM) considering making an interservice agreement with a non-Army agency to dispose of radioactive waste in excess of 1000 cubic feet (shipping volume) at any one time or during any one fiscal year will be coordinated with CG, DARCOM. The agreement will state the manner of reimbursement and the activity responsible for disposal procedures. Coordination correspondence will be sent through Cdr, ARRCOM, ATTN: DRSAR-MAD-CG to Cdr, DARCOM, ATTN: DRCMM.

5-18. Records. Records will be kept to document the disposal of radioactive material and waste according to AR 340-18-6. CG, ARRCOM (DRSAR-MAD-CG) will prepare an annual summary of radioactive items disposed of during the preceding fiscal year. The summary will list the nomenclature, NSN, and quantities of items disposed of. It will be sent to—

a. Each major DARCOM subcommand (1 copy),

b. Each of the proponent licensees of items covered (1 copy), and

c. (Cdr, DARCOM, ATTN: DRCSF-P (5 copies) no later than the following December 15th.

GLOSSARY

Activity (Radioactivity). The number of nuclear transformations occuring in a given quantity of material per unit time. The unit of measure is the curie (Ci).

Agreement State. Any State in the United States that the NRC has made an effective agreement with under subsection 274(b) of the Atomic Energy Act of 1954, as amended.

Authorized land burial site. In the United States, a US NRC approved site (usually contractor operated) designated by CG, ARRCOM as the place radioactive waste will be sent for land burial. Outside the United States, a land burial facility whose services to the oversea commander have been approved by—

a. The US State Department,

b. CG, DARCOM, and

c. The foreign government having jurisdiction over the land burial facility.

Authorized material. Radioactive material not requiring a specific NRC license. Receipt, possession, use, or transfer of radioactive material requires specific authorization or permit by a specific agency or Service organization.

Byproduct material. Any radioactive material (except special nuclear material) yielded in, or made radioactive by—

a. Exposure to the radiation incident or

b. The process of producing or using special nuclear material.

Commodity (radioactive). An item of Government property made up in whole or in part of radioactive materials. A national stock number (NSN), (formerly called a federal stock number (FSN) or part number is assigned to radioactive items in excess of—

Item	*Amount*
Americium-241	0.01 microcuries
Plutonium-239	0.01 microcuries
Radium-226	0.01 microcuries
Uranium-233	0.01 microcuries
Uranium-234	0.01 microcuries
Uranium-235	0.01 microcuries
Radioactive materials not listed above	0.01 microcuries
Mixtures of alpha emitters	0.01 microcuries

Curie (Ci). A measurement unit of radioactivity. One Ci equals 3.700×10^{10} nuclear transformations per second.

Microcurie (pCi). One-millionth of a curie (3.7×10^4 disintegrations per second on 2.22×10^6 distintegrations per minute).

Fissile material. Plutonium-238, plutonium-239, plutonium-241, uranium-233, uranium-235, or any material containinng any of the foregoing (49 CFR 173.389(a) and 173.398(a)).

Ionizing radiation. Electromagnetic or special radiation capable of producing ions, directly or indirectly in its passage through matter. For purposes of this regulation, alpha and beta particles, gamma rays, X-rays, and neutrons are examples of ionizing radiation. This type of radiation does not include sound or radiowaves, visible, infrared, or ultraviolet light or lasers.

Ionizing radiation control committee. A group of qualified personnel officially appointed by a commander to set local policy and to guide the radiation protection program.

Ionizing radiation producing devices. Electronic devices that are capable of making ionizing radiation. Examples are X-ray machines, linear accelerators, electron microscopes, cyclotrons, and radio frequency generators that use klystrons, magnetrons, or other tubes that produce X-rays.

Leak test. Test of how well a sealed source is containing its radioactive content.

Licensed material. Source, special nuclear, or byproduct material received, stored, possessed, used, or transferred under a general or specific license issued by the NRC or an Agreement State.

License-exempt material items. Radioactive material not subject to NRC regulations or radioactive material exempt from NRC licensing under 10 CFR.

License (specific). A document issued by the NRC under 10 CFR that gives the right to the bearer to procure, receive, store, transfer, use, export, and import specified radioactive items under specific terms.

Life cycle controls. The composite of all management actions to ensure that the hazards of radioactive materials are kept to a minimum. These controls are set for each phase of the life cycle to ensure the effects of radiation on personnel and the environment are kept within acceptable limits.

Medical use. The internal use of radioactive material (byproduct, etc.), or the radiation from it, on human beings or animals.

Monitoring (area). Routine monitoring of the radiation level or contamination of a certain area, building, room, or equipment. Some laboratories or operations distinguish between routine monitoring and survey activities.

Monitoring (personnel). Monitoring any part of an individual including the breath, excretions, or any part of the clothing.

Naturally occuring radioactive materials. Radioactive isotopes, such as radium and radon found in nature, but not classified as source material.

Radiation control officer. An officer, enlisted person, or DA civilian employee appointed by each major Army commander to manage the radiation protection program for the major command.

Radiation protection officer. A person appointed by the commander to give advice on the hazard of ionizing radiation and to supply effective ways to control these hazards.

Radiation sources. Materials or devices that make or are capable of making ionizing radiation, including—

a. Naturally occuring radioactive materials.

b. Byproduct materials

c. Source materials

d. Special nuclear materials

e. Fission products

f. Materials containing induced or deposited radioactivity

g. Radiographic and fluoroscopic equipment

h. Particle generators and accelerators

i. Electronic equipment that uses klystrons, magnetrons, or other electron tubes that produce X-rays.

Radioactive controlled items. All commodities, components, and end items containing radioactive material that are controlled with respect to maintenance, disposal, and bulk storage. Items requiring additional controls are listed in 10 CFR 30.71.

Radioactive individually controlled items. Items that are assigned NSNs and must be controlled to the extent their integrity and location are known by the licensee, or designated agent (control points), at all times.

Radioactive material. Any material or combination of materials that voluntarily give off ionizing radiation. This includes natural elements such as radium and accelerator-made radionuclides.

Radioactive material control point. Any Army element (including the RCO) that has been designated by a major Army commander to control radioactive items within the command.

Radioactive waste. Includes the following:

a. Property contaminated to the extent that decontamination is economically unsound

b. Surplus radioactive material whose sale, transfer, or donation is prohibited

c. Surplus radioactive material that is determined to be unwanted after being advertised as surplus

d. Waste that is radioactive due to production, possession, or use of radioactive material

Report, survey. A written record of the data, analysis, evaluation, disposition of radioactive materials and radiation levels, required actions, and recommendations associated with performing a radiation survey.

Sealed source. Any radioactive material that is permanently bonded or fixed in a capsule or matrix designed to prevent the release or dispersal of such radioactive material under the most severe conditions that may be encountered in normal use or handling.

Source material. Uranium or thorium or a combination of both, in any physical form. Ores that contain by weight one-twentieth (0.5 percent) or more of uranium or thorium or any combination. Source material does not include special nuclear material.

Special nuclear material. Plutonium or uranium enriched in isotope 233 or 235 and any other material the NRC determines to be special nuclear material. Any material (except source material) artificially enriched by either isotope.

Survey (radiation). Evaluation of the radiation hazard incident to the production, use, or existence of radioactive materials or other sources of radiation under specific conditions. The evaluation usually includes—

a. A physical survey of the disposition of materials and equipment

b. Measurements or estimates of the levels of radiation involved

c. Predictions of hazards resulting from expected or possible changes in materials or equipment

Unwanted radioactive material. Any radioactive item, including waste or excess supplies, that is not needed by the owner.

The proponent agency that has overall responsibility for the regulation is the US Army Materiel Development and Readiness Command. The Office of the Director of Safety is responsible for chapter 4. Users are invited to send comments and suggested improvements on DA Form 2028 (Recommended Changes to Publications and Blank Forms) to Cdr, DARCOM, ATTN: DRCSF-P, Alexandria, VA 22333. Comments on chapter 4 should be sent on DA Form 2028 direct to HQDA (DAPE-HRS) WASH DC 20310, with an information copy to Cdr, DARCOM.

By Order of the Secretary of the Army:

E. C. MEYER
General, United States Army
Chief of Staff

Official:

J. C. PENNINGTON
Major General, United States Army
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TABLE I

ACCEPTABLE SURFACE CONTAMINATION LEVELS

NUCLIDES[a]	AVERAGE[b c f]	MAXIMUM[b d f]	REMOVABLE[b e f]
U-nat, U-235, U-238, and associated decay products	5,000 dpm α/100 cm²	15,000 dpm α/100 cm²	1,000 dpm α/100 cm²
Transuranics, Ra-226, Ra-228, Th-230, Th-228, Pa-231, Ac-227, I-125, I-129	100 dpm/100 cm²	300 dpm/100 cm²	20 dpm/100 cm²
Th-nat, Th-232, Sr-90, Ra-223, Ra-224, U-232, I-126, I-131, I-133	1000 dpm/100 cm²	3000 dpm/100 cm²	200 dpm/100 cm²
Beta-gamma emitters (nuclides with decay modes other than alpha emission or spontaneous fission) except SR-90 and others noted above.	5000 dpm βγ/100 cm²	15,000 dpm βγ/100 cm²	1000 dpm βγ/100 cm²

[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 contaminant should not be averaged over more than 1 square meter. For objects of less surface area, the average should be derived for each such object.

[d] The maximum contamination level applies to an area of not more than 100 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 surfce contamination resulting from beta-gamma emitters should not exceed 0.2 mrad/hr at 1 cm and 1.0 mrad/hr at 1 cm, respectively, measured through not more than 7 milligrams per square centimeter of total absorber.

The proponent agency that has overall responsibility for the regulation is the US Army Materiel Development and Readiness Command. The Office of the Director of Safety is responsible for chapter 4. Users are invited to send comments and suggested improvements on DA Form 2028 (Recommended Changes to Publications and Blank Forms) to Cdr, DARCOM, ATTN: DRCSF-P, Alexandria, VA 22333. Comments on chapter 4 should be sent on DA Form 2028 direct to HQDA (DAPE-HRS) WASH DC 20310, with an information copy to Cdr, DARCOM.

By Order of the Secretary of the Army:

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GUIDELINES FOR DECONTAMINATION OF FACILITIES AND EQUIPMENT PRIOR TO RELEASE FOR UNRESTRICTED USE OR TERMINATION OF LICENSES FOR BYPRODUCT, SOURCE, OR SPECIAL NUCLEAR MATERIAL

U.S. Nuclear Regulatory Commission
Division of Fuel Cycle and Material Safety
Washington, D. C. 20555

June 1980

The instructions in this guide in conjunction with Table 1 specify the radionuclides and radiation exposure rate limits which should be used in decontamination and survey of surfaces or premises and equipment prior to abandonment or release for unrestricted use. The limits in Table 1 do not apply to premises, equipment, or scrap containing induced radioactivity for which the radiological considerations pertinent to their use may be different. The release of such facilities or items from regulatory control are considered on a case-by-case basis.

1. The licensee shall make a reasonable effort to eliminate residual contamination.

2. Radioactivity on equipment or surfaces shall not be covered by paint, plating, or other covering material unless contamination levels, as determined by a survey and documented, are below the limits specified in Table 1 prior to the application of the covering. A reasonable effort must be made to minimize the contamination prior to use of any covering.

3. The radioactivity on the interior surfaces of pipes, drain lines, or ductwork shall be determined by making measurements at all traps, and other appropriate access points, provided that contamination at these locations is likely to be representative of contamination on the interior of the pipes, drain lines, or ductwork. Surfaces of premises, equipment, or scrap which are likely to be contaminated but are of such size, construction, or location as to make the surface inaccessible for purposes of measurement shall be presumed to be contaminated in excess of the limits.

4. Upon request, the Commission may authorize a licensee to relinquish possession or control of premises, equipment, or scrap having surfaces contaminated with materials in excess of the limits specified. This may include, but would not be limited to, special circumstances such as razing of buildings, transfer of premises to another organization continuing work with radioactive materials, or conversion of facilities to a long-term storage or standby status. Such requests must:

   a. Provide detailed, specific information describing the premises, equipment or scrap, radioactive contaminants, and the nature, extent, and degree of residual surface contamination.

   b. Provide a detailed health and safety analysis which reflects that the residual amounts of materials on surface areas, together with other considerations such as prospective use of the premises, equipment or scrap, are unlikely to result in an unreasonable risk to the health and safety of the public.

5. Prior to release of premises for unrestricted use, the licensee shall make a comprehensive radiation survey which establishes that contamination is within the limits specified in Table 1. A copy of the survey report shall be filed with the Chief, Material Licensing Branch, Division of Fuel Cycle and Material Safety, USNRC, Washington, D.C. 20555, and also the Director of the Regional Office of the Office of Inspection and Enforcement, USNRC, having jurisdiction. The report should be filed at least 30 days prior to the planned date of abandonment. The survey report shall:

   a. Identify the premises.

   b. Show that reasonable effort has been made to eliminate residual contamination.

   c. Describe the scope of the survey and general procedures followed.

   d. State the findings of the survey in units specified in the instruction.

   Following review of the report, the NRC will consider visiting the facilities to confirm the survey.