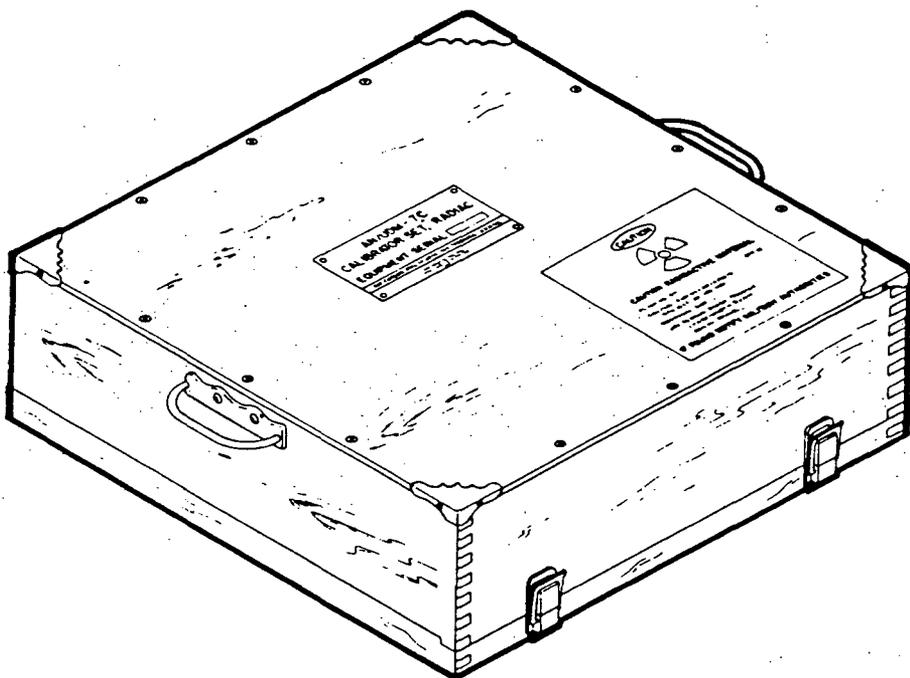


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**TM 11-6665-247-10**

**OPERATOR'S MANUAL  
CALIBRATOR, RADIAC AN/UDM-7C  
(NSN 6665-01-084-7777)**



**US NUCLEAR  
REGULATORY  
COMMISSION  
REQUIREMENTS**

**EQUIPMENT  
DESCRIPTION**

**OPERATING  
INSTRUCTIONS**

**MAINTENANCE  
INSTRUCTIONS**

**FORM NRC-3  
NOTICE TO  
EMPLOYEES**

**HEADQUARTERS, DEPARTMENT OF THE ARMY  
AUGUST 1981**

*Encl 5*

*LL/4d.*

# WARNING

## RADIATION HAZARD



Use Radiac Calibrator AN/UDM-7C only under the guidance of an installation/ activity (local) Radiation Protection Officer and in accordance with requirements of Chapter 5, Section IV, AR 40-5 and AR 385-11.

Plutonium 239 (Pu239) is dangerous to living tissue. Small amounts of Pu239, when inhaled, ingested, or absorbed in open cuts or wounds, can cause serious illness or death. To avoid accident, observe the following:

- Use and store the calibrator only in designated radiation controlled areas.
- Do not eat, drink, smoke, apply cosmetics, or store food stuffs, drinks, tobacco, or cosmetics where the calibrators are used or stored.
- Do not allow personnel with open skin wounds to handle or work with the calibrators without the approval of the medical officer and the (local) Radiation Protection Officer (RPO).
- Prohibit loitering in the area by unauthorized personnel.
- Handle the calibrator carefully. Do not drop, rough handle, alter or damage it in anyway. Mishandling can cause source leakage.
- Do not touch the source surface with the hands. Wear plastic or surgical type gloves which allow sufficient dexterity during calibration and leak testing. Avoid contact of objects, such as tools, instruments, and components of the set, with the sources.
- Always wash and dry hands thoroughly after handling the calibrator; monitor the hands with a low-range alpha radiac meter; repeat the washing and drying if necessary. Notify the Radiation Protection Officer if washing does not remove contamination.
- DO NOT ATTEMPT TO CLEAN THE SOURCE OR SOURCE HOLDERS.

**OPERATOR'S MANUAL  
CALIBRATOR, RADIAC AN/UDM-7C  
(NSN 6665-01-084-7777)**

**REPORTING ERRORS AND RECOMMENDING IMPROVEMENTS**

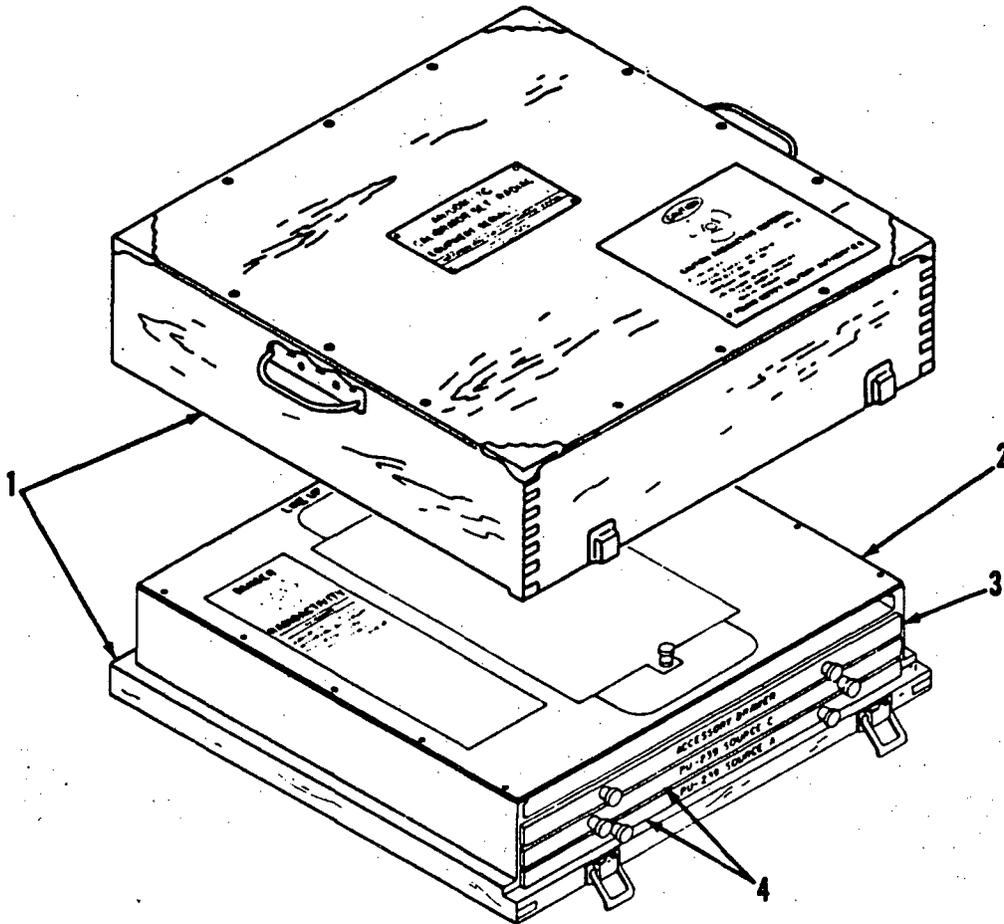
You can help improve this manual. If you find any mistakes or if you know a way to improve the procedures, please let us know. Mail your letter, DA Form 2028 (Recommended Changes to Publications and Blank Forms), or DA Form 2028-2 located in the back of this manual direct to: Commander, US Army Communications-Electronics Command, ATTN: DRSEL-ME-MQ, Fort Monmouth, New Jersey 07703. A reply will be furnished to you.

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AN/UDM-7C CALIBRATOR, RADIAC



1. Hardwood carrying case

3. Accessory drawer

2. Aluminum cabinet

4. Aluminum source holders



# CHAPTER 1 INTRODUCTION

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## Section I. GENERAL INFORMATION

### 1-1. SCOPE

This manual describes Calibrator, Radiac AN/UDM-7C (Calibrator) and covers its installation and operation. It includes instructions for initial service, operation, cleaning, and inspection of the equipment. The calibrator, radiac provides a calibration check for the AN/PDR-54, AN/PDR-56F and AN/PDR-60 Alpha Radiac Sets. Here in referred to as radiac sets. The calibrators contain plutonium which is controlled by the US Nuclear Regulatory Commission (NRC), Title 10 Code of Federal Regulations. AR 385-11 and AR 700-64 implement NRC regulations. Army-wide possession and use of the calibrators are authorized by a Special Nuclear Materials License issued to Department of the Army, US Army Communications-Electronics Command, Fort Monmouth, NJ 07703. The license is issued on the basis of statements concerning procedures established for the life-cycle control of the items. The sets are issued to authorized Army calibration activities, schools, and research and development laboratories through the US Army Communications-Electronics Command, National Inventory Control Point (DRSEL-MME-VC). Established Army supply procedures are augmented by radiological control procedures (AR 385-11).

### 1-2. MAINTENANCE FORMS AND RECORDS

Department of the Army forms and procedures used for equipment maintenance will be those prescribed by TM 38-750, The Army Maintenance Management System (TAMMS).

### 1-3. REPORTING EQUIPMENT IMPROVEMENT RECOMMENDATIONS (EIR)

If your AN/UDM-7C needs improvement, let us know. Send us an EIR. You, the user, are the only one who can tell us what you don't like about your equipment. Let us know why you don't like the design or performance. Put it on an SF 368 (Quality Deficiency Report). Mail it to Commander, US Army Communications-Electronics Command, ATTN: DRSEL-ME-MQ, Fort Monmouth, NJ 07703. We'll send you a reply.

## Section II. US NUCLEAR REGULATORY COMMISSION REQUIREMENTS

### 1-4. GENERAL

The NRC sets standards/conditions and issues licenses for the use of radioactive materials in the United States. The An/UDM-7C comes under the NRC regulations and a license for its use has been issued. Information required by the NRC license and regulations is contained below:

**a. Radiation Protection.** Users of the AN/UDM-7C should refer to instructions on control, safe handling, storage, emergency situations and operation and maintenance instructions contained in this technical manual. This satisfies the radiation protection requirements of the NRC regulations (Title 10, Code of Federal Regulations, Parts 19 and 20).

**b. Notice to Employees.** Form NRC-3, Notice to Employees, contained in the back of this manual, must be removed for posting wherever the AN/UDM-7C is used and/or stored. The posting requirements are contained on the form.

c. **NRC License.** The NRC license for the AN/UDM-7C and documents relating to that license are held by the US Army Communications-Electronics Command Safety Office at Fort Monmouth, New Jersey. AN/UDM-7C users may request further information on these documents by letter addressed to:

Commander  
US Army Communications-Electronics Command  
ATTN: DRSEL-SF-H  
Fort Monmouth, NJ 07703

Requests for further information may also be made by phone by calling on AUTOVON 995-4427 or COMMERCIAL (201) 544-4427.

## **1-5. RESPONSIBILITY**

### **a. Responsibilities of Major Commands.**

- (1) Establishing at least one Radioactive Material Control Point (RMCP) (AR 385-11).
- (2) Appointing a Radiation Control Officer (RCO) for each RMCP and qualifications to Commander, US Army Communications-Electronics Command, ATTN: DRSEL-SF-H, Fort Monmouth, New Jersey 07703.
- (3) Developing implementation procedures to insure periodic leak testing and forwarding two copies of procedures to Commander, US Army Communications-Electronics Command, ATTN: DRSEL-SF-H, Fort Monmouth, New Jersey 07703.
- (4) Forwarding leak test smears to nearest approved smear counting station for evaluation.
- (5) Insuring that each installation or activity using the AN/UDM-7C has an effective radiation protection program.

### **b. Responsibilities of Radiation Control Officer.**

- (1) Review and approve the qualifications of each local Radiation Protection Officer (RPO) for the AN/UDM-7C and forward to Commander, US Army Communications-Electronics Command, ATTN: DRSEL-SF-H, Fort Monmouth, New Jersey 07703 a list of these local RPO's and their qualifications for approval and certification.
- (2) If a qualified local RPO is not available, take one or more of the following actions:
  - (a) Suspend requisition for the AN/UDM-7C.
  - (b) Suspend use of the AN/UDM-7C until someone can be qualified by training.
  - (c) Transfer the AN/UDM-7C to an installation or activity with qualified personnel.
- (3) Maintain the following records for each AN/UDM-7C under his control:
  - (a) National stock number.
  - (b) Description.
  - (c) Serial number.
  - (d) Isotope, source activity, and date activity was determined.
  - (e) Dates and results of leak tests.
  - (f) Shipment number.
  - (g) Shipped from.
  - (h) Shipped to.
  - (i) Date shipped.
  - (j) Date of manufacture.
  - (k) Name of manufacturer.
  - (l) Name of qualifications of local RPO's.
  - (m) Radiation incident reports.
- (4) Insure that the AN/UDM-7C is properly handled in accordance with Army, DOD, and NRC regulations. Periodically inspect and audit records of installations and activities possessing the AN/UDM-7C.

(5) Assure that a Radiation Incident Report is submitted by electrical means to Command, US Army Communications-Electronics Command, ATTN: DRSEL-SF-H, Fort Monmouth, New Jersey 07703, within 24 hours, when an incident occurs.

(6) Consolidate and forward DA Form 3252-R (Radioisotope Inventory and Leak Test Report) (RCS DRC-192) listing all Calibrators, Radiac AN/UDM-7C in area of responsibility to Commander, US Army Communications-Electronics Command, ATTN: DRSEL-SF-H, Fort Monmouth, New Jersey 07703 at least quarterly (31 January, 30 April, 31 July and 31 October). Reports may include information on other CECOM managed calibration and test items of supply listed in AR 385-11.

## 1-6. SUPERVISION

a. All calibration in which the AN/UDM-7C is used will be supervised by a qualified radiation protection officer. To be a qualified RPO, a person must have received a minimum of 40 hours formal training on radiation including the following topics:

- (1) Principles and practices of radiation protection.
- (2) Biological effects of radiation.
- (3) Radioactivity measurement standardization and monitoring techniques and instruments.
- (4) Mathematics and calculations basic to the use and measurement of radioactivity.
- (5) The operation and use of the AN/UDM-7C.

### NOTES

1. Completion of the Radiological Safety Course at the US Army Chemical School or at the US Army Ordnance Center and School meets these requirements.

2. Where circumstances warrant, alternate training may be substituted if this training is approved by Commander, US Army Communications-Electronics Command, ATTN: DRSEL-SF-H, Fort Monmouth, NJ 07703. Such training must be received under the guidance of a qualified RPO, and must include at least 16 hours of actual experience in the use of the AN/UDM-7C.

b. The person appointed as radiation protection officer may be a commissioned officer, a warrant officer, an enlisted man, or civilian, if he meets the minimum qualifications prescribed above. A radiation protection officer designated custodian for the AN/UDM-7C is a specified person designated to control the use of the AN/UDM-7C.

c. The operator or user of the AN/UDM-7C shall have a minimum of 8 hours training under the guidance of a qualified RPO for the AN/UDM-7C in the basic fundamentals of radiation operation, radiac instrumentation theory and application and survey techniques and 16 hours on-the-job training in operation and care of the AN/UDM-7C. Instructions shall include safe working practices and inherent hazards associated with the instrument.

## 1-7. DUTIES OF RADIATION PROTECTION OFFICER (RPO)

The specific duties of the appointed radiation protection officer will be to:

- a. Insure that the AN/UDM-7C's under his jurisdiction are properly used and stored.
- b. Train local users and operators and maintain list and record of training of users and operators.
- c. Insure records are maintained on each item.
- d. Advise RMCP of any forthcoming change in accountability, local RPO, or installation relocation for the AN/UDM-7C.
- e. Submit Radiation Incident Report according to published directives.

- f. Establish radiation controlled areas for AN/UDM-7C storage and use.
- g. Post Radiation Area warning signs.
- h. Insure items are stored in a fire-resistant structure and no explosives of any kind are stored in the same structure.
- i. Immediately refer actual or suspected overexposure to medical officer.
- j. Insure that periods of time between leak tests do not exceed 3 months and supervise performance of leak tests.
- k. Secure items against unauthorized use and removal.
- l. Insure that all Army, DOD, and Federal Regulations are being followed and that personnel are exposed to a minimum of radiation consistent with practical considerations.
- m. Conduct a physical inventory according to published frequencies.
- n. Submit inventory, leak test, and other reports to RMCP as required.
- o. Prior to relief from duties, place all AN/UDM-7C's under this jurisdiction in locked storage.
- p. Investigate each case of excessive or abnormal exposure to determine the cause, recommend remedial action to prevent recurrence, and submit a complete written report to the Commander, US Army Communications-Electronics Command, ATTN: DRSEL-SF-H, Fort Monmouth, NJ 07703 within 24 hours.

### **1-8. REQUISITIONING PROCEDURE**

Stations in CONUS and Oversea supply agencies will submit requisitions through radioactive material supply channels to Commander, US Army Communications-Electronics Command, ATTN: DRSEL-MME-VC, Fort Monmouth, New Jersey 07703, for issue to certified Radiation Protection Officers. All requisitions will be accompanied by the name of the Radiation Protection/Control Officer who is to be responsible for the equipment. In addition, each request will include the following certification: As required by chapter 3, AR 385-11, 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 the typed name and grade of the appropriate radiation control officer.

### **1-9. EMERGENCY SITUATIONS**

The procedure outlined below will be followed in an emergency situation.

#### **a. Loss of Calibrator.**

- (1) Attempt to recover the radiac calibrator set.
  - (a) Review records to determine the responsible individual.
  - (b) Make a physical survey.
- (2) If the radiac calibrator set is recovered, revise procedures as necessary to prevent a recurrence.
- (3) If the radiac calibrator set is not recovered, report the loss through command channels to the Area Radioactive Material Control Point (AR 385-11) and to the US Army Communications-Electronics Command stating the serial number of the radiac calibrator set, the circumstances involved, and the action taken to prevent recurrence.

#### **b. Internal Exposure of Personnel.**

- (1) Internal exposure is the result of personnel becoming contaminated when radioactive particles are inhaled, swallowed, or absorbed through breaks in the skin.
- (2) In the event of a known or suspected internal exposure:
  - (a) Obtain immediate medical advice from the Medical Officer.
  - (b) Remove the individual from duties involving occupational exposure to ionizing radiation until subsequent exposure limitations are established by proper medical authority (AR 40-14).
  - (c) Prepare written report of circumstances leading to the internal exposure; include serial number(s) of the AN/UDM-7C involved, action taken to prevent recurrence, and other applicable

information. Forward the report through proper channels to Command, US Army Communications-Electronics Command, ATTN: DRSEL-SF-H, Fort Monmouth, NJ 07703.

**c. Damage or Leaking AN/UDM-7C.** AN AN/UDM-7C could begin to leak as a result of being dropped, damage to the source, or even as a result of age. Action required in the event of a known or suspected leaking calibrator is:

- (1) Discontinue use of the calibrator. Cover it with plastic, seal it with tape, and label it as contaminated.
- (2) Monitor personnel, equipment, and areas for possible contamination and decontaminate as required.
- (3) Report the item to the Radioactive Material Control Point and to the US Army Communications-Electronics Command.
- (4) Dispose of the AN/UDM-7C as directed by the US Army Communications-Electronics Command, the US Army Ionizing Radiation Dosimetry Center and the Radioactive Material Control Point.
- (5) Report the completed disposal action to the US Army Communications-Electronics Command, ATTN: DRSEL-SF-H, Fort Monmouth, New Jersey 07703 and the Radioactive Material Control Point.

**d. Firefighting Emergency Procedures.**

(1) **General.** Emergency plans must include procedures for combating fires involving radioactive items. Plans should be commensurate with the quantity and type of items present. Firefighting personnel must know the location(s) of the items and must be familiar with radiation protection procedures. As a general rule, personnel should wear protective respiratory equipment when fighting fires involving radioactive items.

(2) **Emergency procedures.**

- (a) Evacuate personnel in the immediate area who are not directly involved.
- (b) Notify the fire department.
- (c) Extinguish the fire, if possible, and if radioactive materials are involved, with possible release to the environment, clear personnel from downwind area immediately.
- (d) Notify the Radiation Protection Officer.
- (e) Notify medical personnel when appropriate.
- (f) Control access to the immediate area.
- (g) Monitor personnel, equipment, supplies, and environs with appropriate alpha radiation survey instrument.
- (h) Decontaminate personnel, equipment, supplies, and environs.
- (i) The Radiation Protection Officer shall record and report the results of the fire.

**1-10. TRANSPORTATION**

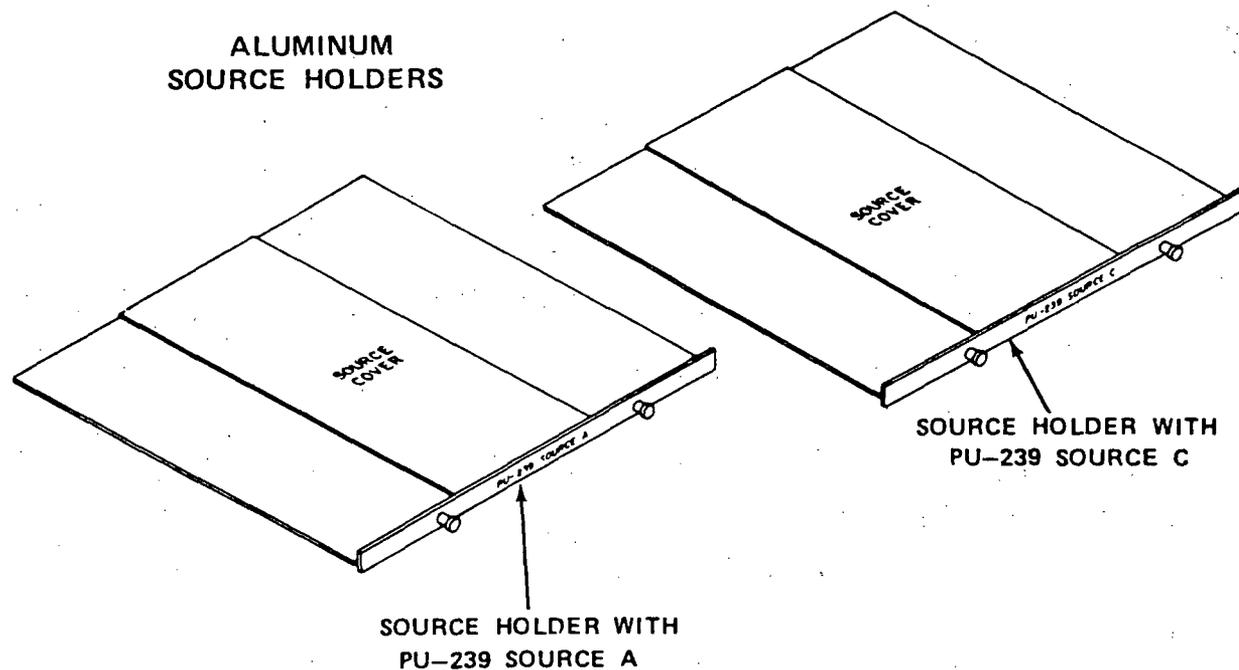
The AN/UDM-7C requires packaging and shipment in accordance with the requirements set forth in Title 49, Code of Federal Regulations (49 CFR) of US Department of Transportation (DOT) regulations and AR 385-11. These regulations require all appropriate information on radioactive shipments to be incorporated onto shipping documentation as follows:

- a. **Proper shipping name (49 CFR 172.101):** Radioactive Material, NOS.
- b. **Hazardous Material Identification Number (49 CFR 172.202):** NA 9181.
- c. **Pieces, weight, cube (49 CFR 172.202):** Hardwood case, 17 inches x 17 inches x 6 inches, with calibrator packed inside; weight approximately 30 pounds. Two alpha sources, Pu239, on plastic disks are housed in aluminum source holders.
- d. **Type of packaging (49 CFR 172.202):** Hardwood case.
- e. **Name of radioactive material as listed in 49 CFR 173.390 (49 CFR 172.202):** Pu239.
- f. **Description of chemical and physical form (49 CFR 172.203):** Plutonium 239 (Plutonium Chloride) solid.
- g. **Specific activity (49 CFR 172.203):** 50.21 microcuries.

- h. Type label (49 CFR 172.203): RADIOACTIVE WHITE I (SF 413).
- i. The words FISSILE EXEMPT shall appear on the shipping documentation as required by 49 CFR 173.396(a).
- j. Shipper's certification (49 CFR 172.204): As applicable.
- k. Shipments of Plutonium 239 must be made in accordance with the applicable provisions of DOT and NRC regulations. At the present time, all shipments of the AN/UDM-7C should only be made by surface transportation.
- l. Any other information as required.

### Section III. EQUIPMENT DESCRIPTION

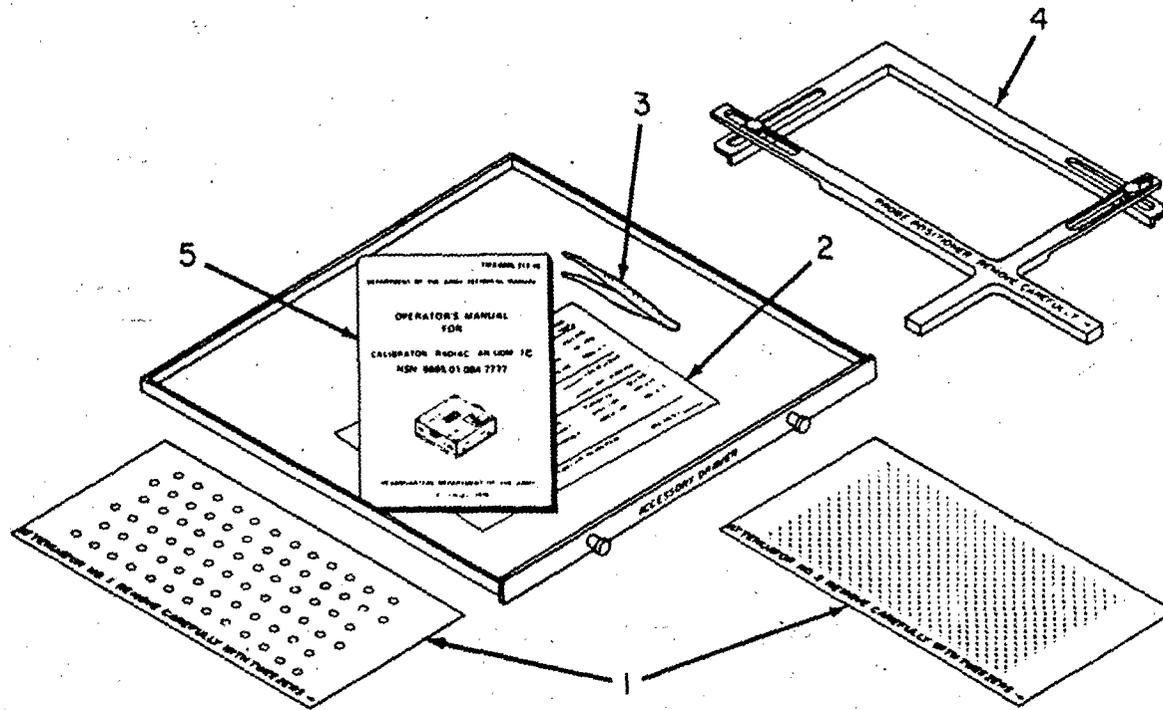
#### 1-11. LOCATION AND DESCRIPTION OF MAJOR COMPONENTS



The aluminum source holders house the Pu239 alpha sources, labeled A and C, which are resin-deposited on plastic discs approximately 12-1/2 inches (32 cm) in diameter. The sources have an approximate accuracy of  $\pm 5\%$ . Disintegrations per minute (DPM) for source A are on the order of  $10^7$ . For source C, the DPM are on the order of  $10^5$ .

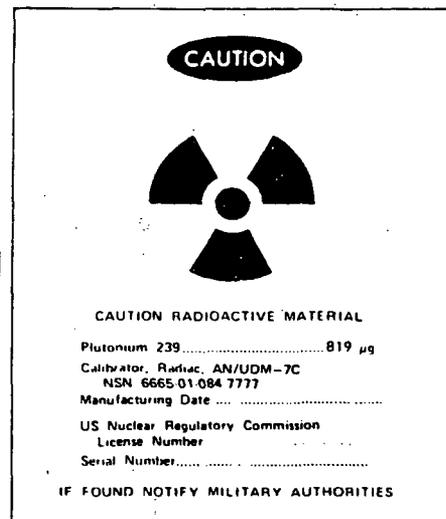
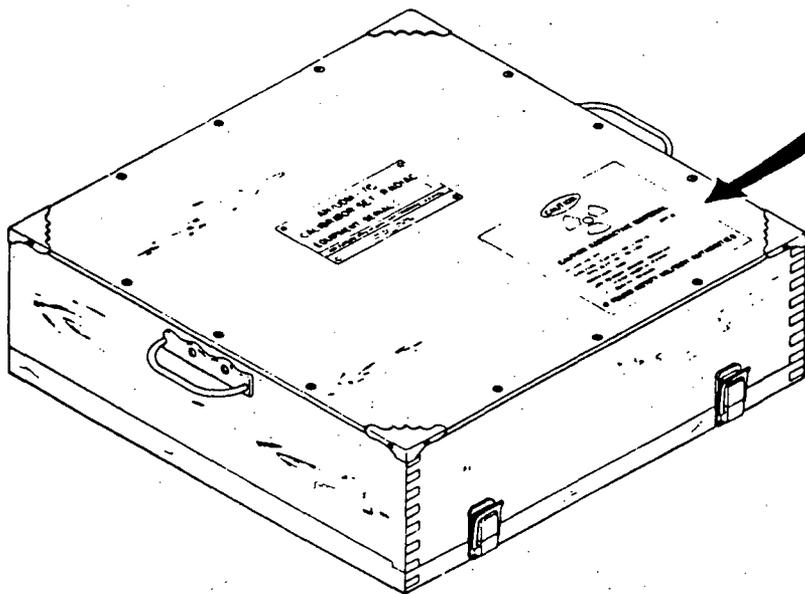
A minimum of 90% of the alpha particles emitted from these sources have energies from 4 to 5.15 MEV (million electron volt).

ACCESSORY DRAWER COMPONENTS



The accessory drawer contains two attenuators (1), a table of meter readings to be used in calibration of radiac sets (2), tweezers (3), and an adjustable probe positioner (4). This technical manual (5) will be stored in the accessory drawer.

HARDWOOD  
CARRYING CASE



A **CAUTION** label should always be affixed on top of the hardwood carrying case as required by NRC regulations.

1-12. EQUIPMENT DATA

Weights and Dimensions

● Complete Item

Weight	24.5 lb (11.1 Kg)
Length	15-1/16 in. (38.3 cm)
Width	14-7/8 in. (37.7 cm)
Height	4-1/32 in. (10.2 cm)

● Calibrator

Weight	17 lb (7.7 Kg)
Length	13-17/32 in. (34.4 cm)
Width	13-25/32 in. (35.0 cm)
Height	2-3/32 in. (5.3 cm)

● Source Holders

Length	13-1/4 in. (33.6 cm)
Width	13-1/4 in. (33.6 cm)
Depth	1/4 in. ( 0.6 cm)

● Exposed Source Area

Length	10.0 in. (25.4 cm)
Width	4.0 in. (10.2 cm)

● Source Positioning Shelf (Interior)

Length	13-1/2 in. (34.3 cm)
Width	13-1/2 in. (34.3 cm)
Depth	5/16 in. ( 0.8 cm)

● Probe Positioning Well

Length	10-1/4 in. (26.0 cm)
Width	5 in. (12.7 cm)
Depth	3/8 in. ( 1.0 cm)

Shipping Data

● Pack - Wooden Box	17x17x6 in (43.2x43.2x15.2 cm)
● Contents	Calibrator with carrying case
● Volume	1 cu. ft. (0.03 m <sup>3</sup> )
● Weight	30 lb. (13.6 Kg)

Performance

● PU-239 Sources	
Source A	Order of 10 <sup>7</sup> DPM
Source C	Order of 10 <sup>5</sup> DPM

● Attenuators

No. 1	Approximately 10% of transmission
No. 2	Approximately 2.5% of transmission



## CHAPTER 2 OPERATING INSTRUCTIONS

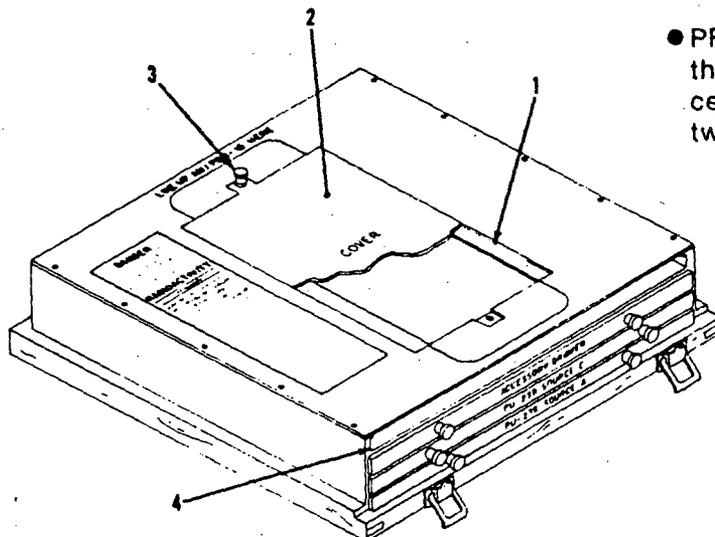
### Section I. DESCRIPTION AND USE OF OPERATOR'S CONTROLS AND INDICATORS

#### WARNING

Use the AN/UDM-7C only under the guidance of an installation/activity (local) Radiation Protection Officer and in accordance with requirements of Chapter 5, Section IV, AR 40-5 and AR 385-11.

Plutonium 239 (Pu239) is dangerous to living tissue. Small amounts of Pu239, when inhaled, ingested, or absorbed in open cuts or wounds, can cause serious illness or death. To avoid accident, observe the following:

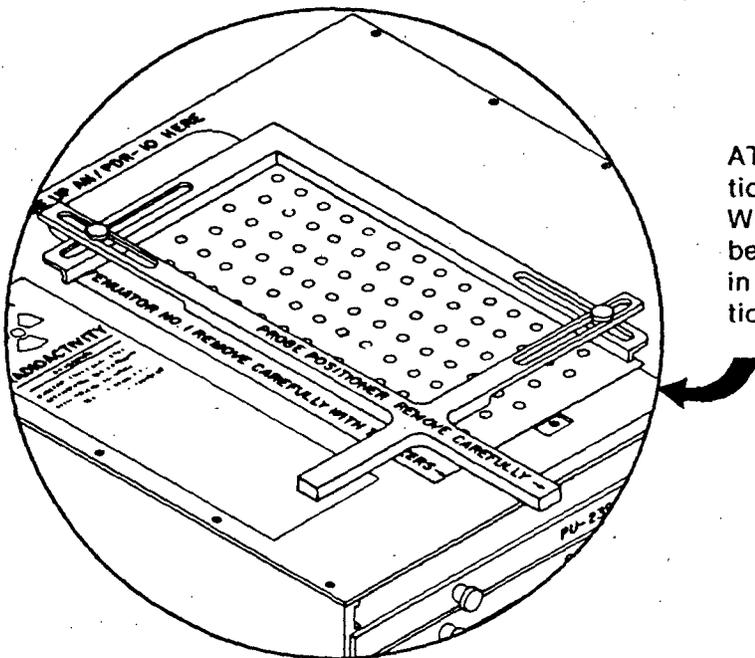
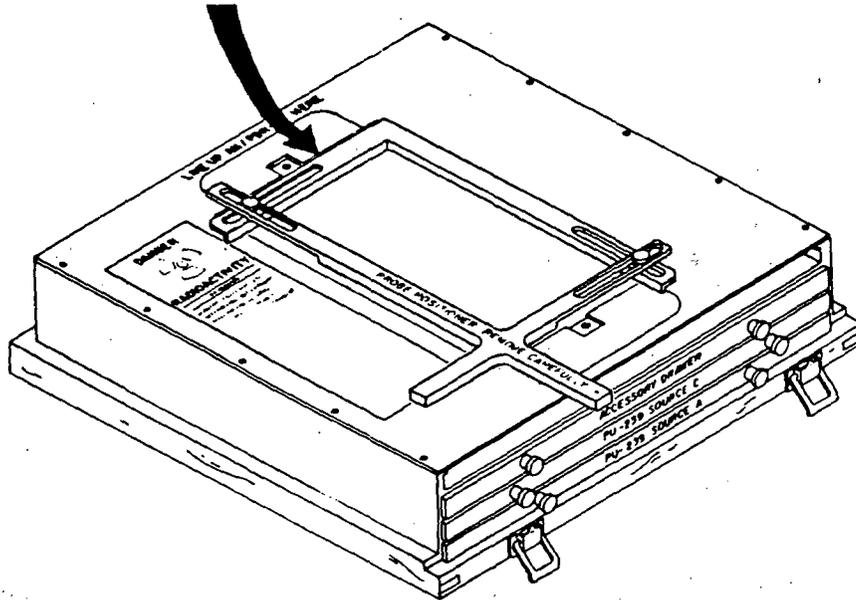
- Use and store the AN/UDM-7C only in designated radiation controlled areas.
- Do not eat, drink, smoke, apply cosmetics, or store food stuffs, drinks, tobacco, or cosmetics where the calibrators are used or stored.
- Do not allow personnel with open skin wounds to handle or work with the AN/UDM-7C without the approval of the medical officer and the (local) Radiation Protection Officer.
- Prohibit loitering in the area by unauthorized personnel.



- PROBE POSITIONING WELL (1). Opening over which the radiac probe is positioned for calibration. Access is gained by removing the cover (2) secured by two thumbscrews (3).

- SOURCE POSITIONING SHELF (4). Provides for insertion of proper source holder.

**ADJUSTABLE PROBE POSITIONER.** Aligns radiac probe over exposed source in probe positioning well. The two L-shaped legs of the probe positioner can be adjusted to fit the contour of the probe base by loosening two thumbscrews which engage elongated slots in the legs, sliding the legs along the axis of the slots, and then tightening the thumbscrews. The positioner will then be clamped to the edges of the probe.



**ATTENUATORS.** Provide reduced radiation transmission levels when required. When an attenuator is used with the probe positioner, the attenuator is placed in the milled groove and the probe positioner is placed on top of the attenuator.

**Section II. OPERATION UNDER USUAL CONDITIONS**

**2-1. INITIAL CHECKS AND SERVICES**

**a. Leak Test (Wipe Test).**

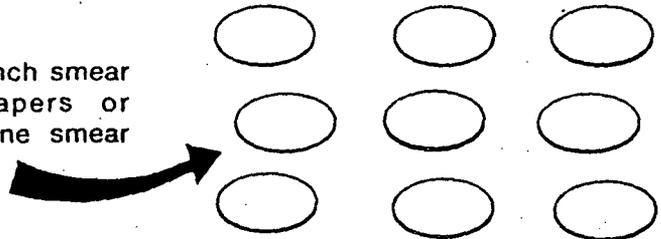
**NOTE**

A leak test is performed immediately upon receipt of the AN/UDM-7C and at least every 3 months thereafter, while in use.

**WARNING**

Plutonium 239 is dangerous to living tissue. Handle the AN/UDM-7C and components carefully; **DO NOT TOUCH THE SOURCE SURFACE.** Avoid contact of objects, such as tools, instruments, and calibrator components with the sources. Wear plastic or surgical gloves when performing leak tests and during calibration.

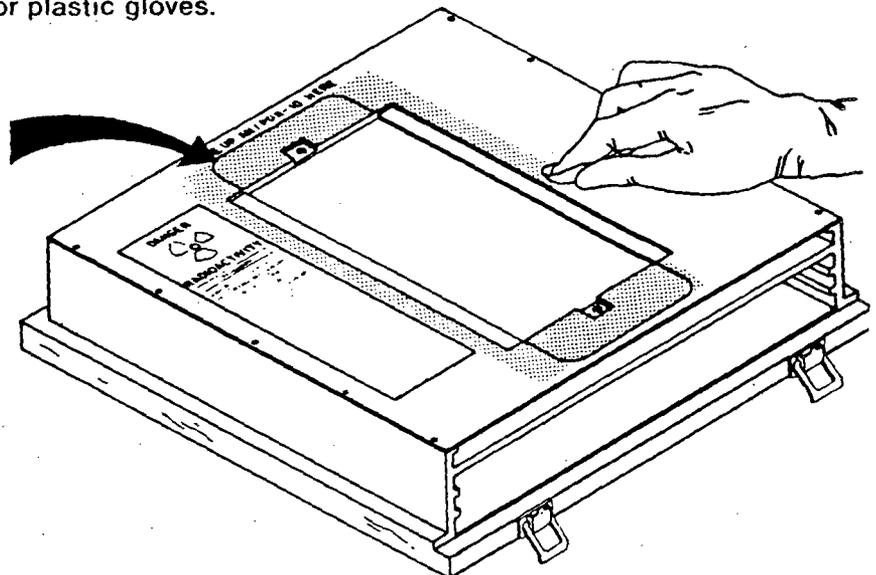
Use commercially available 1 inch smear papers (Whatman filter papers or equivalent). A minimum of nine smear papers will be required.



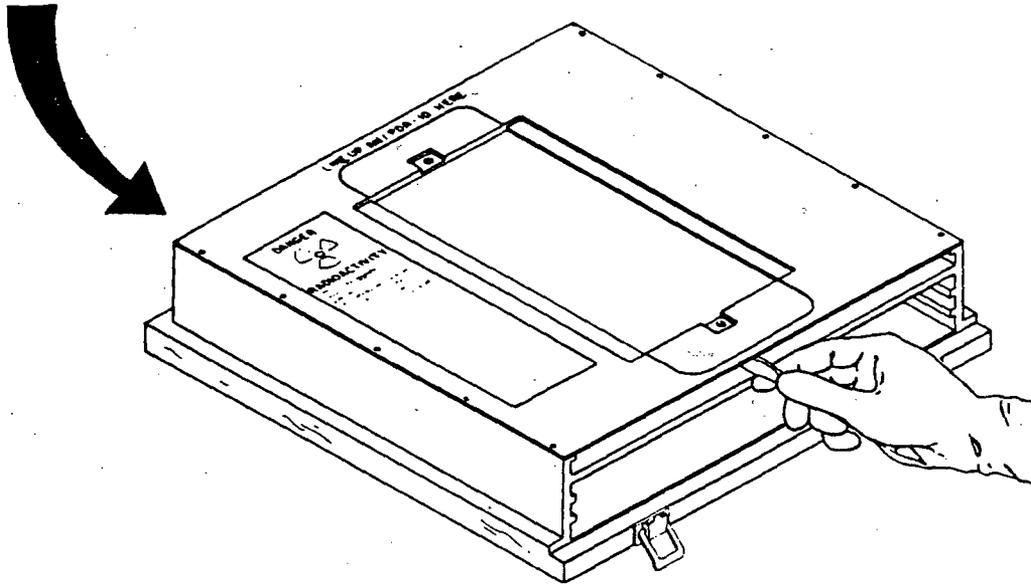
Number consecutively one side of each smear paper and key the numbers to each area, component, or calibrator to be smeared. Use ballpoint or china marking pen to number the papers.

- Dampen the smear papers with water. Do not soak them.
- Put on rubber or plastic gloves.

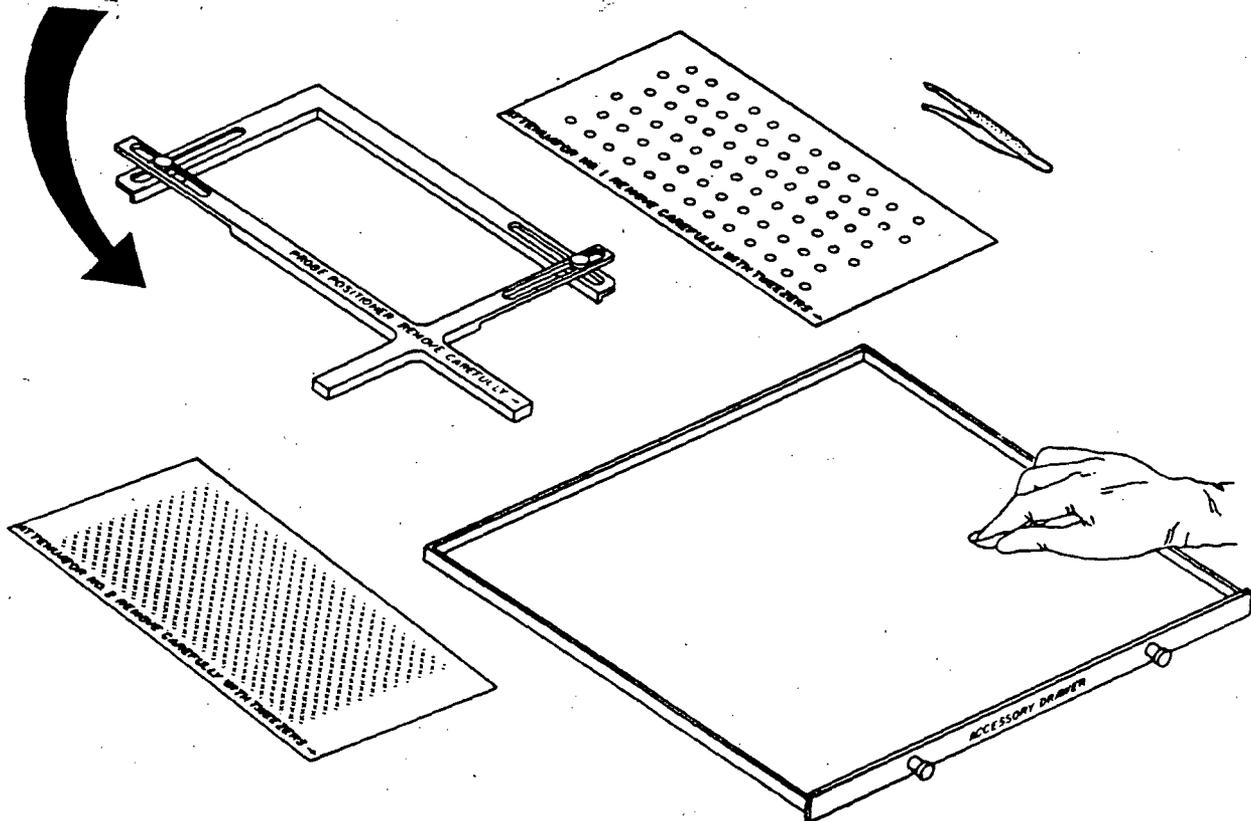
Smear the exterior surfaces surrounding the probe positioning well (shaded area). One smear paper should be enough.



Smear the interior surfaces of the source positioning shelf. Wrap a moistened smear paper around the blunt end of a pencil or dowel and smear those surfaces which are near the radioactive-coated surface of the source when the source is inserted into the shelf.



Smear the probe positioner, both attenuators, the tweezers, the inner surfaces of the accessory drawer, and the inner surfaces of the carrying case cover. Use a separate smear paper for each item.





**b. Smear Paper Evaluation**

Evaluate each smear paper using laboratory equipment capable of detecting 0.001 microcurie of alpha contamination on the test sample. Record test results and maintain these records for inspection. If the test reveals the presence of 0.005 microcurie or more of contamination, the user shall immediately withdraw the calibrator from use and report the condition through the Radiation Control Officer, (AR 385-11) to the licensee who will furnish disposition instructions and submit required reports to DA and NRC.

**NOTE**

No maintenance or repair will be performed by the operator. The US Army Ionizing Radiation Dosimetry Center located at Lexington-Bluegrass Depot Activity is the only authorized facility for maintenance or repair of the calibrator. Requests for maintenance or repair will be submitted to the radioactive material control point for coordination with CECOM and the US Army Ionizing Radiation Dosimetry Center.

If a using installation/activity does not have the proper laboratory equipment, the smear papers will be processed as follows:

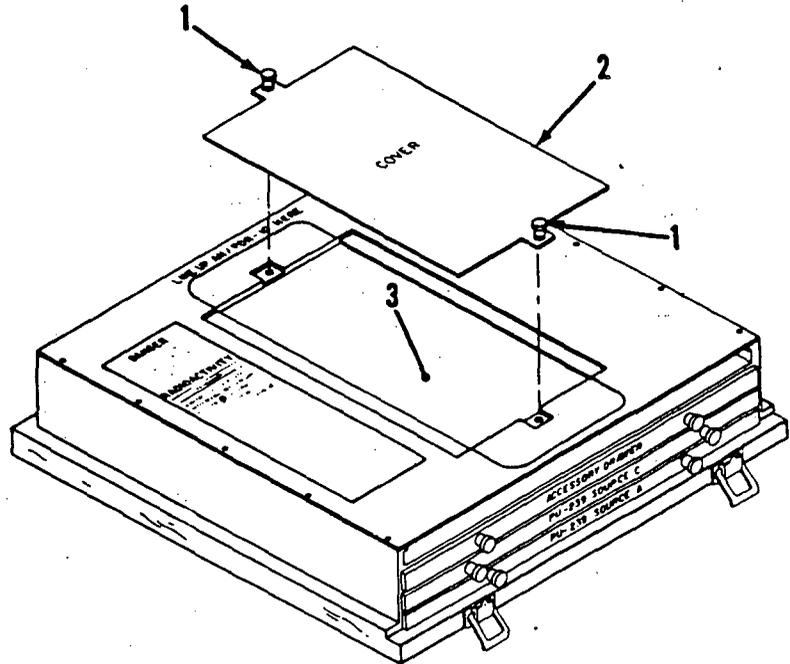
- Place the smear papers, each separated by a sheet of paper in a small envelope marked with the name and location of the user, the serial number(s) of the radioactive test sample(s) and the words: MAILROOM-DO NOT OPEN. Seal the envelope for forwarding.
- In CONUS, forward the smear papers for evaluation using official mail handling channel to, Chief, US Army Ionizing Radiation Dosimetry Center, ATTN: DRSMI-MCJ-DC, Lexington, KY 40511.
- Commanders at overseas installations will comply with procedures established by the responsible commander.

**2-2. OPERATING PROCEDURE**

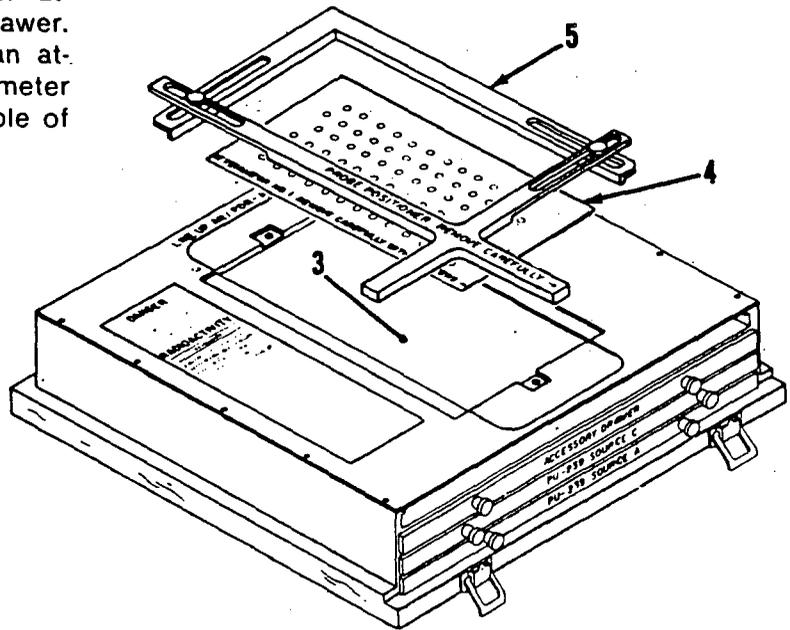
Unlock carrying case and place lid aside. (Calibrator need not be removed from case.)

Put on rubber or plastic gloves (item 1, Appx D).

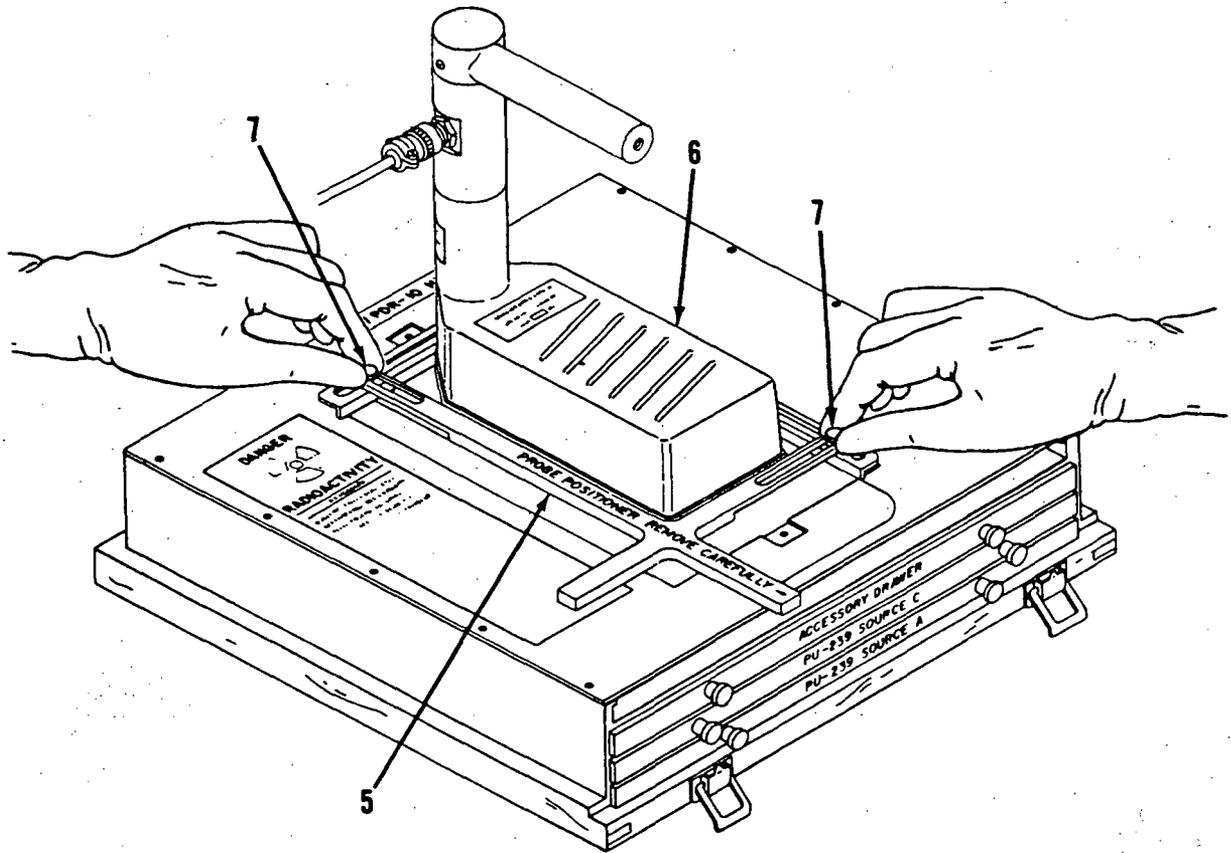
Loosen two thumbscrews (1) and remove cover (2) from probe positioning well (3).



Remove probe positioner and proper attenuator (if required) from necessary drawer. Positioner is used with or without an attenuator depending on which radiacmeter scale is being calibrated. Refer to table of meter readings in accessory drawer.



Place attenuator (4) if used, in probe positioning well (3). Place probe positioner (5) over attenuator in positioning well.



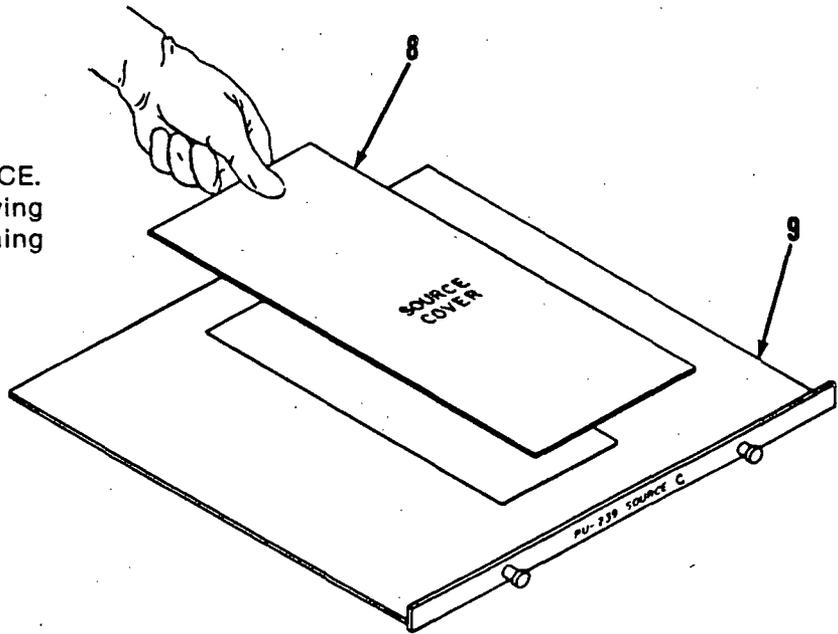
Loosen the two thumbscrews (7) on probe positioner (5).

Place probe (6) of radiac set in positioner (5). Secure the probe by adjusting the two L-shaped legs of the probe positioner to fit the contour of the probe base; clamp the positioner to the edges of the probe by tightening the two thumbscrews (7). The probe sensing area is now aligned with the effective radiation area of the source.

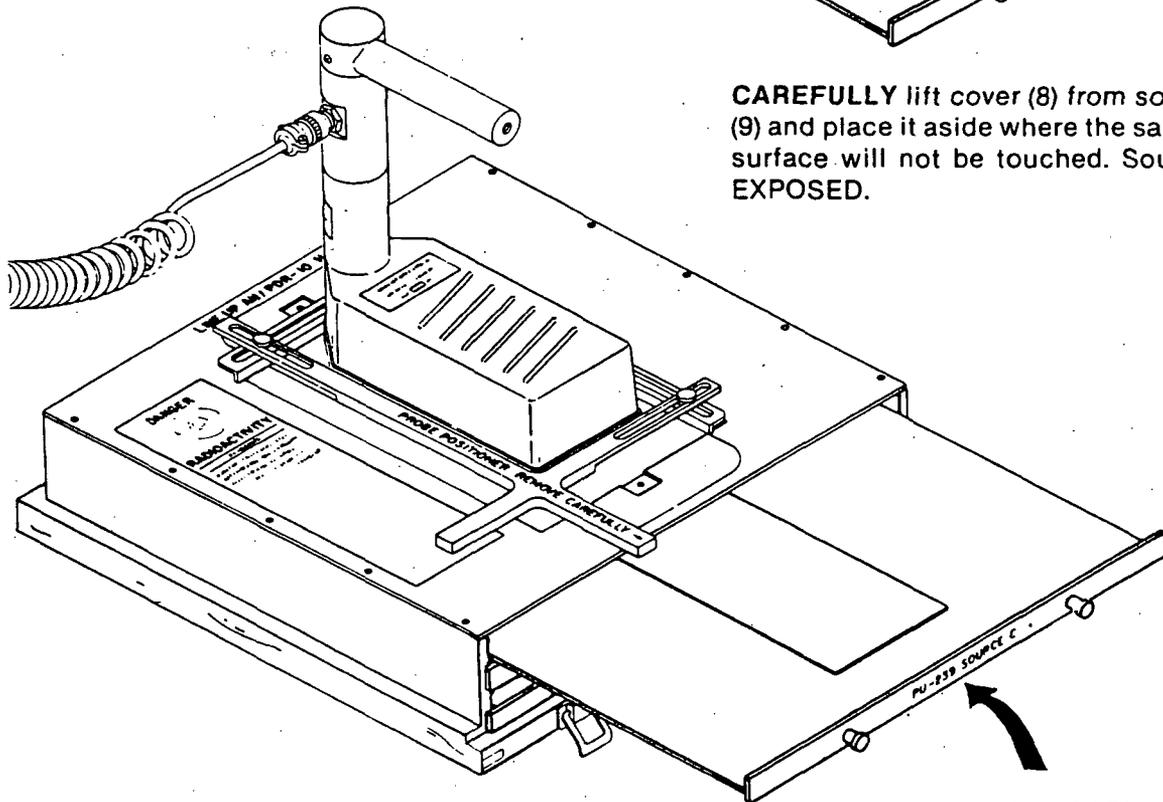
Carefully remove desired Pu239 source (A or C) from cabinet.

**WARNING**

DO NOT TOUCH OR GOUGE SOURCE. Plutonium 239 is dangerous to living tissue. Heed all warnings at beginning of Chapter 2.



CAREFULLY lift cover (8) from source holder (9) and place it aside where the saran-covered surface will not be touched. Source is now EXPOSED.



Slide EXPOSED source into source positioning shelf.

Select appropriate scale on radiac set and check meter reading. Compare reading with table of meter readings located in the accessory drawer. If the reading is different than the one indicated by the table, use the instructions given in the appropriate radiac set technical manual to adjust set reading to desired value.

**2.3. AFTER OPERATING PROCEDURE**

Carefully withdraw source from source positioning shelf and place cover on the source.

Replace source in its proper cabinet shelf.

Loosen probe positioner and carefully remove the attenuator using the tweezers from the accessory drawer.

Place probe positioning well cover and carrying case lid.

Remove rubber or plastic gloves. Dispose of gloves as radioactive waste as prescribed in AR 385-11.

**WARNING**

Always wash and dry hands thoroughly after handling the calibrator; monitor the hands with a low-range alpha radiac meter; repeat the washing and drying if necessary. Notify the Radiation Protection Officer if washing does not remove contamination.

## CHAPTER 3 MAINTENANCE INSTRUCTIONS

### Section I. TROUBLESHOOTING PROCEDURES

#### 3-1. INTRODUCTION

Table 3-1 lists the common malfunctions which you may find during the operation or maintenance of the calibrator or its components. You should perform the tests/inspections and corrective actions in the order listed.

This manual cannot list all malfunctions that may occur, nor all tests or inspections and corrective actions. If a malfunction is not listed or is not corrected by listed corrective actions, notify your supervisor.

**Table 3-1. Troubleshooting**

<b>MALFUNCTION</b>	<b>TEST OR INSPECTION</b>	<b>CORRECTIVE ACTION</b>
<b>1. SOURCE DAMAGE.</b>		
<b>Step 1.</b>	Use a similar type radiac calibrator and obtain a set of readings.	
<b>Step 2.</b>	Compare the two sets of readings with readings obtained from damaged calibrator before damage occurred.	If readings are still erroneous, contact ARRCOM National Maintenance Point (NMP) and request maintenance or repair.
<b>2. CALIBRATION MALFUNCTION.</b>		
<b>Step 1.</b>	Verify that the radiac set is intended to be calibrated with the calibrator.	
<b>Step 2.</b>	Verify that the correct accessories (i.e., source and attenuator) are being used for the radiac set being calibrated.	If a malfunction still exists, return the radiac set to the using activity for maintenance or repair.

## Section II. MAINTENANCE PROCEDURES

### 3-2. OPERATOR MAINTENANCE

- a. Operator maintenance is limited to inspection and initial checks and services. No other maintenance or repair will be performed by the operator. The US Army Ionizing Radiation Dosimetry Center is the only authorized facility for maintenance or repair.
- b. Requests for maintenance or repair will be submitted to the radioactive material control point for coordination with the CECOM National Inventory Control Point and the US Army Ionizing Radiation Dosimetry Center. Points of contact are:

CECOM National Inventory Control Point (NICP)  
Commander, US Army Communications-Electronics Command  
ATTN: DRSEL-MME-VC  
Fort Monmouth, New Jersey 07703

CECOM National Maintenance Point (NMP)  
Commander, US Army Communications-Electronics Command  
ATTN: DRSEL-ME-ES  
Fort Monmouth, New Jersey 07703

### 3-3. STORAGE

- a. Store the calibrators only in fire-resistant buildings (TM 5-812-1) and in rooms/areas/sections designated for storage of radioactive materials which are free from the danger of flooding, outside the danger of radius of flammables or explosives, and secured against unauthorized removal.
- b. Post the area/building with CAUTION - RADIOACTIVE MATERIAL signs as required by AR 385-30.

**APPENDIX A  
REFERENCES**

**A-1. GENERAL**

This appendix lists all forms, technical manuals, and miscellaneous publications referenced in this manual and/or to be utilized in relation to this equipment.

**A-2. FORMS**

Equipment Inspection and Maintenance Worksheet .....	DA Form 2404
Recommended Changes to Publications .....	DA Form 2028
Recommended Changes to Equipment Technical Publications .....	DA Form 2028-2
Punched Transmission Worksheet-Radioisotope Inventory and Leak Test Report .....	DA Form 3252-R
Notice to Employees .....	NRC-3
Radiological Accident Report .....	RCSDD-SD 1168
Quality Deficiency Report .....	SF 368
Radioactive I .....	SF 413

**A-3. TECHNICAL MANUALS**

Handling and Disposal of Unwanted Radioactive Material .....	TM 3-261
Fire Protection Manual .....	TM 5-812-1
List of Applicable Publications (LOAP) for Communications Electronic Equipment .....	TM 11-5800-213-L
Operator's, Organizational, Direct Support, General Support, and Depot Maintenance Manual: Radiac Set AN/PDR-54 (NSN 6665-00-542-1587) .....	TM 11-6665-208-15
Operator's, Organizational, Direct Support, General Support, and Depot Maintenance Manual: Radiac Set AN/PDR-60 (NSN 6665-00-965-1516) .....	TM 11-6665-221-15
Operator's and Organizational Maintenance Manual for Radiac Set AN/PDR-56F (NSN 6665-00-211-6895) .....	TM 11-6665-245-12
The Army Maintenance Management System (TAMMS) .....	TM 38-750
Transportation Guidance for Safe Transport of Radioactive Materials .....	TM 55-315

**A-4. MISCELLANEOUS PUBLICATIONS**

Health and Environment .....	AR 40-5
Control and Recording Procedure for Occupational Exposure to Ionizing Radiation .....	AR 40-14
Reporting of Transportation Discrepancies in Shipment .....	AR 55-38
Ionizing Radiation Protection (Receiving, Control, Transportation, Disposal, and Radiation Safety) .....	AR 385-11
Safety Color Code Markings and Signs .....	AR 385-30
Accident Reporting and Records .....	AR 385-40
Packaging Improvement Report .....	AR 700-58
Radioactive Commodities in the DOD Supply System .....	AR 700-64
Reporting of Item and Packaging Discrepancies .....	AR 735-11-2



## APPENDIX D EXPENDABLE SUPPLIES AND MATERIALS LIST

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### Section I. INTRODUCTION

#### D-1. SCOPE

This appendix lists expendable supplies and materials you will need to operate and maintain the AN/UDM-7C. These items are authorized to you by CTA 50-970, Expendable Items (Except Medical, Class V, Repair Parts, and Heraldic Items).

#### D-2. EXPLANATION OF COLUMNS

a. **Column 1 - Item Number.** This number is assigned to the entry in the listing and is referenced in the narrative instructions to identify the material (e.g., "Use plastic gloves, item 1, App. D").

b. **Column 2 - Level.** This column identifies the lowest level of maintenance that requires the item.

C — Operator/Crew

c. **Column 3 - National Stock Number.** This is the National stock number assigned to the item; use it to request or requisition the item.

d. **Column 4 - Description.** Indicates the Federal item name and, if required, a description to identify the item. The last line for each item indicates the part number followed by the Federal Supply Code for Manufacturer (FSCM) in parentheses, if applicable.

e. **Column 5 - Unit of Measure (U/M).** Indicates the measure used in performing the actual maintenance function. This measure is expressed by a two-character alphabetical abbreviation (e.g., ea, in, pr). If the unit of measure differs from the unit of issue, requisition the lowest unit of issue that will satisfy your requirements.

Section II. EXPENDABLE SUPPLIES AND MATERIALS LIST

(1) ITEM NUMBER	(2) LEVEL	(3) NATIONAL STOCK NUMBER	(4) DESCRIPTION  PART NO. AND FSCM	(5) U/M
1	C	8415-00-682-6786	GLOVES, DISPOSAL PIMKIES (96717)	Pr
2	C	8540-00-291-0391	TOWEL, PAPER UU-7-591 (81348)	Bx

☆U.S. GOVERNMENT PRINTING OFFICE: 1981-703-029/1283

Form NRC-3  
(1-80)  
10 CFR 19  
10 CFR 20



UNITED STATES NUCLEAR REGULATORY COMMISSION  
Washington, D.C. 20555

# NOTICE TO EMPLOYEES

## STANDARDS FOR PROTECTION AGAINST RADIATION (PART 20); NOTICES, INSTRUCTIONS AND REPORTS TO WORKERS; INSPECTIONS (PART 19)

In Part 20 of its Rules and Regulations, the Nuclear Regulatory Commission has established standards for your protection against radiation hazards from radioactive material under license issued by the Nuclear Regulatory Commission. In Part 19 of its Rules and Regulations, the Nuclear Regulatory Commission has established certain provisions for the options of workers engaged in NRC-licensed activities.

### YOUR EMPLOYER'S RESPONSIBILITY

Your employer is required to —

1. Apply these NRC regulations and the conditions of his NRC license to all work under the license.
2. Post or otherwise make available to you a copy of the NRC regulations, licenses, and operating procedures which apply to work you are engaged in, and explain their provisions to you,

3. Post Notices of Violation involving radiological working conditions, proposed imposition of civil penalties and orders.

### YOUR RESPONSIBILITY AS A WORKER

You should familiarize yourself with those provisions of the NRC regulations, and the operating procedures which apply to the work you are engaged in. You should observe their provisions for your own protection and protection of your co-workers.

### WHAT IS COVERED BY THESE NRC REGULATIONS

1. Limits on exposure to radiation and radioactive material in restricted and unrestricted areas;
2. Measures to be taken after accidental exposure;
3. Personnel monitoring, surveys and equipment;
4. Caution signs, labels, and safety interlock equipment;
5. Exposure records and reports;
6. Options for workers regarding NRC inspections; and
7. Related matters.

### REPORTS ON YOUR RADIATION EXPOSURE HISTORY

1. The NRC regulations require that your employer give you a written report if you receive an

### POSTING REQUIREMENTS

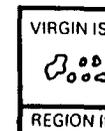
Copies of this notice must be posted in a sufficient number of places in every establishment where activities licensed by the NRC are conducted, to permit employees working in or frequenting any portion of a restricted area to observe a copy on the way to or from their place of employment.

exposure in excess of any applicable limit as set forth in the regulations or in the license. The basic limits for exposure to employees are set forth in Sections 20.101, 20.103, and 20.104 of the Part 20 regulations. These Sections specify limits on exposure to radiation and exposure to concentrations of radioactive material in air.

2. If you work where personnel monitoring is required pursuant to Section 20.202:
  - (a) your employer must give you a written report of your radiation exposures upon the termination of your employment, if you request it, and
  - (b) your employer must advise you annually of your exposure to radiation, if you request it.

### INSPECTIONS

All activities under the license are subject to inspection by representatives of the NRC. In addition, any worker or representative of workers who believes that there is a violation of the Atomic Energy Act of 1954, the regulations issued thereunder, or the terms of the employer's license with regard to radiological working conditions in which the worker is engaged, may request an inspection by sending a notice of the alleged violation to the appropriate United States Nuclear Regulatory Commission Inspection and Enforcement Regional Office (shown on map at right). The request must set forth the specific grounds for the notice, and must be signed by the worker or the representative of the workers. During inspections, NRC inspectors may confer privately with workers, and any worker may bring to the attention of the inspectors any past or present condition which he believes contributed to or caused any violation as described above.



### UNITED STATES NUCLEAR REGULATORY COMMISSION

A representative of the Nuclear Regulatory Commission can be contacted at the following addresses and telephone numbers. The Regional Office will accept collect telephone calls from employees who wish to register complaints or concerns about radiological working conditions or other matters regarding compliance with Commission rules and regulations.

#### Regional Offices

REGION	ADDRESS	TELEPHONE	
		DAYTIME	NIGHTS AND HOLIDAYS
I	Region I, Office of Inspection and Enforcement, USNRC 631 Park Avenue King of Prussia, Pennsylvania 19406	215 337-5000	215 337-5000
II	Region II, Office of Inspection and Enforcement, USNRC 101 Marietta St., N.W., Suite 3100 Atlanta, Georgia 30303	404 221-4503	404 221-4503
III	Region III, Office of Inspection and Enforcement, USNRC 799 Roosevelt Road Glen Ellyn, Illinois 60137	312 932-2500	312 932-2500
IV	Region IV, Office of Inspection and Enforcement, USNRC 611 Ryan Plaza Drive, Suite 1000 Arlington, Texas 76012	817 334-2841	817 334-2841
V	Region V, Office of Inspection and Enforcement, USNRC 1990 N. California Boulevard, Suite 202, Walnut Creek Plaza Walnut Creek, California 94596	415 943-3700	415 943-3700

By Order of the Secretary of the Army:

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