



REPLY TO  
ATTENTION OF

DEPARTMENT OF THE ARMY  
US ARMY AREA TMDE SUPPORT CENTER-SACRAMENTO  
SACRAMENTO ARMY DEPOT  
SACRAMENTO, CALIFORNIA 95813-5035

AMXTM-CW-SA

17 April 1989

MEMORANDUM THRU:

Chief, U.S. Army Calibration and Repair Center-Sacramento, ATTN: AMXTM-CW-SA, Sacramento Army Depot, Sacramento, CA 95813-5035

Commander, U.S. Army TMDE Support Group, ATTN: AMXTM-SR, Redstone Arsenal, AL 35898-5400

FOR: United States Nuclear Regulatory Commission, Region V, 1450 Maria Lane, Suite 210, ATTN: Beth A. Riedlinger (Mail Control Number: 70697), Walnut Creek, CA 94596-5368

SUBJECT: Renewal of Special Nuclear License #SNM-507

1. Request action be taken to amend and renew our Special Nuclear Material License #SNM-507 (see encl 1).

2. The following changes are requested:

- a. Delete Frederick T. Toyama as RPO.
- b. Add Charles R. Wallace as RPO.
- c. Add Eugene Fong, Robert L. Butler, Edward R. Enz and Quan Y. Luke as users.
- d. Delete Charles E. Gerdel, Joseph F. DeMelo, James C. Ralls and Ida M. Jones as individual users.
- e. Add Elbert E. Anderson as Alternate RPO.

Encl

CF:  
Pat Elker

*Charles R. Wallace*

CHARLES R. WALLACE  
Radiological Protection Officer  
Army Primary Nucleonics Laboratory

FEE EXEMPT

8908010227 890515  
REG5 LIC70  
SNM-507 PDR

DATA SHEET (U-235 and PU-239)

1. Name of Applicant: Department of the Army  
U.S. Army Area Calibration and Repair Center-Sacramento  
Sacramento Army Depot  
Sacramento, CA 95813-5035

2. The description of the sources are as follows:

a. Eighty grams of Plutonium-239 is mixed homogeneously with Beryllium in proportions that gives maximum neutron flux.

b. Two grams of Uranium-235 (enriched) is incorporated in a neutron detector.

c. Approximately four hundred and eight (408) micrograms of Plutonium-239 are electrolytically deposited on metal plates and are:

(1) Three sets of rectangular calibration sources manufactured by Eberline Instrument Corporation. Each Set consists of three rectangular metal plates electrolytically deposited of Plutonium. The three sources contain approximately 60 micrograms, 6 micrograms, and 0.6 micrograms of Plutonium.

(2) Three sets of disc sources manufactured by Eberline Instrument Corporation. Each set consists of three each metal disc sources electrolytically deposited of Plutonium. The three sources in each set contain approximately 1 microgram, 0.1 microgram, and 0.02 microgram of Plutonium.

(3) Four each rectangular metal sources manufactured by Monsanto Chemical Company. Each rectangular source consists of metal plate electrolytically deposited of Plutonium. The four sources contain approximately 1 microgram, 0.1 microgram, 0.04 microgram, and 0.02 microgram of Plutonium.

(4) One each disc calibration source manufactured by Eberline Instrument Corporation. The Plutonium-239 material is electrodeposited uniformly on a nickel disc. The disc source contains approximately 200 micrograms of Plutonium (Eberline Model DNS-16 Special).

The four hundred and eight (408) micrograms Plutonium-239 electrolytically deposited on metal plates will be used by any personnel specified in paragraph 5 below anywhere in the United States or overseas.

DATA SHEET (Cont'd)

3. The material is requested for an indefinite loan and the license is requested for an indefinite period of time.

4. The sources are as follows:

a. The Plutonium Beryllium Neutron Source is used to calibrate survey instruments, neutron detectors, film badges, etc., (see Appendix B for method).

b. Uranium-235 is in a Neutron Detector.

c. The Plutonium-239 sources will be used to calibrate counters, survey instruments, counting systems, etc. Personnel using Plutonium sources will follow the safety procedure, as outlined (see Appendix A). These sources are kept at the Sacramento Army Depot (SAAD), and will be under the responsibility of the Radiological Protection Officer and user and will be secured from unauthorized use. The user will monitor himself whenever there is a possibility of himself/herself becoming contaminated. The following action is required in the event of a known or suspected internal exposure:

(1) Notify the Radiological Protection Officer (RPO), AUTOVON 839-3561; Commercial (916) 388-3561.

(2) Seek medical advice from the medical officer.

5. Persons responsible for control, safety, and use of special nuclear materials are: Charles R. Wallace and Elbert E. Anderson. The users are: Robert L. Butler, Eugene (NMI) Fong and Edward R. Enz (see Appendix C).

6. Drawing Number 1 shows the layout of the U. S. Army Area Calibration and Repair Center-Sacramento building. Drawing Number 2 shows the manner in which the Plutonium Beryllium Neutron Source is used. Appendix D shows equipment for radiation detection. Appendix E shows general radiation safety and procedures.

7. Wipe testing for removable contamination of all special nuclear material sources will be performed on three-month intervals. The method for performing wipe tests will be sufficiently sensitive to detect minimum detectable activity of  $4.85 \times 10^{-5}$  microcuries. A permanent record will be kept of all wipe test results, including negative results. The record will include:

a. Location, date, and minimum detectable activity of the equipment used.

b. Name of person conducting the survey.



DATA SHEET (Cont'd)

c. Corrective action taken in case of contamination, the exposure rate, the reduced contamination levels or exposure rates after corrective action and any appropriate comments.

d. Surveys will be conducted and posted for maximum readings. A copy of emergency procedures will be posted in the work area with the information as required by NRC Regulatory Guide 10.3, paragraph 4.6.9.

8. Waste Disposal will be in accordance with AR 385-11 (see Appendix F



U.S. ARMY PRIMARY NUCLEONICS LABORATORY  
REPORT OF CALIBRATION

Owner: \_\_\_\_\_ UIC: \_\_\_\_\_

Instrument checks: Battery check: \_\_\_\_\_ mR/hr or \_\_\_\_\_

Calibration Geometry: 

Window:    ☐ open    ☐ closed    ☐ fixed

[illegible]

Average Correction Factors: \_\_\_\_\_

Name: \_\_\_\_\_

Date: \_\_\_\_\_

incl #1

**SOURCE-WIPE TEST**  
(Maint Dir 750-25)

TYPE \_\_\_\_\_ ACTIVITY \_\_\_\_\_

MODEL \_\_\_\_\_ SERIAL NO. \_\_\_\_\_

DATE \_\_\_\_\_ DUE DATE \_\_\_\_\_

BY US ARMY CALIBRATION & REPAIR CENTER - SACRAMENTO

AMXTM-CW-SA LAB 76, 1 Feb 67

US ARMY CALIBRATED INSTRUMENT	
1. DATE CALBR	2. CALBR BY
3. CALBR VOID	4. NAME/REPORT NO.
5. IDENTIFICATION NO.	6. OWNER
DA LABEL 80 1 DEC 77 REPLACES EDITION OF 1 JAN 70 WHICH IS OBSOLETE.	

Figure C-1. DA Label 80, US Army calibrated instrument. (White background, black printing.)

# EXAMPLE



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APPENDIX A

## APPENDIX A

### WARNING

#### RADIATION HAZARD

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 calibrator 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 any way. Mishandling can cause source leakage.

Do not touch the source surface with your hands. Wear plastic or surgical type protective 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 your hands thoroughly after handling the calibrator; check your 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.



APPENDIX B

## APPENDIX B

### OPERATING PROCEDURE

#### Plutonium-Beryllium Neutron Calibrator

- a. Only authorized personnel will be allowed to operate this source.
- b. Obtain the keys to the Isotope Storage Room and to the Calibration Room from the custodian of the key cabinet.
- c. Open the door to the Isotope Storage Room. Remove the tag from the container of the Pu-Be Neutron Calibrator and place it on the "Source Out" Board.
- d. Transport the calibrator to the Calibration Room.
- e. Check and see if it is safe to go into the Calibration Room to operate the Neutron Calibrator. If not, wait until it can be used safely.
- f. When the calibrator can be operated safely, open the door, position the calibrator and activate the blinking radiation warning lights.
- g. Position the object to be exposed.
- h. Connect the capsule lead to the lead from the remote raising and lowering system.
- i. Remove the plug from the container, being careful so that no part of the body gets into the radiation beam.
- j. Go to the remote position and raise the source to the desired height.
- k. Leave the room, closing the self-locking door to the Calibration Room.
- l. Place the chain with the radiation sign across the door.
- m. Upon completion of exposure, take the chain off, open the door and lower the source back to the fully shielded position.
- n. Replace the plug into the hold of the container.
- o. Disconnect the capsule lead from the lead to the remote raising and lowering system.
- p. De-activate the blinking radiation warning lights.
- q. Remove the object exposed to radiation.
- r. Transport the calibrator to the Isotope Storage Room closing the self-locking door to the Calibration Room.

Operating Procedure (cont'd)

- s. Open the door to the Isotope storage Room, take the tag off the "Source Out" board and replace it on the container of the calibrator.
- t. Leave the Isotope Storage Room closing the self-locking door.
- u. Return the keys to the custodian of the key cabinet.



APPENDIX C

# APPENDIX C (Cont'd)

Resume of Experience and Training of Robert L. Butler 8 December 1987

A. Type of Training	Where Trained	Duration of Training		On-the Job	Formal
(1) Principles & Practices of Radiation Protection	Sacramento Army Depot USN Radiological Trng School #1 and #2	2½ Yrs		Yes	Yes
		2 Mos			Yes
		1 Wk			Yes
(2) Radioactivity Measurement Standardization & Monitoring Techniques & Instruments	Sacramento Army Depot USN Radiological Trng School #1 and #2	2½ Yrs		Yes	Yes
		2 Mos			Yes
		1 Wk			Yes
(3) Mathematics & Calculations Basic to the Use & Measurement of Radioactivity	Sacramento Army Depot USN Radiological Trng School #1 and #2	2½ Yrs		Yes	Yes
		2 Mos			Yes
		1 Wk			Yes
(4) Biological Effect of Radiation	Sacramento Army Depot USN Radiological Trng School #1 and #2	2½ Yrs		Yes	Yes
		2 Mos			Yes
		1 Wk			Yes

B. Experience with Radiation		Duration		Type of Use	
Isotopes	Maximum Amt.				
Co-60	4500 curies	1 Yr		Calibration	
Co-60	1000 curies	3½ Yrs		Calibration	
Cs-137	1 curies	3½ Yrs		Calibration	
Cs-137	600 curies	3½ Yrs		Calibration	
Pu-239	5 curies	3½ Yrs		Calibration	
Am-241	4 curies	3½ Yrs		Calibration	
Radium-226	0.5 grams	3½ Yrs		Calibration	
X-Ray Machine	250 KVCP	3½ Yrs		Calibration	

#1 - University of Texas Health Science Center at San Antonio  
#2 - Fort Belvoir, Virginia

# APPENDIX C (Cont'd)

Resume of Experience and Training of Eugene (NMI) Fong 8 December 1987

A.	Type of Training	Where Trained	Duration of Training	On-the-Job	Formal
(1)	Principles & Practices of Radiation Protection	USAMC, Rockville, Md. University of Texas Health Science Center at San Antonio	10 Dys 5 Dys	Yes	Yes Yes
(2)	Radioactivity Measurement Standardization & Monitoring Techniques and Instruments	USAMC, Rockville, Md. University of Texas Health Science Center at San Antonio	10 Dys 5 Dys	Yes	Yes Yes
(3)	Mathematics & Calculations Basic to the Use & Measurement of Radioactivity	USAMC, Rockville, Md. USN Radiological Trng School Center at San Antonio	10 Dys 5 Dys	Yes	Yes Yes
(4)	Biological Effect of Radiation	USAMC, Rockville, Md. University of Texas Health Science Center at San Antonio	10 Dys 5 Dys	Yes	Yes Yes
B.	Experience with Radiation				
	Isotopes	Where Experience was Gained	Duration	Type of Use	
	Co-60	Sacramento Army Depot, Nucl Br	12 Yrs	Calibration	
	Cs-137	Sacramento Army Depot, Nucl Br	12 Yrs	Calibration	
	Cs-137	Sacramento Army Depot, Nucl Br	12 Yrs	Calibration	
	Pu-239	Sacramento Army Depot, Nucl Br	12 Yrs	Calibration	
	Am-241	Sacramento Army Depot, Nucl Br	12 Yrs	Calibration	
	Radium-226	Sacramento Army Depot, Nucl Br	12 Yrs	Calibration	
	X-Ray Machine	Sacramento Army Depot, Nucl Br	12 Yrs	Calibration	
		Mobile Calibration Van	6 Yrs	Mobile Calbr of Radiac Instruments	



# APPENDIX C (Cont'd)

## Resume of Experience and Training of Elbert E. Anderson

8 December 1987

A. Type of Training	Where Trained	Duration of Training		On-the Job	Formal
(1) Principles & Practices of Radiation Protection	Sacramento Army Depot	4 Yrs		Yes	
	US Public Health Service	1 Mo			Yes
	Technical Mgt Services	40 Hrs			Yes
	Ofc of Emer Serv, State of CA	80 Hrs			Yes
(2) Radioactivity Measurement Standardization & Monitoring Techniques & Instruments	Sacramento Army Depot	4 Yrs		Yes	
	US Public Health Service	1 Mo			Yes
	Technical Mgt Services	40 Hrs			Yes
	Ofc of Emer Serv, State of CA	80 Hrs			Yes
(3) Mathematics & Calculations Basic to the Use & Measurement of Radioactivity	Sacramento Army Depot	4 Yrs		Yes	
	USN Radiological Trng School	1 Mo			Yes
	Technical Mgt Services	40 Hrs			Yes
	Ofc of Emer Serv, State of CA	80 Hrs			Yes
(4) Biological Effect of Radiation	University of Michigan	6 Sem			Yes
	Sacramento Army Depot	4 Yrs		Yes	
	US Public Health Service	1 Mo			Yes
	Technical Mgt Services	40 Hrs			Yes
	Ofc of Emer Serv, State of CA	80 Hrs			Yes

## B. Experience with Radiation

Isotopes	Maximum Amt.	Where Experience was Gained	Duration	Type of Use
Co-60	500 curies	Sacramento Army Depot	4 Yrs	Calibration
Co-60	1000 curies	Sacramento Army Depot	12 Yrs	Calibration
Cs-137	1 curies	Sacramento Army Depot	17 Yrs	Calibration
Cs-137	600 curies	Sacramento Army Depot	15 Yrs	Calibration
Pu-239	5 curies	Sacramento Army Depot	17 Yrs	Calibration
Radium-226	0.5 grams	Sacramento Army Depot	17 Yrs	Calibration

# Resume of Experience and Training of Edward R. Enz

17 April 1989

## A. Type of Training

	<u>Where Trained</u>	<u>Duration of Training</u>	<u>On-the-Job</u>	
				<u>Formal</u>
(1) Principles & Practices of Radiation Protection	RPO for Naval Elect Systems Engineering Ctr Vallejo, CA USN Radiological Trng School	1 Week 2 Mos	Yes	Yes
(2) Radioactivity Measurement Standardization & Monitoring Techniques & Instruments	RPO for Naval Elect Systems Engineering Ctr Vallejo, CA USN Radiological Trng School	1 Week 2 Mos	Yes	Yes
(3) Mathematics & Calculations Basic to the Use & Measurement of Radioactivity	RPO for Naval Elect Systems Engineering Ctr Vallejo, CA USN Radiological Trng School	1 Week 2 Mos	Yes	Yes
(4) Biological Effect of Radiation	RPO for Naval Elect Systems Engineering Ctr Vallejo, CA USN Radiological Trng School	1 Week 2 Mos	Yes	Yes

## B. Experience with Radiation

<u>Isotopes</u>	<u>Maximum Amt.</u>	<u>Where Experience was Gained</u>	<u>Duration</u>	<u>Type of Use</u>
Co-60	4500 curies	Sacramento Army Depot	2 Mos	Calibration
Co-60	1000 curies	Sacramento Army Depot	2 Mos	Calibration
Cs-137	1 curies	Sacramento Army Depot	2 Mos	Calibration
Cs-137	30 curies	Naval Elect Sys Engr Ctr-Vallejo	8 Yrs	Calibration
Pu-239	5 curies	Naval Elect Sys Engr Ctr-Vallejo	8 Yrs	Calibration
Radium-226	0.5 grams	Naval Elect Sys Engr Ctr-Vallejo	8 Yrs	Calibration
X-Ray Machine	250 KVCP	Sacramento Army Depot	2 Mos	Calibration

APPENDIX C (Cont'd)

8 December 1987

Resume of Experience and Training of Radiological Protection Officer-Charles R. Wallace

A. <u>Type of Training</u>	<u>Where Trained</u>	<u>Duration of Training</u>	<u>On-the Job</u>	<u>Formal</u>
(1) Principles & Practices of Radiation Protection	Sacramento Army Depot	4 Yrs	Yes	
	US Public Health Service			Yes
	Univ of So. Nevada	2 Wks		Yes
	Ft. McClellan, AL	3 Wks		Yes
	So. Texas Medical Center	2 Wks		Yes
	Ft. Belvoir, VA	1 Wk		Yes
	Ft. Gordon, GA	2 Wks		Yes
(2) Radioactivity Measurement Standardization & Monitoring Techniques & Instruments	Sacramento Army Depot	4 Yrs	Yes	
	US Public Health Service			Yes
	Univ of So. Nevada	2 Wks		Yes
	So. Texas Medical Center	3 Wks		Yes
	Ft. Belvoir, VA	1 Wk		Yes
	Ft. Gordon, GA	2 Wks		Yes
(3) Mathematics & Calculations Basic to the Use & Measurement of Radioactivity	Sacramento Army Depot	4 Yrs	Yes	
	US Public Health Service			Yes
	Univ of So. Nevada	2 Wks		Yes
	So. Texas Medical Center	3 Wks		Yes
	Ft. Belvoir, VA	1 Wk		
	Ft. Gordon, GA	2 Wks		
(4) Biological Effect of Radiation	Sacramento Army Depot	4 Yrs	Yes	
	US Public Health Service			Yes
	Univ of So. Nevada	2 Wks		Yes
	So. Texas Medical Center	3 Wks		Yes
	Ft. Belvoir, VA	1 Wk		Yes
	Ft. Gordon, GA	2 Wks		Yes



# APPENDIX 3 (Cont'd)

## Resume of Experience and Training of RPO-Charles R. Wallace (Cont'd)

### B. Experience with Radiation

Isotope	Maximum Amt.	Where Experience was Gained	Duration	Type of Use
Co-60	500 curies	Sacramento Army Depot	10 Yrs	Calibration
Co-60	120 curies	Sacramento Army Depot	20 Yrs	Calibration
Co-60	9000 curies	Sacramento Army Depot	5 Yrs	Calibration
Co-60	1000 curies	Sacramento Army Depot	24 Yrs	Calibration
Co-60	8 curies	Sacramento Army Depot	24 Yrs	Calibration
Cs-137	1 curie	Sacramento Army Depot	24 Yrs	Calibration
Pu-239	5 curies	Sacramento Army Depot	23 Yrs	Calibration
Ra-226	0.5 grams	Sacramento Army Depot	22 Yrs	Calibration
Cs-137	600 curies	Sacramento Army Depot	21 Yrs	Calibration
X-Ray	250 KVCP	Sacramento Army Depot	24 Yrs	Calibration
Van Degraff Accelerator	400 KV	Sacramento Army Depot	12 Yrs	Activation
X-Ray	250 KVC	Sacramento Army Depot	24 Yrs	Calibration
Iodine 131	8 m curies	Sacramento Army Depot	10 Yrs	Unsealed Source
Cs-137	170 m curies	Sacramento Army Depot	10 Yrs	Unsealed Source
Chlorine 36	1 m curies	Sacramento Army Depot	10 Yrs	Unsealed Source
Co-60	8 m curies	Sacramento Army Depot	10 Yrs	Unsealed Source
Co-60	2.2 m curies	Sacramento Army Depot	2 Yrs	Unsealed Source
Cs-137	7.7 m curies	Sacramento Army Depot	2 Yrs	Unsealed Source
X-Ray Machine	300 KVCP	Sacramento Army Depot	3 Yrs	Mobile Calbr of Radiac Instruments

APPENDIX D

# APPENDIX D

## Radiation Detection Instruments Used in Nucleonics Branch

TYPE OF INSTRUMENTS	NO.	RADIATION DETECTED	SENSITIVITY RANGE	WINDOW THICK- NESS (mg/cm )	USE
AN/PDR-27 Geiger-Mueller Survey Meter	3	Beta Gamma	0-500 mR/hr	5	Monitoring Surveying
Slow Neutron Detector BF type, Radiation Counter Lab Mdl 10501	1	Neutrons	0-10 n/cm -sec	215	Neutron Monitoring
Fast Neutron Detector Radiation Counter Lab Mdl 10703	1	Neutrons	0-10 n/cm -sec	1100	Neutron Monitoring
Neutron Detector, U O Sensitive Coating, duo- range, Anton Electronics Mdl 812	1	Neutrons	0-10 n/cm -sec	135	Neutron Monitoring
Alpha Scintillation Counter, Eberline Instru- ments Corp Modl PAC-ISA	2	Alpha	0-2X10 <sup>6</sup> cpm corrected for 50% geometry	0.5	Monitoring
Film Badge	1	Beta Gamma	5mR-1000R	N/A	Personnel Monitoring
Film Badge	1	Neutrons	36 mRem (min)	N/A	Personnel Monitoring
Alpha Scintillation Counter, Eberline Instrument Corp Mdl SAC-3A	2	Alpha	Minimum detectable activity of 4.85 X 10 <sup>-5</sup> microcuries	N/A	Assaying

See #5 of Htr. dtd. 4/25/87



APPENDIX D (Cont'd)

Method, Frequency, and Standards Used in Calibrating Instruments Above

INSTRUMENT	METHOD	FREQUENCY	STANDARDS USED
AN/PDR-27	Each range is individually calibrated	Quarterly	100 Curies Co-60 50 mg. Radium Natural Uranium
Slow Neutron Detector	Slow Neutrons are counted on decimal scaler. Results are compared each quarter	Quarterly	80 gms. Plutonium-Beryllium Neutron Source
Fast Neutron Detector	Fast Neutrons are counted on decimal scaler. Results are compared each quarter	Quarterly	80 gms. Plutonium-Beryllium Neutron Source
Duo-Range Neutron Detector	Slow & Fast Neutrons are counted on decimal scaler. Results are compared each quarter	Quarterly	80 gms. Plutonium-Beryllium Neutron Source
Alpha Scintillation Counter, Mdl PCA-ISA	Each range is individually calibrated	Quarterly	Plutonium Standards
Army Film Badge Both Beta Gamma and Neutrons	Developed and read by U.S. Army Ionizing Radiation Dosimetry Center, Lexington, KY.	Monthly	Standards that are traceable to National Bureau of Standards
Alpha Scintillation Counter, Eberline Instrument Corp Mdl SAC-3A	NBS Calibrated Alpha standards are counted & are compared with NBS readings. All the instruments are supplemented with a standard source check before use.	Semiannual	Plutonium Standard

APPENDIX E

US ARMY CALBR & REPAIR CENTER  
SACRAMENTO ARMY DEPOT  
Sacramento, California 95813

APNL IOP  
NUMBER 01

9 January 1989

MEMORANDUM FOR: All Army Primary Nucleonics Laboratory (APNL)  
SUBJECT: APNL Procedures

	Paragraph
Administration. . . . .	1
Operating Instructions. . . . .	2
Radiation Warning Signs and Labels. . . . .	3
Personnel Security. . . . .	4
Source Security . . . . .	5
Storage of Source . . . . .	6
Transporting Sources. . . . .	7
Emergency Procedures. . . . .	8

1. Administration:

a. Only personnel authorized by the Chief, US Army Calibration and Repair Center-Sacramento (USACRC-SAC) or Chief, Army Primary Nucleonics laboratory (APNL), allowed to use radioactive sources.

b. Personnel directly responsible for overall radiation protection are:

Chief, USACRC-Sac  
Chief, APNL  
Radiological Protection Officer

2. Operating Instructions:

a. Personnel Controls:

(1) Control relative to the exposure of personnel to radiation will be in accordance with AR 40-14.

(2) All personnel who work in the Primary and Secondary Laboratory of APNL will wear a film badge and a pocket dosimeter. Visitors and other Center personnel will be required to wear a film badge only when entering radiation controlled areas. All film badges are exchanged monthly.

(3) All personnel working with or handling unsealed radioactive materials will be required to wear uniforms, and will monitor themselves before eating, drinking, smoking, or leaving the work areas.



(4) The results of the film badge check will be recorded on DD Form 1141, "Record of Occupation Exposure to Ionizing Radiation", and will be maintained in the employee's personnel medical file.

(5) Shields, remote handling tongs and other safety devices will be used as necessary for personnel safety.

b. Radiation Surveys

(1) The air in the Building 300 will be monitored when there is a possibility of airborne radioactive, contamination.

(2) The results of the air monitor will be recorded on AMXTM-CW-SA Form 339 and will reflect the test location, flow rate, counts per minute, level of radiation, date and time of observation and the initials of the person recording the observation.

(3) Specific areas in and around Building 300 will be monitored monthly using alpha counter or beta gamma detection instruments.

(4) A wipe test will be made upon receipt of all incoming radioactive sources and repeated periodically thereafter as required.

(5) AMXTM-CW-SA Label 76, when required, will be affixed to radioactive sources. (See Enclosure #2)

(6) Instruments used for radiation protection will be in proper operating condition and will be calibrated at least once every three months. Report of Calibration, Form # AMXTM-CW-SA 396-2 will be prepared and provided to the customer. (See Enclosure #1)

c. Army Primary Nucleonics Laboratory:

(1) Calibration by APNL includes ionization chambers, radioactive sources and other radiation detection devices within the ACRC mission area.

(2) Calibration of all equipment will be scheduled in accordance with due dates established by USACRC Production Controller.

(3) On site calibration will be performed for customers' sources as required.

(4) Parcel post will be used whenever possible when returning secondary sources and radiation detection devices to the customer.

(5) Calibration Data Form, DRSMI-M Form 34, will be prepared for each item calibrated. In addition, DA Label 80 will also be prepared and affixed to the equipment as applicable.

(6) Report of Calibration, AMXTM-CW-SA Form 396, when required, will be prepared and provided to the customer. (See Enclosure #1)

(7) The standards calibrated by NBS should not be used for routine calibration but should be used to calibrate working standards. This working standard should be used for routine calibrations.

(8) The calibration techniques will be used to calibrate standards and test and measuring equipment.

(9) When a standard requires minor repair where parts are available, it will be repaired. If parts have to be ordered, it will be red tagged with a DA Form 2417. Customer will be notified when their equipment is red tagged.

(10) When a standard is red tagged with DA Form 2417, DA Form 2407 will be initiated for repair of standard. DA Form 2407 will be completed in accordance with (IAW) TM 38-750.

(11) Periodically, the working standards will be checked against the NBS calibrated standards.

d. Radiac Repair and Calibration Facility:

(1) Overhaul and repair of radiac equipment will be performed in APNL, USACRC.

(a) Workload (PBC) assignment will be made by the USACRC Production Controller, and equipment processed IAW assigned priority.

(b) Equipment restored or repaired to Class "A" Condition for mission stock or Director for Maintenance work order will be presented to Maintenance Quality Control Division for acceptance inspection.

(2) Calibration and Return:

(a) Equipment received from the customer for calibration will be calibrated to TB 9-6665-285-15, dated 15 April 1987, guidance and return will be processed according to the due date established by the USATSC Production Controller.

(b) As each unit is calibrated, DRSMI-M Form 34 and DA Label 80 will be prepared IAW TB 750-25. DA Label 80 will be affixed to the equipment.

(c) Equipment not meeting calibration requirements will be repaired. If parts have to be ordered, the equipment will be red tagged with DA Form 2417. Customer will be notified when their equipment is red tagged.

(d) For equipment red tagged with DA Form 2417, a PBC will be obtained from the Production Controller, and the equipment repaired and calibrated.

e. Providing certification of photometric, radiometric, laser, and optical test and measuring equipment.

(1) Calibration of all equipment will be scheduled IAW due dates established by the USACRC Production Controller.

(2) Calibration Data Form, DRSMI-M Form 34, will be prepared for each item calibrated. DA Label 80 will be prepared IAW TB 750-25, and affixed to the equipment.

(3) Equipment not meeting calibration requirements will be tagged with DA Form 2417 (Red Tag) for repair.

(4) The standards calibrated by the Army Standards Lab, US Army TMDE Support Group will not be used for routine calibration, but will be used to calibrate working standards. This working standard will be used for routine calibrations.

### 3. Radiation Warning Signs and Labels

a. Radiation warning signs will be prepared with the following wordings:

- (1) Caution, or Danger Radiation Area
- (2) Caution, or Danger High Radiation Area
- (3) Caution, or Danger Airborne Radioactivity, Do Not Remain in this Area
- (4) Caution, or Danger Radioactive Material (S)
- (5) Other wording as approved by the Chief, APNL that will enhance the desired degree of safety.

b. Specifications for Warning Signs

- (1) All signs will have a yellow background with purple or magenta letters.
- (2) Area warning signs will be of such size as to be readily legible at a distance of 20 feet to an individual with normal vision.
- (3) Signs on containers of radioactive materials will be legible at a distance of 10 feet to an individual with normal vision.

c. Use of warning signs and labels

(1) Calibration rooms and the Radioactive Material storage room will be posted with 18" X 18" Caution, Radioactive Material High Radiation Area signs.

(2) Radiation danger labels, XSA label 89, will be placed on the container of radioactive source and indicate the following information.

- (a) Radioisotope
- (b) Activity in curies, millicuries, or microcuries
- (c) Date measured



#### 4. Personnel Security

a. All personnel in APNL will be informed of radiation dangers and actions to be taken by them should an emergency occur.

b. Personnel will not be allowed to eat or drink in the calibration rooms, Radioactive material Storage Room, radiochemical laboratory or the decontamination room.

c. Protective gloves, clothing and devices will be worn when required for personal protection.

d. Material contaminated by radioactivity must never come in direct contact with the body.

e. Personnel who have cuts or sores will not handle radioactive materials without adequate waterproof covering on the wound.

f. Personnel working with radioactive materials will wash exposed parts of the body frequently. Thorough washing and monitoring is mandatory when leaving the active area

g. Decontamination will be done in accordance with AMC Reg 385-25 or the Emergency Procedures outlined in this procedure.

#### 5. Source Security

a. The radioactive source in the deep well will be in the safe position (lowest position in the well) and the lead shields will be placed over the top when not in use. The source will be in safe ("off") position when not in use.

b. The radioactive source in the AN/UDM-1 will be kept in the safe position with "a" plug on when not in use.

c. The sources stored in the Radioactive Material Storage Room will be kept in the shielded container at all times.

d. The calibration rooms and the Radioactive Material Storage Room will be kept locked or guarded at all times.

e. Only authorized persons will be allowed in the calibration rooms and the Radioactive Material Storage Room.

f. Records on radioactive sources will be kept showing the receipt, transfer, shipment or disposal

#### 6. Storage of Source

a. Radioactive sources not in the AN/UDM-1, the deep well or other type calibrator will be stored in the Radioactive Material Storage Room in their appropriate shielded container.

b. The outside of the container will be labeled and marked properly.

c. Entry to the Radioactive Material Storage Room will be limited to authorized personnel only.

## 7. Transporting of Sources

a. The radioactive sources stored in the Radioactive Material Storage Room will be transported in their containers.

(1) Tags will be removed from the container and placed on the appropriate position on the "source out" board when the source is taken out of the Radioactive Material Storage Room.

(2) On the tag will be the following information:

- (a) Radioisotope
- (b) Activity
- (c) Date Measured
- (d) Serial Number of Content

## 8. Emergency Procedures

a. In case of emergency, notify the Chief of USACRC-Sac or Chief of APNL or Radiological Protection Officer and the Post Surgeon as soon as possible when it involves personnel safety.

### b. Contamination of Skin

(1) Decontamination Procedures - NBS Handbook 48 and 92.

(a) For decontamination of hands and other parts of the body wash thoroughly with soap and water.

(b) If the contamination is localized, mask off the affected area and cleanse with swabs, before risking the danger of spreading the contaminant by general washing.

(c) Procedure for general hand washing are as follows:

1. Wash for not less than 2 minutes, nor more than 3 minutes with mild pure soap in moderately warm water with a good lather, covering the entire affected area thoroughly. Give special attention to areas between the fingers and around the finger nails. Do not use highly alkaline soaps or abrasives. Rinse thoroughly and repeat as monitoring indicates, until the desired degree of decontamination is achieved, but not to exceed 3 or 4 times.

2. If the above procedure is not sufficient to remove the contamination, scrub the hands with a soft brush using a heavy lather and moderately warm water. This scrubbing is primarily to agitate the cleansing agent. Three washes, including rinses, should be made within 8 minutes of which at least 6 minutes should be devoted to scrubbing. Only light pressure should be applied to the brush. Rinse thoroughly and monitor.

3. If the above procedures are not sufficient to remove the contamination, notify the post surgeon immediately.

c. Wounds

In the event that the skin is broken in accidents while working with radioactive substances, immediate action will be taken to remove possible contamination.

(a) Wash the wound under large volumes of running water immediately (within 15 seconds) and spread the edges of the wound to permit flushing action by the water.

(b) Notify the post surgeon as soon as possible.

(c) Report all wounds to the Radiological Protection Officer, or Chief USACRC-Sac, or Chief APNL as soon as emergency precautions have been taken.

d. Minor spills involving no radiation hazard to personnel.

(1) Notify all other persons in the room at once.

(2) Only minimum number of persons necessary to deal with the spill is permitted in the area.

(3) Confine the spill immediately.

(a) Dry spills

1. Don protective gloves.

2. Dampen spill thoroughly taking care not to spread the contamination

(b) Liquid spills

1. Don protective gloves.

2. Drop absorbent paper on spill

(4) Notify the Radiological Protection Officer or Chief, USACRC-Sac, or Chief APNL and the post surgeon as soon as possible.

(5) Decontaminate.

(6) Monitor all persons involved in the spilling and cleaning.

(7) Permit no person to resume work in the area until a survey is made and approval of the Radiological Protection Officer or physicist is secured.

(8) Prepare a complete history of the accident and subsequent activity related thereto for the branch records.



e. Major spills involving radiation hazard to personnel.

(1) Notify all persons not involved in the spill to vacate the room at once.

(2) If the spill is liquid, and the hands are protected, place the container in an upright position.

(3) If the spill is on the skin, flush thoroughly.

(4) If the spill is on clothing, discard outer or protective clothing at once.

(5) Turn alarm on (this switches off all fans and air conditioning system.)

(6) Vacate the room.

(7) Notify the Radiological Protection Officer or Chief, USACRC-SAC or Chief, APNL, and the post surgeon as soon as possible.

(8) Take immediate steps to decontaminate personnel involved as necessary.

(9) Decontaminate the area (personnel involved in decontamination must be adequately protected.)

(10) Monitor all persons involved in the spill and cleaning to determine adequacy of decontamination.

(11) Permit no person to resume work in the area until a survey is made and approval of the Radiological Protection Officer or physicist is secured.

(12) Prepare a complete history of the accident and subsequent activity related thereto for the branch records.

f. Accidents involving radioactive dusts, mists, fumes, organic vapors, and gases.

(1) Notify all other persons to vacate the room immediately.

(2) Hold breath and close escape valves, switch off air circulating devices, etc., if time permits.

(3) Vacate the room

(4) Notify the Radiological Protection Officer or Chief, USACRC-Sac or Chief, APNL, and the post surgeon at once.

(5) Ascertain that all doors giving access to the room are closed and post conspicuous warning or guard to prevent accidental opening of doors.

(6) Report at once all known or suspected inhalations of radioactive materials.

(7) Evaluate the hazard and activate the necessary safety devices for safe reentry.

(8) Determine the cause of contamination and rectify the condition.

(9) Decontaminate the area.

(10) Perform air survey of the area before permitting work to be resumed.

(11) Monitor all persons suspected of contamination.

(12) Prepare a complete history of accident and subsequent activity related thereto for the branch records.

g. Injuries to personnel involving radiation hazard.

(1) Wash minor wounds immediately, under running water, while spreading the edges of the wound.

(2) Report all radiation accidents to personnel (wounds, over-exposure, ingestion, inhalation) to the Radiological Protection Officer or Chief, USACRC-Sac or Chief, APNL, and the post surgeon as soon as possible.

(3) No person involved in a radiation injury will be permitted to return to work without the approval of the Radiological Protection Officer or physicist and the attendant physician.

(4) Prepare a complete history of the accident and subsequent activity related for the Center records.

h. Fires or other major emergencies

(1) Notify all other persons in the room and building at once.

(2) Attempt to put out fires if radiation hazard is not immediately present.

(3) Notify the fire department (phone Ext 117 or pull the fire alarm in front or in back of the building) and other local plant safety personnel.

(4) Notify the Radiological Protection Officer or the physicist.

(5) Govern fire-fighting or other emergency activities as directed by the Radiological Protection Officer.

(6) Following the emergency, monitor the area and determine the protective devices necessary for safe decontamination.

(7) Decontaminate

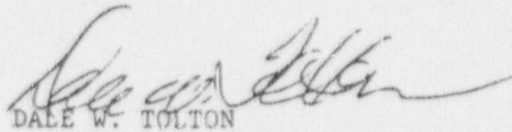
(8) Permit no person to resume work without approval of the Radiological Protection Officer or the health physicist or the post surgeon.

(9) Monitor all persons involved in combating the emergency.

(10) Prepare a complete history of the emergency and subsequent activities related thereto for the Center records.

1. Permissible levels of contamination.

See AMC Reg 385-25.



DALE W. TOLTON

Chief, U.S. Army Calibration and  
Repair Center-Sacramento



APPENDIX F

## 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—

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- (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. Unincorporated 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-CG, 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)

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- (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

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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.

c. 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),

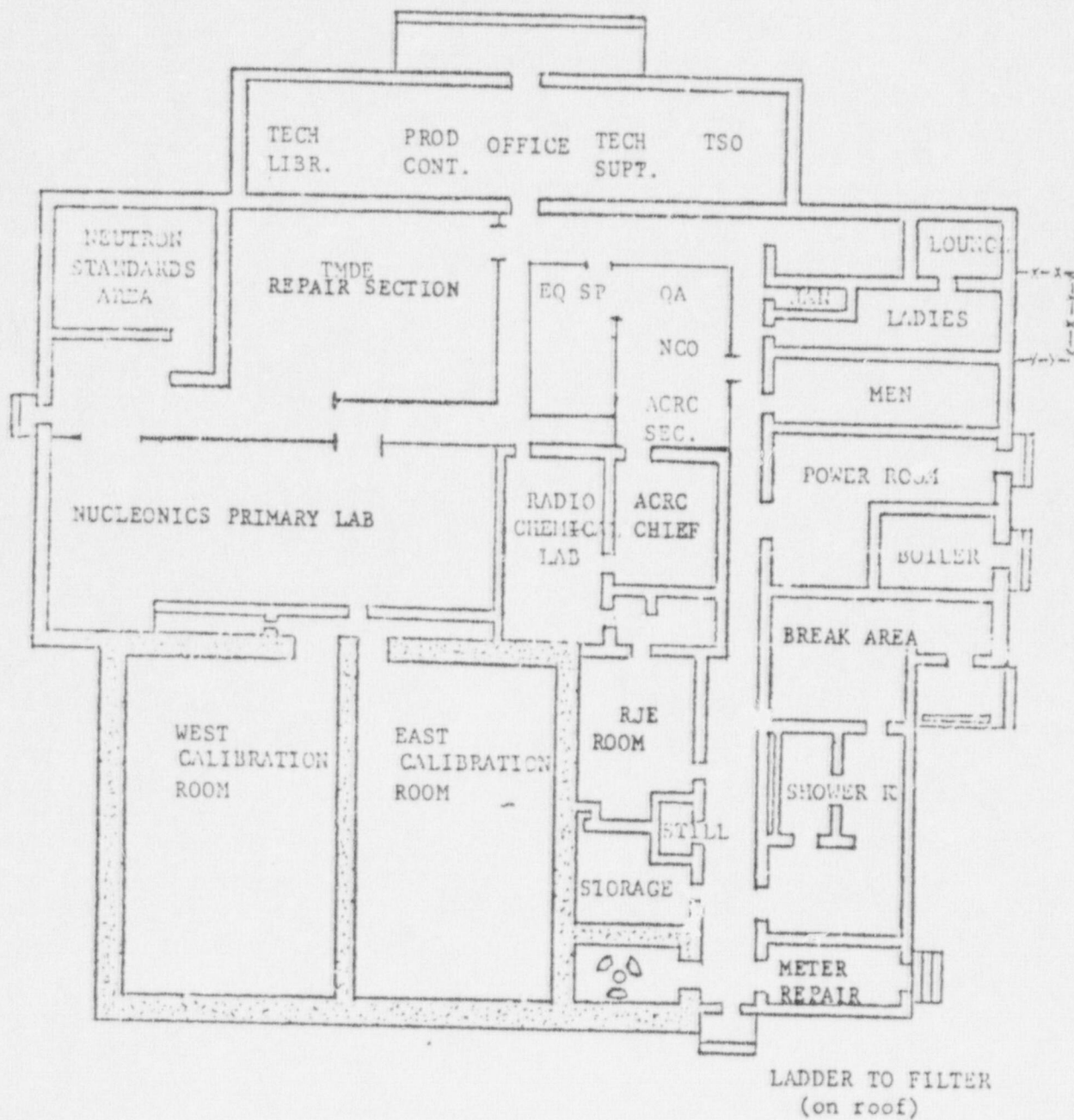
b. Each of the proponent licensees of items covered (1 copy), and

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



DRAWING NUMBER 1

\*Note: Cyclone fence surrounds the building yard area.

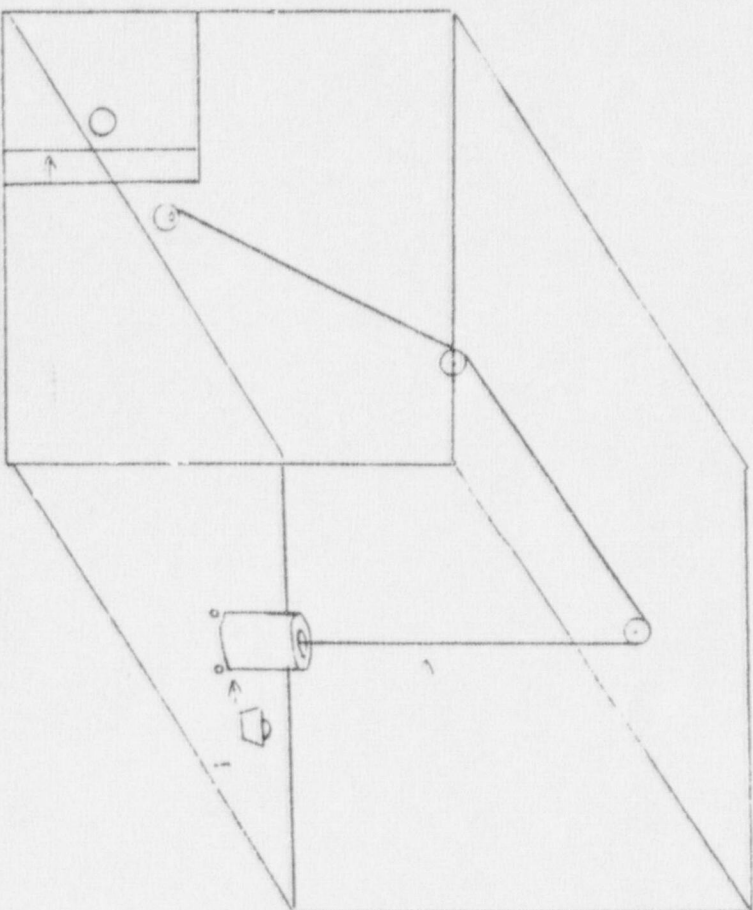


DRAWING NO. 1



DRAWING NUMBER 2





WEST CALIBRATION ROOM, ACRC BLDG.

DRAWING NO. 2

18 INCHES CONCRETE WALLS

REEL AND WOOD TO RAISE  
NEUTRON SOURCE

SOURCE STORAGE CAN  
8 INCHES OF PARAFFIN  
SHIELDING

WOOD DOOR WITH  $\frac{3}{4}$  INCH LEAD  
PANEL

DEPARTMENT OF THE ARMY TECHNICAL BULLETIN

ARMY CALIBRATION PROGRAM

FOR RADIAC METERS

Headquarters, Department of the Army, Washington, DC  
15 April 1987

Approved for public release; distribution is unlimited.

REPORTING OF ERRORS

You can help improve this publication by calling attention to errors and by recommending improvements and stating your reasons for the recommendations. Your letter or DA Form 2028, Recommended Changes to Publications, should be mailed directly to Commander, U.S. Army TMDE Support Group, ATTN: AMXTM-LPP, Redstone Arsenal, AL 35898-5400. A reply will be furnished directly to you.

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General-----	4	2
Responsibility-----	5	3
Procedures-----	6	4

APPENDIX-----	A-1
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**1. Purpose.** This technical bulletin (TB) delineates responsibilities, instructions, and guidance for effective calibration and repair of radiac meters.

**2. Applicability.** This TB is applicable to U.S. Army Activities, Army National Guard and U.S. Army Reserves, using or providing calibration and repair service for radiac meters.

**3. Definition of Terms.** Radiac meters are portable test, measurement, and diagnostic equipment (TMDE), such as Geiger counters or ionization chambers, used to detect ionizing radiation and to measure dose or dose rates. Radiac meters may detect or measure alpha, beta, gamma, X-ray, or neutron radiation and may be expressed in various units of measure. All radiac meters are related to health and safety (H/S) and are categorized as follows:

**a. Radiac Meters-Active.** These meters are used full or part time in day-to-day Army operations (civilian and military) for making quantitative measurements of radioactive contamination and determining radiation levels. They are used by organizations where personnel handle, use, maintain, store, transport, or dispose of materials or equipment that produce ionizing radiation (including X-rays).

**b. Radiac Meters-Radiographic**

(1) These are radiac meters-active that are used to measure (gamma) radiation from sealed source by-product material used in radiography.

(2) Radiac meters-radiographic have the same technical calibration requirements as radiac meters-active that are used for gamma and X-ray work, however, they may have different calibration intervals. Since radiographic meters have certain instrument and calibration requirements stated in Title

10, Code of Federal Regulations (10 CFR 34.24), they are categorized separately from active meters.

### c. Radiac Meters-Contingency

(1) These meters are maintained in a storage or standby status for use in contingency plans related to a nuclear accident or incident, or as a defense against effects of a nuclear attack. They are used by active Army, Army National Guard, and Reserve Units to measure and determine the level of radiation within a potentially hazardous area after a nuclear accident, incident, or attack. They are used to identify and isolate a radioactive contaminated area. This category includes Nuclear Emergency Team (NET), Radiological Advisory Medical Team (RAMT), and Explosive Ordnance Disposal (EOD) units' radiac meters.

(2) The definition of radiac meters-contingency does not preclude the commander of a NET, RAMT, EOD unit, etc., from designating all or a portion of its radiac meters as "active" when the mission and use for the meter coincides with paragraph a above.

(3) The definition radiac meter-contingency does not include Civil Defense radiac meters. Such Civil Defense meters include the CD V-700, CD V-711, CD V-715, CD V-717, CD V-720, and CD V-781. Civil Defense instruments are normally supported by state Civil Defense Radiological Equipment Maintenance and Calibration Facilities. The Civil Defense Radiological Instrumentation Program is administered by the Federal Emergency Management Agency (FEMA) and is not a part of the Army RADIAC Calibration Program. Interservice support agreements will be processed when supporting FEMA TMDE used in Civil Defense Operations.

(4) The definition of radiac meters-contingency has no association with Logistic Control Codes (USACDA Pamphlet No. 18-1) which use the term "contingency."

## 4. General

### a. Identification

(1) Each radiac meter will be identified to one of the above three categories. The owner/user must determine and designate the category based on use. When a radiac meter is used in both an active and contingency application, it will be categorized as radiographic.

(2) Embossing tape with the word "ACTIVE" or "RADIOGRAPHIC" will be affixed by the owner/user to the front portion or handle of the appropriate meter in such a manner that it will be readily visible to the user. In general, contingency meters should not be affixed with embossing tape. However, units with mixed categories of radiac meters may identify their contingency meters with the word "CONTINGENCY," if they so choose. A DA Form 2402, DA Form 2416, or AMXTM Form 34 will be affixed to each radiac meter submitted for calibration, and a DA Form 2407 when deemed locally necessary.

(3) DA Form 2416 (AMXTM Form 34A) Calibration Data Card Block System Code, will be annotated with C06 for radiac meters-active and radiographic, and C05 or W11 for radiac meters-contingency.

### b. Restrictions

(1) Radiac meters should have a battery test mode and must have an appropriate radioactive (check) source available for testing. It is recommended that survey meters without battery test modes be exchanged for those with them, whenever possible.

(2) Substitution of battery types and sizes will be permitted only when the substitute is identified in the technical manual (TM) for the specific radiac meter. Most modern meters are equipped with a voltage regulating circuit and do not require recalibration immediately after replacing



batteries (calibration on or before the calibration void date is adequate). This can be determined locally by substituting a variable dc power supply for the Radiac meter's batteries and by lowering the supply voltage until the meter's response to a check source varies. If the voltage causing the variation is below the BATTERY OK check voltage, then the meter is equipped with voltage regulation. If not, return meter for recalibration when batteries fail.

(3) Active and radiographic meters used to measure gamma and X-rays must be calibrated at two points on each scale with each point separated by at least 50 percent of the maximum scale reading. Other parameter (e.g., alpha) survey meters should be similarly calibrated when possible. This requirement specifically excludes the use of the AN/UDM-2 as a calibration source for active and radiographic meters.

(4) Active and radiographic meters must be kept in a separate location from contingency meters and be readily available for use.

(5) Radiographic meters must comply with the instrument requirements of Title 10 Code of Federal Regulations (10 CFR 34.24).

#### NOTE

Be sure all radiac meters are OFF when not in use. Failure to do so may cause battery failure and corroded battery compartments.

**c. TB 43-180.** Calibration Requirements for the Maintenance of Army Materiel identifies:

(1) Cyclic calibration intervals for all radiac meters.

(2) Calibration procedures to support contingency meters.

#### d. Maintenance

(1) Repair of radiac meters will be in accordance with TB 750-25.

(2) Calibration will be accomplished whenever repair is effected.

**e. TB Emphasis.** This TB primarily discusses radiac meters-active and radiographic. This is because these meters are usually commercial instruments with no standardized calibration procedures or guidelines published within the Army. Additionally, there are specific radioactive material licensing requirements and guides associated with active meters. Radiac meters-contingency, however, are standardized Army radiac meters managed by USA Communications and Electronics Command (CECOM), and published Army TM's and TB's describe their maintenance and calibration. However, some information pertaining to contingency meters is contained in this TB.

### 5. Responsibilities

**a. Local TMDE support coordinators will assure that:**

(1) Support that is traceable to the National Bureau of Standards (NBS) is obtained from the appropriate Calibration and Repair Center (ACRC, TSC, or ATST).

(2) Owner/user organizations are kept informed of calibration due dates for radiac meters.

(3) Communication is established between owners/users of radiac meters (especially active or radiographic) and the supporting CRC concerning services and responsibilities outlined in this TB.

(4) Owner/user radiac meters-active or radiographic are identified to the supporting CRC by manufacturer, model, and serial number; and this information is updated as necessary.

**b. Owner/user organizations of radiac meters will:**

(1) Comply with paragraphs 6a and b below (where applicable) of this TB.

(2) Assure that active or radiographic meters (where applicable):

(a) Are properly selected for personnel radiological protection (including the restrictions of paragraph 4b above).

(b) Are available in adequate quantities for organizational mission objectives - but that quantities are not excessive, since these calibrations are more expensive than contingency survey meters.

(c) Are identified in accordance with paragraph 4a above.

(d) Are maintained in accordance with paragraph 4d above.

(e) Are removed from service when poor maintenance records or inability to maintain calibration are demonstrated.

c. CRC's will comply with paragraph 6c below.

d. The U.S. Army TMDE Support Group (USATSG) will establish and maintain calibration quality control of radiac meters:

(1) By analysis of calibration data submitted by CRC's.

(2) By answering questions from owners/users and calibration coordinators concerning meter calibration services (AUTOVON 746-2879/5042).

(3) Through technical audits of CRC's supporting active and radiographic meters.

(4) Through quality assurance technical inspections of CRC's.

## 6. Procedures

a. All owner/user organizations of radiac meters will assure that:

(1) Their meters are submitted for calibration on the due date and after maintenance (normally, excluding battery change).

(2) Radioactive check sources are removed from their meters and stored in a secured location, in accordance with AR 700-64, and do not accompany the meters to the CRC (unless they are an integral part of the instrument). Additional radiac meter equipment and accessories such as straps, ear phones, etc., are to be retained by the using organization in order to prevent loss,

damage, or accidental exchange during the calibration cycle. Only those components necessary for the calibration requested are to be submitted. A packing list is to accompany each instrument submitted, so that submitted components are not misplaced.

(3) Batteries are checked with instrument's battery test mode. Weak, dead, or corroded batteries are discarded. Serviceable batteries are to be provided with the radiac meters, if available.

(4) The following information will be provided with the meter:

(a) Name and address of the organization requesting calibration.

(b) Name and AUTOVON telephone number of individual point of contact within the owner/user organization.

(c) Manufacturer, model, and serial number of the instrument.

(d) General instructions: "CALBR & RETURN - Active M," "CALBR & RETURN - Radiographic M," or "CALBR & RETURN - Contingency M."

(e) Specific instructions for requested active or radiographic calibration service as indicated below. Contingency meters do not require any specific instructions; ignore this subparagraph for contingency meters. (Alpha survey meters usually do not require special instructions.)

1. Meter ranges to be calibrated. If not stated, all ranges will be calibrated.

### 2. Specify:

aa. "Calib to ERC," which means calibrate such that instrument is compatible with energy responsive curve (ERC). Enclose a copy of manufacturer's ERC from instrument's TM (or the entire TM) with the instrument.

bb. "Calib at KEV(MEV)," which means calibrate such that when used at \_\_\_\_\_ KEV(MEV) no correction for energy response is required.



3. Specify any other requirement important to use of instrument, such as:

aa. "Beam 1 M side" ("end," "bottom," etc.) which means calibrate with beam perpendicular to meter's side (end, bottom, etc.)

#### NOTE

See paragraph c(4) below for conditions where CRC will use a DA Label 80 or DA Label 163.

(5) Instrument is "reunited" with check sources, and other survey meter equipment and accessories, upon return from calibration. DA Form 2402, section 1, may be left attached to active or radiographic meters to indicate specific calibration instructions requested (para (4)(f) above).

(6) Check source usage to establish radiac meter performance (during the time between calibration intervals and on a long term basis) is optional with owners/users. This would require placing the same (serial numbered) check source adjacent to a given radiac meter in a geometrically reproducible fashion. Then by keeping a record (or graph) of each check source-meter reading and date, instrument stability can be judged. In order to minimize statistical randomness, check source response should be averaged over a period of time (typically 1 minute) before recording and reading.

b. Owner/user organizations with radiac meters requiring off-post calibration support, in addition to compliance with paragraph a above, will assure that their instruments are properly packaged and sent to the appropriate CRC. Guidance concerning parcel post for active and radiographic meters only and conventional transportation for all radiac meters are given below:

(1) Parcel Post. The use of U.S. Postal Service's (USPS) Priority Mail for bulk packages (parcel post) has been authorized by HQDA for active and radiographic meters. Thus, accessibility to

a system of directly mailing meters to the CRC (and like return) is available for minimizing turnaround time. The direct mail mode should be used where minimum turnaround time is important. In order to make effective use of this mode, the following guidance is given:

(a) Restrictions of priority mail authorization are given below:

1. Priority mailing is authorized for active and radiographic meters only.

2. Use of certified or registered mail is not authorized.

3. Mailing of active and radiographic meters is only authorized where it is the most economical mode of transportation to the Government. Normally, the total cost for ordinary priority mailing of active and radiographic meters is less than the total cost for conventional transportation when the additional expense of handling and administrative processing is considered. Local cost comparisons should be made if doubt exists concerning the overall cost effectiveness of ordinary priority mail.

4. Mailing authorization does not apply to DA contractors - but only to DA organizations (civilian and military).

(b) Records should be maintained for all radiac meters sent off post, to include: Model and serial number of each item, address of calibration facility, date mailed, and space for date returned.

(c) Mailing containers should be of the permanent, reusable type with each radiac meter having its own container. The container should:

1. Be lined with permanent packing material with individual pockets for the instrument, batteries, probe(s), and any other parts necessary for calibration.

2. Be marked externally with "REUSABLE CONTAINER - DO NOT DESTROY."

3. Contain the following information permanently attached to the container.



aa. Using organization's name and address.

bb. Name and AUTOVON telephone number of individual point of contact.

cc. Manufacturer, model, serial number for radiac meter, and like information for any additional pieces; e.g., extra probes.

4. Have a transparent window whereby a card, with the calibration facility's address on one side and the using organization's on the other, can be inserted.

5. Be as small and light as possible, but not exceed 100 inches of length plus girth, and 70 pounds in weight. Typically, a packaged active radiac meter would be in a container with 35 inches of length and girth and having a total weight of 18 pounds.

(d) Packaging of contents inside the mailing containers should be done with the following considerations.

1. Compliance with a(2) and (3) above.

2. Serviceable batteries are not left in the instrument's battery compartment, but placed in the packing material's battery pocket.

#### CAUTION

Care must be taken so that the battery storage location does not cause damage to instrument or probes, particularly instrument meter movement.

(e) Addressing of parcel shall be in compliance with AR 340-3, Official Mail. In particular, the parcel should include:

1. The mailing address of the appropriate calibration facility, as listed in appendix.

2. The return address of the using organization.

3. The marking "PRIORITY MAIL."

4. An appropriate Required Delivery Date (RDD) annotation (usually 3 to 5 days after posting date).

(f) Radioactive material should not be enclosed with the radiac meter. However, when small activity check sources are an integral part of the survey meter, it may be mailed if in compliance with USPS Publication 6, Radioactive Matter.

(2) Conventional Transportation. Conventional transportation may be used for all radiac meters and should be used when packaged active or radiographic meter exceeds USPS length or weight limitations; or when turnaround time is not a significant factor in organizational mission; or when priority mailing costs exceed conventional transportation costs. When using this mode, the following guidance should be considered:

(a) Shipping containers should have the same characteristics as parcel post mailing containers (paragraph b(1)(c) above).

(b) Packaging of contents should be the same as paragraph b(1)(d) above.

(c) Radioactive material should not be enclosed with the radiac meter. However, when small activity check sources are an integral part of the radiac meter, shipping container labeling/marketing and shipping documents must comply with AR 385-25, and DOT regulations (Title 49 Code of Federal Regulations).

c. All CRC's providing radiac meter calibration service will accomplish the following:

(1) Assign a higher priority for active and radiographic meters than contingency meters. Normally, this will dictate total CRC possession time of 1 week or less for active and radiographic meters.

(2) Perform precalibration operations, as follows:

(a) Review appropriate sections of TB's TM's, or owner's manuals pertaining to radiac meter calibration. Should any conflict exist between owner's manual and this TB, concerning active or radiographic calibration instructions, this TB will be followed.

(b) Test individual batteries with Test Set, Battery TS-183, NSN 6625-00-224-5174, or equivalent. Discard all unserviceable batteries.

(c) Supply freshly tested batteries, when required.

(d) Allow time for instrument warmup.

(e) Verify instrument battery test(s).

(f) Zero indicating needle.

(3) Perform calibration operations, as follows:

(a) Active and Radiographic Meters. Gamma and X-ray meter tolerance of each calibration point is +10 percent of standard's calculated value (uncertainty of standard is not included in +10 percent). Other parameter radiac meter; e.g., alpha, should be similarly calibrated when possible.

1. Always record readings before any adjustments are made.

2. Adjust radiac meter readings (if necessary) even when radiac meter is within tolerance, such that both calibration points (of a given range) are as close to the standard's calculated values as possible. Do not report instrument as out-of-tolerance if in-tolerance adjustment is made.

3. Provide a minimum of two calibration points per scale, separated by a distance of not less than 50 percent of full scale for gamma and X-ray meters. Other parameter radiac meters should be similarly calibrated when possible. It is preferred that the highest calibration point be taken at 80 percent of full scale and the lowest point be 30 percent. It may not be possible to calibrate radiac meters with logarithmic or digital display indicators at the points specified. If this condition is encountered, omit this requirement and use the calibration procedure provided in the manufacturer's manual.

4. Perform calibration requested. Provide a calibration report on all active radiacmeters. The report will include the type calibration service (isotope or effective energy), the calibration points and the radiacmeters actual indications. Questions concerning the calibration should be resolved by telephone with the individual user in order to minimize turnaround time.

(b) Contingency radiac meters.

1. Always record or take note of readings before any adjustments are made.

2. See radiac meter or calibrator TM or TB for meter's accuracy statement. Unless stated otherwise, the given accuracy is only of the radiac meter itself; i.e., does not include the calibrator's (source's) uncertainty.

3. Adjust radiac meter readings to correct values, where radiac meter is outside of tolerance.

4. Render the calibrations outlined in appropriate TM's and TB's. Normally, contingency radiac meters will be given one calibration point per scale. When a gamma source is used in lieu of the AN/UDM-2 RADIAC calibrator, the calibration point should be approximately 80 percent of full scale.

5. When gamma sources are used, Cesium 137 ( $^{137}\text{Cs}$ ) will be the calibration standard, where possible, for purposes of standardization.

(4) Annotate DA Label 80 or DA Label 163 in accordance with TB 750-25 and the following instructions:

(a) Active and radiographic meters.

1. DA Label 80 is used when all of the following conditions are met:

aa. All ranges were properly calibrated (see c(2) and (3) above).

bb. Instrument was calibrated to instrument manual's ERC.

2. DA Label 163 is used when any of the following conditions are encountered:



(1) Radiac meter was not calibrated to respond to instrument manual's ERC. This would be the case where the ERC was unknown; or where the radiac meter was calibrated against Co-60, Cs-137, a given effective energy X-ray, or any specific energy radiation such that the radiac meter's scale reading did not match the ERC.

(2) Any conditions in paragraph c(3)(a) above cannot be met. Annotated in Blocks 7a and 7b, with the information that required its use. See Example 1 for composite examples. (It is unlikely any given meter would have as many annotations.)

a. PARAMETER/VALUE	b. TOLEREANCE/UNCERTAIN
1,000 mR/hr range	NOT CALBR
50 mR/hr range	+1%
2 mR/hr range	single calibr pt
NO ERC CALBR	Co-60 Calbr
sliding shutter open <sup>1</sup>	NOT CALBR

<sup>1</sup>Where, in this example, "sliding shutter open" was requested on DA Form 2402.

Example 1. DA Label 163, Blocks 7a and 7b

#### NOTE

A DA Label 163 may be used on active and radiographic meters to indicate calibration point(s) on a range(s) greater than  $\pm 10$  percent of standard's calculated value. Active or radiographic meters which exceed  $\pm 20$  percent of standard's calculated value are considered unserviceable for these categories. It is preferred that these "exceptions" calibration points not exceed  $\pm 15$  percent.

#### (b) Contingency Meters

1. DA Label 80 is used when calibration conditions of appropriate TB's and TM's as listed in TB 43-180 and this TB are met.

2. DA Label 163 is:

aa. Used when any of the following conditions exist. There is no overprinting of DA Label 163 with a contingency designator.

(1) A range(s) could not be properly calibrated to survey meter's tolerance, but the range(s) is otherwise serviceable.

(2) Radiac meter was calibrated against a different standard or utilized a different calibration technique than identified in appropriate TM or TB (as listed in TB 43-180), except for calibration of gamma radiac meters by Co-60 or Cs-137 standards.

bb. Annotated in Blocks 7a and 7b with the information that required its use. See Example 2.



a. PARAMETER/VALUE  
500 mR/hr range

b. TOLERANCE/UNCERTAIN  
+40%

Example 2. DA Label 163, Blocks 7a and 7b

#### NOTE

When a contingency meter cannot be calibrated to within proper tolerance, but that range(s) is otherwise serviceable, that meter will be considered unserviceable after the CALBR VOID date on the DA Label 163. The meter must be repaired or replaced prior to recalibration.

#### NOTE

When a contingency meter is calibrated with a gamma source calibrator, one point per scale is adequate, unless the TM or TB requires otherwise.

(5) Annotate DA Form 2416 or AMXTM Form 34A in accordance with TB 750-25 and the following instructions, after completion of radiac meter calibration.

(a) Block 8, System Code, (Block 14, AMXTM Form 34A) requires C06 for all active and radiographic survey meters. Contingency survey meters normally use System Code C05 or W11 (do not use C06).

(b) Block 18, (Block 32, AMXTM Form 34A) Parts Replaced, include batteries and desiccant replaced. Use "BATTERIES" or "DESICCANT" when all or part of these items were changed out.

(c) Block 19, (Block 33, AMXTM Form 34A) Remarks, is used to indicate specific information. Data must be preceded by a full colon (:), all annotations must be in capital letters and data must be separated with semicolons (;). Do not use a full colon or semicolon in the data body. The following data is requested.

1. Radiac meter range(s) out of tolerance (before the calibration adjustment was made). Precede the range value(s) with : (1), indicate the range values(s), and close with a semicolon; e.g., : (1) 0.5 MR/HR, 500MR/HR;. Omit this subparagraph when all ranges are within tolerance.

2. Calibration source standard. Precede the source abbreviation with : (2), indicate the calibration source standard, and close with a semicolon e.g., : Co-60;. Other calibration source standards might be: Pu-Be, Cs-137, Pu-239, MFB (medium filtered NBS X-ray technique "B"), or 38 KEV EFF (38 KEV effective X-ray beam). Information requested by this paragraph is required for all active and radiographic meter calibrations. Omit for contingency meters unless calibration source is other than identified in appropriate TM or TB, as listed in TB 43-180.

3. Active or radiographic survey meter. Precede the classification abbreviation with : (3), indicate the classification, and close with a semicolon; e.g., : (3) ACT; or : (3) RAD;. Information requested by this paragraph is required for all active and radiographic meter calibrations. Omit for contingency meters.

4. DA Label 163, Blocks 7a and 7b data. Annotate DA Form 2416, Block 19, (Block 33 AMXTM Form 34A) the exact information annotated on DA Label 163, Blocks 7a and 7b (paragraph c(4)(a)2 or c(4)(b)2 above), except use all capital letters. Precede the information with : (4); record the information from each line of Block 7a and 7b; separate each line of information by a comma, (not a semicolon), and close this information with a semicolon;

e.g., ; (4) 1000MR/HR RANGE NOT CALBR, 50 MR/HR RANGE +12%, 2 MR/HR RANGE SINGLE CALBR PT, NO ERC CALBR Co-60 CALBR, SLIDING SHUTTER OPEN NOT CALBR; (see example 1).

Omit this paragraph when a DA Label 80 is used.

5. Example of composite Block 19 (Block 33 AMXTM Form 34A) information. : (1) 0.5 MR/HR; (2) Co-60; (3) RAD; (4) 50 MR/HR RANGE  $\pm 12\%$ , NO ERC CALBR Co-60 CALBR; .

(6) Promptly return radiac meter and attached DA Form 2402, DA Form 2416,

AMXTM Form 34, or enclosed DA Form 2407 when applicable, to the using organization. The instrument should be returned to the user by the same mode of transportation that it was received.

(7) Maintain a library consisting of the following:

(a) Radiac meter (owner's) manual for the active and radiographic meters encountered.

(b) Appropriate Army TB's and TM's associated with contingency meters.

(c) Appropriate radiological safety publications (see Appendix).

## APPENDIX

## REFERENCES

AR 40-14	Control and Recording Procedures For Occupational Exposure to Ionizing Radiation
AR 340-3	Official Mail
AR 385-30	Safety Color Code Markings and Signs
AR 700-64	Radioactive Commodities in the DOD Supply Systems
AR 725-1 (Chapter 8)	Special Authorization and Procedures for Issues, Sales, and Loans
SB 11-206	Film Badge (Photodosimetry) Supply and Service for Technical Radiation Exposure Control
TB Med 249	(NBS Handbook 73) Protection Against Radiation from Sealed Gamma Sources
TB 43-0108	Handling, Storage, and Disposal of Army Aircraft Components Containing Radioactive Materials
TB 43-180	Calibration Requirements for the Maintenance of Army Materiel
TB 43-0116	Identification of Radioactive Items in the Army Supply System
TB 43-0122	Instructions for Safe Handling and Identification of US Army Electronics Command Managed Radioactive Items in the Army Supply System
TB 43-0141	Instructions for Safe Handling, Maintenance, Storage, and Disposal of Radioactive Commodities Managed by US Army Troop Support Command
TB 385-4	Safety Precautions for Maintenance of Electrical/Electronic Equipment
TB 750-25	Maintenance of Supplies and Equipment: Army Metrology and Calibration System
TM 55-315	Transportability Guidance for Safe Transport of Radioactive Materials
Title 10	Code of Federal Regulations
Title 29	Code of Federal Regulations
Title 49	Code of Federal Regulations



JOHN A. WICKHAM, JR.  
General, United States Army  
Chief of Staff

Official:

R. L. DILWORTH  
Brigadier General, United States Army  
The Adjutant General

Distribution:

To be distributed in accordance with DA Form 12-34C, Block No. 319, requirements for calibration procedures publications.

APR 11 1989

Docket No. : 070-00553  
License No.: SNM-507  
Control No.: 70697

Department of the Army  
U.S. Army Calibration & Repair Center  
Sacramento Army Depot  
Sacramento, California 95813

Attention: Mr. Charles R. Wallace  
Radiation Protection Officer

Gentlemen:

This is in reference to your request dated December 8, 1987 for renewal of your byproduct material license. In order to complete our review, we need the following additional information. The items are presented in the order of appearance in your application:

1. page 1 of "DATA SHEET (U-235 and Pu-239)." Item d. references a total possession limit for 160 gram plutonium beryllium sources of 320 grams. This is an increase; do you intend to procure another source?
2. page 2 of the "DATA SHEET" Item 7. An exponent is missing in the reference to the minimum detectable activity. Specify the appropriate exponent.
3. page 3 of the "DATA SHEET" Item c. There appears to be a typographical error. You should revise and resubmit.
4. Appendix B, "OPERATING PROCEDURE" A step appears to be missing between Items m. and n. The user should be instruction to lower the source back to the fully shielded position, unless it automatically drops at the end of a set exposure time. You should revise and resubmit Appendix B to specify how the source is returned to the calibrator.
5. Appendix D, page 1, last item. An exponent is missing from the description of the sensitivity range. Another exponent may be missing in the description of the PAC-ISA sensitivity range. You should specify what the exponents should be.
6. APNL IOP-01, page 1. Specify the frequency of exchange of your film badges. As fading can occur with film dosimetry, they should be exchanged at least monthly.

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APR 1 1989

7. APNL IOP-01, page 2. The Report of Calibration, AMXTM-CW-SA Form 396 should include the information detailed in Item 10 of the enclosed guide. You should submit a blank form 396 to demonstrate this fact.
8. a. APNL IOP-01, page 2, Item (5). DA Label 80 should include:
  - a.) The results of the last calibration with a chart or graph if necessary, b.) The date of the last calibration, and c.) The due date of the next calibration. You should specify what information DA Label 80 contains.
- b. APNL IOP-01, page 2, Item (6). Each survey instrument should be calibrated at 1/3 and 2/3 of full scale. Exposure rates measured should differ from true exposure rates by less than plus or minus 10 percent at the calibration points, as specified in item 10.3 of the enclosed guide. Readings within plus or minus 20 percent will be considered acceptable if a calibration chart, graph, or response factor is prepared and used with the instrument to interpret meter readings to within plus or minus 10 percent for radiation protection purposes. You should amend and resubmit this portion of your procedure to include these requirements.

It should be noted that licensed material may not be disposed to the normal trash simply because it has decayed below the limits in Schedule A, 10 CFR 30.70. The decay-in-storage option for hospitals is now specified in 10 CFR 35.92. Refer also to AR 385-11, page 5-4, Item (d). As this item does not apply to this license, no response is required.

We will continue the review of your renewal request upon receipt of this information. In order to continue prompt review of your application, we request that you submit your response to this letter within 30 calendar days from the date of this letter. Please reply in duplicate, and refer to Mail Control No. 70697.

Sincerely,

Beth A. Riedlinger  
Health Physicist (Licensing)  
Nuclear Materials Safety Section

Enclosures:  
Guide for Instrument Calibration  
10 CFR Part 35

cc: Darwin N. Taras  
Department of the Army  
Headquarters, U.S. Army Materiel Command  
5001 Eisenhower Avenue  
Alexandria, Virginia 22333-0001



Docket No. : 070-00553  
License No.: SNM-507  
Control No.: ~~70645~~ 70697

Department of the Army  
U.S. Army Calibration & Repair Center  
Sacramento Army Depot  
Sacramento, California 95813

Attention: Charles R. Wallace  
Radiation Protection Officer

SUBJECT: LICENSE RENEWAL APPLICATION

Gentlemen:

This is to acknowledge receipt of your application for renewal of the material(s) license identified above. Your application is deemed timely filed, and accordingly, the license will not expire until final action has been taken by this office.

Any correspondence regarding this renewal application should reference the control number specified above and your license number.

Sincerely,

Beth A. Riedlinger  
Health Physicist (Licensing)  
Nuclear Materials Safety Section

RV *67*  
ROSELINSKY

1 15-88

RV *[Signature]*  
THOMAS

115-88