*TB 9-6665-285-15

DEPARTMENT OF THE ARMY TECHNICAL BULLETIN

ARMY CALIBRATION PROGRAM FOR RADIAC INSTRUMENTATION

Headquarters, Department of the Army, Washington, DC
16 September 2004

REPORTING OF ERRORS AND RECOMMENDING IMPROVEMENTS

You can improve this manual. If you find any mistakes or if you know of a way to improve these procedures, please let us know. Mail your letter or DA Form 2028 (Recommended Changes to Publications and Blank Forms) directly to: Commander, US Army Aviation and Missile Command, AMSAM-MMC-MA-NP, Redstone Arsenal, AL 35898-5000. A reply will be furnished to you. You may also provide DA Form 2028 information to AMCOM via e-mail, fax, or the World Wide Web. Our fax number is DSN 788-6546 or Commercial 256-842-6546. Our e-mail address is 2028@redstone.army.mil. Instructions for sending an electronic 2028 may be found at the back of this manual. For the World Wide Web, use https://amcom2028.redstone.army.mil.

*This bulletin supersedes TB 9-6665-285-15, dated 12 August 1991.

1. Purpose. This technical bulletin (TB) delineates responsibilities, instructions, and guidance for effective calibration and repair of RADIAC instrumentation.

2. Applicability. This TB is applicable to US Army Activities, Army National Guard, and US Army Reserves, using or providing calibration and repair service for RADIAC instrumentation. It will serve as a minimum guideline for the US Army Primary Standards Laboratory.

3. Definition of Terms. RADIAC instruments 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 instruments may detect or measure alpha, beta, gamma, X-ray, or neutron radiation and may be expressed in various units of measure. All RADIAC instruments are related to health and safety (H/S) and are categorized as follows:

a. RADIAC Instruments - ACTIVE. Instruments used full or part time in day-to-day ionizing radiation safety operations on Army installations or by Army personnel (civilian and military) for making quantitative measurements of radioactive contamination and/or determining radiation levels. Instrumentation classified in this category is utilized anywhere personnel handle, use, maintain, store, transport, dispose of, or are exposed to materials or equipment that produce any type of ionizing radiation (i.e., alpha, beta, gamma/X-ray, or neutron radiation).

b. RADIAC Instruments - RADIOGRAPHIC. These are ACTIVE instruments that are used to measure radiation from sealed source gamma radiation producing by-product material used in radiography operations on Army installations or by Army personnel (civilian or military). Although the technical calibration requirements for these items are the same as those for like ACTIVE devices, there are additional requirements specified in Title 10, Code of Federal Regulations, Part 34.24, Safety Requirements for Radiographic Operations, which separate the support of the instrumentation in this category from similar equipment classified as ACTIVE.

c. RADIAC Instruments - MEDICAL. These instruments are survey instruments used by Army hospitals, clinics, and other medical units to comply with requirements set forth in Title 10, Code of Federal Regulations, Part 35.51**,** Medical Use of By-product Material - Calibration and Check of Survey Instruments. These requirements include additional calibration documentation and the measurement support of accompanying dedicated check sources. Technical procedures followed in the calibration of these devices will be generally the same as those used in the support of like make/model number ACTIVE items.

d. RADIAC Instruments - REACT. Ionizing radiation measurement devices used to measure and determine radiation levels, to identify and isolate radioactive contaminated areas, and maintained in standby status for dedicated use in the event of a nuclear accident or incident or radiological dispersal device. This category includes devices utilized by the Nuclear Emergency Team (NET), the Radiological Advisory Medical Team (RAMT), Explosive Ordnance Disposal (EOD) units, Civil Support Teams (CST), and other groups tasked with the responsibility to respond to these situations. Calibration requirements will

be specified by the user. Calibration intervals may be shorter than those required for similar TACTICAL devices but will not be shorter than 180 days. Calibration accuracy requirements may exceed those for similar TACTICAL devices but shall not exceed those for similar ACTIVE instrumentation.

e. RADIAC Instruments - TACTICAL. Instrumentation maintained in storage by active Army, Army National Guard, and Reserve units for use in wartime situations as a defense against the effects of a nuclear attack.

NOTE

ACTIVE-type RADIAC instrumentation shall refer to ACTIVE, RADIOGRAPHIC, and MEDICAL instrumentation.

4. General

a. Identification

(1) Each RADIAC instrument will be identified to one of the above four categories. The owner/user must determine and designate the category based on use.

(a) When a RADIAC instrument is used in both an ACTIVE and TACTICAL application, it will be categorized as ACTIVE.

(b) When a RADIAC instrument is used in both an ACTIVE and RADIOGRAPHIC application, it will be categorized as RADIOGRAPHIC.

(c) When a RADIAC instrument is used in both an ACTIVE and MEDICAL application, it will be categorized as MEDICAL.

(d) ACTIVE, RADIOGRAPHIC, and MEDICAL instrumentation may be used for REACT purposes, but will maintain their categorization as ACTIVE, RADIOGRAPHIC, or MEDICAL.

(2) Embossing tape or pre-printed labels with the word "ACTIVE", "RADIOGRAPHIC", “REACT”, or “MEDICAL” should be affixed by the owner/user to the front portion or handle of the appropriate instrument in such a manner that it will be readily visible to the user. Unlabeled instruments will be considered " TACTICAL" and will be calibrated as such.

(3) DA Form 7372 will be annotated with the appropriate system code, selected from the following list:

U80 = RADIAC Instrument - RADIOGRAPHIC

U81 = RADIAC Instrument - MEDICAL

U82 = RADIAC Instrument – ACTIVE

U83 = RADIAC Instrument – REACT

U84 = RADIAC Instrument - TACTICAL

U85 = RADIAC Calibration Instrumentation Standards

b. Restrictions

(1) RADIAC instruments requiring batteries shall have a battery test mode. It is recommended that RADIAC instruments without battery test modes be exchanged for those with battery test mode, if available.

(2) MEDICAL instruments shall be accompanied by an appropriate dedicated radioactive check source (built-in or owner supplied) at the time of calibration. If an instrument is not accompanied by such a check source, it will be calibrated at ACTIVE intervals

(3) Substitution of battery types and sizes will be permitted only when the substitute is identified in the technical manual (TM) for the specific RADIAC instrument. Most modern RADIAC instruments 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 instrument batteries and by lowering the supply voltage until the RADIAC instrument response to a check source changes. If the voltage causing the change is below the BATTERY OK check voltage, then the RADIAC instrument is equipped with voltage regulation. If not, return the RADIAC instrument for recalibration when batteries fall.

(4) ACTIVE-type instruments 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) RADIAC instruments should be similarly calibrated when possible. This requirement specifically excludes the AN/ UDM-2 as a calibration source for ACTIVE type instruments.

(5) ACTIVE-type instruments must be kept in a separate location from TACTICAL instruments and be readily available for use.

NOTE

Be sure all RADIAC instruments are switched to the OFF position when not in use. Failure to do so may cause battery failure and corroded battery compartments.

c. TB 43-180 Identifies:

(1) Calibration intervals and handling/reporting requirements for RADIAC Instrumentation.

(2) Calibration procedures to support ACTIVE-type and TACTICAL instruments.

d. Maintenance. Calibration will be accomplished whenever repair is affected.

e. TB Emphasis. This TB primarily discusses ACTIVE-type RADIAC instruments. This is because these RADIAC instruments are usually commercial instruments with no standardized calibration procedures or guidelines published within the Army. Additionally, there are specific radioactive material licensing requirements and guidances associated with ACTIVE instruments. RADIAC instruments-TACTICAL, however, are standardized Army RADIAC instruments managed by US Army Communications and Electronics Command (CECOM) and published Army TM's and TB's describe their maintenance and

calibration. However, some information pertaining to TACTICAL instruments is contained in this TB.

5. Responsibilities

a. Local TMDE support coordinators will ensure that:

(1) Calibration support for RADIAC instruments that is traceable to the National Institute of Standards and Technology (NIST) is obtained from the appropriate TMDE support organization.

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

(3) Communication is established between owners/users of RADIAC instruments (especially ACTIVE-type) and the supporting TMDE operations concerning services and responsibilities outlined in this TB.

(4) Owner/user ACTIVE-type RADIAC instruments are identified to the supporting TMDE operations by manufacturer, model, and serial number and this information is updated as necessary.

b. Owner/user organizations of RADIAC instrument will:

(1) Comply with paragraph **6 a** below (where applicable) of this TB.

(2) Comply with TB 750-25.

(3) Assure that ACTIVE type instruments:

(a) Are available in adequate quantities for organizational mission objectives, but that quantities are not excessive, since these calibrations are more expensive than those for TACTICAL instruments.

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

(c) Are maintained in accordance with paragraphs **4 b** and **4 d** above.

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

c. The supporting TMDE operations will comply with paragraph **6 b** below.

d. The US Army TMDE Activity (USATA) will establish and maintain calibration quality control of RADIAC instruments through:

(1) Analysis of calibration data submitted by USATA and other certified supporting TMDE operations (APSL Directorate Nucleonics Section).

(2) Response to questions from owners/users and calibration coordinators concerning RADIAC instrument calibration services (DSN 746-3317/0520/1302) (APSL Directorate Nucleonics Section).

(3) Administration of technical audits of TMDE support operations supporting ACTIVE-type instruments (APSL Directorate Nucleonics Section in conjunction with USATA Inspection and Policy Compliance Division).

(4) Inspection TMDE support operations' technical aspects for quality assurance (USATA Inspection and Policy Compliance Division).

6. Procedures

a. All owner/user organizations of RADIAC instruments will ensure that:

(1) RADIAC instruments are submitted for calibration on the due date and after maintenance (normally, excluding battery changes).

(2) Additional RADIAC equipment and accessories such as straps, earphones, etc., are 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.

(3) When an instrument designed for use with one probe is submitted for calibration with several probes, one probe is designated the primary probe, and the others designated as secondary. The instrument will be calibrated using the primary probe. Meter indications only will be provided for secondary probes.

(4) When an instrument designed to store calibration parameters for multiple probes is submitted for calibration with several probes, the instrument will be calibrated for each probe submitted.

(5) The following information is provided with the RADIAC instrument:

(a) Name and address of the organization requesting calibration

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

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

(d) Specific instructions for requested ACTIVE, RADIOGRAPHIC, REACT, or MEDICAL, calibration service as indicated below. Tactical instruments do not require any specific instructions; ignore this subparagraph for TACTICAL instruments.

1. Instrument ranges to be calibrated. If not stated, all ranges will be calibrated (if possible).

2. Specify:

aa. The specific isotope to be used to calibrate the instrument if other than cesium-137.

bb. Check source geometry (if applicable).

cc. Any other requirement important to use of instrument.

b. All supporting TMDE operations providing RADIAC instrument calibration service will accomplish the following:

(1) Perform precalibration operations, as follows:

(a) Review appropriate sections of TM's, TB's, or owner's manuals pertaining to RADIAC instrument calibration. Should any conflict exist between an owner's manual and this TB concerning ACTIVE, RADIOGRAPHIC, REACT, or MEDICAL calibration instructions, this TB will be followed.

(b) Supply freshly tested batteries, when required.

(c) Allow time for instrument warm-up.

(d) Verify instrument battery test(s).

(e) Zero indicating needle.

(2) Perform calibration operations.

(a) ACTIVE-type instruments.

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

2. Gamma and X-ray RADIAC instrument tolerance of each calibration point is ±10 percent of standard's calculated value. This estimated measurement uncertainty (2 standard deviations) is derived by combining uncertainty in standard (source) calibration, uncertainty in the location of the effective center of the detector, uncertainty contributed by radiation scatter, and statistical fluctuations in instrument readings. Other parameter RADIAC instruments; e.g., alpha, should be similarly calibrated when possible.

3. RADIAC instrument adjustment is required only when out-of-tolerance conditions exist.

4. Guidance on calibration points: Survey meter scales.

aa. Linear scales. Provide a minimum of two calibration points per scale, separated by not less than 50 percent of full scale for gamma and X-ray RADIAC instruments. Other parameter RADIAC instruments should be similarly calibrated when possible. It is preferred that the highest calibration point be taken at 75 to 80 percent of full scale and the lowest point be 20 to 30 percent.

bb. Logarithmic scales. Meters having a multidecade logarithmic scale shall be calibrated at two points on one decade and no less than one point on each of the remaining decades. The points on the “two-point decade” should lie at approximately 75 to 80 percent and at 20 to 30 percent of the decade.

cc. Digital displays. Meters having an automatic ranging digital display device for indicating rates shall be calibrated at no less than two points on one decade and at no less than one point on each of the remaining decades. The points on the "two-point decade" should lie approximately 75 to 80 percent and at 20 to 30 percent of the decade.

5. Perform calibration requested. Provide a calibration report (examples, for guidance only, provided at figures 1 and 2) on all ACTIVE-type RADIAC instruments. A copy of this report will be retained for 5 years following calibration. Questions concerning the calibration should be resolved by telephone with the individual user in order to minimize turnaround time.

aa. The calibration report should include the type of calibration service (isotope or effective energy), calibration geometry, check source geometry and reading (if applicable), and clear indication of calibration points and RADIAC instrument readings at those points.

Owner_______________________ OUIC_________ PUIC_________
Manufacturer_________________ Meter Mode_________ Serial No._________
Probe Model_________ Serial No._________

Detector Type: ____ Ion Chamber ___G-M ____NaI (Tl) ____ ____________
Calibration Sources(s): Model No. S/N ______ Isotope/Eff. Energy/Beam Code ________
Model No. S/N ______ Isotope/Eff. Energy/Beam Code ________
Pulser Model No. ____________ Serial No.________

Dedicated check source indicates ____________________ Battery check______________
______flush against detector ___distance ____________ cm

Geometry — Check Source / Calibration

Window _____Open _____Closed _____Fixed

Meter Range	Applied (units_______)	Init Meter Reading	Adjust? (Y/N)	Final Meter Reading	Corr Factor	*Average Corr Factor*

This calibration is traceable to the National Institute of Standards and Technology. For chambers that are open to the atmosphere, measurements are normalized to one standard atmosphere and 22 degrees Celsius.

Calibration Report No. ____________
Date: ____________
Page _____ of _____

____
In Charge of Calibration

____
Reviewer

Figure 1. Radiac Instrument Calibration Report.

Owner Rad Std and Dos Lab | OUIC W1PLPN | PUIC W1PLPN
Manufacturer Bicron | Meter Mode RSO-5 | Serial No. A764T
Probe Model N/A | Serial No. N/A

Detector Type: X Ion Chamber | G-M | NaI (Tl)
Calibration Sources(s): Model No. 81-16 S/N 7085 | Model No. S/N | Pulser Model No.
Isotope/Eff. Energy/Beam Code Cs-137
Isotope/Eff. Energy/Beam Code
Serial No.

Dedicated check source indicates N/A
flush against detector | distance cm
Battery check OK

Geometry
Check Source
Calibration X

Window Open X Closed Fixed

Meter Range	Applied (units mR/hr)	Init Meter Reading	Adjust? (Y/N)	Final Meter Reading	Corr Factor	*Average Corr Factor*
5000	4000	4300	Y	4000	1.0	
	1000	1100	Y	1000	1.0	1.0
500	400	400	N	400	1.0	
	100	100	N	100	1.0	1.0
50	40	46	Y	40	1.0	
	10	12	Y	10	1.0	1.0
5	4	5	Y	4	1.0	
	1	1.2	Y	0.9	1.1	1.05

This calibration is traceable to the National Institute of Standards and Technology. For chambers that are open to tl atmosphere, measurements are normalized to one standard atmosphere and 22 degrees Celsius.

Calibration Report No. W1PLPN216R
Date: 26 Sep 90
Page 1 of 1

In Charge of Calibration

Reviewer

Figure 2. Radiac Instrument Calibration Report - example of completed form.

bb. The report should indicate, clearly, a correction factor for each calibration point as well as an average correction factor of each meter range calibrated.

cc. For meters, which can be calibrated with multiple probes, a separate report page should be issued for each probe.

dd. If any part of the calibration is electronic, it should be documented on the report.

6. A label, which indicates calibration source radioisotope, probe window condition, and dedicated check source reading and geometry, shall be attached to all MEDICAL instruments. See example below for a typical label.

Isotope Cs 137
Window Closed
Check source indicates 3.2 mR/hr
Check source distance 1 cm

7. ACTIVE-type instruments, which exceed 10 percent calculated value of the standard, are considered unserviceable for these categories.

(b) TACTICAL instruments.

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

2. Adjust RADIAC instrument readings to correct values where RADIAC instrument is outside of tolerance.

3. Render the calibrations outlined in appropriate TM's and TB's. Normally TACTICAL instruments will be given one calibration point per scale. When a gamma source is used in lieu of the AN/UDM2 RADIAC calibrator, the calibration point should be approximately 80 percent of full scale.

(3) Annotate DA Label 80 (US Army Calibrated Instrument) or DA Label 163 (US Army Limited or Special Calibration) in accordance with TB 750-25**,** Appendix C, and the following instructions:

(a) ACTIVE-type instruments.

1. DA Label 80 is used when all instrument ranges were properly calibrated (see paragraph **6 b** (l) and (2) (a) above).

2. DA Label 163 is:

aa. Used when any of the requirements of paragraph **6 b** (3) (a) above cannot be met.

bb. Annotated in Blocks 7a and 7b, with the information that required its use. See example below for a typical ACTIVE-type instrument. (It is unlikely any given RADIAC instrument would have as many annotations.)

a. PARAMETER/VALUE	**b. TOLERANCE/UNCERTAIN**
1,000 mR/hr range	**NOT CALBR**
2 mR/hr range	**Single calibr pt**
sliding shutter open[1]	**NOT CALBR**

[1]Where, in this example, "sliding shutter open" was requested on DA Form 2402.

(b) TACTICAL instruments.

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:

i. Range(s) could not be properly calibrated to RADIAC instrument tolerance, but the range(s) is otherwise serviceable.

ii. RADIAC instrument 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 survey instruments by ^{60}Co or ^{137}CS standards.

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

a. PARAMETER/VALUE	b. TOLERANCE/UNCERTAIN
500 mR/hr range	±40%

NOTE

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

(4) Annotate DA Form 7372 in accordance with instructions given in TB 750-25, Appendix D.

(5) Promptly return instrument calibration report, and attached DA Form 7372 (and DA Form 2417, Instrument Rejection, if applicable) to the using organization.

(6) Maintain a library/file consisting of the following:

(a) RADIAC instrument (owner's) manual for the ACTIVE-type instruments encountered.

(b) Appropriate Army TM's and TB's associated with TACTICAL instruments.

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

(d) File copy of all calibration reports issued, for a period of 5 years following calibration.

APPENDIX A

REFERENCES

AR 11-9	Army Radiation Safety Program
AR 725-1 (Chapter 8)	Special Authorization and Procedures for Issues, Sales, and Loans
AR 750-43	Maintenance of Supplies and Equipment: Army Test, Measurement, and Diagnostic Equipment Program
DA PAM 40-18	Personnel Dosimetry Guidance and Dose Recording Procedures for Personnel Occupationally Exposed to Ionizing Radiation, 30 Jun 95
TM 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 Test, Measurement, and Diagnostic Equipment (TMDE) Calibration and Repair Support Program
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
NRC Reg. Guide 10.8	Guide for the Preparation of Applications for Medical Use Programs

APPENDIX B
ACTIVE-LEVEL RADIAC SUPPORT FACILITIES
(ACTIVE -TYPE INSTRUMENTATION)

US Army TMDE Activity
Army Primary Standards Laboratory Directorate
ATTN: AMSAM-TMD-SR
Redstone Arsenal, AL 35898-5400
Capabilities: alpha (^{238}Pu, ^{239}Pu, ^{241}Am), gamma (^{137}Cs, ^{60}CO), beta (^{90}Sr), X-ray (10 - 300 keV)

US Army TMDE Support Laboratory - Edgewood
ATTN: AMSAM-TMD-A-ARC
Aberdeen Proving Ground, MD 21005-5001
Capabilities: alpha (^{238}Pu, ^{241}Am), gamma (^{137}Cs), beta (^{90}Sr)

US Army TMDE Support Center - Anniston
ATTN: AMSAM-TMD-B-A
Anniston Army Depot
Anniston, AL 36201-5095
Capabilities: alpha (^{238}Pu, ^{241}Am), gamma (^{137}CS), beta (^{90}Sr)

US Army TMDE Support Center - White Sands
ATTN: AMSAM-TMD-C-WS
White Sands Missile Range
White Sands, NM 88002-5528
Capabilities: alpha (^{238}Pu, ^{241}Am), gamma (^{137}Cs), beta (^{90}Sr)

US Army TMDE Region - Europe
ATTN: AMSAM-TMD-E-PN (CMR 434)
Pirmasens, Germany
APO AE 09138
Capabilities: alpha (^{238}Pu, ^{239}Pu, ^{241}Am), gamma (^{137}Cs), beta (^{90}Sr)

US Army TMDE Region - Pacific
ATTN: AMSAM-TMD-P-KN
Camp Carroll, Korea
APO AP 96260-0276
Capabilities: alpha (^{238}Pu, ^{241}Am), gamma (^{137}Cs), beta (^{90}Sr)

US Army TMDE Support Center - Chambersburg
ATTN: AMSAM-TMD-A-C
Michigan Avenue
Chambersburg, PA 17201-4185
Capabilities: alpha (^{238}Pu, ^{241}Am), gamma (^{137}Cs), beta (^{90}Sr)

US Army TMDE Support Center - Tobyhanna
ATTN: AMSAM-TMD-A-T
11 Hap Arnold Blvd
Tobyhanna, PA 18466-5104
Capabilities: alpha (^{238}Pu, ^{241}Am), gamma (^{137}CS), beta (^{90}Sr)

US Army TMDE Support Center - Richmond
ATTN: AMSAM-TMD-B-L
Blue Grass Army Depot
2091 Kingston Hwy
Richmond, KY 40475-5103
Capabilities: alpha (^{238}Pu, ^{241}Am), gamma (^{137}Cs), beta (^{90}Sr)

US Army TMDE Support Center - Fort Hood
ATTN: AMSAM-TMD-C-HD
PO Box 5008
Fort Hood, TX 76544-0008
Capabilities: alpha (^{238}Pu, ^{241}Am), gamma (^{137}CS), beta (^{90}Sr)

GLOSSARY
OF ABBREVIATIONS AND ACRONYMS

AR	US Army Regulation
CECOM	US Army Communications-Electronics Command
CST	Civil Support Team
DA	Department of the Army
EOD	Explosive Ordnance Disposal
FEMA	Federal Emergency Management Agency
NET	Nuclear Emergency Team
NIST	National Institute of Standards and Technology
RAMT	Radiological Advisory Medical Team
TB	Technical Bulletin
TM	Technical Manual
TMDE	Test, Measurement, and Diagnostic Equipment
USATA	US Army TMDE Activity

By Order of the Secretary of the Army:

PETER J. SCHOOMAKER
General, United States Army
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Secretary of the Army

0420202

Distribution:
To be distributed in accordance with the initial distribution number (IDN) 342299, requirements for calibration procedure TB 9-6665-285-15.

Instructions for Submitting an Electronic 2028

The following format must be used if submitting an electronic 2028. The subject line must be exactly the same and all fields must be included; however, only the following fields are mandatory: 1, 3, 4, 5, 6, 7, 8, 9, 10, 13, 15, 16, 17, and 27.

From: "Whomever" whomever@redstone.army.mil
To: <2028@redstone.army.mil

Subject: DA Form 2028

1. **From**: Joe Smith
2. Unit: home
3. **Address**: 4300 Park
4. **City**: Hometown
5. **St**: MO
6. **Zip**: 77777
7. **Date Sent**: 19-OCT –93
8. **Pub no:** 55-2840-229-23
9. **Pub Title**: TM
10. **Publication Date**: 04-JUL-85
11. Change Number: 7
12. Submitter Rank: MSG
13. **Submitter FName**: Joe
14. Submitter MName: T
15. **Submitter LName**: Smith
16. **Submitter Phone**: 123-123-1234
17. **Problem**: 1
18. Page: 2
19. Paragraph: 3
20. Line: 4
21. NSN: 5
22. Reference: 6
23. Figure: 7
24. Table: 8
25. Item: 9
26. Total: 123
27. **Text**

This is the text for the problem below line 27.