104-21

NRC FORM 374 U.S. NUCLEAR REGULATORY COMMISSION

Amendment No. 12

MATERIALS LICENSE

Pursuant to the Atomic Energy Act of 1954, as amended, the Energy Reorganization Act of 1974 (Public Law 93-438), and Title 10, Code of Federal Regulations, Chapter I, Parts 30, 31, 32, 33, 34, 35, 36, 39, 40, and 70, and in reliance on statements and representations heretofore made by the licensee, a license is hereby issued authorizing the licensee to receive, acquire, possess, and transfer byproduct, source, and special nuclear material designated below; to use such material for the purpose(s) and at the place(s) designated below; to deliver or transfer such material to persons authorized to receive it in accordance with the regulations of the applicable Part(s). This license shall be deemed to contain the conditions specified in Section 183 of the Atomic Energy Act of 1954, as amended, and is subject to all applicable rules, regulations, and orders of the Nuclear Regulatory Commission now or hereafter in effect and to any conditions specified below.

Licensee	In accordance with the letter dated October 19, 1999,
1. Department of the Army Commander, Seneca Army Depot Activity ATTN: SDSSE-CO 2. Romulus, New York 14541-5001	3. License number SUC-1275 is amended in its entirety to read as follows: 4. Expiration date February 28, 2005 5. Docket No. 040-08526 Reference No.

6. Byproduct, source, and/or special nuclear material	7. Chemical and/or physical form	8. Maximum amount that licensee may possess at any one time under this license
A. Uranium (depleted in the isotope uranium 235)	A. Solid metal alloy	A. 5,000,000 kilograms
B. Uranium (depleted in the isotope uranium 235)	B. Solid metal alloy	B. 5,000,000 kilograms

9. Authorized use:

A. For receipt, possession, storage, transportation, inspection and disposal incident to the demilitarization of munitions.

B. For receipt, possession, storage, transportation, inspection, and disposal incident to demilitarization of munitions from other licensed U.S. Army and U.S. Navy installations.

CONDITIONS

10. Licensed material may be used only at the licensee's facilities located at the Seneca Army Depot, Romulus, New York.

11. A. Licensed material shall be used by, or under the supervision of John F. Cleary, Michael R. Lewis, or Thomas E. Reynolds.

B. The Radiation Safety Officer for this license is John Cleary.

104-51

MATERIALS LICENSE
SUPPLEMENTARY SHEET

License Number
SUC-1275

Docket or Reference Number
040-08526

Amendment No. 12

12. The licensee is authorized to transport licensed material in accordance with the provisions of 10 CFR Part 71, "Packaging and Transportation of Radioactive Material."

13. Radioactive waste generated shall be stored in accordance with the statements, representations, and procedures included with the waste storage plan described in the licensee's letter dated January 27, 1995.

14. In accordance with 10 CFR 40.42(g)(2) and the licensee's letters dated December 5, 1996 and August 13, 1997, a decommissioning plan for the licensee's facilities at the Seneca Army Depot, Romulus, New York, must be submitted to the NRC by June 30, 2000.

15. Except as specifically provided otherwise in this license, the licensee shall conduct its program in accordance with the statements, representations, and procedures contained in the documents, including any enclosures, listed below, except for minor changes in the medical use radiation safety procedures as provided in 10 CFR 35.31. The U.S. Nuclear Regulatory Commission's regulations shall govern unless the statements, representations, and procedures in the licensee's application and correspondence are more restrictive than the regulations.

A. Letter dated January 17, 1992
B. Letter dated March 31, 1992
C. Application dated October 30, 1992
D. Letter dated November 2, 1992
E. Letter dated December 21, 1992
F. Letter dated September 2, 1993
G. Letter dated September 27, 1993
H. Letter dated December 15, 1993
I. Letter dated January 27, 1995
J. Letter dated December 5, 1996
K. Letter dated August 13, 1997

For the U.S. Nuclear Regulatory Commission

Date February 7, 2000

By ***Original signed by John D. Kinneman***

John D. Kinneman, Chief
Nuclear Materials Safety Branch 2
Division of Nuclear Materials Safety
Region I
King of Prussia, Pennsylvania 19406

15650944

Amendment No. 11

MATERIALS LICENSE

Pursuant to the Atomic Energy Act of 1954, as amended, the Energy Reorganization Act of 1974 (Public Law 93-438), and Title 10, Code of Federal Regulations, Chapter I, Parts 30, 31, 32, 33, 34, 35, 36, 39, 40, and 70, and in reliance on statements and representations heretofore made by the licensee, a license is hereby issued authorizing the licensee to receive, acquire, possess, and transfer byproduct, source, and special nuclear material designated below; to use such material for the purpose(s) and at the place(s) designated below; to deliver or transfer such material to persons authorized to receive it in accordance with the regulations of the applicable Part(s). This license shall be deemed to contain the conditions specified in Section 183 of the Atomic Energy Act of 1954, as amended, and is subject to all applicable rules, regulations, and orders of the Nuclear Regulatory Commission now or hereafter in effect and to any conditions specified below.

Licensee	In accordance with the application dated June 18, 1998,
1. Department of the Army Commander, Seneca Army Depot Activity ATTN: SDSSE-CO 2. Romulus, New York 14541-5001	3. License number SUC-1275 is amended in its entirety to read as follows: 4. Expiration date February 28, 2005 5. Docket No. 040-08526 Reference No.

6. Byproduct, source, and/or special nuclear material	7. Chemical and/or physical form	8. Maximum amount that licensee may possess at any one time under this license
A. Uranium (depleted in the isotope uranium 235)	A. Solid metal alloy	A. 5,000,000 kilograms
B. Uranium (depleted in the isotope uranium 235)	B. Solid metal alloy	B. 5,000,000 kilograms

9. Authorized use:

A. For receipt, possession, storage, transportation, inspection and disposal incident to the demilitarization of munitions.

B. For receipt, possession, storage, transportation, inspection, and disposal incident to demilitarization of munitions from other licensed U.S. Army and U.S. Navy installations.

CONDITIONS

10. Licensed material may be used only at the licensee's facilities located at the Seneca Army Depot, Romulus, New York.

11. A. Licensed material shall be used by, or under the supervision of John F. Cleary, Michael R. Lewis, or Thomas E. Reynolds.

B. The Radiation Safety Officer for this license is John Cleary.

12. The licensee is authorized to transport licensed material in accordance with the provisions of 10 CFR Part 71, "Packaging and Transportation of Radioactive Material."

MATERIALS LICENSE
SUPPLEMENTARY SHEET

License Number
SUC-1275

Docket or Reference Number
040-08526

Amendment No. 11

13. Radioactive waste generated shall be stored in accordance with the statements, representations, and procedures included with the waste storage plan described in the licensee's letter dated January 27, 1995.

14. In accordance with 10 CFR 40.42(g)(2) and the licensee's letters dated December 5, 1996 and August 13, 1997, a decommissioning plan for the licensee's facilities at the Seneca Army Depot, Romulus, New York, must be submitted to the NRC by January 4, 1999.

15. Except as specifically provided otherwise in this license, the licensee shall conduct its program in accordance with the statements, representations, and procedures contained in the documents, including any enclosures, listed below, except for minor changes in the medical use radiation safety procedures as provided in 10 CFR 35.31. The U.S. Nuclear Regulatory Commission's regulations shall govern unless the statements, representations, and procedures in the licensee's application and correspondence are more restrictive than the regulations.

A. Letter dated January 17, 1992
B. Letter dated March 31, 1992
C. Application dated October 30, 1992
D. Letter dated November 2, 1992
E. Letter dated December 21, 1992
F. Letter dated September 2, 1993
G. Letter dated September 27, 1993
H. Letter dated December 15, 1993
I. Letter dated January 27, 1995
J. Letter dated December 5, 1996
K. Letter dated August 13, 1997

For the U.S. Nuclear Regulatory Commission

Date August 31, 1998

By ***Original signed by Sattar Lodhi, Ph.D.***

Sattar Lodhi, Ph.D.
Nuclear Materials Safety Branch 2
Division of Nuclear Materials Safety
Region I
King of Prussia, Pennsylvania 19406

MATERIALS LICENSE

Amendment No. 09

Pursuant to the Atomic Energy Act of 1954, as amended, the Energy Reorganization Act of 1974 (Public Law 93-438), and Title 10, Code of Federal Regulations, Chapter I, Parts 30, 31, 32, 33, 34, 35, 36, 39, 40, and 70, and in reliance on statements and representations heretofore made by the licensee, a license is hereby issued authorizing the licensee to receive, acquire, possess, and transfer byproduct, source, and special nuclear material designated below; to use such material for the purpose(s) and at the place(s) designated below; to deliver or transfer such material to persons authorized to receive it in accordance with the regulations of the applicable Part(s). This license shall be deemed to contain the conditions specified in Section 183 of the Atomic Energy Act of 1954, as amended, and is subject to all applicable rules, regulations, and orders of the Nuclear Regulatory Commission now or hereafter in effect and to any conditions specified below.

Licensee	
1. Department of the Army Commander, Seneca Army Depot Activity ATTN: SDSSE-CO 2. Romulus, New York 14541-5001	In accordance with the application dated January 17, 1992, 3. License Number SUC-1275 is amended in its entirety to read as follows:
	4. Expiration Date February 29, 2000
	5. Docket or Reference No. 040-08526

6. Byproduct, Source, and/or Special Nuclear Material	7. Chemical and/or Physical Form	8. Maximum Amount that Licensee May Possess at Any One Time Under This License
A. Uranium (depleted in the isotope uranium 235)	A. Solid metal alloy	A. 5,000,000 kilograms
B. Uranium (depleted in the isotope uranium 235)	B. Solid metal alloy	B. 5,000,000 kilograms

9. Authorized use

A. For receipt, possession, storage, transportation, inspection and disposal incident to the demilitarization of munitions.

B. For receipt, possession, storage, transportation, inspection, and disposal incident to demilitarization of munitions from other licensed U.S. Army and U.S. Navy installations.

CONDITIONS

10. Licensed material may be used only at the licensee's facilities located at the Seneca Army Depot, Romulus, New York.

11. A. Licensed material shall be used by, or under the supervision of, John F. Cleary, Michael R. Lewis, Thomas E. Reynolds, or Thomas J. Stincic.

B. The Radiation Safety Officer for this license is Michael R. Lewis.

12. The licensee is authorized to transport licensed material in accordance with the provisions of 10 CFR Part 71, "Packaging and Transportation of Radioactive Material."

13. Radioactive waste generated shall be stored in accordance with the statements, representations, and procedures included with the waste storage plan described in the licensee's letter dated January 27, 1995.

MATERIALS LICENSE
SUPPLEMENTARY SHEET

License number
SUC-1275

Docket or Reference number
040-08526

Amendment No. 09

14. Except as specifically provided otherwise in this license, the licensee shall conduct its program in accordance with the statements, representations, and procedures contained in the documents, including any enclosures, listed below, except for minor changes in the medical use radiation safety procedures as provided in 10 CFR 35.31. The U.S. Nuclear Regulatory Commission's regulations shall govern unless the statements, representations, and procedures in the licensee's application and correspondence are more restrictive than the regulations.

A. Letter dated March 31, 1992
B. Application dated October 30, 1992
C. Letter dated November 2, 1992
D. Letter dated December 21, 1992
E. Letter dated September 2, 1993
F. Letter dated September 27, 1993
G. Letter dated December 15, 1993
H. Letter dated January 27, 1995

Date FEB 28 1995

For the U.S. Nuclear Regulatory Commission
Original Signed By:
By Mohamed M. Shanbaky

Nuclear Materials Safety Branch
Region I
King of Prussia, Pennsylvania 19406

NRC Form 374
(5-84)

U.S. NUCLEAR REGULATORY COMMISSION

MATERIALS LICENSE

Amendment No. 08

Pursuant to the Atomic Energy Act of 1954, as amended, the Energy Reorganization Act of 1974 (Public Law 93-438), and Title 10, Code of Federal Regulations, Chapter I, Parts 30, 31, 32, 33, 34, 35, 40 and 70, and in reliance on statements and representations heretofore made by the licensee, a license is hereby issued authorizing the licensee to receive, acquire, possess, and transfer byproduct, source, and special nuclear material designated below; to use such material for the purpose(s) and at the place(s) designated below; to deliver or transfer such material to persons authorized to receive it in accordance with the regulations of the applicable Part(s). This license shall be deemed to contain the conditions specified in Section 183 of the Atomic Energy Act of 1954, as amended, and is subject to all applicable rules, regulations and orders of the Nuclear Regulatory Commission now or hereafter in effect and to any conditions specified below.

Licensee	
1. U. S. Department of the Army Commander, Seneca Army Depot 2. ATTN: SDSSE-AX Romulus, New York 14541-5001	In accordance with letter dated March 7, 1990, 3. License number SUC-1275 is amended in its entirety to read as follows: 4. Expiration date April 30, 1992 5. Docket or Reference No. 040-08526

6. Byproduct, source, and/or special nuclear material	7. Chemical and/or physical form	8. Maximum amount that licensee may possess at any one time under this license
A. Uranium (depleted in the isotope Uranium 235)	A. Solid metal alloy	A. 4,082,400 kilograms

9. Authorized use

1. For possession, storage, transportation, and inspection incident to the demilitarization of munitions.

CONDITIONS

10. Licensed material shall be used only at the licensee's facilities located at Seneca Army Depot, Romulus, New York.

11. Licensed material shall be used by, or under the supervision of, Thomas J. Stincic or Michael R. Lewis.

12. Except as specifically provided otherwise in this license, the licensee shall conduct its program in accordance with the statements, representations, and procedures contained in the documents including any enclosures, listed below. The Nuclear Regulatory Commission's regulations shall govern unless the statements, representations and procedures in the licensee's application and correspondence are more restrictive than the regulations.

A. Application dated February 24, 1986
B. Letter dated March 7, 1990

For the U.S. Nuclear Regulatory Commission

Date APR 20 1990

By [signature]
Nuclear Materials Safety Branch
Region I
King of Prussia, Pennsylvania 19406

NRC Form 374
(5-84)

U.S. NUCLEAR REGULATORY COMMISSION

MATERIALS LICENSE

Amendment No. 07

Pursuant to the Atomic Energy Act of 1954, as amended, the Energy Reorganization Act of 1974 (Public Law 93-438), and Title 10, Code of Federal Regulations, Chapter I, Parts 30, 31, 32, 33, 34, 35, 40 and 70, and in reliance on statements and representations heretofore made by the licensee, a license is hereby issued authorizing the licensee to receive, acquire, possess, and transfer byproduct, source, and special nuclear material designated below; to use such material for the purpose(s) and at the place(s) designated below; to deliver or transfer such material to persons authorized to receive it in accordance with the regulations of the applicable Part(s). This license shall be deemed to contain the conditions specified in Section 183 of the Atomic Energy Act of 1954, as amended, and is subject to all applicable rules, regulations and orders of the Nuclear Regulatory Commission now or hereafter in effect and to any conditions specified below.

Licensee	
1. U. S. Department of the Army Commander, Seneca Army Depot ATTN: SDSSE-AX 2. Romulus, New York 14541-5001	In accordance with application dated February 24, 1986, 3. License number SUC-1275 is amended in its entirety to read as follows:
	4. Expiration date April 30, 1992
	5. Docket or Reference No. 040-08526

6. Byproduct, source, and/or special nuclear material	7. Chemical and/or physical form	8. Maximum amount that licensee may possess at any one time under this license
A. Uranium (depleted in the isotope Uranium 235)	A. Solid metal alloy	A. 4,082,400 kilograms

9. Authorized use

A. For possession, storage, transportation, and inspection incident to the demilitarization of munitions.

CONDITIONS

10. Licensed material shall be used only at the licensee's facilities located at Seneca Army Depot, Romulus, New York.

11. Licensed material shall be used by, or under the supervision of, Thomas J. Stincic or Michael R. Lewis.

12. Except as specifically provided otherwise in this license, the licensee shall conduct its program in accordance with the statements, representations, and procedures contained in the documents including any enclosures, listed below. The Nuclear Regulatory Commission's regulations shall govern unless the statements, representations and procedures in the licensee's application and correspondence are more restrictive than the regulations.

A. Application dated February 24, 1986

For the U.S. Nuclear Regulatory Commission

Date APR 20 1987

By James M. Johansen
Nuclear Materials Safety and
Safeguards Branch, Region I
King of Prussia, Pennsylvania 19406

NRC FORM 313
(1-84)
10 CFR 30, 32, 33, 34, 35 and 40

APPLICATION FOR MATERIAL LICENSE

U.S. NUCLEAR REGULATORY COMMISSION
APPROVED BY OMB
3150-0120
Expires: 5-31-87

INSTRUCTIONS: SEE THE APPROPRIATE LICENSE APPLICATION GUIDE FOR DETAILED INSTRUCTIONS FOR COMPLETING APPLICATION. SEND TWO COPIES THE ENTIRE COMPLETED APPLICATION TO THE NRC OFFICE SPECIFIED BELOW.

FEDERAL AGENCIES FILE APPLICATIONS WITH:

U.S. NUCLEAR REGULATORY COMMISSION
DIVISION OF FUEL CYCLE AND MATERIAL SAFETY, NMSS
WASHINGTON, DC 20555

ALL OTHER PERSONS FILE APPLICATIONS AS FOLLOWS, IF YOU ARE LOCATED IN:

CONNECTICUT, DELAWARE, DISTRICT OF COLUMBIA, MAINE, MARYLAND, MASSACHUSETTS, NEW JERSEY, NEW YORK, PENNSYLVANIA, RHODE ISLAND, OR VERMONT, SEND APPLICATIONS TO:

U.S. NUCLEAR REGULATORY COMMISSION, REGION I
NUCLEAR MATERIAL SECTION B
631 PARK AVENUE
KING OF PRUSSIA, PA 19406

ALABAMA, FLORIDA, GEORGIA, KENTUCKY, MISSISSIPPI, NORTH CAROLINA, PUERTO RICO, SOUTH CAROLINA, TENNESSEE, VIRGINIA, VIRGIN ISLANDS, OR WEST VIRGINIA, SEND APPLICATIONS TO:

U.S. NUCLEAR REGULATORY COMMISSION, REGION II
MATERIAL RADIATION PROTECTION SECTION
101 MARIETTA STREET, SUITE 2900
ATLANTA, GA 30323

IF YOU ARE LOCATED IN:

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

U.S. NUCLEAR REGULATORY COMMISSION, REGION III
MATERIALS LICENSING SECTION
799 ROOSEVELT ROAD
GLEN ELLYN, IL 60137

ARKANSAS, COLORADO, IDAHO, KANSAS, LOUISIANA, MONTANA, NEBRASKA, NEW MEXICO, NORTH DAKOTA, OKLAHOMA, SOUTH DAKOTA, TEXAS, UTAH, OR WYOMING, SEND APPLICATIONS TO:

U.S. NUCLEAR REGULATORY COMMISSION, REGION IV
MATERIAL RADIATION PROTECTION SECTION
611 RYAN PLAZA DRIVE, SUITE 1000
ARLINGTON, TX 76011

ALASKA, ARIZONA, CALIFORNIA, HAWAII, NEVADA, OREGON, WASHINGTON, AND U.S. TERRITORIES AND POSSESSIONS IN THE PACIFIC, SEND APPLICATIONS TO:

U.S. NUCLEAR REGULATORY COMMISSION, REGION V
MATERIAL RADIATION PROTECTION SECTION
1450 MARIA LANE, SUITE 210
WALNUT CREEK, CA 94596

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

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

- [ ] A. NEW LICENSE
- [ ] B. AMENDMENT TO LICENSE NUMBER _____
- [X] C. RENEWAL OF LICENSE NUMBER SUC-1275

2. NAME AND MAILING ADDRESS OF APPLICANT *(Include Zip Code)*

Commander
Seneca Army Depot
ATTN: SDSSE-AX
Romulus, NY 14541-5001

3. ADDRESS(ES) WHERE LICENSED MATERIAL WILL BE USED OR POSSESSED.

Seneca Army Depot
Romulus, New York 14541-5001

4. NAME OF PERSON TO BE CONTACTED ABOUT THIS APPLICATION

THOMAS J. STINCIC

TELEPHONE NUMBER: 607-869-1432

SUBMIT ITEMS 5 THROUGH 11 ON 8½ x 11" PAPER. THE TYPE AND SCOPE OF INFORMATION TO BE PROVIDED IS DESCRIBED IN THE LICENSE APPLICATION GUIDE

5. RADIOACTIVE MATERIAL
a. Element and mass number, b. chemical and/or physical form, and c. maximum amount which will be possessed at any one time.

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

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

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

9. FACILITIES AND EQUIPMENT.

10. RADIATION SAFETY PROGRAM.

11. WASTE MANAGEMENT.

12. LICENSEE FEES *(See 10 CFR 170 and Section 170.31)*
FEE CATEGORY | AMOUNT ENCLOSED $

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

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

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

SIGNATURE-CERTIFYING OFFICER	TYPED/PRINTED NAME	TITLE	DATE
[signature]	BRUCE M. GARNETT Colonel, OD	Commander	24 FEB 1986

14 VOLUNTARY ECONOMIC DATA

a. ANNUAL RECEIPTS

- [ ] <$250K
- [ ] $250K–500K
- [ ] $500K–750K
- [ ] $750K–1M
- [ ] $1M–3.5M
- [ ] $3.5M–7M
- [ ] $7M–10M
- [ ] >$10M

b. NUMBER OF EMPLOYEES *(Total for entire facility excluding outside contractors)*

c. NUMBER OF BEDS

d. WOULD YOU BE WILLING TO FURNISH COST INFORMATION *(Dollar and/or staff hours)* ON THE ECONOMIC IMPACT OF CURRENT NRC REGULATIONS OR ANY FUTURE PROPOSED NRC REGULATIONS THAT MAY AFFECT YOU? *(NRC regulations permit it to protect confidential commercial or financial–proprietary–information furnished to the agency in confidence)*

- [ ] YES
- [ ] NO

FOR NRC USE ONLY

TYPE OF FEE	FEE LOG	FEE CATEGORY	COMMENTS	APPROVED BY

AMOUNT RECEIVED	CHECK NUMBER		DATE

PRIVACY ACT STATEMENT ON THE REVERSE

PRIVACY ACT STATEMENT

Pursuant to 5 U.S.C. 552a(e)(3), enacted into law by section 3 of the Privacy Act of 1974 (Public Law 93-579), the following statement is furnished to individuals who supply information to the Nuclear Regulatory Commission on NRC Form 313. This information is maintained in a system of records designated as NRC-3 and described at 40 Federal Register 45334 (October 1, 1975).

1. **AUTHORITY:** Sections 81 and 161(b) of the Atomic Energy Act of 1954, as amended (42 U.S.C. 2111 and 2201(b)).

2. **PRINCIPAL PURPOSE(S):** The information is evaluated by the NRC staff pursuant to the criteria set forth in 10 CFR Parts 30, 32, 33, 34, 35 and 40 to determine whether the application meets the requirements of the Atomic Energy Act of 1954, as amended, and the Commission's regulations, for the issuance of a radioactive material license or amendment thereof.

3. **ROUTINE USES:** The information may be (a) provided to State health departments for their information and use; and (b) provided to Federal, State, and local health officials and other persons in the event of incident or exposure, for their information, investigation, and protection of the public health and safety. The information may also be disclosed to appropriate Federal, State, and local agencies in the event that the information indicates a violation or potential violation of law and in the course of an administrative or judicial proceeding. In addition, this information may be transferred to an appropriate Federal, State, or local agency to the extent relevant and necessary for an NRC decision or to an appropriate Federal agency to the extent relevant and necessary for that agency's decision about you.

4. **WHETHER DISCLOSURE IS MANDATORY OR VOLUNTARY AND EFFECT ON INDIVIDUAL OF NOT PROVIDING INFORMATION:** Disclosure of the requested information is voluntary. If the requested information is not furnished, however, the application for radioactive material license, or amendment thereof, will not be processed. A request that information be held from public inspection must be in accordance with the provisions of 10 CFR 2.790. Withholding from public inspection shall not affect the right, if any, of persons properly and directly concerned need to inspect the document.

5. **SYSTEM MANAGER(S) AND ADDRESS:** U.S. Nuclear Regulatory Commission
   Director, Division of Fuel Cycle and Material Safety
   Office of Nuclear Material Safety and Safeguards
   Washington, D.C. 20555

SENECA ARMY DEPOT

APPLICATION FOR MATERIAL LICENSE

Supplement 5

Radioactive Material.

a. Element and Mass Number	b. Chemical and Physical Form (Including 0/0 U)	c. Maximum Amount to be Possessed at any one time.
Uranium, depleted in the U235 Isotope	Alloy: 99.25% U238 0.75% Titanium Solid: 99.25% U238	4,082,400 kg 17,601,617 pounds

The staballoy penetrator, encapsulated in the projectile of 30mm cartridges, models PGU 14/B, PGU 14A/B and PGU 14B/B, is a low specific activity material weighing approximately 298.6 grams and consists of 99.25% depleted uranium and 0.75% titanium. The depleted uranium contains not more than 0.711% U235, the remainder being U-238. The specific activity is approximately 99.4 micro curies per round or 3.33×10^{-7} curies per gram.

SENECA ARMY DEPOT

APPLICATION FOR MATERIAL LICENSE

SUPPLEMENT 6

1. Purposes for which licenses material will be used:

a. The 30mm Depleted Uranium ammunition will be received, stored, inspected, shipped and demilitarized.

b. Armor piercing projectiles will be received from Aerojet Ordnance and Manufacturing Company, Downey, California (California License 1450-36), or Honeywell, New Brighton, Minnesota (USNRC License SUB971) as integral components of 30mm PGU-14 series Armor Piercing Incendiary (API) ammunition. Each projectile contains approximately 4,650 grains (0.68 pounds) of extruded DU alloyed with 0.75% by weight of Titanium in the form of a cylindrical penetrator 4.5 inches long and having a maximum diameter of 0.633 inch. The penetrator is seated in an aluminum base and is completely contained within an aluminum jacket.

b. DU which results from refining raw uranium ores and enrichment in gaseous diffusion plants contains about 0.3 percent by weight of U-235, 0.0002 percent U-234 and the remainder U-238. All other radioactive daughter products such as radium and radon are removed during the refining process. Since the DU penetrator is completely encapsulated and is an integral component of the PGU-14 series ammunition, radiation levels exterior to the projectile, storage box and pallet under normal operating conditions is such that personnel monitoring is not routinely required. Unusual circumstances, or other deviations from routine handling procedures may present a minimal radiation hazard. Such circumstances will be assessed by the local Radiation Protection Officer and appropriate administration protective measures instituted to insure compliance with non-occupational whole body exposure limit of 0.5 rem per year. If operational considerations do not permit such administrative limitations, appropriate personnel dosimetry will be instituted and controls established to insure compliance with occupational limits.

2. Transportation.

a. The PGU-14 series 30mm ammunition is packaged either 36 rounds per M548 container or in an ratio of five PGU-14 series rounds to one round of PGU-13 series High Explosive Incendiary (HEI) ammunition in CNU-309/E containers.

b. When the ammunition is ratio packed, there will be a total of 575 rounds per CNU-332/E container or 588 rounds per CNU-309/E container. Thus, there will be a maximum of 490 rounds of PGU-14 series ammunition when ratio packed in the CNU-309/E container.

c. The ammunition, when ratio packed, is shipped under a U.S. Department of Transportation (DOT) Exemption Number DOT-E-8101. This

exemption authorizes the ammunition to be shipped without a radioactive placard for specific modes of transport. It also authorizes the ammunition to be shipped without requiring that the CNU-309/E or CNU-332/E containers be labeled or marked as containing radioactive material.

d. Ammunition received at Seneca Army Depot will be monitored by a Quality Assurance Specialist (Ammunition Surveillance). Ammunition shipped by Seneca Army Depot will be randomly swiped by the Radiological Protection Officer (RPO) or a designated individual. A 30 pound MET-L-X fire extinguisher will be present when operations with 30mm API ammunition are conducted.

3. Storage.

a. The following general requirements have been established at Seneca Army Depot for the storage of 30mm APIT ammunition and other explosive item.

b. Packing material, empty boxes, tools, handling equipment or any miscellaneous material will not be stored in igloos containing explosives.

c. Containers of different lots will be stacked separately and the separation between lots shall be clearly defined.

d. Sealed containers shall not be opened except for issue or inspection.

e. Incomplete packages will be securely closed and properly marked to identify contents and quantity.

f. Only earth-covered igloos will be used for storage of 30mm APIT ammunition.

g. Igloos containing APIT ammunition will be kept locked at all times except when authorized operations are in progress. Keys to the igloos will be under positive control at all times.

4. Inventory. A 100 percent inventory/location survey will be conducted at least annually. The inventory will be based on container count; individual containers will not be opened. An annual radiological survey will be performed by or under the supervision of the RPO to assure radiological safety.

5. Inspection. The Directorate for Quality Assurance will conduct the following technical inspections.

a. Initial Receipt Inspection. This type inspection will be conducted on all material received from manufacturer. Inspection will be limited to the visual inspection of a sample size that is expected to indicate gross manufacturer error. The Air Force GFU 7/E, GFU 8/E Loader/Unloader will be used to facilitate inspections.

b. Receipt Inspection. This type inspection will be conducted on all material returned from using units. Inspection will be limited to that visual inspection necessary for the assignment of a true ammunition condition code. Contents of unsealed and/or damaged containers will be inspected 100%. Radiac meters will be immediately available for use.

c. Periodic Inspection (Cyclic). This type inspection will be conducted biannually of each lot in storage. Inspection will be limited to the visual inspection of a sample size that is expected to reveal deterioration. Radiac meters will be immediately available for use.

d. Magazine Inspection. This inspection is conducted every six months to assure proper storage conditions are maintained. In addition to the visual inspection of the structure, the lightning protection system is tested for grounding adequacy every twelve months.

e. Safety in Storage. This inspection will be conducted on unserviceable, uneconomically repairable stock to assure continued safe storage.

6. Demilitarization. Demilitarization will consist of removing DU projectile assembly from the aluminum cartidge case. The DU penetrator will remain encapsulated in the aluminum windscreen and aluminum body, and will then be disposed of, either by transfer to an NRC license or to an authorized burial site.

DESCRIPTION OF OPERATIONS

OPERATION	MAX AMT OF CARTRIDGES PER OPERATION	HAZARD	CONTROL
Transportation a) Receipt, each vehicle b) On-Post, each vehicle c) Shipment, each vehicle	 52,000 52,000 52,000	No internal/external radiation hazard. Slight internal hazard if punctured.	Compliance with Title 49 CFR. Normal explosive safety practice, e.g. selection and training of drivers and handlers. Radiation monitoring of unusual situations.
Storage	245,000 ctgs. per igloo	No internal/external hazard except in the event of a fire or explosion.	Normal explosive safety procedures to minimize risk. Igloos are designed to prevent sympathetic detonation. Combustible material will be kept at a minimum to minimize fire hazards.
Inventory	245,000 ctgs per igloo	No internal/external hazard.	Limited to count of exterior containers.
Inspection	1176 ctgs. per operating bay. 5750 ctgs. per holding bay.	No internal/external hazard.	Personnel may wear normal protective clothing and have available radiac monitoring equipment in the event a hazardous condition is discovered; i.e., windscreen damaged. Monitoring of storage area by RPO will greatly reduce the possibility of inspection personnel being exposed to excessive radiation.
Demilitarization	40,000 ctgs. per bldg.	Low internal/external hazard.	Local ventilation systems will be used to prevent possible airborne contamination, if required.

DEPARTMENT OF TRANSPORTATION
RESEARCH AND SPECIAL PROGRAMS ADMINISTRATION
WASHINGTON, D.C. 20590

DOT-E 8101
(SECOND CORRECTED COPY)

1. The U.S. Department of Defense, Washington, D.C., is hereby granted an exemption from those provisions of this Department's Hazardous Materials Regulations specified in paragraph 5 below to offer packages prescribed herein of a Class B explosive containing a low specific activity radioactive material in the same outside shipping container with a Class A explosive for transportation in commerce subject to the limitations and special requirements specified herein. This exemption authorizes the use of the EXPLOSIVES A placard only when 30mm GAU-8 (PGU-14/B) armor piercing ammunition, containing a depleted uranium metal projectile, is loaded in the same shipping container with PGU-13/B ammunition, which is Class A explosives, relieves the need to label and mark the packages as containing radioactive material, and provides no relief from any regulation other than as specifically stated.

2. BASIS. This exemption is based on The Department of Defense's application dated August 28, 1978, and supplemented by letters dated June 6, 1979, and June 4, 1980, submitted in accordance with 49 CFR 107.103 and the public proceeding thereon.

3. HAZARDOUS MATERIALS (Descriptor and Class). Ammunition for cannon with solid projectile, Class B explosive; Ammunition for cannon with explosive projectile, Class A explosive.

4. PROPER SHIPPING NAME (49 CFR 172.101). Ammunition for cannon with explosive projectile.

5. REGULATION AFFECTED. 49 CFR 173.87, 173.392(c)(7), 173.392(c)(8).

6. MODES OF TRANSPORTATION AUTHORIZED. Motor vehicle, rail freight, and cargo vessel.

7. SAFETY CONTROL MEASURES. Packaging prescribed is the USAF designated CNU-309/E and CNU-332/E, 30mm Ammunition Shipping and Storage Container, appropriate drawings thereof on file with the Office of Hazardous Materials Regulation (OHMR). Each shipping container used under this exemption must be approved in accordance with 49 CFR 173.7(a) by container certification AF-78-51.

8. SPECIAL PROVISIONS

a. A RADIOACTIVE placard is not required on shipping containers transported under this exemption nor are the packages required to be marked or labeled as containing radioactive materials.

b. Shipping documents must be marked: "Packaged IAW 173.7(a) of 49 CFR by authority of Certification Control No. AF-78-51", in addition to other information required by Subpart C of 49 CFR Part 172.

c. The control and loading of materials transported under this exemption shall be carried out with minimum delay and stowage shall be as far as practicable from crews quarters or other regularly occupied areas and in no case closer than 20 feet to these areas unless it can be demonstrated that the radiation dose rate in these areas does not exceed 0.75 millirem per hour.

d. A copy of this exemption must be carried aboard each motor vehicle or vessel used to transport packages covered by this exemption.

e. Persons who receive packages covered by this exemption may reship them pursuant to the provisions of 49 CFR 173.22a.

9. REPORTING REQUIREMENTS. Any incident involving loss of contents of the packages must be reported to the OHMR as soon as practicable.

10. EXPIRATION DATE. November 30, 1980.

Issued at Washington, D.C.:

J R Grothe for

Alan I. Roberts
Associate Director for
Hazardous Materials Regulation
Materials Transportation Bureau

13 JUN 1980
(DATE)

Address all inquiries to: Associate Director for Hazardous Materials Regulation, Materials Transportation Bureau, Research and Special Programs Administration, U.S. Department of Transportation, Washington, D.C. 20590. Attention: Exemptions Branch.

Dist: FHWA, FRA, USCG

U.S. Department
of Transportation

Research and
Special Programs
Administration

400 Seventh Street, S.W.
Washington, D.C. 20590

DOT-E 8101 (EXTENSION)

In accordance with 49 CFR 107.105 of the Department of Transportation (DOT) Hazardous Materials Regulations DOT-E 8101 is hereby extended by changing the expiration date in paragraph 10 from September 10, 1984 to September 1, 1986.

This extension applies only to party(s) listed below based on the application(s) received in accordance with 49 CFR 107.105. All other terms of the exemption remain unchanged. This extension forms part of the exemption and must be attached to it.

SEP 18 1984

Alan I. Roberts
Associate Director for
Hazardous Materials Regulation
Materials Transportation Bureau

(DATE)

Dist: FHWA FRA USCG

EXEMPTION HOLDER	APPLICATION DATE
U. S. Department of Defense Washington, DC	June 18, 1984

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS ARMAMENT DIVISION (AFSC)
EGLIN AIR FORCE BASE, FLORIDA 32542

AD CONTAINER CERTIFICATION

AF-78-51
(REISSUED)

This Certification of Equivalency is issued pursuant to 49 CFR 173.7(a) of the Department of Transportation Hazardous Materials Regulations, under authority established in AFR 80-18 and AFSC/AFLC Regulation 800-29.

1. CONTAINERS. Two container configurations are authorized: (a) CNU-309/E 30mm Ammunition ALS Container, Wayne Colony Dwg No. 1444J050, assembled in pairs strapped and dunnaged to AF Dwg No. 785040, Rev B, and (b) CNU-332/E 30mm Ammunition Shipping and Storage Container, Wayne Colony Dwg No. 1444J050, Rev R, assembled in pairs to Wayne Colony Dwg No. 5073K107-1.

2. COMMODITY. GAU-8, 30mm ammunition for cannon with explosive projectiles and ammunition for cannon with solid projectiles, configured in model and series designated as PGU-13, PGU-14, and PGU-15. Proper shipping name: Ammunition for cannon with explosive projectile.

3. TEST REPORTS. Rough Handling Test Report No. 43777-1, Wyle Laboratories dated 5 Dec 77. ADTC/SD3T Test Report, dtd 11 Oct 78. AFALD/PTPD Test Report No. 79-12, dtd Jul 79. Vibration Test Report 44778-1, Wyle Laboratories, dtd 15 Sep 79. Radiation Measurements Report, AFWL/DYV dtd 18 Sep 79. Radiation Survey Report, AFWL/DY, dtd 3 Jan 79. WHCC Drop Test Report, dtd 6 Mar 80.

4. SPECIAL PACKAGING REQUIREMENTS.

a. Validate container packing and marking procedures to TO 11A13-14-7. CNU-332/E will utilize interior dunnage consisting of cushion described in AF Dwg 785040 or empty linked tube carriers described in WHCC Dwg 5073K107-1.

b. Container will be marked with Certification Control No: AF-78-51.

c. Container CNU-309/E will be unitized to AF Dwg 785040, Rev B. Container CNU-332/E will be unitized to Wayne Colony Dwg 5073K107.1.

5. SPECIAL TRANSPORTATION REQUIREMENTS.

a. Department of Transportation Exemption DOT-E-8101 (second corrected copy), dated 13 June 80, is incorporated by reference and made a part of this certification.

b. A copy of DOT-E-8101 exemption must be carried aboard each motor vehicle or vessel used to transport authorized containers.

c. DOD Hazard Classification for GAU-8 30mm Ammunition, AFISC/SEV letter, dated 25 Jun 79, is incorporated by reference and made a part of this certification.

d. Shipping documents will be marked: Packaged IAW 173.7(a) of 49 CFR by authority of Certification Control No. AF-78-51.

e. Containers will be loaded, blocked and braced on transport equipment IAW AF Dwg AF796129 for motor vehicles and Army Dwg 19-48-7062-SP5M7 for railcars.

6. REPORTING REQUIREMENTS. Any change to containers affecting configuration on performance will be coordinated for approval by the certifying office. Any incident involving loss of contents of the containers must be reported to the certifying office and as required by DOT-E-8101 exemption.

7. ADTC Container Certification AF-78-51, dated 19 Nov 79, is cancelled by this reissued certification.

NEAL P. CROSSON
Project Engineer
AD/SD3E

DAVID R. WOLZ
Transportability Agent
AD/SD3P

FRED H. CARLEY
Chief, Packaging and Transportation Division
Munitions SPO

DATE OF CERTIFICATION: 13 June 1980

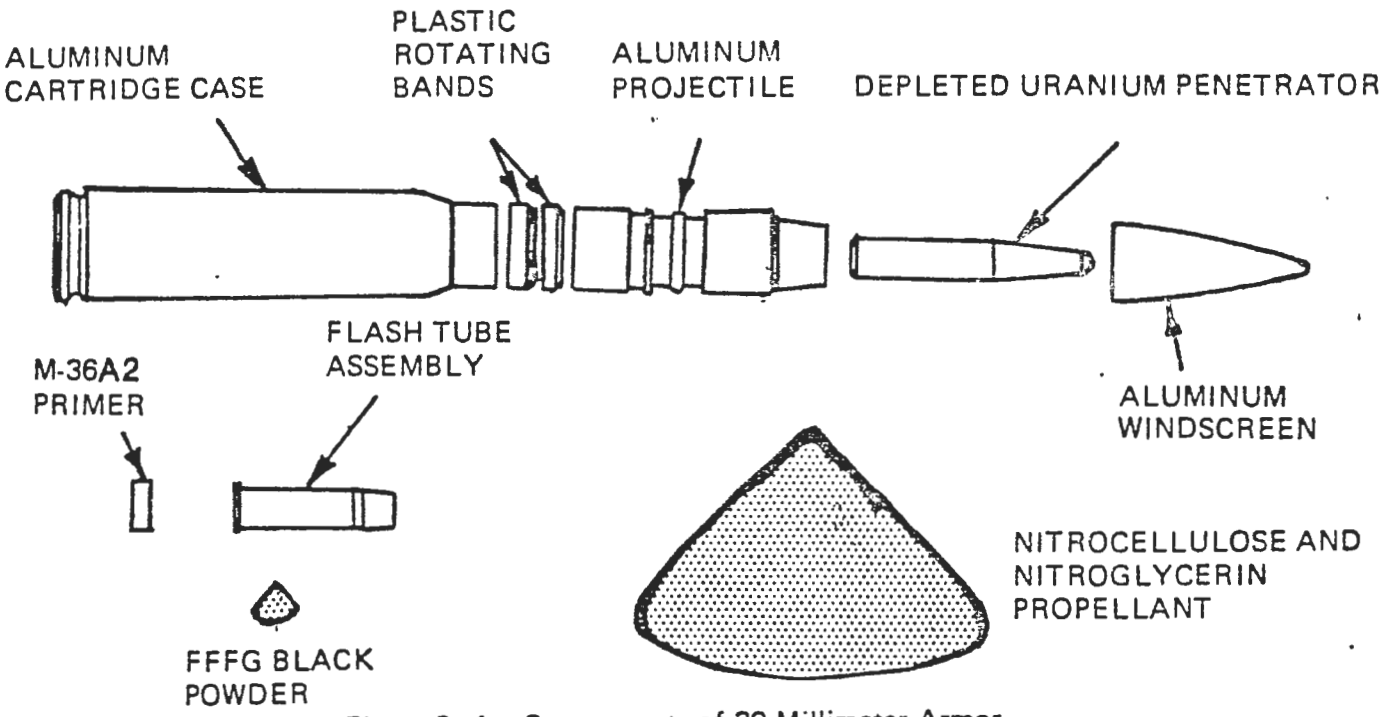
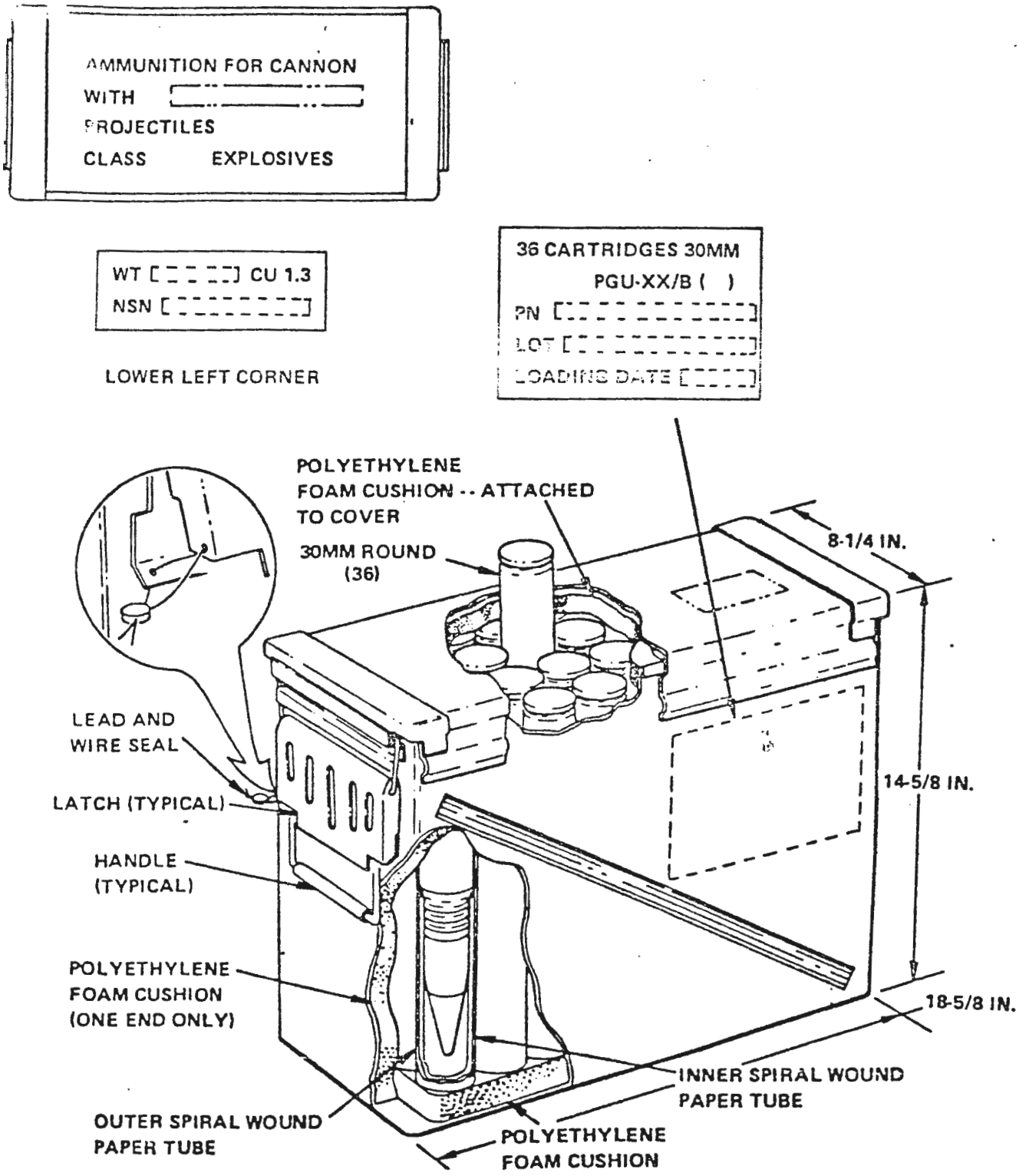


Figure 2–1. Components of 30 Millimeter Armor Piercing Incendiary Tracer Cartridge PGU–14/B (Aerojet)



, M548 Shipping Container Outer Package/Markings

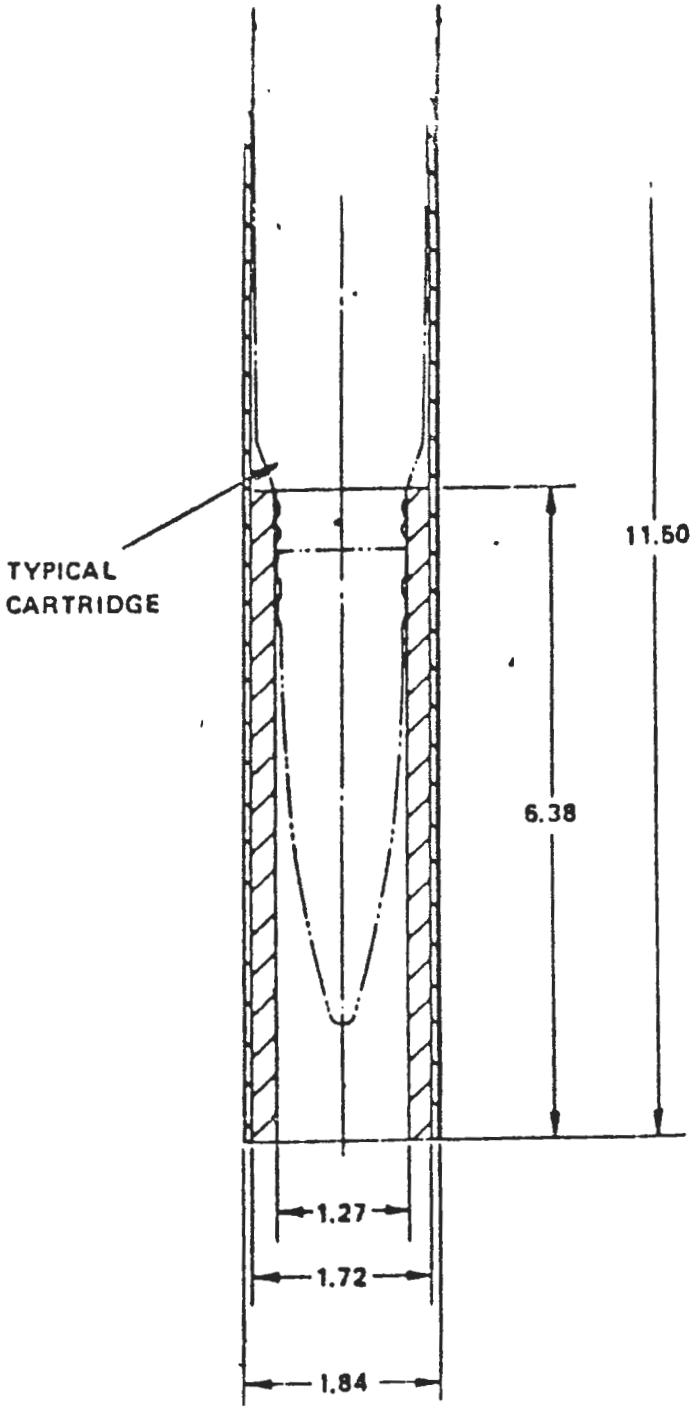
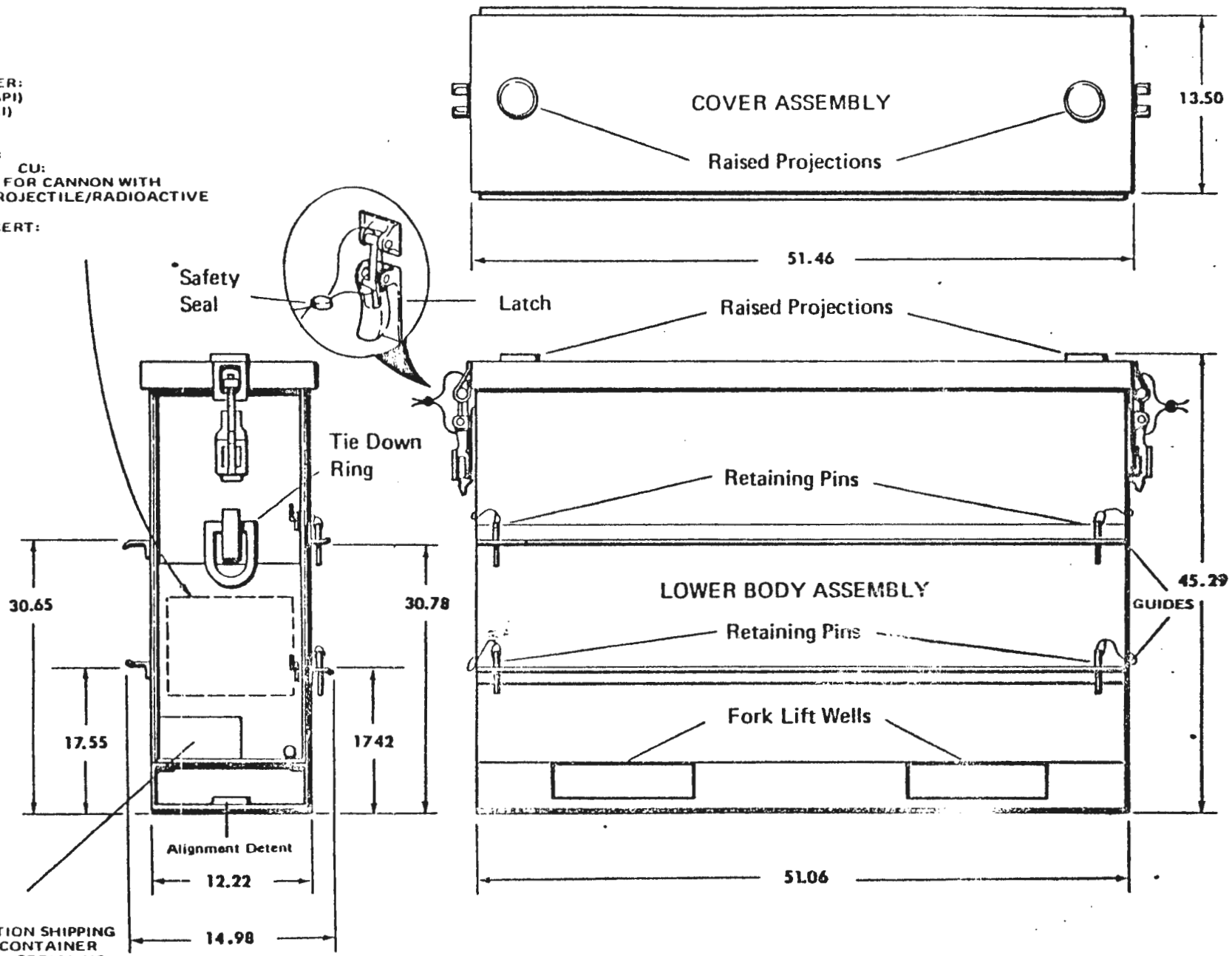


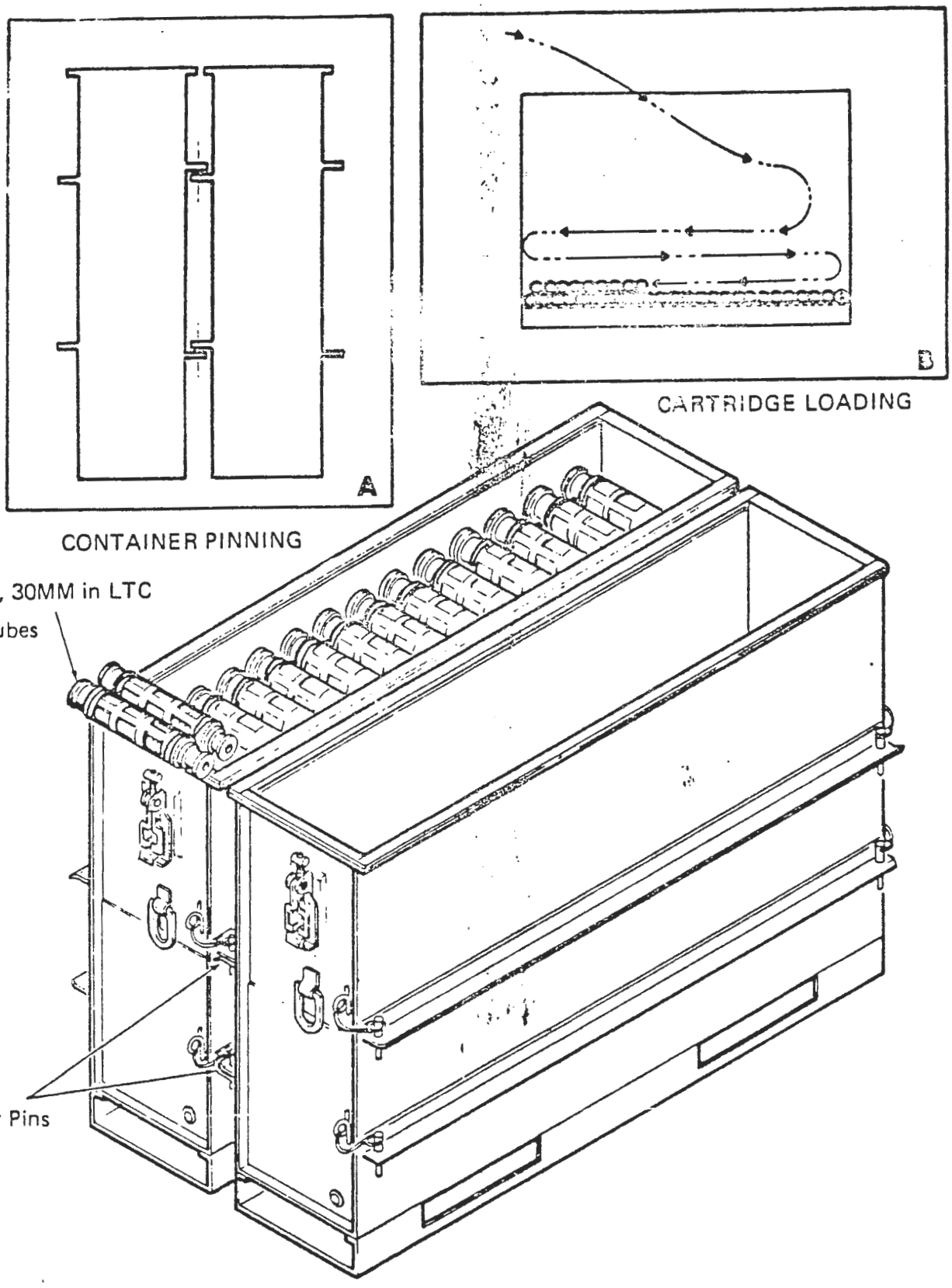
Figure 2- 6. Inner Pack for 30 Millimeter Cartridges

STOCK NUMBER:
PGU-14A/B (API)
PGU-13/B (HEI)
QUANTITY:
PACKED:
LOT NUMBER:
WEIGHT: CU:
AMMUNITION FOR CANNON WITH
EXPLOSIVE PROJECTILE/RADIOACTIVE
LSA
CONTAINER CERT:

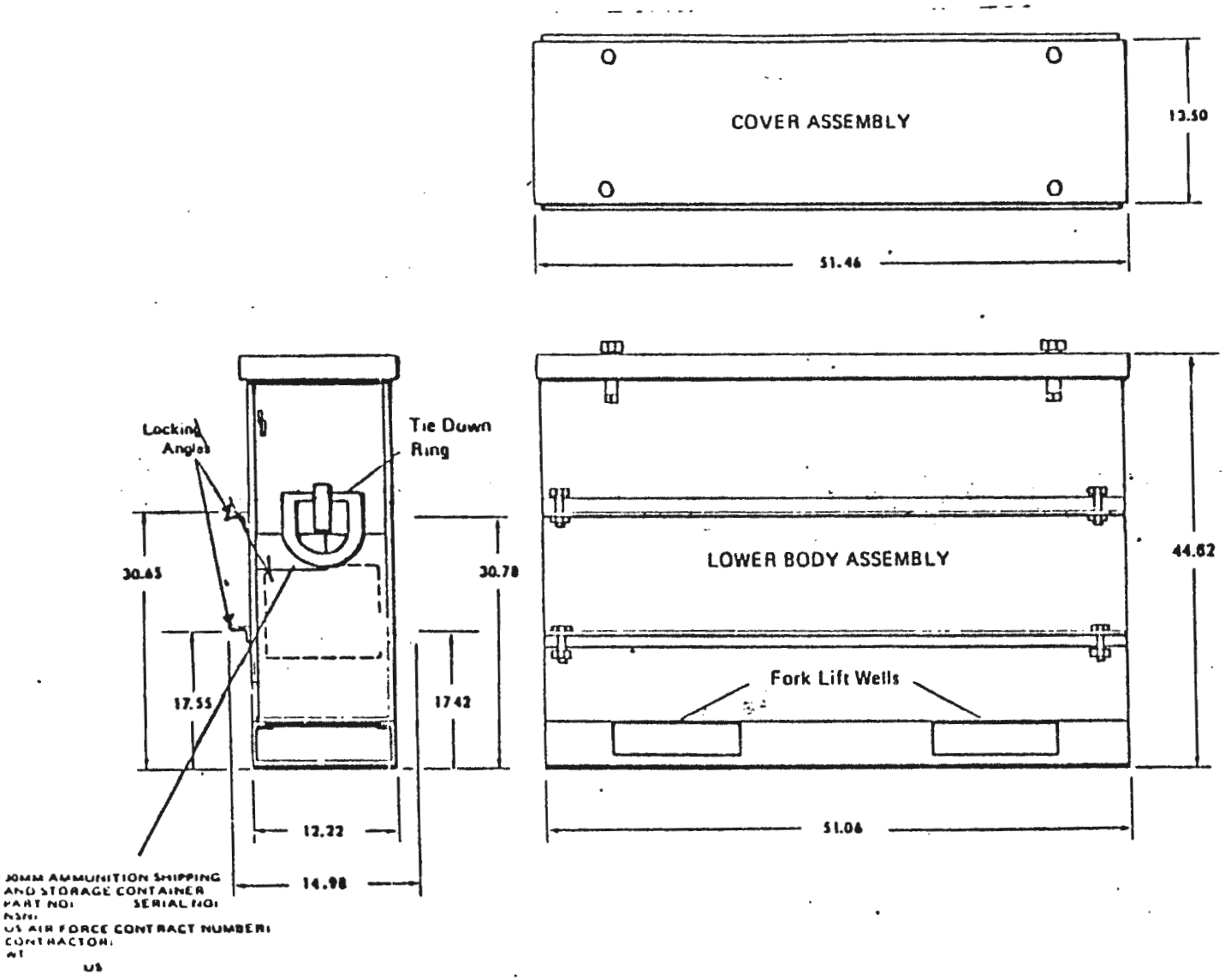


30MM AMMUNITION SHIPPING
AND STORAGE CONTAINER
PART NO: SERIAL NO:
NSN:
US AIR FORCE CONTRACT NUMBER:
CONTRACTOR:
WT:
US

CNU -309/E Shipping and Storage Container Outer Package/Marking



CNU–309/E Shipping and Storage Container



CNU 332/E Shipping ar. Storage Container

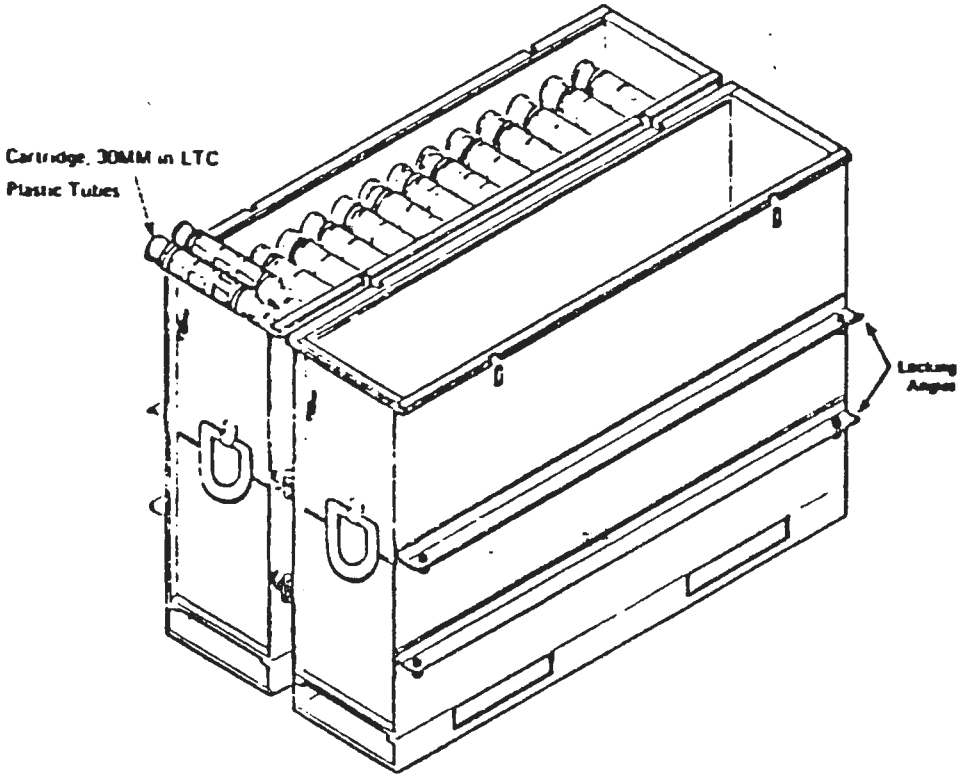


Figure 2-24 CNU 332/E Shipping and Storage Container Inner Pack

SENECA ARMY DEPOT
ROMULUS, NEW YORK 14541-5001

RADIOLOGICAL PERSONNEL TRAINING AND EXPERIENCE RESUME

SUPPLEMENT 7

Individuals responsible for Radiation Safety. Their training and experience.

The Radiological Protection Officer is Thomas J. Stincic. The alternate Radiological Protection Officer is Michael R. Lewis. The supervisors for Depleted Uranium operations are Phillip Wilkie and John Hennessey.

NAME: Thomas J. Stincic

1. Type Training:

a. Principles and Practices of Radiation Protection.

b. Radioactivity Measurement Standardization, Monitoring Techniques and Instruments.

c. Mathmatics and Calculations Basic to the Use and Measurements of Radioactivity.

d. Biological Effects of Radiation.

e. Safety practices applicable to protection from the radiation, chemical toxicity and pyrophoric and explosive property of source materials.

TYPE	WHERE TRAINED	DURATION	OJT	FORMAL
A,B,C,D	AMC Ammunition School, Savanna Army Depot Activity	2 weeks 1-12 Aug 77	Yes	Yes
A,B	AMC Ammunition School, SEAD	2 days 16-17 Feb 78	No	Yes
A,B,C,D	Oak Ridge Associated Universities	1 week 23-27 Jan 78	Yes	Yes
A	Defense Nuclear Agency/DOE Nevada Test Site NUWAX-79	3 days 18-20 Apr 79	Yes	No
A,B,C,D	Defense Nuclear Agency, Kirland, AFB NETEX	1 week 16-20 Jul 79	Yes	Yes

A,B,C,D,E	Eberline Corp Santa Fe, NM	1 week 7-11 Apr 80	Yes	Yes
A,B,C,D	SEAD-by Leo Foley AMC FSA	2 weeks 10-21 Aug 81	No	Yes
A,B,C,D	SEAD-by Thomas Grucci AMC	2 weeks Oct 81	No	Yes
A,B,D	RMC Technical Svcs Ft. Belvoir, VA	1 week 9-13 Jan 84	No	Yes
A,B,C,D,E	Pacific NW Labs Ft. Belvoir, VA	1 week 5-9 Mar 84	No	Yes
A,B,C,D	General Hlth Physics Ft. Belvoir, VA	2 weeks 9-20 July 84	No	Yes
A,B,D	AFFTREX, LTD Ft. Belvoir, VA	1 week 14-18 Jan 85	No	Yes

2. Experience:

ACTIVITY	SITE	DURATION	RESPONSIBILITY
SW Munitions Storage	Seneca	2 Years	Alpha Team Chief
Depleted Uranium Storage	Seneca	Jul 80/present	Radiation Safety
Radioactive Source Set M3A1	Seneca	Jul 80/present	Radiation Safety
Radiac Calibrator AN/ UDM-6	Seneca	Jul 80/present	Radiation Safety
Columbite Concentrate Storage 1400 tons	Seneca	Jul 80/present	Radiation Safety
Radiac Calibrator AN/ UDM-2	Seneca	Jul 80/present	Radiation Safety
Radiological Decontamination of Pitchblende Ore.	Seneca	Jul 85	Radiation Safety

SENECA ARMY DEPOT
ROMULUS, NEW YORK 14541-5001

RADIOLOGICAL PERSONNEL TRAINING AND EXPERIENCE RESUME

SUPPLEMENT 7

NAME: Michael R. Lewis

1. Type Training:

a. Principles and Practices of Radiation Protection.

b. Radioactivity Measurement Standardization, Monitoring Techniques and Instruments.

c. Mathmatics and Calculations Basic to the Use and Measurements of Radioactivity.

d. Biological Effects of Radiation.

e. Safety practices applicable to protection from the radiation, chemical toxicity and pyrophoric and explosive property of source materials.

TYPE	WHERE TRAINED	DURATION	OJT	FORMAL
A,B,C,D	AMC Ammunition School, Savanna Army Depot Activity	2 weeks 1-12 Aug 77	Yes	Yes
A,B,C,D	Defense Nuclear Agency Kirkland, AFB, NETEX	1 week 7-11 May 79	Yes	Yes
A,B,C,D	Defense Nuclear Agency Kirkland, AFB, NETEX	1 week 16-20 Jun 80	Yes	Yes
A,B,C,D	U.S. Army, Ft McClellan, AL, Radiological Safety	3 weeks 21 Jan-10 Feb 81	Yes	Yes
A,B,C,D,E	Pacific NW Labs Ft. Belvoir, VA	1 week 5-9 Mar 84	No	Yes
A,B,C,D	General Health Physics Ft. Belvoir, VA	2 weeks 9-20 Jul 84	No	Yes
A,C	Chemical Nuclear Systems, Inc. Seminar Columbia, South Carolina	1 week 22-26 Apr 85	No	Yes

2. Experience:

ACTIVITY	SITE	DURATION	RESPONSIBILITY
SW Munitions Storage	Seneca	Aug 77 to May 80	Alpha Team Member
Depleted Uranium	Seneca	Feb 81 to present	Alternate RPO

NAME: Phillip Wilkie

TYPE	WHERE TRAINED	DURATION	OJT	FORMAL
A,B,C,D,E	Pacific NW Labs Ft. Belvoir, VA	1 week 5-9 Mar 84	No	Yes

NAME: John Hennessey

A,B,C,D,E	Pacific NW Labs Ft. Belvoir, VA	1 week 5-9 Mar 84	No	Yes

SENECA ARMY DEPOT
ROMULUS, NEW YORK 14541-5001

APPLICATION FOR MATERIAL LICENSE

SUPPLEMENT 8

Training for individuals working in or frequenting restricted areas:

1. Annual training for all individuals who work with depleted uranium munitions is conducted by the Radiological Protection Officer, Mr. Thomas J. Stincic.

2. Training at Seneca Army Depot is outlined as follows:

a. Identification of licensed radioactive materials and radiological hazards present in the restricted area to be entered by the individual.

(1) Description of the 30mm API round.

(2) Internal hazards - none if round is not broken open or involved in a fire.

(3) External hazards - minimal gamma radiation, confirmed by surveys.

b. Precautions and procedures to minimize exposures and the spread of contamination.

(1) ALARA concept.

(2) Use of time - do work quickly.

(3) Use of distance - work around containers as needed then keep one meter away.

(4) Loading/unloading and storage - stress safe use of MHE to avoid puncturing containers, thereby exposing DU.

(5) Firefighting - may fight incipient fires but must call fire department. Must withdraw 2000 feet upwind.

c. Purposes and functions of protective devices required. None required.

d. Applicable NRC regulations to be observed by individuals working in or frequenting restricted area.

(1) Health protection - applicable if aluminum windshield is broken or if DU is involved in a fire.

(2) Procedures to minimize exposure - already covered.

(3) No protective devices.

(4) Reporting to the licensee any condition which may lead to or cause a violation of Commission regulations and licenses or unnecessary exposure to radiation or radioactive materials.

(5) Appropriate responses to warnings made in the event of any unusual occurrence or malfunction that may involve exposure to radiation or radioactive material - emergency procedures.

(6) Radiation exposure reports and worker's rights to obtain them. Will explain that exposure levels are so low that film badges are not required.

(7) Presence of representatives of licenses and workers during inspections.

(8) Consultation with workers during inspections.

(9) Requests by workers for inspections.

(10) Employee protection.

e. Terms of NRC license applicable to employees working in or frequenting restricted areas.

(1) Why fim badges are not required.

(2) Emergency procedures.

f. Standing operating and emergency procedures to be followed by individuals working in or frequenting restricted areas.

(1) SOP's must be read and understood prior to the start of an operation.

(2) Emergency procedures will be discussed.

g. Responsibility of individuals to report unsafe acts or conditions observed in restricted areas. (Discussed in para d above).

h. Rights of employees to receive radiation exposure reports upon request. (Discussed in para d above).

3. Testing will be accomplished by written test.

4. Participation will be recorded by DD Form 1556 which will be on file at the Civilian Personnel Office.

TEST FOR DU TRAINING

1. What round, that is stored at Seneca Army Depot, has a Depleted Uranium penetrator?

   a. 105mm HEAT-T

   b. 20mm Phalanx

   c. 30mm APIT

   d. 120mm AP

2. You are exposed to "internal hazards" when you handle Depleted Uranium ammunition.

   a. True

   b. False

3. Define ALARA - as low as Reasonably Achievable.

4. You can keep your exposure to a minimum by:

   a. Working quickly.

   b. Stay around the containers only as long as is necessary.

   c. Keeps one meter from the containers when possible.

   d. All of the above.

5. What is the approved fire extinguisher for DU?

   a. Carbon Dioxide.

   b. Light water.

   c. MET-L-X.

   d. Dry Chemical.

6. There is an NRC requirement to report any condition which may lead to or cause a violation of Commission regulations.

   a. True.

   b. False.

7. What should you do if you see an incipient fire involving DU ammunition?

a. Sound alarm.

b. Try to extinguish with approved MET-L-X extinguisher.

c. Evacuate 2000 feet upwind.

d. All of the above.

8. If you see an NRC Inspector making an official inspection you may not talk to him/her.

a. True.

b. False.

9. If you believe that a violation of NRC rules and regulations or of Seneca Army Depot's NRC License has occurred with regard to radiological working conditions, you may request an inspection by giving notice of the alleged violation to the NRC.

a. True.

b. False.

10. Film badges are not required because radiation levels associated with the DU Ammunition are too low.

a. True.

b. False.

SENECA ARMY DEPOT

APPLICATION FOR MATERIAL LICENSE

Supplement 10

RADIATION SAFETY PROGRAM

1. Personnel Monitoring Devices. Since the DU penetrator is completely encapsulated and is an integral component of the PGU-14 series ammunition, radiation levels exterior to the projectile, storage box and pallet under normal operating conditions is such that personnel monitoring is not routinely required. Unusual circumstances, or other deviations from routine handling procedures may present a minimal radiation hazard. Such circumstances will be assessed by the local Radiation Protection Officer and appropriate administrative protective measures instituted to insure compliance with non-occupational whole body exposure limit of 0.5 rem per year. If operational considerations do not permit such administrative limitations, appropriate personnel dosimetry will be instituted and controls established to insure compliance with occupational limits. The standard Army film badge will be available and will be exchanged on a monthly basis.

2. Bioassays will not normally be required because the depleted uranium penetrator is completely encapsulated in the aluminum projectile, thereby eliminating any chance of internal disposition.

3. Surveys and Monitoring. Radiation surveys of the DU storage igloos will be performed on an annual basis, by or under the direction of the Radiological Protection Officer. Records of surveys shall be maintained by the Radiological Protection Officer and shall include results, instruments used, name of survey or corrective action taken and dates. Radiation surveys of the DU inspection and maintenance/demil bays will be performed on a quarterly basis by or under the direction of the Radiological Protection Officer. Records shall be maintained as above.

4. Radiation Detection Instuments:

A	B	C	D
Type of Instrument	Number Available	Radiation Detected	Sensitivity Range
Eberline PRS-1 0.5 mg/cm2	1	alpha	0-999999 cpm
Eberline PRS-1 30 mg/cm2	1	beta/gamma	0 - 80 mR/hr
Ludlum Model 19	2	gamma	0-5000 microR/hr
AN/PDR-27 0.0005 inch	2	beta/gamma	0-500 mR/hr

Ludlum Model 3 1 mg/cm2	10	alpha	0-500000 cpm
Ludlum Model 3 1.5 to 2 mg/cm2	5	beta/gamma	0-200 mR/hr
AN/PDR-54 0.00025 inch	2	alpha	0-100000 cpm
Nuclear Measurements Corp PC-5 Counter 0.9 mg/cm2	2	alpha/beta/gamma	10-7 cpm

The depot has 3 each Staplex Model TFIA-27, High Volume air samplers.

Radiac instruments will be calibrated so that readings are plus, minus 20% of the actual values over the range of the instrument. A calibration chart is affixed to each meter and shows the results of the calibration. A DA Label 80 is also affixed to each meter which shows the date of last calibration and due date of next calibration. All radiac instruments will be calibrated at 90 or 180 day intervals and after maintenance. Calibration records will be kept for a minimum of 2 years after calibration. Calibration is performed by the Test, Measurement and Support Operation (TSO) - Seneca.

5. Radiation Safety Program. a. Seneca Army Depot's SEADR 385-1, Chapter 9, Radiation Safety is enclosed (Encl 1).

b. Standing Operating Procedures, SDSSE-60 and SE-AOOO-R-305 are enclosed (Encl 2&3). At present, Seneca requires the use of a film badge when working with depleted uranium. If approved, the requirement for film badges will be deleted.

c. Annex E, Seneca Army Depot's Disaster Control Plan is enclosed to illustrate emergency procedures (Encl 4).

d. Formats or forms used by Seneca Army Depot personnel to record:

(1) Results of personnel monitoring - test form WR AMC-082 (Encl 5).

(2) Results of radiological instrument calibrations - XSE-HQ Form 16, Radiac Instrument Data Sheet (Encl 6).

(3) Results of radiological surveys are recorded on the Radiation Survey Sheet (Encl 7).

(4) Quantities of radioactivity in effluents would be recorded on a Disposition Form, DA 2496.

(5) Inventories (receipts, transfers and disposals) of source materials (DU ammunition) are handled by the Directorate for Ammunition Operation. Receipts are documented on either DD Form 250 or DD Form 1348. Transfers or disposals are documented on DD Form 1348. Records are

maintained in the Standard Depot System Computer.

(6) Accident and incident investigation reports are done in accordance with AR 385-40, Accident Reporting and Records, Chapter 10, Ionizing Radiation Accidents/Incidents (Encl 8).

(7) Audits and evaluation of the radiation safety program are conducted by higher headquarters. A copy of AMXOS-PE SOP No. 1-84, Standing Operating Procedure for Combined Radiation Protection Surveys at U.S. Army Depot System Command Depots and Depot Activities is enclosed (Encl 9).

e. Radiation surveying and monitoring procedures are contained in DARCOM-P 385-1, Fundamentals of Health Physics for the Radiation Protection Officer, Chapter 4, Radiation Survey Programs (Encl 10). DU storage igloos will be inspected annually while inspection and maintenance/demil bays will be inspected quarterly.

DEPARTMENT OF THE ARMY
US ARMY DEPOT SYSTEM COMMAND
CHAMBERSBURG, PENNSYLVANIA 17201

TS
info/ACTION

REPLY TO
ATTENTION OF

AMSDS-T

28 October 1985

SUBJECT: Combined Radiation Protection Surveys

SEE DISTRIBUTION

1. The concept of instituting a single, combined radiation protection survey at each DESCOM installation having radioactive commodities or operations was implemented in FY84 and successfully continued in FY85. This approach reduces the inspection burden on DESCOM field elements while prompting consistency in radiation protection efforts. It has reportedly been well received by installation personnel and survey participants alike.

2. In view of the continued success, arrangements have been made with other AMC major subordinate commands for conducting these surveys during FY86. The survey schedule, showing survey participants, is at enclosure 1 for your information and planning purposes.

3. Each of the FY86 surveys will be performed as outlined in the SOP at enclosure 2. Of special note in this regard are the evaluation guides at Appendix A and B, which describe the specific issues to be addressed.

4. Request your preparation for the survey of your organization begin as soon as possible to ensure sufficient documentation is readily available to verify compliance with requirements referenced in the evaluation guides.

5. Also request that clerical support, your Radiation Protection Officer (RPO), and at least one alternate RPO be made available to assist the survey team during your scheduled survey.

6. POC is Mr. Robert Owen, AV 238-7328.

7. "DESCOM - Providing Leaders the Decisive Edge."

FOR THE COMMANDER:

John E. Rankin

2 Encls

JOHN E. RANKIN
Chief
Safety Office

AMSDS-T 28 October 1965
SUBJECT: Combined Radiation Protection Surveys

DISTRIBUTION:

E (Attn: Safety Ofcs)

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COMBINED RADIATION PROTECTION SURVEYS FY86

		1ST QTR OCT	NOV	DEC	2D QTR JAN	FEB	MAR	3D QTR APR	MAY	JUN	4TH QTR JUL	AUG	SEP	PARTICIPANTS*
ANAD	24-28 FEB 86					▲								1, 2, 3
CCAD	16-20 DEC 85			▲										1, 2
LEAD	19-23 MAY 86								▲					1, 2
LBAD	14-18 JUL 86										▲			1, 2, 3
NCAD	4-8 NOV 85		▲											1, 2, 3, 4
RRAD	13-17 JAN 86				▲									1, 2, 3, 4
SAAD	19-23 MAY 86								▲					1, 3, 5
SEAD	16-20 JUN 86									▲				1, 2
SHAD	2-6 DEC 85			▲										1, 2, 3, 4
SIAD	8-12 SEP 86												▲	1, 2
TOAD	4-8 AUG 86											▲		1, 3
MZAD	11-26 AUG 86											▲		1
PUDA	21-25 APR 86							▲						1
SVDA	10-14 MAR 86						▲							1
TEAD	28 APR – 2 MAY 86							▲						1

* PARTICIPANTS

1. HQDESCOM (FSA)
2. HQAMCCOM
3. HQCECOM
4. HQAVSCOM/HQTROSCOM
5. HQMICOM

A-1905 WIN AIR

CHAPTER 9

RADIOLOGICAL PROTECTION

1. Purpose. The purpose of this program is to establish procedures to ensure the safety of individuals involved in the handling and storage of radioactive material and other equipment that produce ionizing radiation.

2. Scope. This chapter is applicable specifically to the Medical Officer, Radiological Protection Officer (RPO), Director of Special Weapons, Director of Supply, Ionizing Radiation Control Committee, and to any depot element involved in the handling and storage of radioactive material.

3. Policy. Seneca Army Depot will provide a safe, healthful environment for all personnel working with or handling radioactive material. All provisions of Department of the Army regulations, Department of Transportation, and Nuclear Regulatory Commission rules will be followed.

4. Definitions.

a. Radiological Protection Officer (RPO): An individual appointed by the Commander to provide overall supervision of the Radiological Protection Program and to provide consultation and advise on the degree of hazards associated with ionizing radiation and the effectiveness of the measures to control these hazards. He must be technically qualified by virtue of education, training and/or experience to assure a capability commensurate with the assignment.

b. Ionizing Radiation Control Committee (IRCC):

(1) A group of persons appointed by the Commander to advise him on policy and actions necessary to ensure safeyt of personnel and property from hazards of radiation.

(2) The committee should consist of the Commander or his designated representative, the RPO, Medical Officer, Safety Manager, representatives of an employee organization, and other persons who are knowledgeable in the safe use of radiation, as are deemed necessary.

(3) The committee membership will be kept up-to-date. Training and experience resumes for each member of the committee will be kept on file by the RPO.

c. Ionizing Radiation: Electromagnetic or particulate radiation capable of producing ions directly or indirectly in its passage through matter. Alpha and beta particles, gamma rays, x-rays and neutrons are examples of ionizing radiation.

d. Controlled (restricted) Area: Any area to which access is controlled for the purpose of protecting persons from exposure to ionizing radiation or radioactive materials.

e. Occupationally exposed individual (radiation worker): An individual whose work is performed in a controlled (restricted) area and who might be exposed to more than 10 percent of the radiation exposure standards in paragraph 6.

f. User: A person who has been delegated the authority for the use, operation, or storage of radiation sources.

5. Responsibilities.

a. Radiological Protection Officer (RPO) is responsible for the following:

(1) All aspects of radiation protection in the storage, handling, reporting, disposition, and shipment of radioactive material.

(2) Inspection and monitoring as necessary to ensure that persons working with radioactive materials are complying with the designated safety measures and are not working under unsafe conditions.

(3) Investigation of radiation incidents.

(4) Guidance as to the types of protective clothing and equipment needed and when they are to be used.

(5) Instruction of personnel working in the storage area and/or handling the radioactive material.

(6) Familiarity with applicable regulations.

(7) Preparation of reports of overexposure and radiological incidents. A written report to the Nucleonics Branch, Lexington Army Depot, will be submitted within 24 hours following incident and to AMCSF-P (AMC-R 385-25).

(8) Ensuring that no individual under nineteen (19) years of age shall be occupationally exposed to ionizing radiation in excess dose equivalent of 1.25 rem to the whole body in any calendar quarter. Persons under 18 years of age will not be exposed to more than 10 percent of the value of AR 40-14, para 7(a).

(9) Keeping Commander and other SEAD organizations informed of any incident that occurs locally.

(10) Designating storage areas for personnel monitoring devices when not being worn.

(11) Maintaining this chapter current in accordance with SEAD Suppl 1 to AR 310-2, and maintaining records in accordance with AMC-R385-25, para 6c(2)(e), and para 33.

b. Ionizing Radiation Control Committee is responsible for:

(1) Recommending to the Commander policies on the safe use, handling, storage, transport, receipts, shipment and disposal of sources of radiation.

(2) Reviewing the radiation safety aspects of proposals for the procurement and use of sources of radiation; the modification of existing radiological operations and SOP's, and providing recommendations to the Commander for appropriate actions.

(3) Reviewing application(s) for Nuclear Regulatory Commission (NRC) Licenses or Department of the Army authorization.

(4) Reviewing and approving the qualifications of users of radiation.

(5) Reviewing reports of radioactive incidents and accidents to determine the cause of recommending appropriate actions for the Commander.

c. Medical Officer is responsible for:

(1) Rendering physical examinations to individuals as required by DARCOM-R 385-25, para 13 and 14.

(2) The establishment and training of an emergency medical team in support of and as outlined in the Depot's NAIC Plan.

d. Nuclear Accident/Incident Control Officer is responsible for the establishment and training of the Alpha Team.

e. The Safety Manager/Radiological Protection Officer is responsible for the monitorship of this program as a part of his normal inspection processes.

f. Supervisors of operations involving radioactive material are responsible for:

(1) Knowing the exact location of all sources of radiation for which they are responsible.

(2) Assuring that their personnel have received adequate instruction and/or experience prior to using or being exposed to radiation.

(3) Controlling contamination.

(4) Preparing, prior to the start of any operation involving radioactive material or possible exposure to radiation, an

adequate SOP for review by the RPO prior to final approval in accordance with para 16-21, DARCOM-R 385-100. The SOP will contain, as a minimum, responsibilities, maximum permissible levels of radiation in the areas concerned, storage of sources, procedure regarding dosimetry, decontamination, and emergencies. (This SOP is mandatory for operations in which there is a reasonable probability of exposure beyond established limits.)

(5) Enforcing SOP's, rules, and special precautions.

g. Calibration Section, Maintenance Division, D/SW, is responsible for:

(1) Ordering required number of film badges to fill requests of all depot elements.

(2) Receiving exposed film badges from depot elements and forwarding to Lexington Army Depot for processing.

(3) Preparing DA Form 3484 (Photo Dosimetry Report).

(4) Forwarding the results of exposure to the Medical Officer for posting to individual's DD Form 1141 with a copy to RPO.

(5) The preparation and maintenance of exposure records, DD Form 1141, as outlined in paragraph 6b below.

h. Radiation workers will be responsible for:

(1) Knowing and following SOP's, rules and instructions.

(2) Using safety equipment properly.

(3) Reporting to the supervisor any accident, unusual incident, personal injury (however slight), suspected over-exposure and/or suspected internal exposure, as soon as possible after the occurence.

i. Transportation Officer will be responsible for ensuring that copies of all documents dealing with shipment or receipt of any radioactive commodity are forwarded to the RPO immediately.

6. Procedures. a. Radiation protection standards adopted by DA and DLA for the control of occupational exposures to ionizing radiation include:

(1) The accumulated dose equivalent of radiation to the whole-body, head and trucnk, active blood-forming organs, gonads, or lens of the eye will not exceed:

(a) 1.25 rem in any calendar quarter, nor

(b) 5 rem in any 1 calendar year.

NOTE: During the entire gestation period, the maximum dose equivalent to the embryo/fetus from occupational exposure of the expectant mother should not exceed 0.5 rem.

(2) The accumulated dose equivalent radiation to the skin of the whole-body (other than hands, wrists, feet, or ankles), and forearms, or cornea of the eye will not exceed:

(a) 7.50 rem in any calendar quarter, nor

(b) 30 rem in any calendar year.

(3) The accumulated dose equivalent of radiation to the hands and wrists or the feet ankles will not exceed:

(a) 18.75 rem in any calendar quarter, nor

(b) 75 rem in any calendar year.

(4) The accumulated dose equivalent of radiation to the bone, thyroid, and other organs, tissues and organ systems will not exceed:

(a) 5 rem in any calendar quarter, nor

(b) 15 rem in any 1 calendar year

(5) Individual(s) entering a controlled area, but who are not classified as radiation worker (i.e. those under 18 years of age (29 CFR 570.57), and occasionallly exposed individual(s) will not be exposed to a whole-body dose equivalent of more than:

(a) 2 millirem in any 1 hours, nor

(b) 100 millirem in any 7 consecutive days, nor

(c) 500 millirem in any 1 calendar year, nor

(d) More than 10 percent of the values in paragraph 5a(a), (3), and (4) above for other parts of the body.

(6) Individuals over 18 years of age, but who have not yet reached their 19th birthday, may be occupationally exposed to ionizing radiation provided that they do not exceed 1.25 rem dose equivalent to the whole-body in any calendar quarter.

b. Personnel Dosimetry.

(1) An appropriate personnel monitoring device shall be used to measure the exposure of each individual who is likely to receive an accumulated dose of radiation in excess of 10% of the applicable quarterly basic Radiation Protection Standard. Each person occupationally exposed to ionizing radiation shall wear a film badge.

(2) The Calibration Section, Maintenance Division, D/SW is designated as the central control point for film badges. (See Appendix J for handling and control of film badges).

(3) Recording Procedures. The Calibration Section, Maintenance Division, D/SW, shall prepare and maintain DD Form 1141 for each person occupationally exposed to ionizing radiation. All exposure entries shall be made in rem.

(a) Initial determination of accumulated dose. In the initial preparation of a DD 1141, reasonable efforts should be made to obtain complete reports of all previous exposure based on recorded personnel dosimetry. DD Form 1952, Dosimetry Application and Record of Occupational Radiation Exposure, will be prepared for all individuals requiring DD Form 1141. For each period in which the individual was engaged in activities where occupational exposure to ionizing radiation was probable, and no record, or only an incomplete record, of his exposure during the period can be obtained, it shall be assumed that an occupational exposure of 1.25 rem was incurred per quarter of each gamma radiation. If an individual was potentially exposed at more than one facility, the cumulative exposures shall be calculated and recorded in items 7 through 12 as appropriate. The sum of these whole-body exposures shall be entered in item 13, and a statement regarding the source of that information shall be entered in item 16, Remarks.

(b) Current record. Appropriate entries on each individual's DD 1141 shall be maintained to record exposures other than whole-body, with appropriate descriptions under Item 16, Remarks...

(1) The DD Form 1141 is a permanent component of the individuals' medial records. Commanders will authorize inspecting officials or supervisors of persons occupationally exposed to ionizing radiation and the individual concerned to review his form. If DD Form 1141 is maintained in the health records or civilian employee medical file, it will be withdrawn for review by the individuals indicated above. The entire health record or civilian employee medical file will not be made available for review by the individual indicated above.

(2) When a civilian employee of the DA or DSA is not included in a Federal Civilian Employee's Health Service, a DD Form 1141 will be maintained as a permanent document in his SF 66, "Official Personnel Folder."

(3) The DD Fom 1141 shall be retained in the retired medical records of any member of the Armed Forces who has been occupationally exposed to ionizing radiation during his services. Disposition of DD Form 1141 for retired or separated civilian personnel will be made in accordance with governing civilian personnel directives.

(4) If any member of the Armed Forces is released from active duty, or if a civilian employee terminated employment with a DOD agency, he may be furnished the appropriate information concerning his radiation exposure history.

4. Control Procedures:

(a) The Radiological Protection Officer shall evaluate at intervals not to exceed a calendar quarter the DD Form 1141 of each individual engaged in duties involving occupational exposure to ionizing radiation. He shall establish procedures to inform and advise the Commander when actin is necessary to limit an individual's exposure history.

(b) When an individual has received a dose of ionizing radiation in an amount exceeding the radiation protection standards in paragraph 6, he shall be removed from duties involving occupational exposure to ionizing radiation until subsequent exposure limitations are established in consultation with competent medical authority. When an individual has received an accumulated dose of ionizing radiation in excess of 5 (m-18) rem, he shall be removed from duties involving occupational exposure to ionizing radiation until his exposure record has been evaluated by the Surgeon General of the military department concerned and subsequent exposure limitations are established as necessary.

7. General Safety Rules. This section outlines the general safety rules to be followed in the radiological safety program. The specific procedures outlined herein as appendixes may contain more stringent requirements. In case of conflict, the more stringent requirement will apply. The following rules are listed for personnel who are exposed to radiation.

a. Individuals will wear a film badge in a storage area containing radioactive material or while handling radioactive material or equipment producing ionizing radiation. In addition to the film badge, two pocket dosimeters or pocket chambers should be worn while in an area in which radiation exceeds a level of 5 millirems per hour.

NOTE: "Radiation Area: means any area, accessible to personnel, in which there exists radiation, at such levels that a major portion of the body could receive in any one hour dose in excess of 5 millirems, or in any five consecutive days a dose in excess of 100 millirems. Area will be marked in accordance with AR 385-30.

b. No individual will work alone in radioactive storage area in levels exceeding 20 millirems per hour.

c. Smoking, eating, drinking, or chewing tobacco or gum within the area is prohibited.

d. Good housekeeping will be maintained at all times.

e. Visitors will be escorted by qualified individuals assigned to the area.

f. Personnel working in the area will be responsible for monitoring themselves and any visitors.

g. Compliance with industrial safety standards should avoid accidents which are complicated by the presence of radioactive material.

h. Radiac meters and pocket dosimeters used for radiation protection purposes shall be calibrated at the intervals specified in the applicable publications.

i. Hands and other exposed parts of the body should be washed thoroughly after handling radioactve materials.

j. Do not place radioactive material (i.e. test samples) in the pocket.

k. Avoid abnormal exposure to radioactive material. Follow procedures carefully and always keep exposure time down to the barest minimum required for the operation.

l. In the event of emergency, notify the Radiological Protection Officer.

8. Inventory. a. An annual inventory will be conducted by users of all radioactive materials, and a copy of the inventory will be forwarded to the RPO. Inventory results will be prepared in accordance with the format depicted in Figure 9-1.

b. Inventory records will contain:

(1) Specific items of equipment or radioisotope.

(2) Serial number.

(3) Location of the items.

(4) Radiation levels.

(5) Radioactivity.

(6) NRC or DA authorization numbers.

(7) Receipts, transfers, and local disposals.

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

c. The RPO will conduct a physical inventory of radioactive materials and retain a copy of this inventory in the appropriate file annually.

9. Leak Test. (Swipe Test) - This test will be performed by the user when required by regulation at time intervals specified in appropriate publications (TMs, TBs, ARs, AMC-Rs). A copy of leak test results will be forwarded to the RPO.

10. Disposal of Radioactive Waste, see Appendix A.

11. Handling of Columbium Concentrates, see Appendix D.

12. Nuclear Accident/Incident Control Plan, see Appendix G.

13. Radioactive Tubes and Self-Luminous Devices, see Appendix H.

14. Handling and Control of Film badges, see Appendix J.

15. List of Available Radiation Survey Instruments, see Appendix K.

16. References.

a. AR 40-14.

b. AR 385-11.

c. AR 385-30.

d. AR 385-40.

e. AR 700-15.

f. AR 700-64.

g. AR 725-1.

h. TM 3-261.

i. TM 55-315.

j. TB 43-0122.

k. TB 43--0141.

l. TB 55-1500-314-24.

m. TB 700-3.

n. TB 750-242-3.

o. TB 750-249.

p. TB MED 62.

q. TB MED 232.

r. SB 11-206.

s. AMC-R 385-25.

t. AMC-R 385-100.

u. MIL M 19590.

v. SEAD Supplement 1 to AR 310-2.

w. Title 10, Code of Federal Regulations

OFFICIAL COPY

SOP COVER SHEET

1. SENECA ARMY DEPOT

STANDING OPERATING PROCEDURE FOR:

2. ITEM Conventional, Guided Missile and Depleted Uranium (DU) Ammunition Items.

3. OPERATION: Receipt, Storage & Shipping

4. DEPOT ORGANIZATIONAL SYMBOL SDSSE-OP

5. SOP NO SDSSE-60 DATE 5 Nov 65

5a. REV NO 4 DATE 18 Aug 82

6. AUTHORITY DATE
DARCOM R 385-100

PREFACE: This procedure is intended to establish general requirements for the receipt, storage, and issue of conv. & GM ammo. This procedure excludes the handling of GM fuels and oxidizers, retrograde of contaminated material from SEA and Group A chemicals.

7. ESTIMATED PRODUCTION: DAILY

8. PREPARED BY Leonard Passifione
LEONARD PASSIFIONE

TITLE Planner & Estimator

PHONE EXTENSION 262

9. REVIEWED BY Mark K Aleckinski
A. NICOLETTA

TITLE Chief, Ammunition Division

10. SUBMITTED BY Linda Secor
LINDA SECOR

TITLE Chief, PP&C Division

11. CONCURRENCES:

OFFICE	SIGNATURE	TITLE
D/SUPPLY	Harry E Stowell D. G. LOPINTO	Director of Supply
D/QUALITY ASSURANCE	P. CHAVEZ	Director/QA
SAFETY OFFICE	Richard Green R. GREEN	Safety Manager

12. APPROVAL
ROBERT J. HUDAK
Colonel, OrdC
Commanding

BIENNIAL REVIEW:

DATE	SIGNATURE	TITLE
6 Jun 84	Dennis W Wells	DEP DIR / SUPPLY

AMMUNITION DIVISION

SOP - Operator's Statement

SOP NO SDSSE-60 REV NO 4 CHANGE NO DATE 18 Aug 82

I have read or have had read to me the general and specific safety requirements, personnel and explosive limits, work description and inspection requirements necessary to accomplish my operation. I thoroughly understand and agree to abide by these instructions throughout my assignment to the operation.

NAME	DATE	OPERATION NUMBER

AMMUNITION DIVISION

SOP - Supervisor's Statement

SOP No. SDSSE-60 REV No. 4 CHANGE No. _____ DATE 18 Aug 82

I have personnally reviewed each of the operational steps of the SOP and have no question in my mind that the operation can be performed safely and efficiently. I have trained the following operators in the details of their part of the operation and have instructed them to follow the SOP without deviation.

NAME	DATE	OPERATION NUMBER

SUPERVISOR DATE

INDEX OF OPERATIONS

1. OPER NO	2. BLDG NO. ON SITE	3. BAY NO.	4. TOTAL EXPL. ALLOWED IN BAY. (REF COL. 3)	5. DESCRIPTION OF OPERATION	6. PAGE NO
1	ALL		N/A	Receive ammunition items and store in magazine	5-9
2	ALL		N/A	Remove ammunition items from storage Magazine, load carriers for shipment	10-14

REMARKS:

1. Only one type of hazard group ammunition as defined in Section 19, DARCOM-R 385-100. will be handled at one time.
2. This Standing Operating Procedure shall provide the basic necessary instructions as required for the receipt, storage, and shipment of Conventional and Guided Missile Ammunition items and/or components, excluding Guided Missile fuel and oxidizers, contaminated retrograded material from SEA, and Group A chemicals.
3. Operations shall consist of receipt, storage, and/or loading for shipment. This procedure is applicable for inter-depot movement of material to and from operating work sites.
4. The Chief, Ammunition Division will be responsible for maintaining adequate housekeeping at all times. He and his branch chiefs will visit the work locations as often as deemed necessary to assure that the operations are accomplished in a safe, clean, efficient and economical manner.
5. Change 1 is prepared to include the use of Strad-O-Lift carrier semi-trailer for intra-depot movement of material and the removing of security devices from doors of carriers containing sensitive material.
6. Revision 3 is prepared to include the handling of Ammunition containing Depleted Uranium (DU) which consists of receipt, storage, inter-depot movement, and/or loading for shipment.
7. Office Symbol Changes and Updated 12 Apr 78.
8. Change 3 is submitted to add the wearing of film badges by operating personnel handling (DU) ammunition.
9. Revision 4 is submitted to upgrade SOP IAW DARCOM R-385-1.
10. All General Safety requirements and Foreman responsibilities will be IAW SOP SDSSE-226.
11. Lift truck will be operated IAW SOP DRXSE-8. Explosive limits that are being handled by forklift will not exceed those limits for that specific operation.
12. In the event of a lightning storm operations will be handled IAW SOP SDSSE-11.
13. For explosive safety limits at loading platforms see appendix "A".
14. In case of an accident involving ammunition items, the following persons shall be notified: AMMO Chief (422) and D/SUPPLY (203,308). The D/Supply will in turn notify other appropriate Divisions required.

A. STANDING OPERATING PROCEDURE FOR: Receipt, Storage and shipping, Conv. and depleted Uranium (DU) and GM Ammunitiion items

B. OPERATION NO. 1

C. BAY NO. N/A

D. SOP NO. SDSSE-60 DATE 5 Nov 65

E. REV NO. 4 DATE 18 Aug 82

F. CHANGE NO. DATE

G. OPERATION: Receive ammunition items and store in magazine

H. EXPLOSIVE LIMITS: UNITS: N/A EXPLOSIVE LBS N/A

I. PERSONNEL LIMITS: OPERATORS: N/A TRANSIENTS N/A

J.

Step No	Description	Specific Instruction (Safety, Operational Quality Characteristics)
1.	Receive carrier(s) at storage site and/or platform and prepare to unload.	1(S) When a single railroad car is spotted, the hand brakes will be set and the wheels properly chocked. When more than one railcar is spotted the hand brakes will be set on a sufficient number of cars to assure that sufficient breakage is provided. When unloading motor vehicles (vans & flatbeds) on a grad the brakes must be set, the wheels chocked, an the motor shut off. 1(S) When a trailer is spotted within the ammunition area, platforms will be placed under the dollies and the wheels will be chocked front and rear.
2.	Post warning and/or slow signs, flags, radiation caution symbols, explosive placards andfire symbols as required on carriers and work sites. Appropriate measures will be taken to control thru traffic.	2(S) Appropriate road signs will be positioned and barricades erected while unloading hazardous items or when site would tend to become congested. Blue flags will be placed at both open ends of railcars. Cars facing dead end of track require only one blue flag on open en
3.	After QA Inspector has removed original seals from carrier door, door shall be opened and secured in place.	3(S) Extreme care must be taken when opening carrier doors to prevent injury by falling objects. Doors will be partially opened to allow observance of the blocking and whether there is any danger of containers falling out of carrier when door is fully opened.
4.	Remove shipping documents from carrier and compare seal numbers on documents with original seal nr's on the carrier. Any discrepancy not verified by Surveillance at time or original inspection will be brought to the attention of the planning branch for further research.	3(S) Non-flame producing devices will be used to remove wire twist from doors of carriers containing sensitive ammo.
5.	Inspect the contents of carrier for instability and other hazardous conditions, pilferage or damage. Verify contents with documents and report any discrepancies at once.	5(O) Identity of items will be verified by NSN, Lot number and/or serial number.
6.	Place and secure car plates, connector ramps, as required. Place and secure magnesium ramp if utilized.	6(S) Care will be taken to position car plates securely. Portable ramp will be secured to undercarriage of carrier with safety chains. Assure that hydraulic valve has been fully opened to relieve weight on traveling wheels. All equipment will be securely braced to insure stability.
7.	Remove dunnage from carrier, utilizing hammers, pry bars, and other approved tools.	7(S) Extreme care will be exercised in the use of tools near ammunition containers to avoid damage and/or accidental functioning of ammo.
8.	Dunnage will be disposed of by the following methods: a. Stack serviceable dunnage neatly, well away from the work site for removal to the Box and Crate shop for re-use.	8(O) Disposition of dunnage will be determined by the supervisor in charge of unloading oper. 8(S) Extreme care will be used in handling dunnage with nails still protruding.

A. STANDING OPERATING PROCEDURE FOR: Receipt, Storage and shipping, Conv. and depleted Uranium (DU) and GM ammunition items

B. OPERATION NO. 1 cont'd

C. BAY NO.

D. SOP NO. SDSSE-60 DATE 5 Nov 65

E. REV NO. 4 DATE 18 Aug 82

F. CHANGE NO. DATE

G. OPERATION: Receive ammunition items and store in magazine

H. EXPLOSIVE LIMITS: UNITS: EXPLOSIVE LBS

I. PERSONNEL LIMITS: OPERATORS: TRANSIENTS

J.

Step No	Description	Specific Instruction (Safety, Operational Quality Characteristics)
	b. Unserviceable dunnage will be stacked neatly, well away from work site for daily removal to the burning pit.	8(S) Operator handling dunnage will wear leather palmed gloves.
	9. Cut and remove steel banding as required with approved band cutter tools. Place all scrap banding steel in Dempster Dump containers (or equal) for transfer to the Disposal Officer.	9(S) Operator utilizing strap cutter will wear safety glasses or goggles and leather palm gloves.
	10. Remove items from carriers and store in magazines, either manually or by means of conveyors and/or approved type forklift or cranes, as deemed most efficient and economical. a. Receiving platforms may be utilized as required. Explosive safety and personnel limits shall be adhered to a s posted. b. Any broken boxes, banding, or non-standard conditions noted during unloading sall be brought to the attention of the QA Inspector and segregated for repair or inspection as required.	10(S) Rough handling of containers is strictly prohibited. Containers will not be tumbled, rolled or dropped. 10(S) Boxes containing ammunition will not be used as conveyor supports. 10(O) If conveyors are used for unloading, they will be securely supported and interlocked to assure stability during operation. 10(S) When material is received by car and is unloaded at a platform, the material will be placed in vans or on flatbeds for movement to the storage location. Vehicles partially or completely loaded shall be sufficiently blocked, braced, or otherwise secured to prevent shifting of the load, laterally or longitudinally, during transit. 10(O) Work will be planned to insure that material is completely stored inside the magazine at the end of the work day. In the event of equipment failure or breakdown which prevents the complete storage of material inside, the Provest Marshall will be notified giving supervisors name, location, and item being stored.
	11. Store ammunition IAW applicable storage drawings.	11(O) Secure drawings and guidance from the storage supervisor.
	12. Clean up carrier unit and unloading site as required. Assure that carrier is empty, all ammunition removed, and placards or fire symbols removed/	12(O) All storage locations will present a neat, orderly appearance at the end of each shift.
	13. Close and securely latch the doors of empty carriers and release as soon as possible.	13(O) Remove blue flags from car unloading site. Notify Transportation Div., as to availability of carriers.
	14. Make and complete magazine data cards and space charts as required. All records must be completed daily.	

A. STANDING OPERATING PROCEDURE FOR: Receipt, storage and shipping, Conv. and depleted Uranium (DU) and GM ammunition items

B. OPERATION NO. 1 cont'd

C. BAY NO.

D. SOP NO. SDSSE-60 DATE 5 Nov 65

E. REV NO. 4 DATE 10 Aug 72

F. CHANGE NO. DATE

G. OPERATION: Receive ammunition items and store in magazine

H. EXPLOSIVE LIMITS: UNITS: EXPLOSIVE LBS

I. PERSONNEL LIMITS: OPERATORS: TRANSIENTS

Step No	Description	J. Specific Instruction (Safety, Operational Quality Characteristics)

EQUIPMENT, TOOLS, GAGES, AND SUPPLIES:

	ITEM	QTY RQRD	NSN OR SPEC NO
1.	Fork lift trucks	as rqrd	
2.	Carriers (USA Vans or flatbeds)	"	
3.	Conveyors and supports	"	
4.	Loading Ramp, connecting ramps, carplates	"	
5.	Signs, Road and warning, placards	2 ea	
6.	Pliers (f/removal of seals)	as rqrd	
7.	Symbols, fire (Req. by AMCR 385-100)	"	
8.	Cntr, Dempster Dumpster (or equal) f/mtl banding, etc.	"	
9.	Cntr, Dempster Dumpster (or equal) f/dunnage	"	
10.	Drawings, storage	"	Various
11.	Brooms, dustpans, cleaning equip.	"	
12.	Leather or leather palmed gloves	1 pr each oper	
13.	First aide equipment	as rqrd	
14.	Safety glasses	1 pr each oper	
15.	Palets	as rqrd	
16.	Bolt cutter or equal	1 ea	
17.	Fire extinguishers Metal X	2 each location	
18.	Fire extinguishers water	2 each location	

A. STANDING OPERATING PROCEDURE FOR: Receipt, storage and shipping, Conv. and depleted Uranium (DU) and GM ammunition items

B. OPERATION NO. 1 Cont'd

C. BAY NO.

D. SOP NO. SDSSE-60 DATE 5 Nov 65

E. REV NO. 4 DATE 18 Aug 82

F. CHANGE NO. DATE

G. OPERATION: Receiv ammunition items and store in magazine

H. EXPLOSIVE LIMITS: UNITS: EXPLOSIVE LBS

I. PERSONNEL LIMITS: OPERATORS: TRANSIENTS

J.

Step No	Description	Specific Instruction (Safety, Operational Quality Characteristics)

K-SPECIAL REQUIREMENTS:

Building 5

(1) Incoming shipments will not be allowed to accumulate and will be distributed as soon as practicable after receipt.

(2) Items for outgoing shipment will not be accumulated prior to receipt of orders covering each specific shipment.

(3) Processing and handling within the facility will be limited to explosives, ammunition and compatible non-hazaedous items or materials.

(4) Exposed explosives will not be permitted in the shipping and receiving building. Items processed or handled will be finished munitions or bulk explosives packed in approved shipping container.

(5) Lethal and incapacitating chemical agents and munitions containing such agents, will not be located, handled or processed in a shipping and receiving building concurrently with conventional ammunition and explosives.

(6) Operations within the facility will be limited to temporary storage and activities associated with the preparation of items and materials for shipment. Renovation, modification, rework, assembly, disassembly and testing activities will not be permitted within the shipping and receiving building.

(7) Incompatible items of ammunition and explosives will be segregated during storage and during prepparation for shipment by protective construction as indicated in the following paragraph.

b. Separate rooms or bays shall be provided for the temporary storage of ammunition and explosives. The storage rooms or bays will be separated from areas used for the preparation of items for shipment, from offices and areas used for operations that do not involve explosives or ammuntion, and from each other, by 12 inch reinforced concrete walls as a minimum. Dividing walls of this type may be used for segregation of materials incompatible in storage. However, substantial dividing walls must be used to subdivide quantities of explosives or ammunition in the facilities for the prupose of reducing the minimum separation distance.

c. The controlling quatity of explosives for quantity-distance determinations will be the sum of the amximum quantities permitted within the building, on building docks and platforms, and in rail cars and other vehicles located at less than intraline distance from the shipping and receiving building. Effective subdivision of explosives locations by substantial dividing walls or other approved barriers, may be used to reduce the controlling quantity of eaplosives for quantity-distance determinations.

DU (Depleted Uranium) Ammunition

(1) In the event of an accident or incident occurs during handling the operation will cease immediately and the RPO (Ext 261), Ammo Chief (Ext 422), D/Supply (Ext 308/ 203) will be notified. D/Supply will inturn notify other appropriate divisions.

(2) Film badges will be worn by operating personnel.

(3) Radiation Caution symbols will be posted at each work site in addition to the appropriate fire symbol.

(4) The Radiological Protection Officer has the authority to suspend operations, if in his judgement, a hazard exists.

(5) When an incoming shipment is identified as containing DU Ammunition, the carrier will be monitored with appropriate radiation detection instruments by the D/QA, ASD.

(6) After unloading is accomplished the trailer will be monitored by the RPO, or designated alternate, with the appropriate radiation detection instruments prior to the trailers release.

A. STANDING OPERATING PROCEDURE FOR: Receipt, storage and shipping, Conv. and depleted Uranium (DU) and GM ammunition items

B. OPERATION NO. 1 Cont'd

C. BAY NO.

D. SOP NO. SDSSE-60 DATE 5 Nov 65

E. REV NO. 4 DATE 18 Aug 82

F. CHANGE NO. DATE

G. OPERATION: Receiv ammunition items and store in magazine

H. EXPLOSIVE LIMITS: UNITS: EXPLOSIVE LBS

I. PERSONNEL LIMITS: OPERATORS: TRANSIENTS

J.

Step No	Description	Specific Instruction (Safety, Operational Quality Characteristics)

K-SPECIAL REQUIREMENTS (Cont'd)

Operation of Motor Vehicles (Government-owned)

a. During loading and unloading of motor vehicles, the brakes must be set. In addition, when on a grade, at least one wheel must be chocked.

b. When a motor vehicle approaches within 25 feet of the doors of a structure through which a shipment is to be moved, the doors must be kept closed until the motor has been switched off unless the exhaust system is equipped with a spark arresting device which meets requirements of Military Specification MIL-A-27302A, or no exposed explosives are present. Exposed explosives excludes finished or no exposed explosives are present. Exposed explosives excludes finshed ammunition and explsoives packaged for shipment in accordance with DOT regulations.

c. Trucks containing ammunition or explosives should not be refueled within magazine or explosives areas of DARCOM installations, including refueling from mobile units. A central refueling station located outside the restricted area should be used.

d. No person shall be allowed to ride in or on the truck body or van of a motor vehicle tranpsorting ammunition or explosives except in cases involving limited quantities of small arms ammunition with nonexplosive bullets. In the latter case the small arms ammunition must be in closed containers which are properly secured in the truck body and seats shall be provided for personnel, restricted in number to the minimum required.

e. No exposed explosives shall be loaded into or unloaded from motor vehicles while their motors are running. Motors may be kept running when required to provide power to vehicle assessories such as mechanical handling equipment utilized in the loading and unloading of the vehicle, provided:

(1) The accessory is an intergral part of the vehicle.

(2) The exhaust gases from the motor are emitted at least six feet from the point at which the loading operations is conductedand are directed away from this point.

(3) The exhaust pipe is equipped with a spark arrestor.

(4) Materials being loaded or unloaded whcih may evolve flammable vapors are exposed in tightly fitting containers.

f. Explosive laden vehicles will not exceed 25 MPH while on depot.

g. Commercial carriers will be provided an escort, by Depot Property Div., at all times, while in the ammunition area.

A. STANDING OPERATING PROCEDURE FOR: Receipt, Storage and shipping, Conv. depleted Uranium (DU) and GM ammunition items

B. OPERATION NO. 2

C. BAY NO.

D. SOP NO. SDSSE-60 DATE 5 Nov 65

E. REV NO. 4 DATE 18 Aug 82

F. CHANGE NO. DATE

G. OPERATION: Remove ammunition items from storage magazine, load carriers for shipment

H. EXPLOSIVE LIMITS: UNITS: N/A EXPLOSIVE LBS N/A

I. PERSONNEL LIMITS: OPERATORS: N/A TRANSIENTS N/A

Step No	Description	J. Specific Instruction (Safety, Operational Quality Characteristics)
1.	Receive commercial carrier at the loading site.	1(S) When material is shipped by car and is moved from igloos to platforms, the material will be placed in vans or in flatbeds. Vehicles partially or completely loaded shall be sufficiently blocked, braced, or otherwise secured to prevent shifting of the load, laterally or longitudinally during transit. 1(O) Work will be planned to insure that material is completely stored inside of magazine at the end of the work day. In the event of equipment failure or breakdown, during the day preventing the complete storage of material inside, the Provost Marshall will be notified giving supervisors name, location, and item. When a single railcar is spotted, the hand brakes will be set and the wheels properly chocked; more than one railcar, hand brakes on sufficient number of cars will be set to assure sufficient brakeage. When loading motor vehicles (vans and flatbeds) on a grade, the brakes must be set, the wheels chocked, and the motor shut off. 1(S) When a trailer is spotted in the Ammunition area, platforms will be placed under the dollies and the wheels will be chocked, front and rear.
2.	Open carrier doors and storage site doors and secure same to prevent movement.	2(O) Check commercial carriers for certification by Surveillance personnel and for suitability for use.
3.	Post appropriate fire symbols and/or DOT placards as required.	3(O) Post roadsigns and erect barricades, as required.
4.	Prepare the worksite for the removal of ammunition items.	4(QC) Inspect all surrounding storage stacks for proper stability and outward evidence of damage prior to removal of items. Correct any discrepancies as necessary to provide safe working conditions.
5.	Identify the item(s) to be loaded with work order and/or specific shipping documents.	5(O) Positive identification must be made prior to movement of items and loading carrier.
6.	Remove items from storage, perform all work specified by Ammo Surveillance and load carrier in accord w/pertinent transportation drawings, utilizing steel roller conveyors, forklifts, cranes, and/or hand methods, as determined to be the most economical method. WARNING- No ammunition will be moved from storage site which has an Ammunition Suspense Tag (DD Form 1575) attached.	6(O) The following work will be performed on all items unless otherwise specified. a. Replace missing seals. b. Remove old shipping labels and markings. c. Paint and mark any standard light box IAW appropriate drawings prior to shipment. d. Remove all tags not pertinent to shipment. 6(S) Rough handling of containers is strictly prohibited. Containers will not be tumbled, rolled or dropped. 6(S) When loading carrier by hand methods, operators must wear leather or leather palmed gloves.

A. STANDING OPERATING PROCEDURE FOR: Receipt, Storage and shipping, Conv. depleted Uranium (DU) and GM ammunition items

B. OPERATION NO. 2 Cont'd

C. BAY NO.

D. SOP NO. SDSSE-60 DATE 5 Nov 65

E. REV NO. 4 DATE 18 Aug 82

F. CHANGE NO. DATE

G. OPERATION: Remove ammunition items from storage magazine, load carriers for shipment.

H. EXPLOSIVE LIMITS: UNITS: N/A EXPLOSIVE LBS N/A

I. PERSONNEL LIMITS: OPERATORS: N/A TRANSIENTS N/A

Step No	Description	J. Specific Instruction (Safety, Operational Quality Characteristics)
		6(O) Car plates, conveyors, or other equipment will be firmly secured to prevent movement, tipping, or falling. Loading ramp, if utilized will be firmly secured to the undercarriage of the carrier with attached safety chains. Hydraulic valves will be fully opened to relieve weight on travelling wheels. 6(O) Use of torque wrench and adapter to assur the proper tension of closing plugs is permitt outside the storage location or at the loadin platform. Torque valves will be supplied for each shipment as necessary. 6(O) Where sufficient space exists in a magazine the following operations incidental to shipment may be performed: palletizing, removing and replacing shipping bands on bombs, removing and replacing grommets on separate loading shells, replacing missing, damaged or loos strapping and placing inner cover retainer spring in one round metal container in which the ammunition is over packed in a fiber container as well as the metal containers. Where insufficient space exists in the magazine to permit these operations without overcrowding, they should be performed immediately outside t magazine. Removal of minor or incidental rust from exterior of metal containers, the application of labels and the obliterating and stenciling of containers will be performed immediately outside the igloo and flammable liquids kept to a minimum.
7.	Block, brace and secure items in carrier IAW pertinent transportation drawing for outshipment.	7(O) A copy of the pertinent loading drawings will be on hand when loading carrier (drawings will be obtained from the Chief, Ammo Div) 7(S) Operator handling wooden dunnage will wea leather palmed gloves.
8.	Maintain complete records of ammunition items removed from storage locations (Magazine data cards and appropriate transfer records)	8(O) Ammunition records shall be current and available for review at all times.
9.	Close doors of carrier and notify the Central Receiving/Shipping dispatcher that carrier is ready for outshipment inspection and application of seals.	9(O) Carriers loaded with ammunition items sha be temporarily sealed when left unattended and awaiting outshipment inspection. Seal numbers will be given to Ammo Supply Clerk Dispatcher Ext 505. Final seals will be applied by the Ammo Surveillance Div. 9(O) Remove blue flags from loading site. Noti Transporation Div, as to the readiness of carrier for removal. Remove road signs and/or barricades.

A. STANDING OPERATING PROCEDURE FOR: Receipt, Storage and shipping, Conv. depleted Uranium (DU) and GM ammunition items

B. OPERATION NO. 2 Cont'd

C. BAY NO.

D. SOP NO. SDSSE-60 DATE 5 Nov 65

E. REV NO. 4 DATE 18 Aug 82

F. CHANGE NO. DATE

G. OPERATION: Remove ammunition items from storage magazine, load carriers for shipment

H. EXPLOSIVE LIMITS: UNITS: N/A EXPLOSIVE LBS N/A

I. PERSONNEL LIMITS: OPERATORS: N/A TRANSIENTS N/A

Step No	Description	J. Specific Instruction (Safety, Operational Quality Characteristics)
10.	Clean up loading site and/or storage location. Return any excess dunnage to the box and Crate Shop.	10(O) Good housekeeping rules and practices wi be observed at all times during the entire operation and a thorough clean up will be conducted upon completion of the oeprations. Tool and equipment will be cleaned and stored, and building or igloo will be secured.
11.	Material requiring unitizing will be processed IAW latest approved drawings for the particular item being processed. This operation will be performed at an operating building, loading platform, or in front of an igloo or standard magazine.	

L-EQUIPMENT, TOOLS, GAGES AND SUPPLIES:

	ITEM	QTY RQRD	SPEC NO	FSN NO
1.	Commercial railcars and/or carriers	as rqrd		
2.	Vans, tractors and/or trucks	"		
3.	Conveyors, ramps and/or car plates	"		
4.	Road signs, warning, barricades	"		
5.	Blocking and bracing materials	"		
6.	Symbols (Fire, as rqrd/DARCOM-R 385-100) DOT symbols and placards	"		
7.	Drawings, transportation	"		
8.	Hammers, saws, nails	"		
9.	Bars, carpenters, pry	"		
10.	Face shields ¢ safety goggles	1 pr each oper		
11.	Brooms, dust pans, etc	as rqrd		
12.	Fire extinguishers, water	2 ea location		
13.	First aid equipment	as rqrd		
14.	Leather or leather palmed gloves	1 pr ea oper		
15.	Skilsaws	as rqrd		
16.	Pallets	"		
17.	Stencil equipment	"		
18.	Labels	"		
19.	Torque wrenches & adapters	"		
20.	Adhesive	1 gal		
21.	Bruch, paint, 2"	4 ea		
22.	Lacquer, sand obliterating	1 gal	TT-L-40	8010-527-3196
23.	Brush, wire scratch	as rqrd		
24.	1¼ strapping tools	2 sets		
25.	1¼ strapping	1 roll	QQ-S-781	8135-283-0671
26.	Lead Seals (w/sealer)	100 ea		5340-292-0886
27.	5/8" strapping	1 roll	QQ-S-781	8135-281-4071
28.	5/8" strapping tools	1 set		

A. STANDING OPERATING PROCEDURE FOR: Receipt, storage and shipping, Conv. depleted Uranium (DU) and GM ammunition items

B. OPERATION NO. 2 Cont'd

C. BAY NO.

D. SOP NO. SDSSE-60 DATE 5 Nov 65

E. REV NO. 4 DATE 18 Aug 82

F. CHANGE NO. DATE

G. OPERATION: Remove ammunition items from storage magazine, load carriers for shipment

H. EXPLOSIVE LIMITS: UNITS: N/A EXPLOSIVE LBS N/A

I. PERSONNEL LIMITS: OPERATORS: N/A TRANSIENTS N/A

Step No	Description	J. Specific Instruction (Safety, Operational Quality Characteristics)

K-SPECIAL REQUIREMENTS:

Building 5

(1) Incoming shipments will not be allowed to accumulate and will be distributed as soon as practicable after receipt. Place in approved temporary storage locations until K-inspection is performed.

(2) Items for outgoing shipment will not be accumulated prior to receipt of orders covering each specific shipment.

(3) Processing and handling within the facility will be limited to explosives, ammunition and compatible non-hazaedous items or materials.

(4) Exposed explosives will not be permitted in the shipping and receiving building. Items processed or handled will be finished munitions or bulk explosives packed in approved shipping container.

(5) Lethal and incapacitating chemical agents and munitions containing such agents, will not be located, handled or processed in a shipping and receiving building concurrently with conventional ammunition and explosives.

(6) Operations within the facility will be limited to temporary storage and activities associated with the preparation of items and materials for shipment. Renovation, modification, rework, assembly, disassembly and testing activities will not be permitted within the shipping and receiving building.

(7) Incompatible items of ammunition and explosives will be segregated during storage and during prepparation for shipment by protective construction as indicated in the following paragraph.

b. Separate rooms or bays shall be provided for the temporary storage of ammunition and explosives. The storage rooms or bays will be separated from areas used for the preparation of items for shipment, from offices and areas used for operations that do not involve explosives or ammuntion, and from each other, by 12 inch reinforced concrete walls as a minimum. Dividing walls of this type may be used for segregation of materials incompatible in storage. However, substantial dividing walls must be used to subdivide quantities of explosives or ammunition in the facilities for the prupose of reducing the minimum separation distance.

c. The controlling quatity of explosives for quantity-distance determinations will be the sum of the amximum quantities permitted within the building, on building docks and platforms, and in rail cars and other vehicles located at less than intraline distance from the shipping and receiving building. Effective subdivision of explosives locations by substantial dividing walls or other approved barriers, may be used to reduce the controlling quantity of eaplosives for quantity-distance determinations.

DU (Depleted Uranium) Ammunition

(1) In the event of an accident or incident occurs during handling the operation will cease immediately and the RPO (Ext 261), Ammo Chief (Ext 422), D/Supply (Ext 308/203) will be notified. D/Supply will in turn notify other appropriate divisions.

(2) Film badges will be worn by operating personnel.

(3) Radiation Caution symbols will be posted at each work site in addition to the appropriate fire symbol.

(4) The Radiological Protection Officer has the authority to suspend operations, if in his judgement, a hazard exists.

(5) When an outbound shipment is identified as containing DU Ammunition, the carrier will be monitored with appropriate radiation detection instruments by the RPO.

A. STANDING OPERATING PROCEDURE FOR: Receipt, storage and shipping, Conv. depleted Uranium (DU) and Cal ammunition items

B. OPERATION NO. 2 Cont'd

C. BAY NO.

D. SOP NO. SDSSE-60 DATE 5 Nov 65

E. REV NO. 4 DATE 13 Aug 82

F. CHANGE NO. DATE

G. OPERATION: Remove ammunition items from storage magazine, load carriers for shipment

H. EXPLOSIVE LIMITS: UNITS: N/A EXPLOSIVE LBS N/A

I. PERSONNEL LIMITS: OPERATORS: N/A TRANSIENTS N/A

Step No	Description	J. Specific Instruction (Safety, Operational Quality Characteristics)

K-SPECIAL REQUIREMENTS (Cont'd)

Operation of Motor Vehicles (Government-owned)

a. During loading and unloading of motor vehicles, the brakes must be set. In addition, when on a grade, at least one wheel must be chocked.

b. When a motor vehicle approaches within 25 feet of the doors of a structure through which a shipment is to be moved, the doors must be kept closed until the motor has been switched off unless the exhaust system is equipped with a spark arresting device which meets requirements of Military Specification MIL-A-27302A, or no exposed explosives are present. Exposed explosives excludes finished or no exposed explosives are present. Exposed explosives excludes finshed ammunition and explsoives packaged for shipment in accordance with DOT regulations.

c. Trucks containing ammunition or explosives should not be refueled within magazine or explosives areas of DARCOM installations, including refueling from mobile units. A central refueling station located outside the restricted area should be used.

d. No person shall be allowed to ride in or on the truck body or van of a motor vehicle tranpsorting ammunition or explosives except in cases involving limited quantities of small arms ammunition with nonexplosive bullets. In the latter case the small arms ammunition must be in closed containers which are properly secured in the truck body and seats shall be provided for personnel, restricted in number to the minimum required.

e. No exposed explosives shall be loaded into or unloaded from motor vehicles while their motors are running. Motors may be kept running when required to provide power to vehicle assessories such as mechanical handling equipment utilized in the loading and unloading of the vehicle, provided:

(1) The accessory is an intergral part of the vehicle.

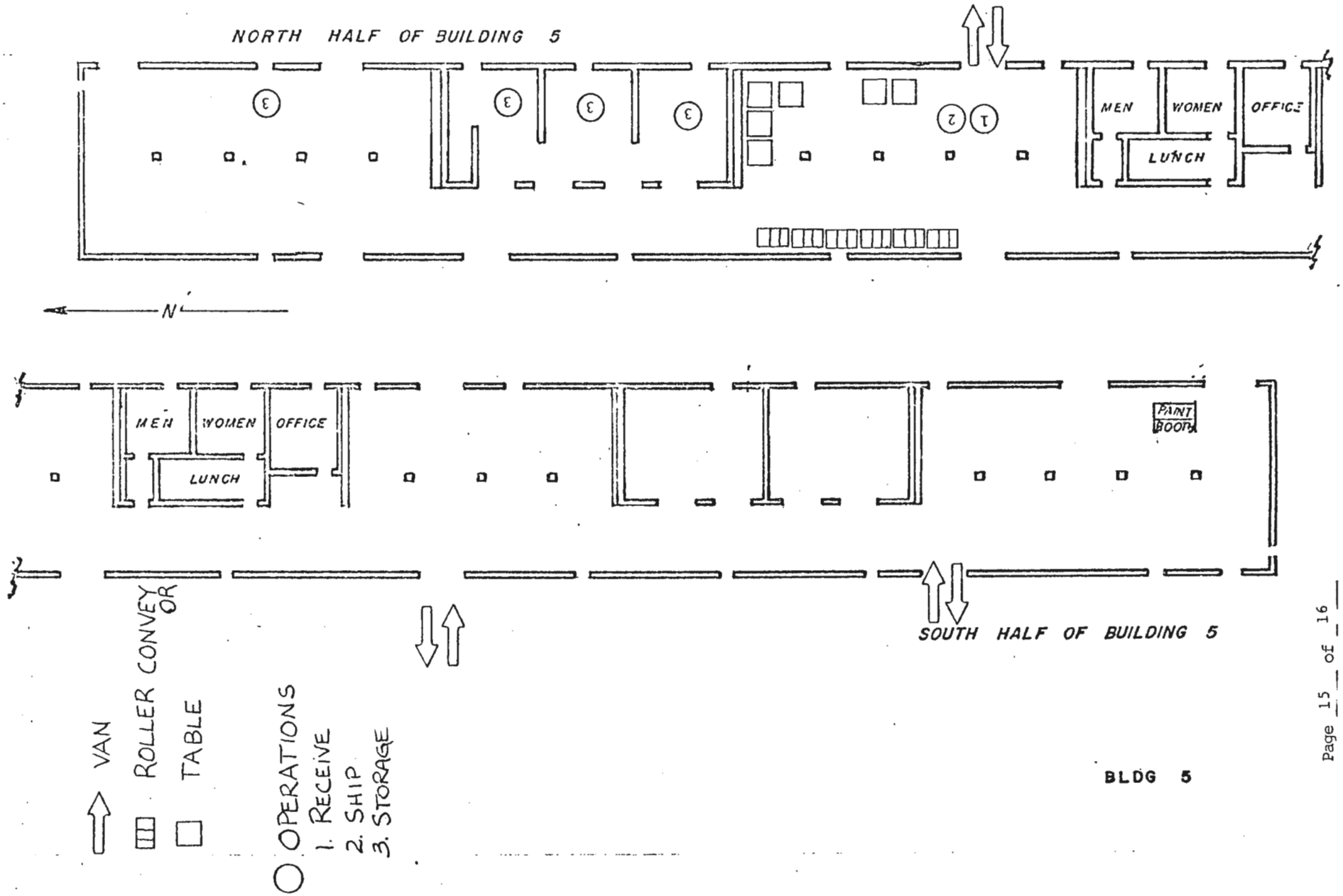
(2) The exhaust gases from the motor are emitted at least six feet from the point at which the loading operations is conductedand are directed away from this point.

(3) The exhaust pipe is equipped with a spark arrestor.

(4) Materials being loaded or unloaded whcih may evolve flammable vapors are exposed in tightly fitting containers.

f. Explosive laden vehicles will not exceed 25 MPH while on depot.

g. Commercial carriers will be provided an escort, by Depot Property Div., at all times, while in the ammunition area.


NORTH HALF OF BUILDING 5
3
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ROLLER CONVEYOR
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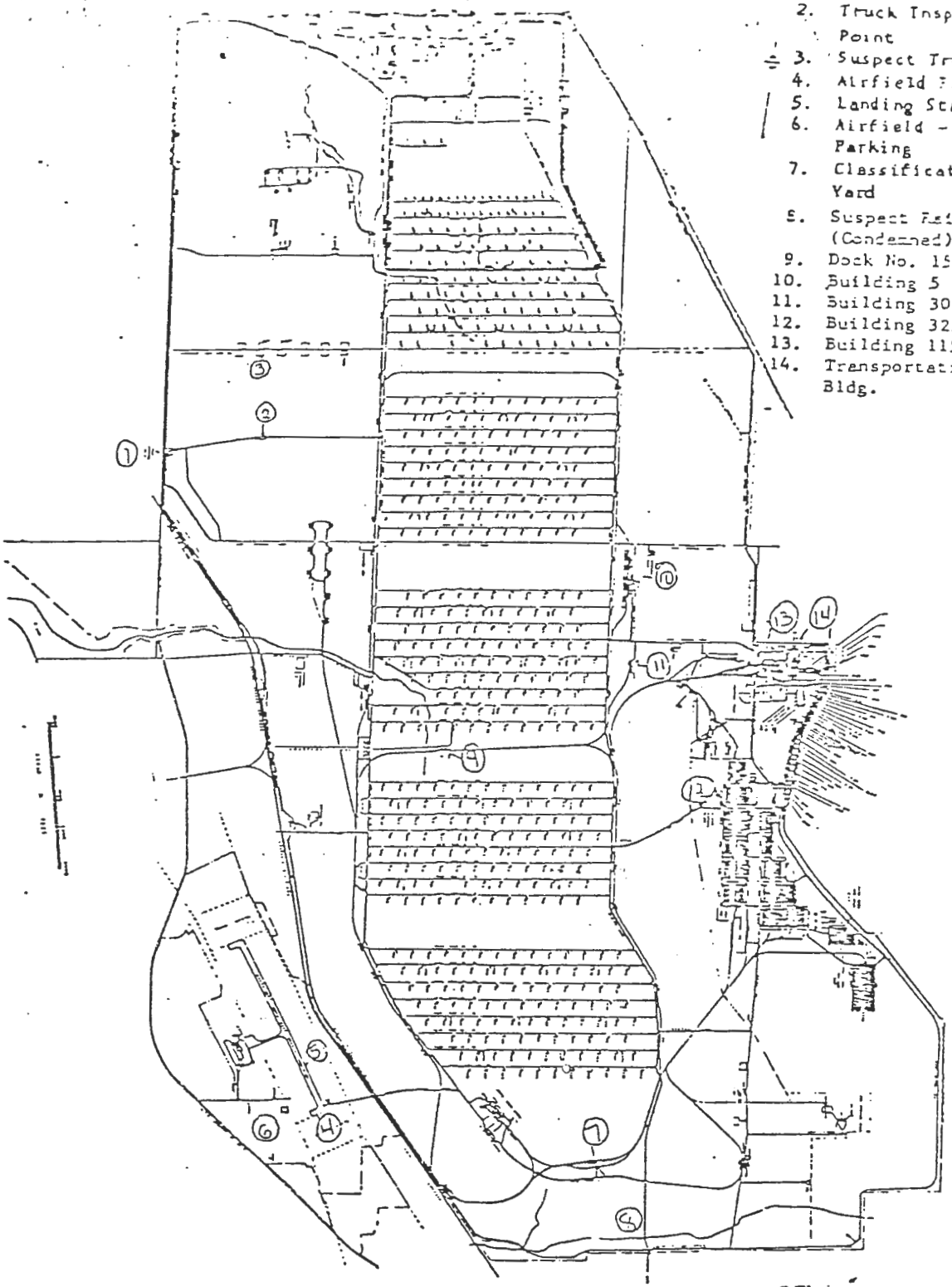
OPERATIONS
1. RECEIVE
2. SHIP
3. STORAGE

BLDG 5


1. Post 2
2. Truck Inspection Point
3. Suspect Truck Ex
4. Airfield Ex
5. Landing Strip
6. Airfield - Vehicle Parking
7. Classification Yard
8. Suspect Rail (Condemned)
9. Dock No. 1593
10. Building 5
11. Building 306
12. Building 323
13. Building 115
14. Transportation Bldg.

SOP COVER SHEET
1. SENECA army DEPOT

STANDING OPERATING PROCEDURE FOR:

2. ITEM: SMALL ARMS AMMUNITION THRU 30MM, FSC - 1305, VARIOUS DODIC'S QD CLASSES (04) 1.2 AND 1.4 FIRE SYMBOLS 1,2 AND 4, RADIOACTIVE MATERIALS SYMBOL AND RADIOACTIVE AREA SIGN FOR CTG, 30MM API AND API-T DU.

3A. OPERATION: SURVEILLANCE INSPECTION

B. ESTIMATED DAILY PROD. RATE

4. DEPOT ORGANIZATIONAL SYMBOL: SDSSE-RA

5. SOP NO: SE-A000-R-305 DATE: 4 JUN 75

a. REV NO: 3 DATE: 2 MAY 83

b. CHANGE NO: 2 DATE: 14 JAN 86

6. AUTHORITY SB 742-1

7. PREPARED BY: JOHN PEDLEY TITLE: QA SPEC (AMMO SURVL) PHONE EXTENSION: 304/552

8. REVIEWED BY: ROBERT REMUS TITLE: QA SPEC (AMMO SURVL)

9. SUBMITTED BY: G. N. LAGATTA TITLE C, S/ASD, DQA

10. CONCURRENCES:

OFFICE	SIGNATURE	TITLE
Directorate for Quality Assurance	LAURENCE M. ORNDORFF	Director of Quality Assurance
Facilities Engineers	RANDY BATTAGLIA	Environmental Protection Officer
Safety	THOMAS BATTAGLIA	Safety Officer

11. APPROVAL: BRUCE M. GARNETT
Colonel, OD
Commanding

12. BIENNIAL REVIEW:

DATE	SIGNATURE	TITLE

SOP - SUPERVISOR'S STATEMENT

SOP NO. SE-A000-R-305 REV NO. 3 CHANGE NO. 2 DATE 14 JAN 86

I have personally reviewed each of the operational steps of the SOP and have no question in my mind that the operation can be performed safely and efficiently. I have trained the following operators in the details of their part of the operation and have instructed them to follow the SOP without deviation.

NAME	DATE	OPERATION NUMBER

SUPERVISOR DATE

AMMUNITION SURVEILLANCE DIVISION

SOP - OPERATORS STATEMENT

SOP NO. SE-A000-R-305 REV NO. 3 CHANGE NO. 2 DATE 14 JAN 86

I have read or have had read to me and understand the general and specific safety requirements, personnel and explosive limits, work description and inspection requirements necessary to accomplish my operation. I have been thoroughly trained in, and am familiar with, my part of the operation and I agree to abide by these instructions throughout my assignment to the operation.

NAME	DATE	OPERATION NUMBER

INDEX OF OPERATIONS

* Note: Storage limits for BLDG 306 is 5000 lbs. Maximum storage of DU is 3500 rounds in Bay 3 as limited by Source Material License SUC 1275.

REMARKS:

Operations 1 thru 5 consists of unpacking, inspecting, and repacking of conventional SAA. Operations 6 thru 9 consists of unpacking, inspecting, and repacking of 30MM SAA.

1. This revision brings this SOP into compliance with DARCOMR 385-1, dated 22 February 1982.

2. This revision incorporates the unpacking, inspection and repacking of 30MM ammunition, Operations 6 through 9; adds the requirement of informing the Fire Dept., Ext 316/436, whenever a fire symbol is posted or changed on Bldg 306 as required by SEADR 420-10, dated Mar 83; adds operator and maintenance requirements for the AN/PDR-54 (Appendices A and B) and includes special requirements for 30MM API/API-T (Appendix C).

3. All personnel exposed to PCP treated wooden boxes shall use the following guidelines to determine the appropriate level of personal protective equipment.

a. Material treated with pentachlorophenol and dried properly, represents a minimal hazard to personnel. It shall, however, be handled with caution and skin contact or inhalation prevented, and personnel must wear leather palmed gloves for handling all properly dried treated items.

b. Such gloves, and all clothing which contacts the treated items, should be replaced or laundered frequently to prevent accumulation of PCP.

c. Material showing areas of wetness or tackiness or evidence of PCP crystallization on the surface shall be handled as follows: Rubber gloves and aprons shall be worn to prevent physical contact with treated items.

d. Personnel should not eat, drink or smoke in areas containing PCP. Personnel should also wash prior to eating, drinking or smoking and after each shift.

e. An obvious odor of pentachlorophenol, irritation of the eyes, nose or throat is an indication of airborne pentachlorophenol and ventilation sufficient to reduce the irritation to an unnoticeable level should be provided.

f. An industrial hygiene survey of airborne pentachlorophenol should be made and it the standard is exceeded, NIOSH TC approved organic vapor respirators are required until engineering or administrative controls are instituted. If an industrial hygiene survey of the operation documents the need for respiratory protection, then NIOSH TC approved respirators shall be provided until feasible engineering or administrative controls can be implemented.

The inspector will use whichever comment on PCP handling that is more stringent or complete.

g. Change 1 incorporates review comments by FSA and USADACS provided by USADACS letter, SMCAC-AV, dtd 16 Sep 83, subject: Review of Standing Operating Procedures for Ammunition Items, reduced the minimum number of operators on the Loader/Unloader from three to two in Operation 9, and added special safety precautions to paragraph K of operation 6 when inspecting 30MM projectiles disassociated from the complete round.

h. Change 2 adds Bldg 612 as a location for operations 2, 4 and 5 and changes all DARCOM references to AMC, and incorporates General Safety Requirements.

4. REFERENCES: AR 385-3, AR 385-30, AMC Handbook 385-1.1-78, AMC-R 385-1, AMC-R 385-100, SB 742-1, SB 742-2, SB 742-1305-1, SC 1305/30, SEADR 385-3, SEADR 420-100, TB 43- 0145, TB 385-4, TM 3-220, TM 9-1305-200, TM 9-1305-201-20&P, TM 9-1305-201-34&P, TM 11-6665-208-15, TM 11-6665-209-15, TM 38-750, TM 43-0001-27, T.O. 11A-1-10, T.O. 11A13-14-7, T.O. 35D2-15-1, T.O.35D30-4-12-2, MIL SPECS, MIL STDS, Source Material License SUC 1275, Title 10,CFR, Ordnance Drawings,Current AINS, TB 43-0142, applicable DMWR's, TM 43-0001-47, TB 43-0195, AR 190-11, AR 40-14, AR 385-11, AMC-R 385-25 and Title 49 CFR.

GENERAL SAFETY REQUIREMENTS

1. Personnel will read all general safety requirements prior to beginning operation.

2. Standing operating procedure (SOP), applicable portion, shall be conspicuously posted in rooms or bays involved in the operation. Supervisory personnel shall maintain copies of a complete standing operating procedure and be responsible for the enforcement of it provisions.

3. There will be no deviation or change from the approved SOP without prior approval of the installation Commander or his designated representative.

4. Employees will not tamper with any safety devices or protective equipment.

5. Any defect or unusual condition noted that is not covered by this SOP will be reported immediately to supervisory/QASAS personnel.

6. Appropriate fire symbol and chemical hazard symbol shall be displayed in such a manner as to be easily visible from all roads of approach.

7. Care will be taken to limit exposure of a minimum number of personnel for a minimum time, to a minimum amount of hazardous material consistent with safe and efficient operations.

8. Personnel will be so located that operator will have an unobstructed path of travel to the nearest available exits.

9. Work locations will be maintained in a neat and orderly condition.

10. All handtools shall be maintained in a good state of repair.

11. Personnel in proximity to steel banding operations will wear face shields and safety eyewear. Operators handling metal banding will also wear leather or leather-palmed gloves.

12. Operators lifting material will use proper, safe hand holds, assume proper lifting position, avoid twisting when lifting or carrying, and avoid sharp objects.

13. Each MHE and/or vehicle operator will have in his possession a valid operators permit for the particular piece of equipment to be operated.

14. Types E, EE, ES, and EX rated battery-powered equipment are satisfactory for handling all classes of ammunition and explosives packed in accordance with Department of Transportation Regulations.

15. Explosives-loaded ammunition, packaged ammunition or bulk explosives shall not be handled roughly, thrown about, tumbled, dropped, or walked over other explosives or ammunition. Large ammunition items, packaged in DOT approved containers designed to permit dragging, rolling or towing, may be so moved when necessary during handling for storage and transportation.

16. Any ammunition determined to be dangerous to handle or store will be reported immediately to supervisory personnel. Operations will be suspended and if warranted, personnel will be evacuated pending further instructions. Doors of operating buildings should have panic hardware installed and must never be bolted or locked when operations are being conducted. Posted personnel and explosives limits must not be exceeded at any time. Transient personnel must comply with the same safety requirements as operating personnel. In bays where conductive footwear is required, transient personnel such as production controllers and other visitors to the operation are authorized to wear conductive booties or leg stats. No more than a 4-hour requirement of supplies should be kept in an operating building.

17. Equipment and the grounding system shall be tested for electrical resistance and continuity when initially installed and at intervals determined locally. Al exposed explosives or hazardous materials shall be removed prior to making the test. Test results will be recorded.

18. Appropriate Fire Symbols and/or chemical hazard symbols shall be displayed on vehicles used in transporting ammunition intradepot.

19. Leather or leather-palmed gloves will be worn when handling wooden boxes.

20. Steel toed safety shoes will be worn by all personnel engaged in material handling operations.

21. Material Handling Equipment and other lifting devices will have the load rating and date of next inspection marked on them. The load rating will not be exceeded and the equipment will not be used without a current inspection date.

22. All employees handling or storing material treated with Pentachlorophenol (PENTA) should be aware of the following guidance:

a. The degree of hazard associated with PENTA treated packing material cannot be determined by visual examination. There are no quantifiable criteria to use judging such items as "loose" or "excessive", therefore, the following information is disseminated to provide final guidance on protective measures for handling Pentachlorophenal (PENTA) treated wood. This guidance should be followed under the direction of a resident industrial hygienist who has evaluated the actual PENTA exposure in question.

b. The following protective measures are recommended for handling:

1. Penachlorophenal - treated lumber - prevent inhalation, ingestion, skin and eye contact.

2. Good housekeeping is essential to prevent reentrainment of Pentachlorophenol crystals or wood dust.

3. Prevention of skin and eye contact through the use of gloves, coveralls, and goggles. The type of gloves to be worn is dependent upon the characteristics of the wood being handled. If the wood is wet or tacky, gloves made of nitrile rubber or polyvinyl chloride (PVC) should be worn. Leather-palmed gloves offer proper skin protection when handling properly treated wood. Perspiration build-up may allow Penachlorophenol to permeate through leather gloves; therefore, only dry leather-palmed gloves should be worn, coveralls which are laundered on a routine basis (preferable daily) should be worn. The coveralls should not be taken home but should remain at the work site. When handling wood with visible crystals of Penachlorophenol or when generating wood dust, chemical goggles should be worn.

4. A National Institute for Occupational Safety and Health (NIOSH) - approved dust mask must be worn when sawing and machining treated wood. If the airborne Pentachlorophenol concentration exceeds, or is expected to exceed, the threshold limit value (TLV) of 0.5 MG/M3 timeweighted average, a NIOSH-approved organic vapor respirator with dust prefilter must be worn.

5. No smoking, eating, or drinking should be permitted in the work areas. Separate break areas and washing facilities should be provided. Personnel should wash hands prior to eating, drinking, smoking, or using toilet facilities. All exposed areas of the body should be washed at the end of each workday.

c. Guidance on handling lumber treated with zinc naphthenate and copper naphthenate - prevent inhalation, ingestion, and skin contact.

1. Good housekeeping - see b(2).

2. Personnel should wash hands before eating, drinking, smoking, and using toilet facilities. All exposed areas of the body should be washed at the end of each workday.

3. Leather-palmed gloves should offer proper skin protection. If skin irritation is noted, a vinyl-coated glove can then be substituted. Coveralls may be required if irritation is noted for other areas of the body.

4. A NIOSH - approved dust mask should be worn when sawing and machining treated wood.

d. The U.S. Army Environmental Hygiene Agency provides the following sampling guidance for monitoring personal exposed to PENTA; however supporting laboratories should be contacted to verify their particular sampling protocol:

				Sample Rate or time Minute	Vol in Liters Maximum
1.	Carried by saw dust	Filter cassette closed-face with spacer (or 0.8 Micron)	1-2 Liters/ minute	50	500
2.	Vapor	Midget Impinger (15ML of Ethylene Clycol)	1-5 Liters/ Minute	100	240

e. If the level of 0.5 MG/M3 time weighted average is exceeded, adequate precautions must be taken to reduce worker exposure to a safe level.

23. Operations where dusts, vapors or gases are present should have an industrial hygienist evaluate the hazard to determine whether respirators are needed. Identify the appropriate type of respirator in the list of equipment for that operation.

24. In the event of an electrical storm, action will be taken as outlined in paragraph 16-12 and 16-13, AMC-R 385-100 or a locally approved Standing Operating Procedure (SOP).

25. All installed gages and equipment will be properly grounded.

26. The supervisor is responsible to report to the safety office, all injuries and accidents occuring during his/her shift. In the event of a fire or explosion, activate all installed fire extinguishing equipment and alarm systems. The person discovering the fire/explosion will notify the Fire Department, Safety Officer, Chief of Surveillance, and Chief of Ammunition. Dial 911.

27. Work tables will be equipped with side boards to prevent ammunition from rolling off. Metal table tops will be grounded.

28. When threatened by fire or explosion, a location containing fire symbol 1.1 material will be evacuated immediately.

29. Paint thinners, oily rags and other highly flammable materiels will be kept in approved, closed receptacles.

STANDING OPERATING PROCEDURE FOR:

SURVL INSPC. OF SMALL ARMS AMMO THRU 30MM, FSC-1305 VARIOUS DODICS, QD CLASSES (04) 1.2 & 1.4, FIRE SYMB. 1, 2 & 4,RADIOACTIVE MATERIALS,RADIOACTIVE AREA F/CTG, 30MM API & API-T DU

B. OPERATION NO. 1

C. BAY NO. N/A

D. SOP NO. SE-A000-R-305 DATE 4 Jun 75

E. REV NO. 3 DATE 2 MAY 83

F. CHANGE NO. 2 DATE 14 JAN 86

G. OPERATION: SAMPLE SELECTION

H. EXPLOSIVE LIMITS: UNITS N/A EXPLOSIVE LBS: STORAGE LOCATION LIMITS

I. PERSONNEL LIMITS: OPERATORS: 2 TRANSIENTS: 2

J. STEP NO	DESCRIPTION	SPECIFIC INSTRUCTION (SAFETY, OPERATIONAL QUALITY CHARACTERISTICS).
1.	QASAS will select samples.	1a. (O) Samples will be selected IAW SB 742-1 or applicable manuals on non-single manager items. 1b. (O) Samples will be selected IAW SOP SDSSE-600-14. 1c. (O) Samples will be transported IAW SOP SDSSE-600-17. 1d. (O) QASAS will note any storage discrepancies on AODR Form SDS 1092R.

K. SPECIAL REQUIREMENTS:

1. Keys to storage locations will be returned to Bldg 323 as soon as possible and not later than 1530 hours.

2. Samples selected for Grant Aid, Civilian Aid, and FMS Programs will be IAW SB 742-2.

3. If an operator has a cut, laceration, abrasion or other open skin wound, he should not be allowed in a DU controlled area (AMC Handbook 385-1.1-78).

4. Any skin wound obtained in a DU contaminated area should be throughly flushed with water and monitored (AMC Handbook 385-1.1-78).

5. Film badges will be worn during all operations with DU Ammunition.

6. Visitors entering DU controlled areas will be required to maintain a distance of at least one meter seperation between themselves and the DU Ammunition. This requirement will make the issuance of a film badge to visitors unnecessary.

6. Operators are responsible for reporting to supervisors any unusual incidents accidents, personal injury (however slight), suspected overexposure to radiation and/or suspected internal exposure as soon as possible after occurrence. Supervisor will report to RPO and Safety and Health Manager. Affected personnel must be referred to Medical Officer immediately (SEADR 385-1).

7. Should a container of DU Ammunition be dropped (in excess of 5 feet) operations will immediately cease and C, ASB (Ext 304) and RPO (Ext 261) will be notified. Operation will resume only upon direction of RPO.

8. Any defect or unusual condition noted that is not covered by this SOP will be immediately reported to C, ASB (Ext. 304).

9. A Metal X Powder Fire Extinguisher will be readily available during 30MM DU Operations.

10. Each operator of MHE will have current operators permit in his possession.

11. Insure that forklift has a current load test/inspection due date as per requirement of TB 43-0142 and SEADR 385-3.

12. Sensitive item security requirements of AR 190-11 apply.

L. EQUIPMENT, TOOLS, GAGES AND SUPPLIES:

ITEM	QUANTITY REQ'D	SPEC NO.	NSN
Blank Manila Shipping Tags	As Required		8135-00-292-2355
SDSSE-R Form 21	As Required		
Palletization Drawings	As Required		
Metal X Fire Extinguisher	1		
Film Badge	1 per operator		
Forklift, battery powered, Type E, EE, ES or EX	1		

A. STANDING OPERATING PROCEDURE FOR: SURVL INSPC OF SMALL ARMS AMMO THRU 30MM FSC-1305, VARIOUS DODICS, QD CLASSES(04)1.2&1.4, FIRE SYMBL 1,2 & 4.RADIOACTIVE MATERIALS & RADIOACTIVE AREA FOR CTG, 30MM API AND API-T DU

B. OPERATION NO. 2

C. BAY NO. Bldg306and612 1or2 A2orA4

D. SOP NO. SE-A000-R-305 DATE 4 Jun 75

E. REV NO. 3 DATE 2 MAY 83

F. CHANGE NO. 2 DATE 14 JAN 86

G. OPERATION: RECEIVE SAMPLES, UNPACK, INSPECT

H. EXPLOSIVE LIMITS: UNITS: 100,000 EXPLOSIVE LBS: N/A

I. PERSONNEL LIMITS: OPERATORS: 6 TRANSIENTS: 3

J. STEP NO.	DESCRIPTION	SPECIFIC INSTRUCTION (SAFETY, OPERATIONAL QUALITY CHARACTERISTICS).
1.	Receive samples from Pick-Up Crew.	1a. (O) Samples will be transported to Bldg 306 IAW SOP SDSSE-600-17. 1b. (S)(O) Assure correct Fire Symbols are posted and Fire Department is notified, Ext 316/436.
2.	Place boxes on conveyor.	2a. (S) Operators handling wooden boxes will wear leather or leather palmed gloves and safety shoes.
3.	Inspect outer pack.	3a. (QC) Inspect outer pack IAW SB 742-1 and applicable MIL STD's, manuals and drawings. 3b. (QC) Classify defects IAW SB 742-1 and applicable MIL STD's, manuals, MIL SPEC's, and dwgs. 3c. (S) PCP Treated containers and dunnage will be inspected IAW current AIN.
4.	Open outer pack.	4a. (O) Place removed seals and banding in proper receptacle provided. 4b. (S) Operators handling wooden boxes and removing banding will wear leather or leather palmed gloves and safety shoes.

4c. (S) Personnel exposed in proximity to steel banding or band cutting operations will wear face shields and safety eyewear. Operators handling the metal banding will also wear leather or leather palmed gloves.

5. Remove inner pack/ item and place on work table.

5a. (S) Conductive shoes and mats are required for operations involving unpacked ammunition with electric primers (20MM). Place electrically primed rounds in a grounded copper tray or on grounded table top.

5b. (S) Place a protective cap over primers of 20MM ammunition during inspection.

5c. (S) Inspect containers containing tracer ammunition for evidence of bulging due to hydrogen gas.

5d. (S) Should bulging be evident, follow procedure in DMWR's 1300-0010-D1, 9-1305-0000-X1, and 9-1300-0017-D1 for release of hydrogen gas.

6. Inspect inner pack.

6a. (QC) Inspect inner pack IAW SB 742-1 and applicable MIL STD's, manuals and drawings.

6b. (QC) Classify defects IAW SB 742-1 and applicable MIL STD's and manuals.

7. Perform pull, twist and flexibility tests on linked ammunition.
NOTE: The load to be applied will be as follows:

Caliber	Load
.30	25 lbs
7.62	25 lbs
.50	80 lbs
20mm	115 lbs

7a. (O) Perform tests IAW MIL STD 644A and APE Manual 2050. Test is required only when DSR does not indicate previous test.

7b. (S) Guard assembly on APE 2050 will be closed prior to applying tension to belt.

7c. (QC) Insure that required tension is applied evenly along entire length of belt.

7d. (QC) Inspect belt of linked cartridges IAW MIL STD 644A.

7e. (QC) Classify defects IAW MIL STD 644A.

8. Delink or remove from clip or box as applicable.

8a. (O) Use approved hand delinker.

8b. (S) Operator of delinker will wear safety glasses or face shield.

9. Inspect items.

9a. (QC) Inspect items IAW SB 742-1 and applicable MIL STD's, manuals and drawings.

9b. (QC) Classify defects IAW SB 742-1 and applicable MIL STD's and manuals.

9c. (QC) Any restrictions stencilled on inner or outer pack will be noted when found, appropriate action will be taken to restrict the lot. (AIN 65-85).

9d. (S) Ctg, Cal .50 Spotter-Tracer contains impact sensitive detonator in projectile nose and should not be dropped or struck on projectile nose.

10. Gage items.

10a. (O) Gaging of ammunition through 50 Caliber may be performed in the operating bay. 20MM Ammunition will be transferred to Bay 2C for gaging. See Operation 3.

10b. (S) Place a protective cap over primers of 20MM ammunition during transfer on cart APE 1008A.

10c. (QC) Assure gage to be used is appropriate Profile and Alignment Gage IAW TB 43-0195.

10d. (O) Thumb pressure only may be used to insert the round into the gage.

10e. (QC) All samples will be gaged at each inspection when DSR indicates no previous gaging was done.

10f. (S) Place a protective cap over primers of 20MM Ammunition during transfer on ammo transfer cart.

	10g. (O) Record the number of passes on gage record card, DA Form 3023.
11. Disposition of defective samples.	11. (QC) Defective samples will be disposed of, stored, and identified IAW paragraphs 2-2c of SB 742-1.
12. For items that require Ballistic or Trace Test, refer to Operation 4.	

K. SPECIAL REQUIREMENTS:

1. To preclude the mixing of other types of Small Arms Ammunition with blank ammunition, the following precautions will be taken during operations involving blank ammunition:

a. No operations including blank Small Arms will be conducted in Bays where operations involving other types of Small Arms are being conducted.
b. Inspect all equipment used before production starts to insure service rounds are not present.
c. Restrict all equipment involved to blank Small Arms until operation is completed.
d. Conduct a 100% visual inspection of all samples prior to final packing to insure that only blank ammunition is present.

2. Only one lot of ammunition at a time will be inspected/processed.

3. Insure that forklift has a current Load Test/Inspection due date as per requirement of TB 43-0142 and SEADR 385-3.

4. Grounding system will be tested prior to commencement of operation in accordance with paragraph 7-4, AMC-R 385-100 and Operation 2, SOP SE-0000-T-303.

L. EQUIPMENT, TOOLS, GAGES AND SUPPLIES:

ITEM	QUANTITY REQ'D	SPEC/DWG NO	NSN
Surveillance Work Table	1		APE 2050
Transfer Cart	1		APE 1008A
Forklift, Battery-Powered Type E, EE, ES or EX	1		
Leather or Leather Palmed Gloves	As Required		
Safety Glasses or goggles, and Face Shields	As Required		
Conductive Shoes	As Required		
Strap Cutters	1		
Pliers, Diagonal Cutting	1		
Conductive Mat	As Required		
Profile and Alignment Gage	1		
Approved Hand Delinker	1		
Safety Shoes	1 pr/per operator		

A. STANDING OPERATING PROCEDURE FOR:

SURVL INSP,SMALL ARMS AMMO THRU 30MM

FSC-1305,VARIOUS DODICS,QD CLASSES

(04) 1.2&1.4,FIRE SYMBOLS 1,2&4. RADIOACTIVE MATERIALS & RADIOACTIVE AREA FOR CTG.30MM API and API-T DU.

B. OPERATION NO. 3

C. BAY NO. Bldg306 2C

D. SOP NO. SE-A000-R-305 DATE 4 Jun 75

E. REV NO. 3 DATE 2 MAY 83

F. CHANGE NO. 2 DATE 14 JAN 86

G. OPERATION: GAGING 20MM

H. EXPLOSIVE LIMITS: UNITS: 1 EXPLOSIVE LBS: 2

I. PERSONNEL LIMITS: OPERATORS: 1 TRANSIENTS: 1

J. STEP NO.	DESCRIPTION	SPECIFIC INSTRUCTION (SAFETY, OPERATIONAL QUALITY CHARACTERISTICS).
1.	Receive rounds from Operation 2.	1a. (O) APE cart will remain outside Bay 2C.
2.	Prepare the gage.	2a. (S) Assure gage is empty and properly grounded. 2b. (S) Conductive mats will be employed and conductive shoes worn when gaging rounds with electric primers.
3.	Remove primer protection.	3a. (S) Protect primer with hand when protective cap is removed.
4.	Gage round.	4a. (S) Again assure gage is empty prior to round insertion. 4b. (O) Thumb pressure only may be used to insert the round into the gage. Gate should close without undue force.
5.	Remove round from gage.	5a. (S) Replace protective cap over primer.
6.	Annotate number of passes on gage record card, DA Form 3023.	

K. SPECIAL REQUIREMENTS:

1. Grounding system will be tested prior to commencement of operation in accordance with paragraph 7-4, AMC-R 385-100 and Operation 2, SOP SE-A000-R-305.

L. EQUIPMENT, TOOLS, GAGES AND SUPPLIES:

ITEM	QUANTITY REQ'D	SPEC/DWG NO.	NSN
Transfer Cart APE 1008A	1		APE 1008A
Profile and Alignment Gage	1		
Conductive Shoes	As Required		
Conductive Mat	As Required		

A. STANDING OPERATING PROCEDURE FOR: SURVL INSPEC OF SMALL ARMS AMMO THRU 30MM FSC -1305.VARIOUS DODICS QD CLS (04)1.2&1.4 FIRE SYM 1, 2 & 4.RADIOACTIVE MATERIALS AND AREA FOR CTG. 30MM API & API-T DU

B. OPERATION NO. 4

C. BAY NO. Bldg306and612 A2,A4 1or2

D. SOP NO. SE-A000-R-305 DATE 4 Jun 75

E. REV NO. 3 DATE 2 MAY 83

F. CHANGE NO. 2 DATE 14 JAN 86

G. OPERATION: PREPARATION OF TEST SAMPLES

H. EXPLOSIVE LIMITS: UNITS: 100,000 EXPLOSIVE LBS: N/A

I. PERSONNEL LIMITS: OPERATORS 3 TRANSIENTS: 3

J. STEP NO.	DESCRIPTION	SPECIFIC INSTRUCTIONS (SAFETY, OPERATIONAL QUALITY CHARACTERISTICS)
1.	Select samples.	1a. (O) Assure proper representation of the lot. Samples are to be selected IAW SB 742-1 and SB 742-1305-1. 1b. (O) Only serviceable rounds will be selected. All samples selected will be gaged. See Operations 2 or 3 as applicable. 1c. (S) Operators handling wooden boxes will wear leather or leather palmed gloves, and safety shoes. 1d. (S) PCP treated containers and dunnage will be inspected IAW current AIN.
2.	Package samples for shipment.	2a. (O) Pack samples IAW SB 742-1, paragraph 2-6b(2). DA Form 3524-R Trace Function Test Report will be prepared IAW SB 742-1305-1 for Tracer Ammunition prepared for shipment to test facility. 2b. (S) Personnel exposed in proximity to steel banding or band cutting operations will wear face shields and safety eyewear. Operators handling the metal banding will also wear leather or leather palmed gloves.

3. Prepare records and reports.	3a. (O) Records/reports will be prepared IAW Specific Procedure Number 1 and SB 742-1.

K. SPECIAL REQUIREMENTS: N/A

L. EQUIPMENT, TOOLS, GAGES AND SUPPLIES:

ITEM	QUANTITY REQ'D	SPEC/DWG NO	NSN
Conductive Shoes	1 pair per operator		
Leather or Leather palmed Gloves	As Required		
Safety Glasses or Goggles and Face Shield	As Required		
Stencil Cutter	1		
Enamel White No. 37875	As Required	TT-E-516	8010-00-878-5617
Paint Brush	1		
Ink, Marking, Stencil, Black	As Required	TT-I-559	7510-00-161-0811
Lead Wire Seals	As Required		
Strapping and Seals	As Required		
Strap Cutters	1		
Strap Stretcher	1		
Hand Tools	As Required		
Profile and Alignment Gage	1		

A. STANDING OPERATING PROCEDURE FOR: B. OPERATION NO. 5

SURVL INSP OF SAA THRU 30MM, FSC-1305 C. BAY NO. Bldg306and612 A2,A4 1or2

VARIOUS DODICS QD CLASSES(04)1.2&1.4 D. SOP NO. SE-A000-R-305 DATE 4 Jun 75

FIRE SYM 1,2&4. RADIOACTIVE MATERIALS E. REV NO. 3 DATE 2 MAY 83

& AREA F/CTG 30MM API & API-T DU F. CHANGE NO. 1 DATE 3 APR 84

G. OPERATION: REPACK

H. EXPLOSIVE LIMITS: UNITS: 100,000 ROUNDS EXPLOSIVE LBS: N/A

I. PERSONNEL LIMITS: OPERATORS: 4 TRANSIENTS: 3

J. STEP NO.	DESCRIPTION	SPECIFIC INSTRUCTION (SAFETY, OPERATIONAL QUALITY CHARACTERISTICS).
1.	Repack ammunition into inner pack.	1a. (QC) Assure that ammunition is packed IAW applicable drawing(s). 1b. (S) Insure inner pack is tight to prevent movement of items.
2.	Reseal inner pack.	2a. (O) Hermetically sealed containers will be resealed IAW paragraph 2-2c(1) of SB 742-1. 2b. (O) Metal (ternplate) lined M1917 boxes will be resealed IAW paragraph 2-2c(2) of SB 742-1. During soldering operations, operators will wear eye protection and wear leather aprons. Area will be ventilated. 2c. (O) Barrier bags will be resealed IAW paragraph 2-2c of SB 742-1.
3.	Repack outer containers.	3. (O) Insure light boxes are identified IAW Drawing 8796522.
4.	Seal and secure outer pack.	4a. (S) Personnel exposed in proximity to steel banding or band cutting operations will wear face shields and safety eyewear. Operators handling the metal banding will also wear leather or leather palmed gloves.

5. Repalletize containers.	5. (O) Containers will be repalletized IAW applicable palletization drawings.
6. Return pallet(s) to parent lot/storage.	6. (O) Samples will be transported IAW SOP SDSSE-600-17.

K. SPECIAL REQUIREMENTS:

1. When inspecting blank ammunition, inspect 100% prior to resealing inner pack to assure no service/live rounds are present.

2. Insure that forklift has a current Load Test/Inspection due date as per requirements of TB 43-0142 and SEADR 385-3.

L. EQUIPMENT, TOOLS, GAGES AND SUPPLIES:

ITEM	QUANTITY REQ'D	SPEC/DWG NO.	NSN
Forklift, Battery-Powered. Type E, EE, ES of EX	1		
Hand Tools	As required		
Strapping and Seals	As required		
Lead Wire Seals	As required		
Strap Cutter	1		
Safety Glasses or Goggles and Face Shield	As required		
Leather or Leather Palmed Gloves	As required		
Safety shoes	1 pair per operator		
Strap Stretcher	As required		
Tape, Pressure Sensitive	As required		
Wax Dip Tank APE 1086	1		APE 1086
Heat Sealer	1		

A. STANDING OPERATING PROCEDURE FOR: SURVL INSP OF SAA THRU 30MM FSC-1305 VARIOUS DODICS, QD CLASSES(04)1.2&1.4 FIRE SYMB 1,2&4.RADIOACTIVE MATERIALS & AREA F/CTG 30MM API & API-T DU.

B. OPERATION NO. 6

C. BAY NO. BLDG 306, BAY 1 OR 2

D. SOP NO. SE-A000-R-305 DATE 4 Jun 75

E. REV NO. 3 DATE 2 MAY 83

F. CHANGE NO. 2 DATE 14 JAN 86

G. OPERATION: UNPACK, INSPECTION AND REPACK (MANUAL OPERATION) 30MM

H. EXPLOSIVE LIMITS: UNITS: HE OR TP: 10,000 DU: 3500/STORAGE BAY 1176/OPERATING BAY EXPLOSIVE LBS: HE OR TP: 5,000 LBS DU:1690 STORAGE BAY 566/OPERATING BAY

I. PERSONNEL LIMITS: OPERATORS 4 TRANSIENTS 3

J. STEP NO.	DESCRIPTION	SPECIFIC INSTRUCTIONS (SAFETY, OPERATIONAL QUALITY CHARACTERISTICS)
1.	Receive samples from pick-up crew.	1a. (O) QASAS will assure transport vehicle is properly placarded. 1b. (O) Proper fire symbols (IAW AMC-R 385-100, para 12-23) will be posted on Bldg 306. Radiation caution symbol (DU Ammunition only) will be posted on Bldg 306 and in corridors outside Operating Bays (IAW AR 385-30 and Title 10 CFR). The Fire Department, Ext 316/436 will be informed when Fire/Hazard symbols are posted or changed. 1c. (S) The RPO (Ext 261), the Fire Dept. (Ext. 316), and medical personnel (Ext 242) will be notified when 30MM DU is moved to inspection location. 1d. (O) A maximum of six (6) ALS containers (3 pallets) of DU Ammunition will be allowed in the storage bay at any time. A maximum of two (2) ALS containers (1 pallet) of DU Ammunition will be allowed in the operating bay at any time (Ref: SUC 1275). 1e. (O) Only one lot of ammunition will be inspected/processed at any time. 1f. (S) Film badges will be worn during all operations with 30MM DU Ammunition.

2. Monitor container exterior.	2a. (S)(O) AN/PDR 27J will be utilized for container exterior. Should radiation level exceed 0.5 millirems/hr, 3 feet from container surface or 10 millirems/hr on container surface, cease operation, evacuate bay, close bay doors and monitor those individuals who were within the bay. To prevent the spread of contamination, those individuals who have readings above the background should remain in one, isolated location. Immediately notify C, ASD (Ext. 304) and RPO (Ext 261) by telephone. The operation will be resumed only upon the direction of the RPO.
3. Inspect outer pack.	3a. (O) Classify defects IAW T.O. 11A-1-10 and T.O. 11A13-14-7.
4. Determine work area background with AN/PDR 54.	4. (O) Obtain background reading with AN/PDR 54.
5. Open outer pack.	5a. (S) Personnel exposed in proximity to steel banding or band cutting operations will wear face shields and safety eyewear. Operators handling the metal banding will also wear leather or leather palmed gloves. 5b. (O) Cut and remove seals and banding as required and place in scrap receptacle provided. Loosen lid bolts as required. 5c. (S)(O) Remove cntr cover and set aside. Operators will wear safety shoes.
6. Monitor interior of container.	6a. (S) Operators will wear coveralls and cotton or surgical gloves during the removal, inspection, and repack of 30MM DU rounds.

6b. (O)(S) Monitor the interior of the cntr using an AN/PDR 54. If the reading obtained from the cntr is greater than background reading: cease operation, evacuate bay, close bay doors and monitor those individuals who were within the bay. To prevent the spread of contamination, those individuals who have readings above background should remain in one, isolated location. Immediately notify C, ASB (ext 304) and RPO (ext 261). Only upon direction of RPO can operation be resumed.

7. Swipe sample container interior.

7a. (O) Prepare three sample envelopes for each container. Label envelopes with date and lot number. Label one envelope as "container interior", another "plastic tubes". and the third "complete rounds".

7b. (O) Take one swipe sample each of the following and place swipe in the respective envelope (100cm^2 swipe sample:

1. Container interior surfaces
2. Plastic tubes.
3. Complete rounds.

7c. (O) Deliver swipe samples to Bldg. 321, Gage Lab for analysis. Request analyzing technician telephonically relay results to ASB as soon as analysis is completed.

8. Inspect inner pack and select complete round samples. Include container performed.

8a. (O) Complete round samples will be selected IAW T.O. 11A13-14-7 criteria and sample size for inspection being performed.

8b. (O) Alignment of fabric loops on plastic tublar assemblies should be visually checked prior to removing sample rounds (ALS containers only).

8c. (O)(S) Inspection of samples in ALS containers may be accomplished utilizing the Air Force Loader/Unloader(GFU-7/E) IAW Operation #9 of this SOP. When the Air Force Loader/Unloader is not available/operational the rounds from the top two (2) layers of 2 out of every 36 ALS containers will be removed from the Linked Tube carriers and placed on work table with sideboards on sides and front to prevent sample from rolling off.

8d. (O)(S) Samples from NON-ALS containers will be placed on work table equipped with sideboards on sides and front to prevent samples from rolling off.

9. Inspect container interior.

9a. (O) Inspect visual portion of container interior IAW T.O. 11A13-14-7 and T.O. 11A-1-10.

9b. (O) Classify defects IAW T.O. 11A-1-10 and T.O. 11A13-14-7.

10. Inspect complete round.

10a. (O) Inspect samples IAW T.O.-11A13-14-7, Table 5-1 and supplements.

10b. (O) Classify defects IAW T.O. 11A13-14-7 and supplements.

11. Repack samples.

11a. (O) Repack rounds IAW T.O.11A13-14-7.

12. Replace container cover.

12a. (O) CNU-332/E container cover lid bolts require 105 inch pounds + or - 5 assembly torque.

13. Reseal containers.

13a. (O)(S) Operators involved in banding operations will wear leather or leather palmed gloves and safety glasses or goggles and face shield.

13b. (O) CNU-309/E containers will be rebanded IAW Air Force drawing 785040.

13c. (O) Apply lead wire seals where required by T.O. 11A13-14-7 and applicable drawing.

14. Monitor work surfaces using an AN/PDR 54.	14a. (S)(O) Should any reading greater than background be obtained, immediately cease operations, evacuate bay, close bay doors and monitor those individuals who were within the bay. To prevent the spread of contamination, those individuals who have readings above background should remain in one, isolated location. Immediately notify C, ASB (Ext.304) and RPO (Ext 261), telephonically. Excess readings will be processed under the direction of the RPO.
15. Monitor personnel.	15a. (S) Perform personnel monitoring IAW Operation 8 of this SOP. Personnel shall be monitored before leaving the inspection bays.

K. SPECIAL REQUIREMENTS.

1. If an operator has a cut, laceration, abrasion or other open skin wound, bandaged or not, should not be allowed in a DU controlled area (AMC-R HANDBOOK 385-1.1-78).

2. Any skin wound obtained in a DU contaminated area should be throughly flushed with water and monitored (AMC-R Handbook 385-1.1-78).

3. Operators are responsible for reporting to supervisors any unusual incidents, accidents, personal injury (however slight), suspected overexposure to radiation and/or suspected internal exposure as soon as possible after occurrence. Supervisor will report to RPO and Safety and Health Manager (Ext 261). Affected personnel must be referred to medical officer immediately (SEADR 385-1).

4. Should a container of DU Ammunition be dropped, operations will immediately cease and C, ASD (Ext. 304) and RPO (Ext. 261) will be notified. Operation will resume only upon direction of RPO. Packaged cartridges dropped in excess of five feet or unpackaged cartridges dropped in excess of one foot shall be inspected for defects IAW Table 5-1 of T.O. 11A13-14-7.

5. Any defect or unusual condition noted that is not covered by this SOP will be immediately reported to C, ASD (Ext. 304).

6. Visitors entering DU controlled areas will be escorted but need not be furnished film badges as they are not expected to receive any measurable radiation exposure if they maintain one (1) meter separation between themselves and the DU Ammunition. There will be no smoking, eating, drinking, or chewing tobacco or gum during DU Operations or in areas where DU is stored (SEADR 385-1).

7. Good Housekeeping will be maintained (SEADR 385-1).

8. Hands and exposed portions of body will be washed thoroughly before breaks, lunch, end of shift and at the end of inspection.

9. Radioactive material will not be placed in pockets (SEADR 385-1).

10. Exposure time to radioactive material will be kept to the barest minimum (SEADR 385-1).

11. Operators will have a two-way radio when inspections are conducted at locations without telephone service.

12. Personnel shall be monitored for contamination IAW Operation 8 of this SOP before leaving the inspection bay. This includes breaks, lunch, and the end of shift.

13. Coveralls and gloves worn during 30MM DU Ammunition Inspection will remain in Bay 2 in the locker provided. A sample of the gloves will be sent for monitoring by the Gage Lab once/week when operations involving 30MM DU rounds have been conducted.

14. A Metal X Fire Extinguisher will be readily available during 30MM DU operations.

15. Each operator of MHE will have a current operator's permit in his possession.

16. Insure that forklift has a current Load Test/Inspection due date as per requirements of TB 43-0142 and SEADR 385-3.

17. Sensitive item security requirements of AR 190-11 apply.

18. Complete required reports IAW all current directives.

19. Operation of AN/PDR-54 requires a flame to be used in assuring proper gas flow to proportional counter if instrument temperature is above 90°F(32°C). If flame is to be used in the magazine area, written authorization by the installation commander or his designated agent is required.

20. The RPO will be notified of defective DU rounds, which will be stored until RPO can determine ultimate disposition from AMCCOM.

21. The following additional precautions will be taken when 30MM Depleted Uranium Projectiles disassociated from the cartridge, are received as field returns:

a. Safety glasses or goggle and faceshield will be worn.

b. Two pairs of gloves will be worn, the outer pair being of an impervious material such as "Platex" gloves or surgical gloves.

c. Projectiles will be monitored with an AN/PDR-27 with beta shield opened and closed to determine if there is any beta contribution, which would indicate bare DU.

d. The RPO will be notified if a projectile with a missing, punctured, or cracked windscreen is encountered.

e. Personnel encountering the situations in 21 c and d will evacuate the bay following personnel monitoring operations in operation 8 of this SOP.

22. QAI: MTL Cntr M548

CRITICAL DEFECTS:

None applicable.

MAJOR DEFECTS:

DS 101 - Heavy Corrosion
DS 102 - Broken Latches
DS 103 - Gasket damaged/inadequate or insufficient pressure(deep groove on lip of cntr.
DS 104 - Marking incorrect, missing or obliterated.
DS 105 - Lead seal missing or improperly positioned.
DS 106 - Large dents, holes or buckled.

MINOR DEFECTS:

a. Inadequate packing material.
b. Burrs or sharp edges on metal container.
c. Inadequate paint cover.

23. QAI: Shipping and Stg Cntrs. CNU-309/E and CNU-332/E.

CRITICAL DEFECTS:

None applicable.

MAJOR DEFECTS:

DS 101 - Broken or missing latches (CNU-309/E).
DS 102 - Angle iron guides broken or bent.
DS 103 - Damaged, loose or missing gasket (CNU-309/E).
DS 104 - Cover warped or bent to prevent proper seal.
DS 105 - Large dents or holes or buckled.

MAJOR DEFECTS (con't):

DS 106 - Lead wire seal missing, improperly positioned, broken or shows signs of tampering.
DS 107 - Markings incorrect, missing or obliterated.
DS 108 - Missing or loose container lid bolts (CNU-332/E).

MINOR DEFECTS:

a. Missing or broken pins (CNU-309/E)
b. Missing or broken tie down rings/lifting eyes.
c. Damaged or missing drain plug (CNU-309/E)
d. Damaged forklift slots
e. Missing or loose container lid bolts (CNU-332/E)

24. QAI: Link Tube Carrier

CRITICAL DEFECTS:

None applicable.

MAJOR DEFECTS:

DS 101 - Misalignment of fabric loop on tubes.
DS 102 - Linked tube carriers broken, split, cracked or otherwise damaged.
DS 103 - Fabric loops missing or broken.
DS 104 - Ties overlapping.
DS 105 - Presence of field splice.
DS 106 - Presence of (Blue) Field Strap.
DS 107 - Strap broken or missing.
DS 108 - Migration or misalignment of strap.
DS 109 - Stretched strap.
DS 110 - Stretch marks or cracks in tube.
DS 111 - Cuts or punctures in tube.
DS 112 - Broken neck, camming flange or window.
DS 113 - Base of tube stretched.
DS 114 - Window supports twisted.

MINOR DEFECTS:

Molding plug not removed.

25. QAI Cartridge 30MM

CRITICAL DEFECTS:

a. Suspended lots
b. Fuze missing or damaged(Surface scratches are acceptable).
c. Projectile windscreen missing, improperly crimped or cracked.
d. Protruding primer.
e. Cracked, split, or perforated cartridge case.

MAJOR DEFECTS:

DS 101 - Fuze loose(Fuze is considered loose if it can be turned under pressure when held between thumb and first finger only).
DS 102 - Projectile windscreen dented(Surface scratches are acceptable. Any dent is unacceptable).
DS 103 - Projectile windscreen loose(Can be turned under pressure when held between thumb, first and second finger only).
DS 104 - Loose projectile(Can be turned under pressure when held between thumb, first and second finger only).
DS 105 - Shelf life expires.
DS 106 - Service life expired.
DS 107 - Heavy corrosion-primer area, case mouth area or all other areas.(Pitting, etching, etc.).
DS 108 - Nicked, dented, or damaged extractor groove.(Fig 5-5).
DS 109 - Projectile not properly aligned in cartridge case.(Tipped)
DS 110 - Improper or partial crimp, as applicable(earlier production rounds are not crimped.
DS 111 - Plastic rotating band(s) missing, cracked, broken or deep gouges.
DS 112 - Lot number missing, incorrect or illegible on cartridge case.
DS 113 - Primer exhibits evidence of firing pin impact.

MINOR DEFECTS:

a. Markings other than lot number missing or illegible on cartridge.
b. Foreign matter on cartridge case.
c. Minor corrosion: Primer area, case mouth area, or all other areas.

26. QAI: 30MM Dummy PGU-16/A

CRITICAL DEFECT:

None applicable.

MAJOR DEFECTS:

DS 101 - Improper or partial crimp (early production rds not crimped).
DS 102 - Aluminum Nose missing.
DS 103 - Projectile retainer bolt protruding from base or Ctg.
DS 104 - Cracks in Ctg. case.
DS 105 - Dents greater than 1/16 inch in depth or 1/4 inch in length on Ctg case body.
DS 106 - Nicked, dented or damaged extractor groove.
DS 107 - Projectile not properly aligned, cracked, broken or deep gouged.

L. EQUIPMENT, TOOLS AND SUPPLIES:

ITEM	QUANTITY	SPEC/DWG NO.	NSN
Table, Workbench	As Required		
Forklift, Battery-Powered, Type E, EE, ES or EX	1		
Fire Symbols	2		
Radiation Control Symbols	As Required		
Coveralls	1 pr/per operator		
Gloves, Cotton or surgical	1 pr/per operator		
Film Badge	1 ea/operator		
AN/PDR 27	1		
AN/PDR 54	1		
Gloves, leather or leather palmed	As Required		
Safety glasses or goggles	As Required		
Face Shield	As Required		
Safety Shoes	1 pr/per operator		
Cutter Banding	1		
Pliers, Diagonal cutting	1		
Wrench Torque, 105 in/lb capability	1		
Wrench Socket or Speed	1		
Banding Tool, Strap Stretcher	1		
Clips, Banding	As Required		
Seals, Lead Wire	As Required		
Filter Paper Circles	As Required		
Envelopes	As Required		
Metal X Fire Extinguisher	1 (30 lb)		

2A. STANDARD OPERATING PROCEDURE FOR: B. OPERATION NO. 7

SURVL INSP OF SMALL AMMO THRU 30MM, C. BAY NO. BLDG 306, BAY 1 OR 2

FSC-1305,VARIOUS DODICS, QD CLASSES D. SOP NO. SE-A000-R-305 DATE 4 Jun 75

(04)1.2 and 1.4. FIRE SYMBOLS 1,2&4. RADIOACTIVE MATERIALS AND RADIOACTIVE AREA F/CTG 30MM API & API-T DU E. REV NO. 3 DATE 2 MAY 83

F. CHANGE NO. 2 DATE 14 JAN 86

G. OPERATION: MONITORING OPERATIONS - INSPECTION SITE

H. EXPLOSIVE LIMITS: UNITS: N/A EXPLOSIVE LBS: N/A

I. PERSONNEL LIMITS: OPERATORS: 4 TRANSIENTS 3

J. STEP NO. DESCRIPTION	SPECIFIC INSTRUCTION (SAFETY, OPERATIONAL QUALITY CHARACTERISTICS)
1. Take swipe sample of inspection table.	1a. (O) Obtain two filter paper disks and swipe the paper covering on the inspection table (where rounds were in contact)(100 cm^2 per swipe).
	1b. (O) Label an envelope with Building number, Bay number, Inspection Table and place the two filter paper disks inside.
2. Package a sample of the table paper covering.	2a. (O) Remove an approximate 2 inch by 2 inch portion of the table covering where samples were laying and place into a plastic bag.
	2b. (O) Label the plastic bag with Building number, Bay number, Date sample was taken, and the words "Table Covering".
3. Package separately one glove from each operator.	3a. (O) One glove from each operator will be individually packed into plastic bags.
	3b. (O) Label the plastic bag(s) with operator name, Date and the word "Glove".
4. Transfer samples to Gage Lab, Bldg, 321 for analysis.	4a. (O) Gage Lab will notify C, ASB by telephone or DF the results of analysis.

K. SPECIAL REQUIREMENTS:

1. This operation will be accomplished at the end of each operation or if continuous operations, once a week minimum.

2. Any defect or unusual condition noted that is not covered by this SOP will be immediately reported to C, ASB.

3. Should PC-5 Counter reveal contamination, the RPO (Ext 261) will be notified and any following actions will be accomplished under the direction of the RPO.

L. EQUIPMENT, TOOLS AND SUPPLIES:

ITEM	QTY REQUIRED	SPEC/DWG NO	NSN
Filter Paper Circles	As Required		
Envelopes	As Required		
Plastic Bags	As Required		

A. STANDING OPERATING PROCEDURE FOR:

SURVL INSP OF SAA THRU 30MM FSC-1305 VARIOUS DODICS, QD CLASSES(04) 1.2 & 1.4. FIRE SYMBOLS 1,2&4. RADIOACTIVE MATERIALS AND RADIOACTIVE AREA FOR CTG, 30MM API AND API-T DU.

B. OPERATION NO. 8

C. BAY NO. BLDG 306, BAY 1 OR 2

D. SOP NO. SE-A000-R-305 DATE 4 Jun 75

E. REV NO. 3 DATE 2 MAY 83

F. CHANGE NO. 2 DATE 14 JAN 86

G. OPERATION: MONITORING - PERSONNEL

H. EXPLOSIVE LIMITS: UNITS: N/A EXPLOSIVE LBS: N/A

I. PERSONNEL LIMITS: OPERATORS: 4 TRANSIENTS: 3

J. STEP NO.	DESCRIPTION	SPECIFIC INSTRUCTIONS (SAFETY, OPERATIONAL QUALITY CHARACTERISTICS).
1.	Monitor personnel with an AN/PDR 54.	1a. (O) Radiation survey instruments utilized for personnel monitoring will be calibrated at least every 90 days, after each maintenance and after each battery replacement (TB 385-4).
2.	Monitor operator before removal of gloves and coveralls.	2a. (O) Monitor the front and back of the hands and arms, the front of the chest and legs, and the top and bottom of the feet. 2b. (O) Should any reading greater than background be obtained, immediately notify C, ASB (Ext 304) and RPO (Ext 261). Operator will remain at inspection location until released by RPO. 2c. (O) If no contamination is noted, operator will remove gloves and coveralls.
3.	Monitor operator's hands and clothes.	3a. (O) Monitor IAW the procedure listed in paragraph 2a(O) above. Follow the procedure of 2b or 2c as applicable after obtaining readings.

K. SPECIAL REQUIREMENTS:

1. Personnel shall be monitored for contamination IAW this operation before leaving the inspection bay. This includes breaks, lunch and the end of shifts.

2. After release from inspection location, operators should wash hands with soap and lukewarm water thoroughly.

3. All coveralls and gloves used during the inspection should be stored in Bay 2 in the locker provided.

L. EQUIPMENT, TOOLS AND SUPPLIES:

ITEM	QTY REQUIRED	DWG/SPEC NO	NSN
Radiac, AN/PDR 54	1		

A. STANDING OPERATING PROCEDURE FOR:

SURVL INSP OF SAA THRU 30MM, FSC-1305 VARIOUS DODICS, QD CLASSES(04) 1.2 & 1.4.FIRE SYMBOLS 1,2 & 4. RADIOACTIVE MATERIALS AND RADIOACTIVE AREA FOR CTG 30MM API AND API-T DU.

B. OPERATION NO. 9

C. BAY NO. BLDG 306, BAY 1 OR 2

D. SOP NO. SE-A000-R-305 DATE 4 Jun 75

E. REV NO. 3 DATE 2 MAY 83

F. CHANGE NO. 2 DATE 14 JAN 86

G. OPERATION: USE OF LOADER GFU-7/E

H. EXPLOSIVE LIMITS: UNITS: HE OR TP: 10,000 3500/STORAGE BAY 1176/OPERATING BAY EXPLOSIVE LBS: HE OR TP: 5,000 lb 1690/STORAGE BAY 566/OPERATING BAY

I. PERSONNEL LIMITS: OPERATORS: 4 TRANSIENTS 3

J. STEP NO.	DESCRIPTION	SPECIFIC INSTRUCTION (SAFETY, OPERATIONAL QUALITY CHARACTERISTICS.)
1.	Preliminary safety check performed.	1a. (S) Open all ALA access doors and verify that there are no tools, equipment, etc. left in the loader. 1b. (S) Check all exposed conveyor tracks and chuting to verify that they are clear of any foreign objects. 1c. (S) A visual check must be made to assure that all personnel are clear of the unit before applying drive power. 1d. (S) Before applying power to the ALA, remove the hand crank and stow properly. 1e. (S) Operators will wear safety shoes and safety glasses when a machine is in operation.
2.	Preliminary Operating Procedures.	2a. (O) Position the loader, ammunition containers, and auxiliary drive assembly as shown in fig 4-7 of TO 35D2-15-1. 2b. (O) Set the parking hand brake on the loader. 2c. (S)(O) Immobilize the auxiliary drive assembly as required. 2d. (S)(O) Check that the ammunition containers are properly positioned and pinned together.

2e. (O) Remove banding from CNU-309/E containers.

2f. (S) Personnel exposed in proximity to steel banding or band cutting operations will wear face shields and safety eyewear. Operators handling the metal banding will also wear leather or leather palmed gloves.

2g. (O) Remove the covers from the ammunition containers.

2h. (S)(O) Check that the right hand ammunition container is empty.

2i. (O) Install the CIU on ammunition containers.

2j. (O) Remove the flexible drive shaft from it's stowed position on the loader and connect to the auxiliary drive coupling.

2k. (S)(O) Connect the power cable from the auxiliary drive assembly to a suitable explosion-proof source of 115 VAC.

3. Threading the loader (if required).

3a. (O) Open the feeder door on the CIU (right side, facing the loader) and lay the loading tube of an empty LTC (approx. 120 tubes) on the feeder sprocket. Close and secure the door.

3b. (S) Operate the loader at a very slow speed when threading the loader. Confirm that the tubes properly engage the upper sprocket in the rear interface, the camming guide around drum, and the lower sprocket in the rear interface before operating the loader at normal speed.

3c. (O) Remove the timing pin in the loadhead. Cycle the loader forward until the leading tube of LTC reaches the upper sprocket in the Rear Interface Assembly.

3d. (O) Check that the tube is captured by the sprocket. Manually engage the tube with the sprocket, if required.

3e. (O) Cycle the loader forward feeding the LTC around the drum assembly until the leading tube reaches the lower sprocket in the rear interface.

3f. (O) Check that the tube is captured by the sprocket. Manually engage the tube with the sprocket, if required.

3g. (O) Cycle the loader forward until the LTC reaches the packer chuting. Pull the LTC upward through the chuting until it reaches to engage the packers sprocket on the CIU (left side, facing the loader).

3h. (O) Check that the packer sprocket captures the leading tube. Manually engage the tube with the sprocket, if required.

3i. (O) Cycle the loader forward until leading tube can be lifted onto the tube rest below the packer door.

3j. (O) Lift both ends of the LTC onto the tube rests on the CIU and cut off any excess LTC.

3k. (O) Replace the timing pin in the loadhead.

4. Priming the loader with a continuous complement of ammunition.

4a. (S) Before operating the ALA, visually inspect the LTC in the top layer of each container to verify serviceability and alignment of fabric loops prior to entering the load head.

4b. (O) At least two personnel will be required to be present to perform an inspection on the ammunition.

4c. (O) Connect the leading tube of a LTC containing approximately 120 rounds to the LTC in the feeder side of the CIU.

4d. (O) Cycle the loader forward until the first round reaches the top of the loadhead.

4e. (O) Lift the empty LTC onto the tube rest on the packer side of the CIU and cut the LTC at this point.

4f. (O) Lift the LTC with ammunition onto the tube rest on the feeder side of the CIU and cut the LTC at this point.

4g. (O) Properly stow the LTC that has been disconnected.

4h. (O) Replace the timing pin in the loadhead.

5. Inspect ammunition, complete round.

5a. (O) When the leading round of ammunition being inspected reaches the counters; reset the counters to zero.

5b. (O) Depress the forward pushbutton on the auxiliary drive assembly and adjust the variable speed control as required to establish a suitable inspection rate.

5c. (S) During operation, observe the LTC, ammunition , and spent casings as they pass through the system. If damaged tubes, missing or damaged straps, damaged or misaligned ammunition or damaged casings are noted, stop the system using the stop buttons located at the loadhead or inspection table site and take corrective action.

5d. (O) Inspect samples IAW T.O.11A13-14-7, Table 5-1 as they rotate through the system, include verification of component marking info on at least one round of each component lot.

5e. (O) If a defective round is detected, press the stop control on the auxiliary drive (or the emergency stop switches). After the ALA stops, open the inspection table door and remove the defective round and replace with a serviceable one (if available). Close and latch the inspection table door and depress the forward control on the auxiliary drive to continue the inspection.

6. Inspect interior of container.

6a. (O) When the last of the ammunition link is off the bottom of the can, stop cycling by pushing the stop button on the auxiliary drive assembly or emergency stop switches.

6b. (O) When the last round is accessible in the ALS Cntr, take the length of empty LTC tubes and connect them to the last ammunition loaded tube on the feeder side.

6c. (O) Continue the inspection of rounds IAW Operation 4 until last round has gone through the counter.

6d. (O) Push stop button on auxiliary drive assembly.

7. Repack of ammunition samples.

7a. (O) Press reverse push button switch.

7b. (O) Cycle the loader in reverse until the first round reaches the top of loadhead. To stop push the stop button.

7c. (O) Detach the primer length of empty LTC's.

7d. (O) Press reverse pushbutton and continue cycling until the first round reaches the top of the loadhead on the packer side.

7e. (O) Press stop pushbutton on auxiliary drive assembly.

7f. (O) Lift the empty LTC onto the tube rest on the packer side of the CIU and link the LTC at this point.

7g. (O) Press reverse pushbutton on auxiliary drive assemble and cycle until the last round is stowed in the container.

7h. (O) Press stop pushbutton on auxiliary drive assembly.

7i. (O) Detach the links, leave approximately 120 LTC in the loader.

7j. (O) Remove the CIU from cntrs.

7k. (O) Reband CNU-309/E shipping container.

71. (S) Personnel exposed in proximity to steel banding or band cutting operations will wear face shields and safety eyewear. Operators handling the metal banding will also wear leather or leather palmed gloves.

8. Monitor work surfaces of loader/unloader daily using an AN/PDR 54.

8a. (S)(O) Should any reading greater than background be obtained, immediately cease operations, evacuate bay and notify C, ASB (Ext 304) and RPO (Ext 261) telephonically. Excess readings will be processed under the direction of the RPO.

9. Perform swipe test of loader/unloader weekly for detailed analysis.

9a. (O) Perform the requirements of Operation 7 of this SOP at the completion of operations or in the event of continuous operations, once a week.

10. Monitor personnel.

10. (S) Perform personnel monitoring IAW Operation 8 of this SOP. Personnel shall be monitored before leaving the inspection bay.

K. SPECIAL REQUIREMENTS:

1. Verify that all personnel are clear of the auxiliary drive and ALA operating mechanisms and cables prior to setting the cariable speed control at any level but 0.

2. Visually check to verify equipment and tools are not in the ALA and that the LTC is properly positioned. Failure to do the above could result in equipment or ammunition damage.

3. Never operate the ALA with the inspection door open when variable speed control is set higher than 4. Keep personnel and loose clothing clear of moving parts.

4. The hand crank must be removed from the manual drive lug when in use.

5. Do not operate the loader with damaged tubes, straps, or rounds.

6. Except for the replacement of defective rounds, no manual handling of individual rounds is required.

7. The ALA is designed to permit manual operation using the hand crank. The auxiliary drive can also be used for certain system emergency and back-up operations.

8. Specific setup and maintenance instructions for the GFU-7/E loader/unloader are to be accomplished IAW T.O. 35D2-15-1 or T.O. 35D30-4-12-2 when applicable.

9. When the GFU-7/E machine is used for inspection the machine will be stopped at 50 rounds, 8 rounds removed from the inspection table, and a physical inspection accomplished on the 8 rounds to determine such defects that require hands on check i.e., loose fuzes, loose windscreens, or loose projectiles. If samples are acceptable they are to be placed back in machine and 150 more rounds processed through machine and 8 more samples inspected. This procedure will continue until 32 samples have been physically inspected from each container to be processed. In the event the GFU-7/E loader is not available for inspection of ammunition packed in the CNU-309/E CNU-309A/E or CNU-332/E containers, two of each 36 containers will be inspected. Top two layers of ammunition in each container will be inspected IAW Operation 6 of this SOP.

10. See Operation 6, Special Requirements 19 through 23 for classification of defects.

11. Each operator of MHE will have a current operator's permit in their possession.

12. Insure that forklift has a current Load Test/Inspection due date per requirements of TB 43-0142 and SEADR 385-3.

13. A Metal X Fire Extinguisher will be readily available during 30MM DU Operations.

L. EQUIPMENT, TOOLS AND SUPPLIES:

ITEM	QTY REQUIRED	DWG/SPEC NO.	NSN
Radiac AN/PDR-27	1		
Radiac AN/PDR-54	1		
Film Badge	1 per operator		
Forklift, Battery-powered Type E, EE, ES or EX	1		
Filter paper circles	As Required		
Envelopes	As Required		
Coveralls	1 pr/operator		
Gloves, cotton or surgical	1 pr/operator		
Fire Symbols	2		
Radiation Control Symbols	As Required		
Gloves, leather or leather palmed	As Required		
Safety glasses or goggles	1 pr/operator		
Face shield	1 per operator		
Cutter, banding	1		
Pliers, diagonal cutting	1		
Wrench, Torque 105 in/lb capability	1		
Wrench, Socket or speed	1		
Banding Tool, Strap stretcher	1		
Clips, banding	As Required		
Seals, Lead Wire	As Required		
Metal X Fire Extinguisher	1		
Safety Shoes	1 pr/operator		

APPENDIX A

NOTE: PAC-3 is synonymous with AN/PDR-54

SECTION 3
OPERATION

*Paragraphs and figures referenced in Appendix A are extracted from TM11-6665-208-15. Figures are also depicted on pages 48 through 50 of this SOP.

3-1 ALPHA PARTICLE CHARACTERISTICS

An operator must have some knowledge of the alpha particle in order to obtain accurate readings from the PAC-3GN Radiac Instrument. Below are listed some details concerning alpha particles that will be helpful to the PAC-3GN operator.

Because of their large mass, alpha particles travel in a straight path, radiating in all directions from their source. Energy is lost by collisions with molecules. When all their energy has been expended, their forward progress stops and they are no longer detectable.

The range of alpha particles depends on the source. For a uranium 238 source, the maximum range in air is 1.06 inches; for plutonium 239, the range is 1.4 inches.

Water, paper, and animal tissue reduce the range to 1/1000 times that for air. Uranium 238 alpha particles penetrate about .001 inch of water, paper or animal tissue. Plutonium 239 alpha particles penetrate about .0014 inch.

A wet surface resulting from rain or early morning dew on the ground, on a truck, or a surface, cannot be monitored successfully. Heavy dust conditions can prevent a reading by dust settling over the contaminated area. A sheet of ordinary paper, which has a thickness of roughly .004 inch, will block out all alpha particles. The operator must keep these facts in mind when monitoring any area.

From this, it can be seen that it may be impossible to detect alpha contamination under some conditions with the instrument working perfectly, because of the characteristics of alpha activity itself.

Another important factor is that alpha particles travel in every direction when emitted from a source. Figure 3-1 illustrates a cross section view of the approximate pattern of alpha emissions from a source. Each line represents the trail of an individual particle, showing the relative range and angle.

If a probe were held in a position similar to line (aa'), the probe would detect only the higher energy particles, and only those which travel vertically. This would give a meter reading on the PAC-3GN, but this reading would be much lower than the actual alpha contamination present.

A probe held in a position similar to line (bb') would detect most of the alpha particles present under the right side, but few would be detected on the left side. Again, the PAC-3GN would read, but the reading would be lower than the alpha contamination present.

Holding the probe in a position similar to line (cc'), nearly all alpha particles will be counted and the PAC-3GN would read the proper amount of contamination.

3-2. CONNECTIONS (See Figure 3-2)

To make the instrument operable, the probe must be connected to the case by the coaxial cable. This is done in the following manner: First, screw the cable into the connector located on the front of the instrument. Next, screw the probe handle onto the other end of the cable. (The cable will ordinarily be packed in the carrying case with the probe handle attached, so this connection may already be made). The cable connections must be screwed in fingertight, metal to metal, so the internal O-ring makes a good seal. If the cable is not properly tightened, a leak will result, reducing the instrument's efficiency.

CAUTION

Tighten fingertight only. Do not use tools.

Connect the probe to the probe handle as follows: Place the probe handle into the socket on the probe, lining up the pins on the handle with the slots in the socket. Push the handle straight down into the socket and turn it clockwise until it snaps into position. The probe may be put on either as illustrated in figure 3-2 or extended out in front of handle.

CAUTION

The probe face is necessarily very thin and can be punctured easily. Do not set the probe down on any sharp object which might puncture the face.

3-3 GAS SYSTEM (HIGH TEMPERATURE ONLY) (See figure 3-4)

If the instrument temperature is above 90°F (32.2°C), the gas flow must be checked as outlined below:

(1) Flush probe for 2 minutes. (Refer to paragraph 3-4, a).

(2) Ventilate the area around the probe to eliminate any concentration of gas. Ventilation may be accomplished by fanning or blowing.

WARNING

If ventilation is not provided, a flash fire may result from the next step.

(3) Push the gas flow control to OPERATE and light the exhaust at the probe outlet. Flame should be approximately 1 inch high.

If the flame is not of proper height, the pressure must be adjusted. Turn the pressure adjustment control valve until the flame at the probe outlet valve is the proper height.

3-4 DESCRIPTION OF CONTROLS (See figure 3-3)

Positions of the operating controls on the instrument are illustrated in figure 3-3. Details on the function of these controls follow.

a. GAS FLOW CONTROL: This three-position control combines the functions of turning the gas on and selecting the proper gas flow. When the control is pushed FULL IN (toward the case), the flow is OFF. When the control is FULL OUT (away from the case), there is a high gas flow to FLUSH air out of the probe preparatory for use. The INTERMEDIATE position, OPERATE, gives a low-flow rate for maintaining a proper gaseous atmosphere in the probe for continuous instrument operation. When gas control is in the OPERATE position, a groove is just visible around the gas flow control, enabling the operator to tell at a glance the control is set in the proper position to operate the instrument.

b. SCALE SWITCH: This four-position control combines the functions of turning the instrument on, selecting the desired scale and proper meter response. The control is marked OFF, X100, X10, and X1.

c. RESET: By pressing the RESET button, the meter pointer can be rapidly zeroed after a reading has been taken. This decreases the delay due to the slow response of the meter on the lower scales.

d. DISCR. (not used in normal operation): The discriminator control determines the minimum pulse size from the probe which will be counted. This control was set when the instrument was calibrated and should not be adjusted for normal monitoring. (Refer to paragraph 3-13, a.)

e. HV ADJUST (Not used in normal operation): This control determines the high voltage fed into the probe. It was set when the instrument was calibrated and should not be adjusted.

3-5 WARM UP

A warm up period is required for both the high-voltage power supply and the gas system. The power supply requires 2 minutes for its output voltage to build up to a stable value. The gas system requires 2 minutes to flush all of the air from the cable and probe. Both systems are stabilized by the same time so the instrument is actually ready to operate in a total of 2 minutes.

3-6 METER READING INTERPRETATION

The meter does not read a fixed number, but fluctuates back and forth within a small area on the dial, indicating not a specific amount, but an average value of alpha field strength present. The operator must watch the meter fluctuations long enough to determine the average value. In figure 3-5, the average reading is 500, however, over a period of time, it has read as low as 450 and as high as 550. This fluctuation is caused by the nature of alpha radiation.

Alpha particles are not emitted at regular intervals. The actual time between particles can vary greatly. When the interval between particles is less

than average, the meter will indicate a higher reading, and when the the interval is greater than average, the meter will indicate a lower reading. The instrument is designed to cancel out much of this variation, but it is not desireable to remove all of the meter fluctuation; therefore it is necessary for the operator to watch the meter for a sufficient period of time to determine the average reading.

To read the alpha field strength, it is necessary to multiply the meter reading by the number indicated by the scale switch. In figure 3-5, the number appearing in the window is X10. The alpha field strength in this case is the meter reading of 500 multiplied by 10, of 5,000 counts per minute. If the scale switch was set on X100 and the meter read 500, the alpha field strength would be this 500 multiplied by 100, or 50,000 counts per minute. Before recording alpha activity, each meter reading must be multiplied by the number indicated by the scale switch.

3-7 STARTING THE EQUIPMENT

The first step in starting the instrument is to pull the gas flow control to the FLUSH position. Turn the scale switch to the X10 position. After a 2-minute warm up period, push the gas flow control to the OPERATE position. The instrument is now ready for use.

To check operation. The check source should be placed in contact with the probe face, being certain the source is under the center or end windows of the probe. (See figure 3-6). The source should give a reading of approximately mid-scale, with the switch set on the X10 scale, enabling the operator to recheck the operation of the instrument at regular intervals during its use.

3-8 ALPHA MONITORING

a. Carry the instrument (fig. 3-2) in the left hand and the probe handle in the right hand; handling the AN/PDR-54 in this manner will help to prevent the operator from accidentally bumping the gas flow control (fig. 3-4). Check the gas flow control frequently to insure that is has not been moved accidentally.

b. To monitor alpha radiation, place the probe very close to or, if necessary, in contact with, the surface being monitored until the meter (fig. 3-5) indicates that the probe is entering a contaminated area. At this time, withdraw the probe until it is one-forth inch from the surface being monitored to prevent contaminating the face of the probe.

NOTE:
If the face of the probe becomes contaminated enough to cause an error in the meter indication during alpha radiation monitoring, the probe must be decontaminated (para 3-13b).

c. Set the scale switch (fig. 3-3) to X100. If the meter does not indicate above 0, set the scale switch to X10. If the meter still does not indiacte above 0, set the scale switch to X1.0. After the correct scale has been selected, observe the meter long enough to determine an average indication.

CAUTION

The probe face is necessarily very thin and can be punctured easily. Do not set the probe down on any sharp object which might puncture the face.

3-9 INSTRUMENT OPERATIONAL CHECK

To make sure the PAC-3GN ia operating properly the reading should be checked with the check source. This check assures that the gas is still flowing, the batteries are still good, and that the entire instrument is operating properly. If the gas bottle is nearing the end of its life, the operation check should be made at frequent intervals. The check source should be placed in contact with the probe face, being certain the source is under the center or end windows of the probe face (See figure 3-6).

WARNING

Be careful when using the check source. Handle the check source only by its plastic edges. Do not allow the active surface (metal) to come in contact with your skin. Damage to body tissue can occur. Wash your hands after using the check source and before eating, drinking or smoking.

3-10 CHECKING GAS FLOW

The expected life of one gas bottle is approximately 24 hours continuous use. This life is shortened by intermittent operation which requires frequent flushing.

The procedure for checking gas flow is outlined in steps (1) through (3), paragraph 3-3. If the flame is low, or if there is no flame, change the bottle.

3-11 CHANGING GAS BOTTLE

The gas bottle should be changed in a well-ventilated place away from fires because of the possibility of gas leakage when the bottle is removed. To change, remove the lower case. Unscrew the gas bottle from the regulator, turning counterclockwise. Replace with a new bottle by inserting the threaded portion into the regulator. Push the bottle towards the regulator and turn clockwise. When the threads engage, screw the bottle in handtight. (See fig. 3-7).

CAUTION

Tighten handtight only. Do not use tools.

Gas bottles stored at high temperatures may lose gas by leakage. The gas content of a bottle can be determined by weighing.

3-12 STOPPING THE EQUIPMENT

To stop the PAC-3GN two controls must be used. The scale switch is turned OFF position and the gas flow control is pushed FULL IN to the OFF position.

APPENDIX B

SECTION 3.1
OPERATOR'S PREVENTIVE MAINTENANCE

*Paragraphs referenced in Appendix B are extracted from TM 11-6665-208-15.

3.1-1. SCOPE OF OPERATOR'S MAINTENANCE

The maintenance duties assigned to the operator of the radiac set are listed below together with a reference to the paragraphs covering the specific maintenance function.

a. Daily preventive maintenance checks and services (para 3.1-5).

b. Weekly preventative maintenance checks and services (para 3.1-6).

c. Cleaning (para 3.1-7).

3.1-2. MATERIALS REQUIRED

a. Lint-free cloth.

3.1-3. PREVENTIVE MAINTENANCE

Preventive maintenance is the systematic care, servicing, and inspection of equipment to prevent occurrence of trouble, to reduce downtime, and to assure that the equipment is serviceable.

a. SYSTEMATIC CARE. The procedure given in paragraphs 3.1-4 through 3.1-7 cover routine systematic care and cleaning essential to proper upkeep and operation of the equipment.

b. PREVENTIVE MAINTENANCE CHECKS AND SERVICES. The preventive maintenance checks and services charts (para 3.1-5 and 3.1-6) outline functions to be performed at specific intervals. These checks and services are to maintain Army electronic equipment in a combat-serviceable condition; that is in good general (physical) condition and in good operating condition. To assist operators in maintaining combat serviceability, the charts indicate what to check, how to check, and what normal conditions are; the Reference column lists paragraph that contain detailed repair or replacement procedures. If the defect cannot be remedied by the operator, higher category maintenance or repair is required. Records and reports of these checks and services must be made in accordance with the requirements set forth in TM 38-750.

3.1-4. PREVENTIVE MAINTENANCE CHECKS AND SERVICES PERIODS

Operator's preventive maintenance checks and services of Radiac Set AN/PDR-54 are required daily and weekly.

a. Paragraph 3.1-5 specifies the checks and services that must be accomplished daily or under the following special conditions:

(1) Before operation after any extended shut-down.

(2) Once a week while the equipment is kept in a standby (ready for immediate use) condition.
NOTE: Equipment in limited storage (requiring service before operation) does not re-
quire periodic preventative maintenance.

(3) When the equipment is initially installed.

b. Paragraph 3.1-6 specifies additional checks and services that must be accomplished weekly.

3.1-5 DAILY PREVENTIVE MAINTENANCE CHECKS AND SERVICES CHART

Sequence No.	Item	Procedure	Reference
1	Overal equipment....	Check all exterior surfaces (fig 1-1 3-2, and 3-3) for loose or missing bolts, screws and nuts.	Para 4-2.
2	External surfaces...	Remove dirt, corrosion, and moisture	Para3.1-7
3	Gas flow control....	Set gas flow control (fig 3-4) to FLUSH	Para 3-3 and 3-10
4	Scale switch.....	Set scale switch (fig 3-5) to read the value of test sample, plus or minus 20%.	Para 3-3, and 3-10
NOTE: Wait 2 minutes for equipment to warm up before preceding to item 5 below.			
5	Gas flow control....	Set gas flow control (fig 3-4) to OPERATE	
6	Check source.....	WARNING The check source emits alpha radiation. Handle carefully and follow instructions (para 3.1-8) exactly.	
		a. Place check source in contact with probe face (fig 3-6). Be sure check source is under center or end window of probe.	a. Para 3-9.
		b. Meter (fig 3-5) indicates approximately at midscale.	b. Para 3-1 and 3-8.
7	Scale switch.....	Set scale switch to OFF	
8	Gas flow control....	Push gas flow control to OFF (fully in).	

3.1-6. WEEKLY PREVENTIVE MAINTENANCE CHECKS AND SERVICES CHART

Sequence No.	Item	Procedure	Reference
1	Overall equipment...	Check for completeness of overall equipment.	Para A-6 and fig 1

2	Coaxial cable.....	Check to see that coaxial cable mates securely with receptacles on radiacmeter and probe handle (fig 3-2).	Para 3-2
3	Probe.....	Check to see that probe fits securely on probe handle (fig 3-2).	Para 3-2.

3.1-7. CLEANING

a. Remove loose dust and dirt from the case of the radiacmeter with a clean soft, lint-free cloth.

b. Clean the meter face and control knobs with a clean, soft lint-free cloth. If difficulty in removing dirt occurs, moisten the cloth with water; use mild soap if necessary.

c. Remove loose dirt from outside of the probe with a clean, soft, lint-free cloth.

3.1-8 SAFE HANDLING, STORAGE, AND DISPOSAL OF THE CHECK SOURCE

Each installation or activity that is authorized a check source as part of a radiac set must have someone appointed as a radiological protection officer (RPO) (AR 385-11). The duties of the RPO is to supervise the control of the check source and to see that no injuries result from its use or storage. Information below is provided to the user of the check source and to the RPO.

a. SAFE HANDLING. Safe handling involves the inspection and proper use of the check source.

(1) Inspect the check source before use. It should not be used if it is damaged or deformed. The radioactive area of the check source is plated metal which can flake off in small particles. These small particles may be transferred to the mouth when smoking or eating from handling a damaged or deformed check source. Consider a damaged or deformed check source as unserviceable.

(2) Take care when removing the check source from its plastic storage bag. Hold the check source only by its edges; place it, active side up on a flat surface to make the instrument operational check (para 3-9). After the instrument operational check replace the check source back in its plastic bag, again only touching the check source on its edges. Wash your hands before eating, drinking or smoking.

b. STORAGE. The check source is usually stored in the AN/PDR-54 metal storage case, in its plastic storage bag, in a covered metal compartment. When not in use for the instrument operational check the check source should be kept in its proper place in the storage case. The exception to this is when the equipment is shipped to another facility for maintenance or calibration and will be returned. In that case the check source should be removed and stored under the supervision of the RPO until the equipment is returned. Removing the check source makes the shipment non-radioactive and simplifies handling.

c. DISPOSAL. If a check source becomes unserviceable, notify the RPO immediately. The RPO will request disposal instructions from Cdr, AMCCOM, ATTN: DRSMC-MAD-CG(R), Rock Island, IL 61299, IAW para 5-11, AR 385-11.

APPENDIX C

SPECIAL REQUIREMENTS
FOR 30MM API/APIT

1. Fire extinguishers (dry chemical), in good working order will be maintained at all locations where work is performed involving explosive items and be readily accessible for instant use. Any special firefighting equipment required will also be present; i.e., METL-X for 30MM API/APIT(DU) ammunition, (at least one each, 30lb size).

2. Safety goggles, face shields, respirators, and any other safety equipment or apparel will be used as required. Determination of requirements will be made in relation to material being handled. Special equipment will not be required for normal handling of 30MM API/APIT (DU) ammunition.

3. Radiac meters will be present in the ammunition inspection building for use in the event hazardous condition is encountered, e.g., damaged windscreen.

4. Following documents will be posted in buildings where they will be readily visible to all personnel working with the 30MM API/APIT (DU) ammunition.

a. Parts 19 and 20 of Title 10, CFR.

b. The operating procedures applicable to the license.

c. Any notice of violation involving radiological working conditions, proposed imposition of civil penalty, or order issued pursuant to Sub-part B of Part 2 of Chapter 1, Title 10, CFR, and any response from the licensee.

d. Form NRC-3, "Notice to Employees".

5. Supervisor will report to the RPO any accident, unusual incident or suspected overexposures as soon as possible after occurrences. If it is suspected that any person, by inhalation, ingestion, or by any other manner, has introduced radioactive materials into his body, the USAHC will be notified immediately so that medical procedures can be initiated to facilitate the elimination of such material.

6. Each employee working with sources of radiation will:

(1) Be familiar with and follow procedures, rules and special instructions.

(2) Use safety equipment properly.

(3) Report to the supervisor any accident, unusual incident, or suspected overexposure as soon as possible after the occurrence.

7. All individuals working with the 30MM API/APIT (DU) ammunition will be informed of radiation levels involved and of possible biological hazards. They

will be instructed in, and instructed to observe, to the extent within the workers control, the applicable provisions of the NRC regulations and licenses for the protection of personnel from exposures to radiation or radioactive materials. Workers will also be informed of their responsibility to report promptly to licensee any condition which may lead to or cause a violation of NRC regulations and licenses or unnecessary exposure to radiation or to radioactive material.

8. The PGU-14/B, A/B, and A/B API rounds are all the same explosiveswise. The weight and dimensions are the same as for the PGU-13/B and 15/B. The propellant weight is 2400 grains. The PGU-14 series is normally thought of and designated as an Armor Piercing Incendiary (API). It is not, however, incendiary in the classical sense of containing an incendiary mixture. The round obtains it incendiary effect through the Kinetic energy of the staballoy penetrator striking a high density target. The heat generated by the impact is sufficient to ignite some quantity of the staballoy. The staballoy penetrator weighs approximately 298.6 grams and consists of depleted uranium (99.25%) and titanium (0.75%). The depleted uranium contains not more than 0.711 percent U-235; the remainder being U-238. The specific activity is approximately 99.4 microcuries per round or 3.33 X 10-7 curies per gram. The radiation level per M548 container is a measured 0.8 millirems at the surface and 0.0 at 3 feet. The CNU-309 container will have varying levels due to the different ratio packs. The five API/one HEI ratio pack represents a "worst case" and measures 2.5 millirems at the surface and 0.25 millirems at 3 feet. All readings are maximum of three separate readings. The following considerations apply to the assigned hazard classification.

a. As a low specific activity material incorporated into an ammunition item, there are three hazards present: Explosives A, Explosives B, and radioactive material. Insofar as actual hazards are concerned, the explosives A components represents the worst hazard and takes precedence for marking followed by explosives B then radioactive material. The labeling requirements of Section 172.402 would apply except that 172.400(b)(3) exempts military ammunition when shipped by, for, or to the DOD and when shipped in carload/truckload lots, if loaded/unloaded by the shipper or DOD. Labels would, therefore, not be required except for nondedicated LTLs and LCLs wherein mixed loading could occur.

b. DOT exemption 8101 exempts the DU shipments from vehicle placards IAW 49 CFR 173.392 (b)(7), from marking as radioactive LSA IAW 49 CFR 173.392(b)(8) and allows the shipping name to be changed from radioactive (49 CFR 172.101) to explosive.

c. In summary, the PGU-14 series API rounds are minimally radioactive and qualify as regulated items. The assigned hazard classifications therefore are:

(1) Ratio pack HEI/API (any ratio):
  (a) DOD Class/Division/SCG: 1.2E
  (b) DOT Class: Class A Explosives.
  (c) DOT Marking: Ammunition for cannon with explosives projectile.

(d) DOT Label: Explosives A (when required)
(e) UN Serial No.: 0321.

(2) Straight pack API:
(a) DOD Class/Division/SCG: 1.4C.
(b) DOT Class: Class B Explosives.
(c) DOT Marking: Ammunition for cannon with solid projectile.
(d) DOT Label: Explosives B (when required).
(c) UN Serial No.: 0339.

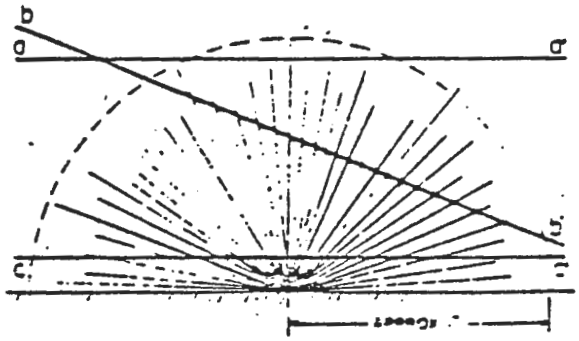


Figure 3-1. Typical Pattern of Alpha Radiation from a Point Source

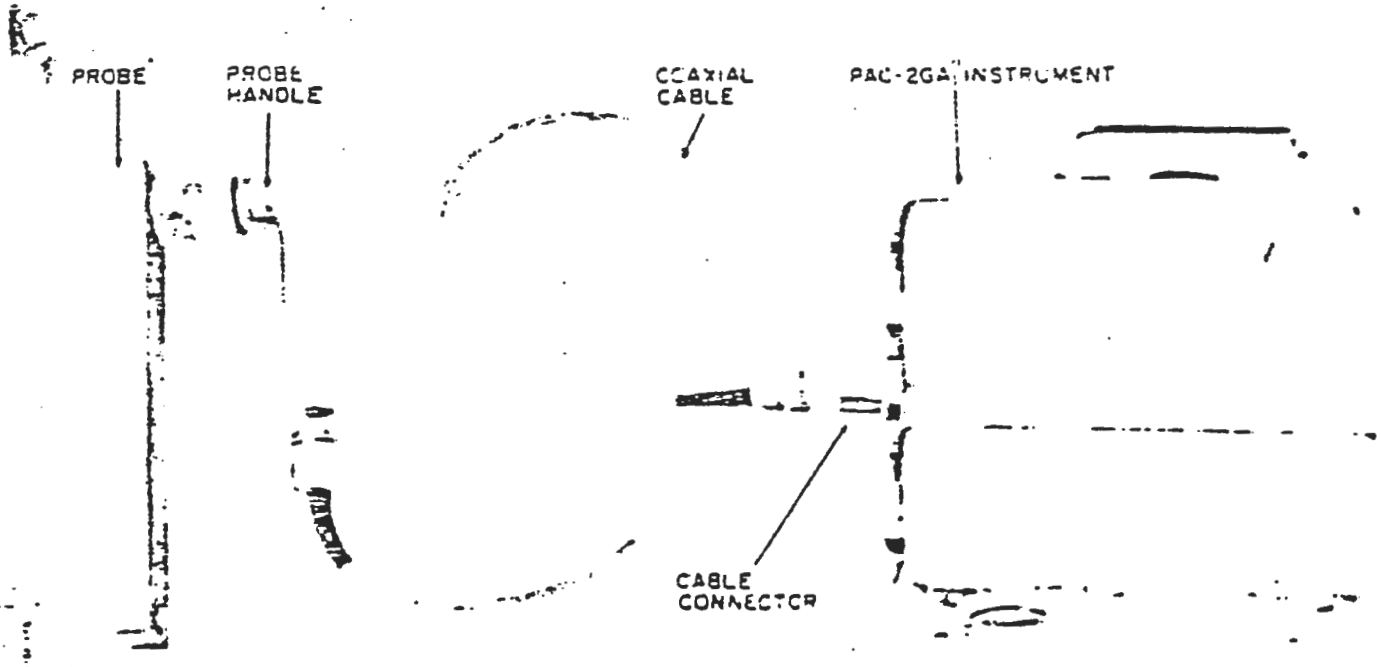


Figure 3-2. Connections to be Made

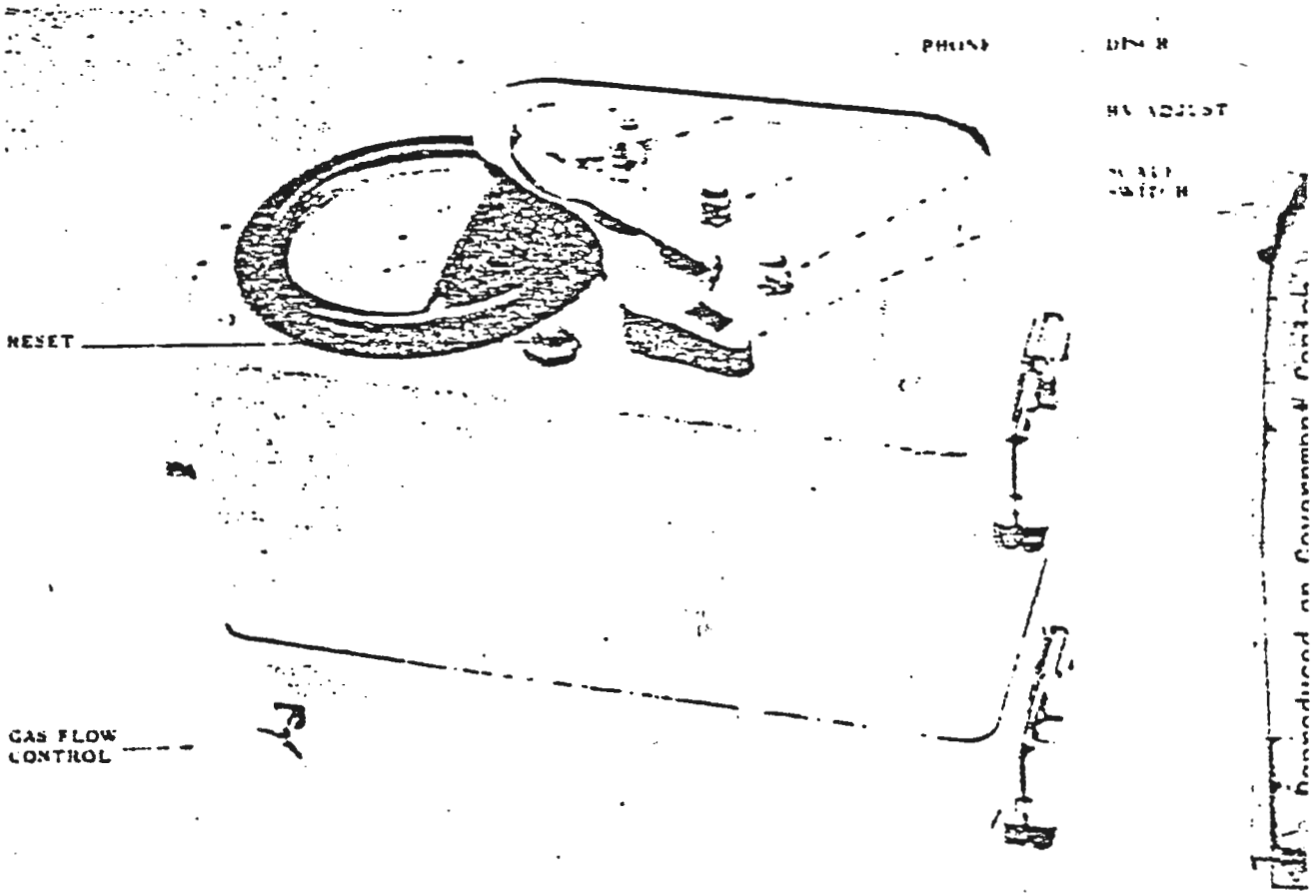


Figure 3-3. Location of Operating Controls

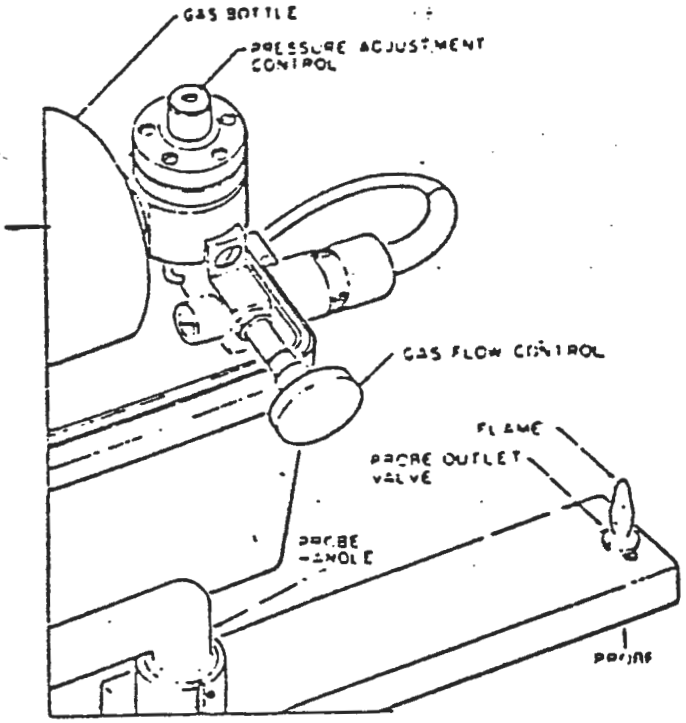


Figure 3-4. Gas System Pressure Adjustment

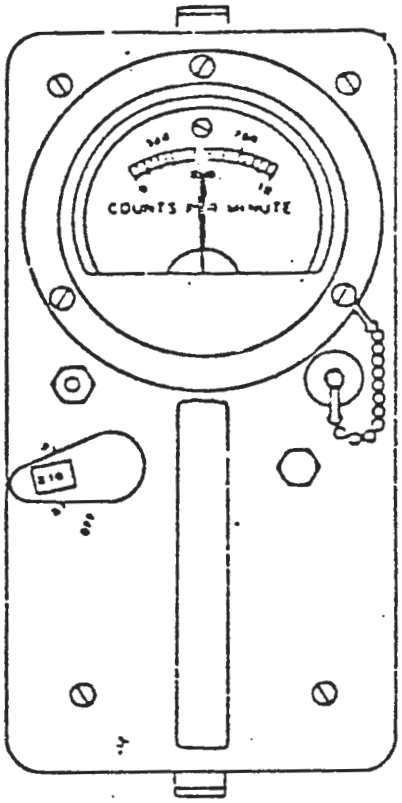


Figure 3-5. Typical Meter Reading

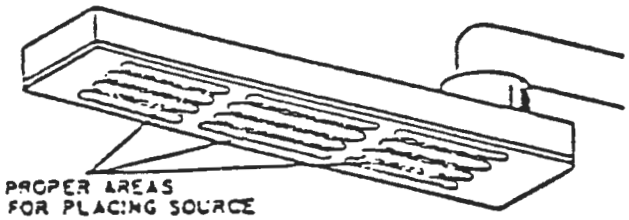


Figure 3-6. Check Source Positions

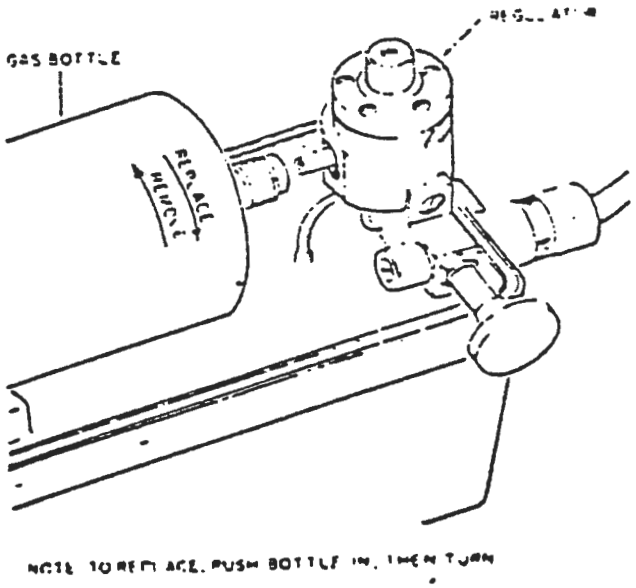
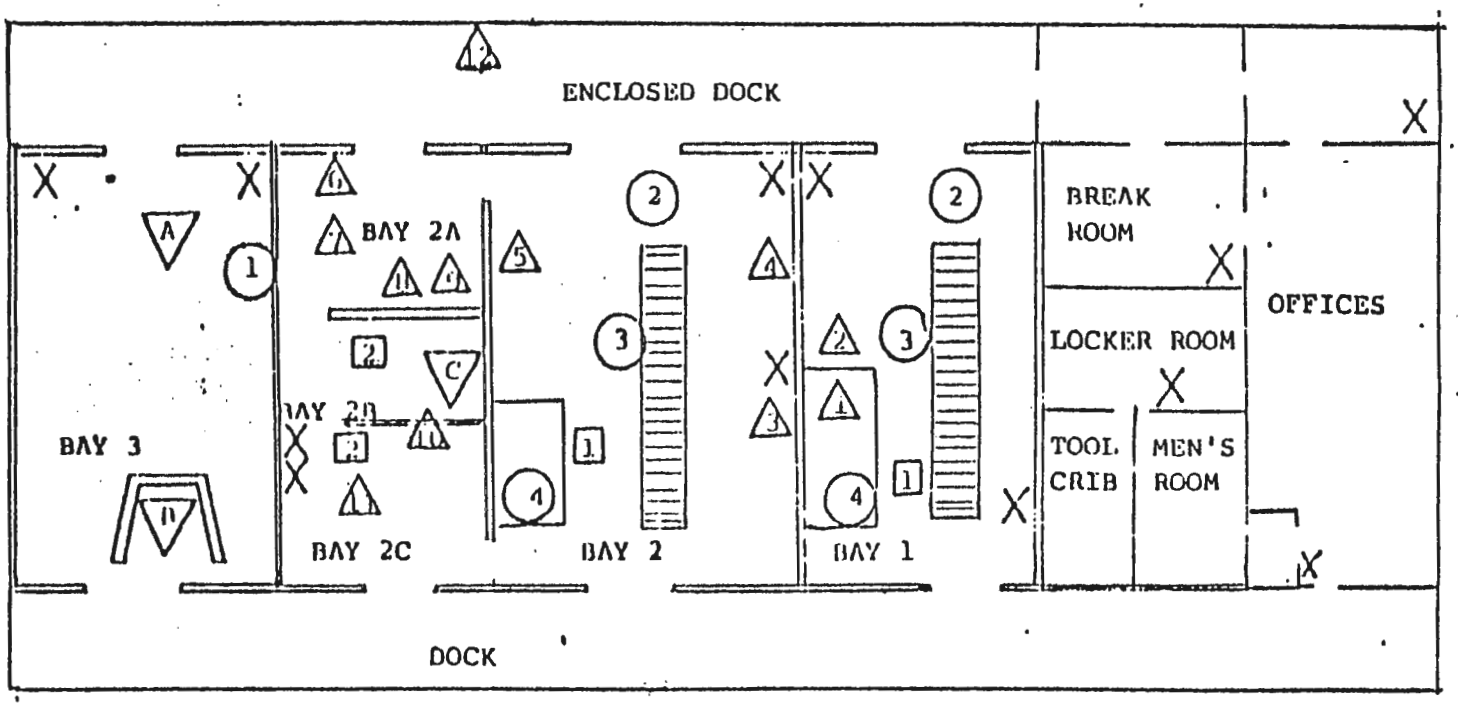


Figure 3-7. Gas Bottle Replacement

Outside walls are constructed of brick. Walls dividing bays are of 1 foot thick reinforced concrete except, between Bays 2B and 2C which is of 1½ inch thick steel. Barricades within Bays 2 and 3 are 10 feet high. Bays 1, 2 and 3 are equipped with Deluge system. Fire extinguishers are marked with an X. Metal X extinguishers and immersion drums are provided for required operations.

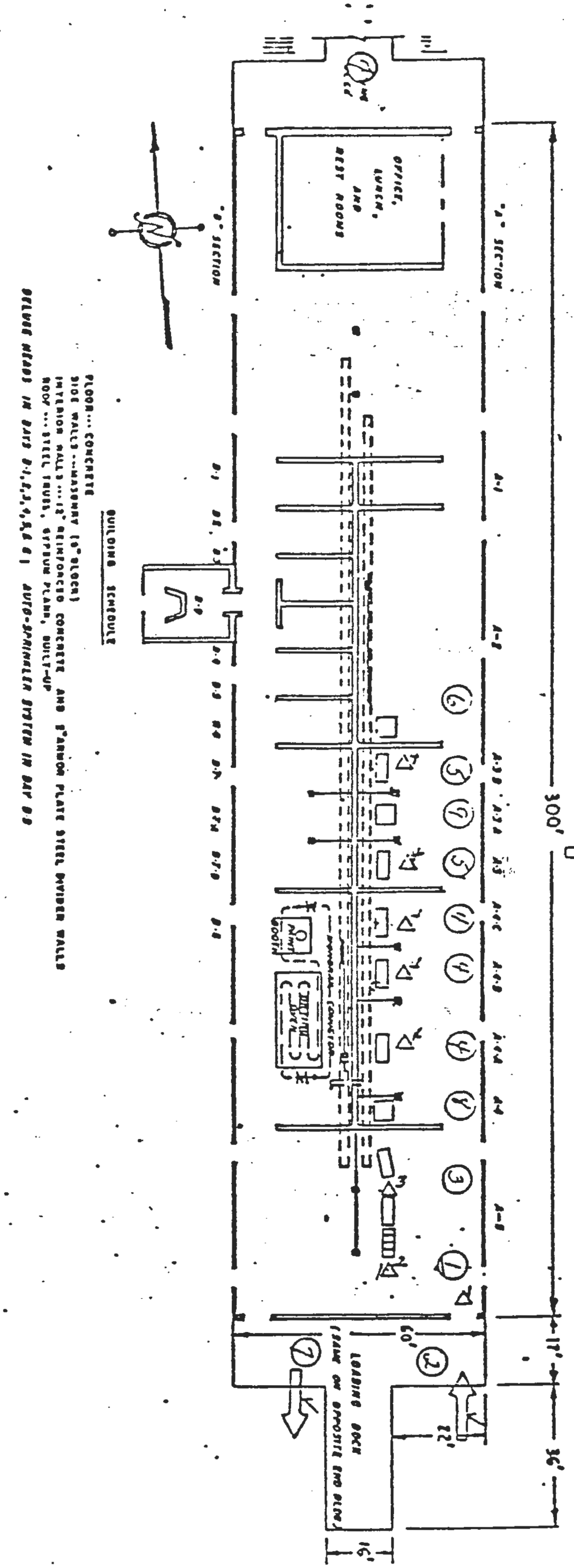


STORAGE
- A. Ammunition
- B. Flammable Supplies
- C. Gages

INSPECTION
- 1 Inspect (PI, IRI, etc.)
- 2 Chamber Gage (as required)

OPERATION
- 1 Receive ammo from storage
- 2 Unpalletize
- 3 Remove from outer pack
- 4 Remove from inner pack

EQUIPMENT
- 1 APE 2050 Table
- 2 APE 1052 Tester
- 3 APE 1086 Wax Pot
- 4 Scale
- 5 Stencil Cutters
- 6 Ape 1223 Fixture
- 7 APE 1204 Vise
- 8 APE 1213 Barricade
- 9 APE 1189 Tester
- 10 APE 1177 Cart
- 11 500 lb. Hoist
- 12 Forklift Truck



◯ OPERATIONS

1. Lift Truck
2. Temporary Storage (Inbound Van)
3. Unpack
4. Remove Propellant and Ignition Components
5. Defuzing
6. Pack Projectiles
7. Temporary Storage (Outbound Van)
8. Temporary Storage (Propellant)
9. Temporary Storage (Ign Cart)
10. Temporary Storage (Fuze w/Burster)
(over)

△ EQUIPMENT

1. Lift Truck
2. Pallet Lift
3. Lid Removal Machine
4. Pneumatic Vice

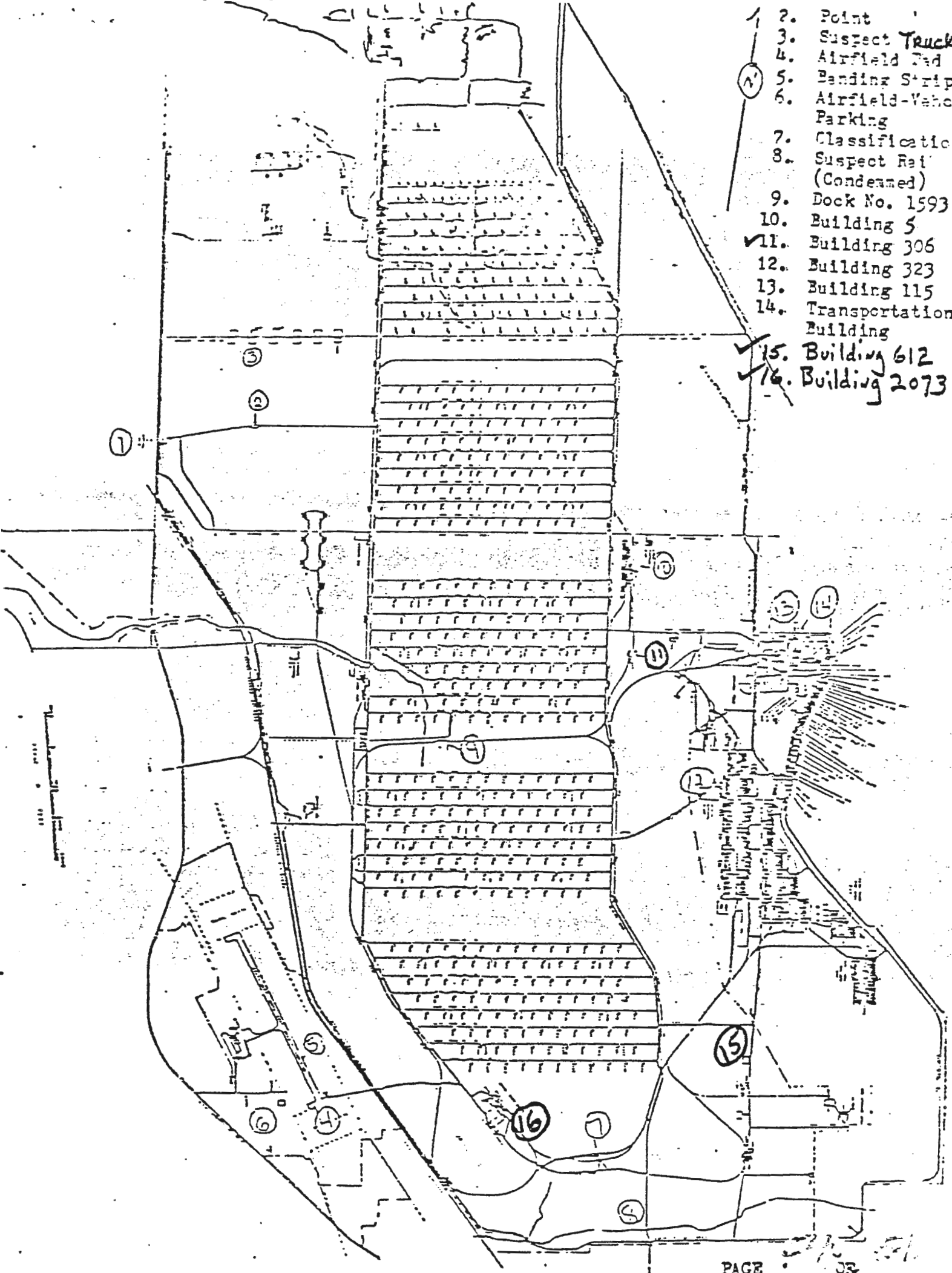
▭ Roller Conveyor

▭ Work Table

□ Pallet

⇨ Van

BLDG 612
SOP


2. Point
3. Suspect Truck Sl
4. Airfield Pad
5. Landing Strip
6. Airfield-Vehicle Parking
7. Classification Y
8. Suspect Rail (Condemned)
9. Dock No. 1593
10. Building 5
11. Building 306
12. Building 323
13. Building 115
14. Transportation Building
15. Building 612
16. Building 2073

ANNEX E (Radiological Accident/Incident Control (RAIC) to SEAD-DCP)

1. Purpose. To establish policy, prescribe procedures, delineate responsibilities and provide planning guidance to DARCOM subordinate commands, installations and activities for the control of radiological accidents and incidents involving radioactive materials in excess of:

a. 1 microcurie radium
b. Schedule B, Title 10 CFR 30.71
c. 15 pounds source material
d. 5 microgram special nuclear material

This Annex does not apply to nuclear weapon accidents/incidents.

2. Scope. The provisions of this Annex apply to all elements of SEAD.

3. Definitions.

a. Radiological (Radiation) Accident - An unexpected event involving radioactive materials that must be reported IAW Title 10 or 49, Code of Federal Regulations or IAW AR 395-40. Examples include:

(1) Injury to personnel, over-exposure, or excessive contamination of personnel or property damage in excess of two-thousand dollars ($2,000).

(2) Off-Post radiological contamination by the radioactive materials.

(3) Seizure, theft, or loss of the radioactive materials.

(4) Public hazard, actual or implied.

b. Radiological Accident/Incident (RAI) - A term used to describe radiological accident(s) and/or incident(s) collectively. A radiation incident is a situation which could result in a radiation accident, create a public hazard or result in embarrassment to the Army if not promptly corrected.

c. Radiological Accident/Incident Control (RAIC) - A term used to describe those measures taken before, during and after any unplanned or unexpected event involving radioactive materials that fit the category of radiological accident and/or incident to reduce the probability of damage or injury, minimize the effects and initiate recovery.

d. Radiological Advisory Medical Team (RAMT) - A special medical team under the control of the Commander, US Army Health Services Command (USAHSC) that is available to advise on radiological health hazards and exposure level criteria (See AR 40-13).

e. Radiological Protection Officer (RPO) - NRC - License SP13-76.

f. Radiological Control Team - A special radiological team, organized, equipped and trained to provide technical assistance, advice and radiological monitoring to support emergency response forces at the scene of a radiological accident or incident.

4. General.

a. All practicable measures will be taken to prevent a radiological accident or incident (RAI). If a RAI should occur at SEAD, every effort will be made to control and reduce any hazardous effects which could cause unnecessary personal injury, damage to property, degradation of the military mission of the installation/activity, the surrounding civilian community or reflect adversely on the US Army.

b. There are three basic radiological hazards at SEAD: Depleted Uranium (DU) ammunition, stored radioactive check sources and stored Tantalum and Columbium Ore. Responsibility for the DU ammunition rests with the Ammunition Division, Directorate for Supply. Responsibility for the radioactive check sources rests with the individual directorates involved. Responsibility for the Tantalum/Columbium Ore rests with General Services Administration (GSA)/ Directorate for Supply. Credible accidents or incidents which could occur are as follows:

(1) A. Fire. In the event of a fire, personnel discovering the fire involving the DU ammunition shall first give alarm and should attempt to extinguish the fire with hand appliances (MET-L-X-extinguisher) only if the fire is in the incipient stage. Alarm will be given by telephone, dialing 117 giving the information stated in paragraph 8.a. 1 through 5 of this Annex. All personnel not actually involved in the initial fire-fighting effects will be evacuated to at least 2,000 feet. Unprotected personnel downwind within the 22 degree pi area shall be evacuated to a distance according to Table F. The decision to fight the fire, maintain fire-fighting efforts, or withdraw is a judgment factor to be made by the Senior Officer present.

B. In the event of a fire in or near the radioactive check sources, personnel should first give the alarm and attempt to extinguish the fire with hand extinguishers (CO_2) if the fire is in the incipient stage. Alarm will be given by telephone, dialing 117 giving the information stated in paragraph 8 a. (1) through (5) of this Annex. All personnel not actually involved in the initial fire-fighting will be evacuated to at least 2,000 feet upwind. The decision to fight the fire, maintain fire-fighting efforts, or withdraw is a judgment factor to be made by the Senior Officer present.

C. In the event of a fire in or near the Tantalum/Columbium Ore, personnel should give the alarm and attempt to extinguish the fire with hand extinguishers if the fire is in

the incipient stage. Alarm will be given by telephone, dialing 117 and giving the information stated in paragraph 8 a. (1) through (5) of this Annex. All personnel not actually involved in the initial fire-fighting will be evacuated to at least 2,000 feet upwind. Unprotected personnel downwind within the 22 degree pi area shall be evacuated to a distance according to Table F. The decision to fight the fire, maintain fire-fighting efforts, or withdraw is a judgment factor to be made by the Senior Officer present.

(2) On Depot Accident Involving Vehicles Carrying 30mm APIT (DU) Ammunition. In the event a vehicle carrying the ammunition is involved in an accident, the driver should attempt to position the vehicle away from the normal flow of traffic. He should immediately dial Ext 117 and his supervisor. The RAICO/RPO will notify the local Explosive Ordnance Disposal Unit (EOD) and the Alpha Team will be notified if the ammunition is damaged and in a hazardous condition.

(3) Theft or Loss. In the event a loss or theft of ammunition is discovered, the following will be immediately notified: Security Officer (Ext 18-265), NRC Regional Office (215-337-1150), Security, US Air Force, Radio Isotope Group (AUTOVON 240-3331), National Military Command Center (AUTOVON 227-8322/8323), and HQDARCOM, Health Physics (AUTOVON 284-9340). Within 30 days after a loss or theft has been reported to the NRC Regional Office, a written report will be made to the Director of Regulatory Operations, Nuclear Regulatory Commission, Washington DC. The report will be in accordance with Part 20.402, Title 10, CFR. A copy of the report will be sent to the NRC Regional Office.

5. Objectives.

a. To assure the readiness of SEAD to react in a timely and effective manner to an RAI and their effects on-post and off-post.

b. To take immediate response action to minimize loss of life, personal injury, hazardous effect and destruction of property: to secure classified material and to maintain public confidence in the ability of the Army to respond to a RAI on the depot or the environs thereof.

c. Identify credible RAI's and their implications based on current and projected radioactive material inventories.

d. Develop workable RAIC plans and emergency action procedures (EAP) that can be implemented/executed effectively and in a timely manner.

e. Equip and train RAIC emergency response personnel to implement/execute the RAIC plans and EAP effectively when and as required.

6. Policies.

a. The service or agency having custody of the ammo has responsibility for RAIC in the absence of an agreement to the contrary. Where ammunition in the custody of another service or agency move through an Army facility, refer to a joint agreement specifically defining responsibilities for all aspects of RAIC. When SEAD is responsible for a RAI occuring on the installation, it will continue to be responsible even if the effects extend beyond the depot boundary. If this should occur and DARCOM capabilities are exceeded or a domestic emergency is declared, control will be transferred to FORSCOM; this will be accomplished at Major Command level.

b. SEAD will respond without delay to requests for assistance in the event of a RAI off depot, as directed by higher authorities.

c. The inherent rights of state and local civil authorities to act on accidents and incidents within their jurisdictions must always be recognized. The military commander should coordinate closely with civil authorities to insure the security of classified material and to minimize or eliminate adverse effects of any accident or incident.

d. Control of Emergency Actions.

(1) To the extent practical, decisions will be made by the RPO/RAICO present based on the most expert advice and after consultation with all available emergency response personnel.

(2) Time dependent actions necessary to save lives or prevent further damage must be taken immediately. For example, fires must be extinguished and personnel rescue operations undertaken even if protective equipment is not readily available.

(3) Essential activities must not be unduly delayed or risks increased by delay; however, actions which are not specifically time-dependent should be unhurried and deliberate to avoid additional hazards.

(4) Disposal procedures will be performed by EOD personnel only.

7. Responsibilities.

a. The Depot Commander is responsible for providing guidance to and controlling all available resources in conducting RAIC Planning and Operations.

b. In the event of an RAI, the RAICO will exercise command and control of the military personnel present, under the provisions of para 17, AR 600-20.

c. Director of Supply: Have staff proponency for preparing, coordinating and maintaining the RAIC Annex to the SEAD-DCP. The Director of Supply and/or Deputy Director of Supply will be the RAICO.

d. Due to similarity between NAIC and RAIC operations, D/SW will maintain and train the Alpha Monitoring Team.

e. SEAD RPO: Provide technical expertise to the RAICO on depleted uranium munitions. Make necessary telephone calls and prepare messages, IAW AR 385-40 and Title 10 Code of Federal Regulations.

8. Procedures:

a. Notification: The first person having knowledge of a radiological accident/incident will immediately call the Security Police Desk Sergeant. This is accomplished by dialing Ext 117. The following information should be furnished:

(1) Name of individual calling.

(2) What happened.

(3) Where it happened.

(4) Is fire involved.

(5) Are people injured.

b. Security Police Desk Sergeant will immediately:

(1) Notify personnel on the Emergency Alert Notification Roster by means of a conference call. Insure that Fire Department has been notified by dialing Ext 117.

(2) Determine wind direction and speed and provide information as requested.

(3) Insure that initial traffic control points (TCPs) are posted so that the scene of the RAI is sealed for a radius of at least 5,000 feet.

(4) During conference call (para 7b(1) above), notify RAICO of the RAI and actions taken.

c. RAICO will:

(1) Assemble RAICO staff and proceed ~~to accident scene/assembly area as appropriate.~~

(2) Assess the situation and initiate necessary action.

(3) Establish contact with the EOC.

(a) Furnish pertinent data for the RAI report.

(b) Submit requests for necessary assistance.

d. EOC Commander will establish and operate the EOC or AEOC in accordance with SEAD EOC Plan

e. OIC US Army Health Clinic will:

(1) Establish, equip and train emergency medical team.

(2) Upon notification, dispatch team and proceed to the RAI site. Immediately establish contact with MP/SP and RAICO for additional details as to security situation and location of RAI. Follow the prescribed route when one is so designated.

(3) Advise RAICO in matters concerning care, treatment, decontamination and evacuation of casualties.

(4) Render first aid, decontaminate and evacuate casualties to the nearest armed forces, federal or civilian medical facility, in that order, consistent with the emergency. Attach a tag to evacuees if necessary.

f. Chief, Alpha Monitoring Team will:

(1) Establish, equip and train an Alpha Monitoring Team in accordance with FM3-15 and DARCOM Suppl 1 to AR 50-5.

(2) Upon notification, have team prepare themselves for initial entry and monitoring.

(3) Establish communications with RAICO to coordinate air sampler emplacement, if required.

(4) Report to RAIC assembly area fully prepared to monitor the area. Response time at scene of accident will not exceed one hour during duty hours or non-duty hours when operations are in progress and EOD is not on stand-by. If EOD is on stand-by, response time will be within two hours.

(5) Establish a Contamination Control Station (CCS) or assume control of EOD CCS.

(6) Monitor personnel equipment and the RAI area for contamination.

(7) In the event of a fire or explosion, air samples will be taken at a distance indicated by RPO. Water samples will be taken and sent off post for analysis at a later date. If the samples reveal radioactive concentrations in excess of 5,000 times the MPC: i.e., air = 3 x 10-12 u Ci/ml, water - 4 x 10-5 u Ci/ml, the NRC Regional Office will be immediately notified. If the samples reveal a concentration of 500 times the MPC, the NRC Regional Office will be notified within 24 hours at: Region 1, USNRC, Office of Inspection and Enforcement, 631 Park Avenue, King of Prussia, PA 19406; Telephone: Day and Night (215)337-1150 or AUTOVON via FT. Dix, Operator 944-1110 and 337-1150. EOD personnel will be notified to recover all rounds and render them safe.

(8) Assist in rescue and evacuation of casualties. Rescue operations will not be delayed due to nonavailability of protective equipment.

(9) Assist medical section in the monitoring and decontamination of personnel.

(10) Make a photographic record if possible of events and actions taken.

(11) Advise the RAICO as required.

g. Commander, 295th Military Police Company will:

(1) Train military police personnel in RAIC procedures. Insure that personnel are aware that rescue operations will not be delayed due to the nonavailability of protective equipment.

(2) Assemble and equip a reserve force and place it under the operational control of the Security Officer.

(3) Establish a command post and establish radio and telephone communications with the Security Officer or his designated representative at the EOC.

(4) Immediately dispatch a trained radio operator with a Secret clearance to the EOC.

h. Security Officer will:

(1) Direct the deployment of security forces and establish traffic control post and roadblocks as required. Preclude RAI support personnel from approaching RAIC assembly point from downwind. Personnel manning TCP will be equipped with protective mask.

(2) Assure that the RAI scene is cleared of personnel and sealed. The minimum radius to be cleared and sealed will be dictated by the RPO or the monitoring team depending on the type and severity of the incident. All personnel will be evacuated through the CCS.

(3) Direct and control the evacuation of personnel to a central collecting point when required.

(4) Provide a representative to the EOC staff.

(5) Designate a representative to report to RAIC assembly area command post to advise the RAICO on security measures and location of Traffic Control Points (TCPs) and/or roadblocks.

i. Commander, 143d Ordnance Detachment (EOD) will:

(1) Proceed directly to the RAIC assembly area.

(2) Perform mission in accordance with established procedures. Report all actions and findings to RAICO.

j. Director of Supply will, on order from EOC, notify commercial railraod agencies to prevent the passage of trains through contaminated areas and provide other support that may be requested.

9. Coordinating Instructions: In the event of an RAI occurring at a DARCOM installation/activity exceeds the installation's/activity's capability to control, requests for the below listed RAI emergency response teams/personnel will be made as indicated.

a. Health Physics Personnel - Submit requests telephonically directly to the Chief, DARCOM Health Physicist, AUTOVON 284-9340/9321. If further assistance is required, requests will be made by DARCOM to the Field Safety Activity.

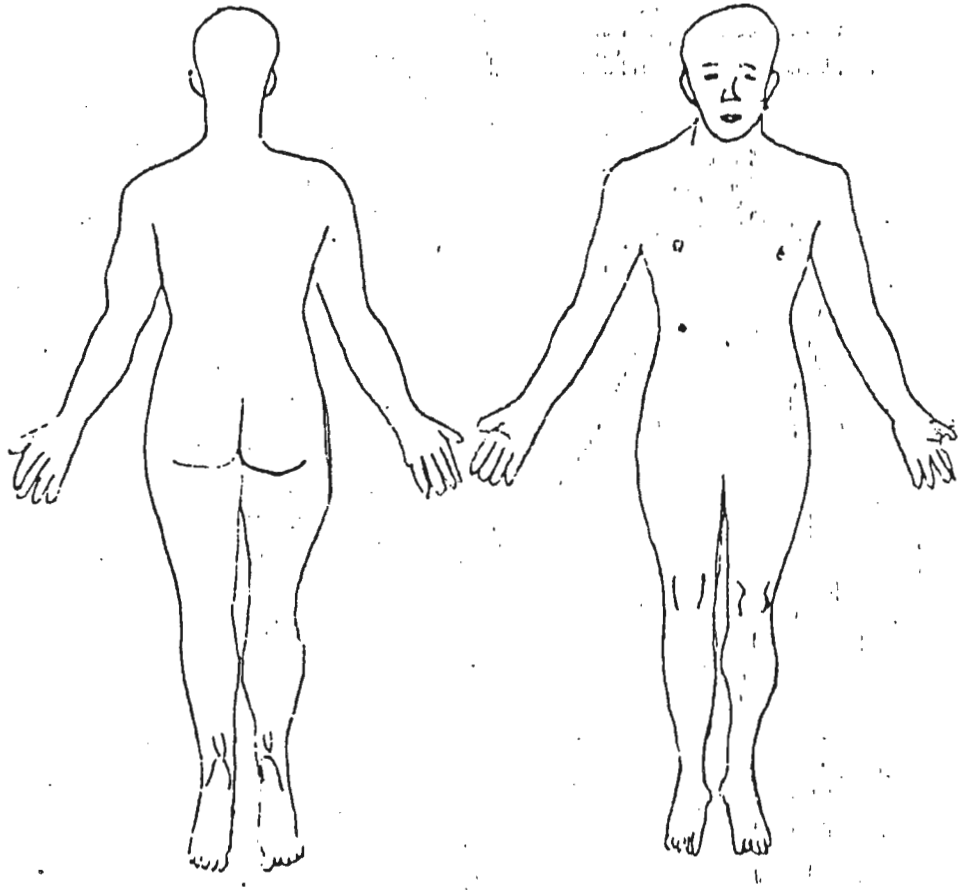
b. Federal, JNACC or other Non-DARCOM Assistance - Submit requests telephonically to Chief, Safety Office, DRCSF, AUTOVON 284-9340/9475 or to the DARCOM Operations Center when activated, AUTOVON 284-8486/9662/8660. During non-duty hours to the DARCOM Staff Duty Officer (SDO) AUTOVON 284-9223/9641. Radiological Control (RADCON) Team will be requested by the EOC when deemed necessary by the RAICO. RADCON Team may be reached at AUTOVON 584-4432/4431.

c. Radiological Advisory Medical Team (RAMT) will be requested by the EOC when deemed necessary by the RAICO. RAMT may be reached at AUTOVON 284-8860/8662 and 291-5107. DARCOM Surgeon's Office and Health Services will be notified by message of the request.

d. In the event a NAI should occur before, during or after an RAI so as to cause a conflict of operation, the NAI will take precedence. If SEAD is unable to cope with both situations, notification will be made as outlined above.

10. Reporting. RAI reports will be prepared and submitted in accordance with the guidance/procedures prescribed in AR 385-40 as supplemented.

NAME	GRADE/RANK	IDENTIFICATION
TEMPORARY ADDRESS + PHONE NUMBER		
PERMANENT ADDRESS + PHONE NUMBER		
ACCIDENT		
DATE	TIME	
LOCATION		
INJURIES / CONTAMINATION		



EXTERNAL	RADIATION TYPES	ESTIMATED EXPOSURE	DOSIMETRY	COMMENTS
WHOLE BODY				
PARTIAL BODY				

SURFACE CONTAMINATION

RADIONUCLIDE OR TYPES OF RADIATION

BODY PART	CONTAMINATED AREA	INITIAL COUNT	COUNT AFTER DECON

DECONTAMINATION METHOD AND AGENTS USED

INTERNAL CONTAMINATION

ROUTE OF EXPOSURE	RADIO-NUCLIDE	CHEMICAL FORM	SOLUBILITY	

NASAL SMEAR	
BLOOD WITHDRAWN	
BIOASSAY SAMPLES	
EARLY RADIATION SYMPTOMS	

PATIENT CONTROL NUMBER

WRAMC FORM 082 (TEST)
1 MAR 81

D

RADIAC INSTRUMENT DATA SHEET	DATE
	SERIAL NO.

NAME

INSTRUMENT TYPE: CHATHAN ELEC

MODEL NO.: IM141 PDR 27J

TEST SAMPLE #

WEIGHT OF RADIATION SOURCE: CO 60 M3A1 TEST SOURCE

INTENSITY IN CPM	DISTANCE FROM SOURCE IN CM	INSTRUMENT METER READING SCALE 500 MR	50 MR		5 MR	.5 MR	
400							
200							
100							
40							
20							
10							
4							
2							
1							
.4							
.2							
.1							
Bat							
Headset							
SHIELDING ATTENUATION DETERMINED BY USING AN/PDR 27J SER#							

RADIATION SURVEY SHEET

LOCATION: DATE: TIME:

SURVEY PERSONNEL:

INSTRUMENTATION:

RADIOISOTOPES:

REMARKS:

CHAPTER 10

IONIZING RADIATION ACCIDENTS/INCIDENTS

10-1. General. Federal laws require prompt accident reporting of certain radiation accidents. Nuclear Regulatory Commission (NRC) requirements are in 10 CFR 20. Department of Transportation (DOT) requirements are listed in 49 CFR 171. Commanders experiencing a radiological accident/incident are responsible for meeting the reporting requirements in the regulations cited above.

10-2. Explanation of terms. An ionizing radiation accident includes an event that involves—

a. Byproduct, source, or special nuclear material which has caused or may cause:

(1) Exposure of the whole body (head, trunk, active blood forming organs, lens of the eye or gonads) to more than 1.25 rems per calendar quarter.

(2) Exposure of the skin of the whole body to more than 7.5 rems per calendar quarter.

(3) Exposure of the extremities (hands, forearms, feet, and ankles) to more than 18.75 rems per calendar quarter.

(4) Exposure of minors (under 18 years of age) to 10 percent of the quarterly value in (1) through (3), above.

(5) Exposure of a minor in a restricted area to airborne radioactive materials in an average concentration in excess of the limits set in appendix B, table II, 10 CFR 20. (Concentrations may be averaged over periods no longer than a week.)

(6) Exposure of an individual in a restricted area—

(*a*) To airborne radioactive material within a restricted area in such concentrations that the amount inhaled in any calendar quarter is greater than the "calculated amount" that could result from inhalation for 40 hours per week for 13 weeks of uniform concentration of the material. Such "calculated amounts" are specified in appendix B, table 1, column 1, 10 CFR.

(*b*) To U-234, U-235, or U-238 in amounts exceeding the limits specified in appendix B, table 1, column 1, 10 CFR 20.

(*c*) Release of radioactive materials in concentrations which, if averaged over a period of 24 hours, would exceed 500 times the limits set for such materials in table II of appendix B to 10 CFR 20.

(*d*) Levels of radiation or concentrations in an unrestricted area in excess of 10 times the limits of appendix B, table II, 10 CFR 20.

(*e*) Levels of radiation or concentrations in a restricted area in excess of the limits of appendix B, table II, 10 CFR 20.

(*f*) Loss of 1 day or more of the operation of any facility.

(*g*) Damage to property of $300 or more.

(*h*) A fatality, lost time injury or restricted duty work for personnel.

b. Loss or theft of licensed material in such quantities that the licensee judges that a substantial hazard may result to personnel in unrestricted areas.

c. Probable high public interest by the general public or news media.

10-3. Radiation incident. A radiation incident includes an event that does not meet the requirements of paragraph 10-2 and has caused or may have caused—

a. Exposure of an individual to levels in excess of those in AR 40-5 and AR 40-14.

b. Contamination of personnel above levels shown in AR 700-64 outside Army radiation controlled areas.

c. Contamination of common carrier equipment or personnel at military shipping and receiving locations (whether or not the contamination was caused by Army operations).

10-4. Reporting procedures (RCS DD-AE(AR)1168). *a.* Accidents meeting the following criteria will be reported at once to the NRC in accordance with guidelines in 10 CFR 20.

(1) Exposure of the whole body (head, trunk, active blood forming organs, lens of the eye, gonads) to 25 rems or more.

(2) Exposure of the skin of the whole body to 150 rems or more.

(3) Exposure of the extremities (hands, fore-

arms, feet or ankles) to 375 rems or more.

(4) Release of radioactive materials in concentrations which, if averaged over a period of 24 hours, would exceed 5,000 times the limit set in Table II of Appendix B to 10 CFR Part 20.

(5) A loss of 1 week or more of the operation of any facilities affected, or

(6) Damage to property in excess of $200,000.

b. Accidents meeting the following criteria will be reported within 24 hours to the NRC (as stated in para 10-1) in accordance with guidelines in 10 CFR 20.

(1) Exposure of the whole body (head, trunk, blood forming organs, lens of the eye, gonads) to five rems or more.

(2) Exposure of the skin of the whole body to 30 rems or more.

(3) Exposure of the extremities (hands, forearms, feet or ankles) to 75 rems or more.

(4) Release of radioactive materials in concentrations which, if averaged over a period of 24 hours, would exceed 500 times the limits set for such materials in Table II of Appendix B to 10 CFR Part 20.

(5) Loss of one day or more of the operation of any facility.

(6) Damage to property totaling more than $2,000.

c. Accidents involving Army motor vehicles carrying licensed material on public highways in which the material has caused or contributed to any of the events below will be reported as soon as practicable to DOT according to guidelines in 49 CFR 171.

(1) A fatality or lost time injury occurs.

(2) Property damage exceeds $50,000.

(3) Fire, breakage, slippage or suspected radioactive contamination occurs.

(4) Any other event that, in the opinion of personnel at the accident site, presents a hazard to personnel.

d. For accidents meeting the criteria in *a* and *c* above, notify the following at once by telephone or electrical means:

(1) HQDA(DAPE-HRS) AUTOVON 225-7291; DASG-PSP, AUTOVON 227-2796.

(2) HQ DARCOM (DRCSF-P, AUTOVON 284-9340).

(3) The affected major Army commander or his representative.

(4) The licensee.

If the accident occurs at a reactor facility, also contact the Chief of Engineers (DAEN-FEZ-N, AUTOVON 354-5501). If an accident occurs during non-duty hours, contact the Army Operations Center, AUTOVON 225-0441, and indicate which offices must be notified.

e. For accidents meeting the criteria of *b* above, 24-hour notification will also be made by electrical means to the same addressees as in *d* above.

f. The format for the reports in *d* and *e* above are:

(1) This is a radiological accident report, RCS DD-AE(AR) 1168.

(2) Date of event.

(3) Radiation-producing device or source involved, including National Stock Number, nomenclature, and radiation characteristics and parameters.

(4) Description of event, including cause, name(s) and SSN of person(s) exposed; estimated exposures and dose rates; contamination levels; facilities affected; and actions taken.

(5) Action taken to prevent recurrence.

(6) Recommendations to avoid instances at other installations processing similar material.

(7) Specific contact (name, address, and telephone number).

(8) A statement of when the appropriate offices DOL, NRC, and DOT were notified (if applicable).

g. For other accidents and incidents not covered by *a*, *b*, and *c* above, 72-hour notification will be made by electrical means to the same addressees in *d* above.

10–5. Follow-up reports after initial notification. *a.* Commanders that have provided initial notification to NRC (per para 10-4*a* and *b*) will provide a written follow-up report within 30 days in accordance with 10 CFR 20.

b. Commanders that have provided initial notification to DOT (per para 10-4*c*) will provide a written follow-up report within 15 days according to 49 CFR 171.

c. Send copies of the above reports to—

(1) HQDA(DAPE-HRS, DASG-PSP), WASH DC 20310.

(2) Commander, DARCOM(DRCSF-P), 5001 Eisenhower Avenue, Alexandria, VA 22333.

(3) The affected major Army commander or his representative.

(4) The licensee.

10–6. Investigations and reports. *a.* A formal board of investigation will be required for all Class A accidents (para 2-12) as a result of a radioactive

accident. The commander to whom the license or authorization (AR 40-37 or AR 385-11) has been issued is responsible for appointing the board in accordance with paragraph 1-8. Reports will be forwarded through channels to HQDA(DAPE-HRE, DASG-PSP), WASH DC 20310 and Commander, DARCOM (DRCSF-P), 5001 Eisenhower Avenue, Alexandria, VA 22333, within 90 days of occurrence. If the accident occurred at a reactor facility, a copy of the report will also be forwarded to Chief of Engineers (DAEN-FEZ-N), WASH DC 20314.

b. Other accidents/incidents that are less than Class A (Class B or C) will be investigated by the local commander. Copies of these reports will be provided to the addressees above within 90 days of occurrence.

c. Accidents involving theft of radioactive material will be investigated and processed through security or law enforcement channels.

d. All accidents that require reports to other Federal agencies than those discussed in this chapter will be reported to those agencies within prescribed time periods. Information copies of those reports will be submitted to the addressees in paragraph *a* above.

10–7. Collateral investigations (AR 15–6). See paragraph 1-7*c*.

10–8. Release of information. See paragraphs 1-7 and 1-9.

10–9. Other reporting requirements. For additional reporting requirements and procedures for personnel exposure see AR 40-5 and AR 40-14.

DEPARTMENT OF THE ARMY
U.S. ARMY MATERIEL ~~DEVELOPMENT AND READINESS~~ COMMAND
FIELD SAFETY ACTIVITY
CHARLESTOWN, INDIANA 47111

REPLY TO
ATTENTION OF:

AMXOS-PE
SOP NO. 1-84

11 September 1984

STANDING OPERATING PROCEDURE FOR COMBINED RADIATION PROTECTION SURVEYS AT US ARMY DEPOT SYSTEM COMMAND DEPOTS AND DEPOT ACTIVITIES

1. PURPOSE. The purpose of this directive is to establish uniform procedures for conducting combined radiation protection surveys and preparation of survey reports.

2. BACKGROUND.

a. Many radioactive commodities are processed by US Army Depot System Command (DESCOM) field elements. The US Nuclear Regulatory Commission (NRC) licenses and the Department of the Army (DA) authorizations that regulate most of these commodities are held by the respective major subordinate commands, i.e., US Army Communications-Electronics Command (CECOM), US Army Troop Support Command (TROSCOM), US Army Aviation Systems Command (AVSCOM), US Army Armament, Munitions, and Chemical Command (AMCCOM), and US Army Tank-Automotive Command (TACOM). In the past, representatives from these commands have conducted separate depot radiation protection surveys to assure the provisions of applicable licenses and authorizations are satisfied. Thus, several depots experienced surveys from some or all of the commands in addition to those conducted by the Field Safety Activity (FSA) and Headquarters (HQ) DESCOM -- all addressing radiation safety.

b. With the "combined survey" approach, a single radiation protection survey will be conducted at each DESCOM installation having radioactive commodities or operations. Survey participants will include a representative from either FSA or HQ DESCOM, who will examine general radiation protection program elements, and representatives from the affected commands, who will examine commodity-oriented radiation protection aspects. A single report, with input from each representative, will be prepared to show the results of each such combined survey. Such an approach decreases the inspection burden experienced by DESCOM field elements while prompting consistency in radiation protection efforts.

3. POLICIES.

a. A single combined radiation protection survey will be conducted annually by a team at each DESCOM installation having radioactive commodities or operations with participation as required by representatives of FSA and HQ's AMCCOM, AVSCOM, CECOM, DESCOM, TACOM, and TROSCOM.

Enc 9

b. The combined radiation protection surveys will not be scheduled during the time that either FSA or HQ DESCOM are at an installation conducting safety program evaluations.

4. RESPONSIBILITIES. FSA and HQ's AMCCOM, AVSCOM, CECOM, DESCOM, TACOM, and TROSCOM are responsible for assuring that team members they assign to participate in combined radiation protection surveys are familiar with this SOP and comply with the established procedures.

5. PROCEDURES.

a. Prior to 31 August, each year, FSA will host a meeting with representatives of HQ's DESCOM, AMCCOM, AVSCOM, CECOM, TACOM, and TROSCOM to develop the annual schedule for the combined radiation protection surveys. In addition, "lessons learned" from the previous fiscal year's (FY's) combined radiation protection surveys will be reviewed and any needed improvements implemented to make surveys more efficient and effective.

b. HQ DESCOM will provide the depots and depot activities with the next FY's schedule of combined radiation protection surveys and the checklists to be used in conducting the surveys.

c. A representative from either HQ DESCOM or FSA will serve as the survey team chief in accordance with separate agreement established between these organizations.

d. Personnel participating as team members on combined radiation protection surveys will insure appropriate notification, to include security clearance, is provided to organizations being surveyed.

e. The chief of the survey team will arrange for an entrance conference with the commander or a designated management official of the depot being surveyed.

f. The FSA/HQ DESCOM representative will serve as survey team chief and will examine the general administrative aspects of the installation's radiation protection effort. The checklist to be used in this area is at Appendix A. Selected items on this checklist may be delegated to an major subordinate command representative by the team chief.

g. Representatives from the major subordinate commands participating in the survey will address commodity peculiar issues and support the team chief in accomplishing the examination of general administrative aspects. The checklist to be used in the commodity areas is at Appendix B.

h. The following report format will be used, i.e.:

(1) Recommendations will be shown only in the Executive Summary. Suggestions to otherwise improve the installation's radiation protection posture may appear in the body of the report.

(2) A discussion will be developed on each Executive Summary item in the body of the report in each section.

(3) If a finding addressed in a discussion is included in the Executive Summary, this fact will be noted in the section discussion, e.g., "This finding was considered significant and has been addressed in the Executive Summary."

(4) Each item included in the Executive Summary will typically contain three sentences as follows:

(a) A description of the finding.

(b) A description of the recommendation.

(c) An identification of reference(s).

NOTE: At Appendix C is a copy of a final report of a combined radiation protection survey signed by the Commanding General, DESCOM. Sections of the reports and executive summaries should be developed using the style and format contained in this example. When two or more commands have the same finding or commendable area it will be listed once in the Executive Summary but discussed in the individual sections. A note will be included in the Executive Summary indicating the commands detecting the finding or commendable area. The draft and final reports will be uniform thus holding the need for editorial changes to a minimum.

i. All team members will provide their handwritten report sections and items for their part of the Executive Summary to the team chief for consolidation and typing at least 4 working hours before the scheduled exit briefing. Significant items to be included in the Executive Summary will be presented in writing to the team chief as soon as they are found.

j. A draft survey report will be left at the installation and will be given to the commander at the exit briefing. The team chief will mail a copy of the draft report to HQ DESCOM on the day of the exit briefing.

k. All team members will be present at the exit briefing to present their respective findings and recommendations to the commander unless released earlier by the team chief.

l. Report sections will be finalized by the respective major subordinate command representatives and formally forwarded to HQ DESCOM within 10 working days after the survey.

m. HQ DESCOM will make no changes in the technical content of the report sections without the concurrence from the originator.

n. HQ DESCOM will insure information copies of the final report will be provided to FSA and each major subordinate command participating in the consolidated survey.

o. HQ DESCOM will assure that a copy of any response required of the surveyed depot will be furnished to FSA and to each participating major subordinate command. This is to allow the team chief the opportunity to advise the Commander, DESCOM, of the technical propriety of the response. After coordination with the command responsible for the finding, the assessment of the response by the team chief will be provided to HQ DESCOM either by telephone or by electronic means, i.e., Military Network (MILNET).

6. CONCURRENCES.

Chief, Safety Office
HQ AMCCOM

Chief, Safety Office
HQ AVSCOM

S. A. HORNE
Actg Chief, Safety Office

Chief, Safety Office
HQ CECOM

Chief, Safety Office
HQ TROSCOM

Chief, Safety Office
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APPENDIX A

EVALUATION GUIDE FOR GENERAL RADIATION PROGRAM ELEMENTS

I. Administration and Management. (DESCOM/FSA Survey Element)

1. Have responsibilities for staff supervision, line supervision, management and implementation of the ionizing radiation protection program been delineated and assigned in a formal manner? (Paragraph 1-20a, Army Regulation (AR) 385-11.)

2. Has a Radiological Protection Officer (RPO) and at least one alternate been appointed by written letter or orders as required? (Paragraph 5e(3), AR 40-14.)

3. Has an Ionizing Radiation Control Committee (IRCC) been established as required? (Paragraph 2-13, AR 385-11.)

4. Does the IRCC have the appropriate members designated? (Paragraph 5e(4), AR 40-14.)

5. Does the RPO have pertinent regulations, technical manuals and bulletins readily available? Are Federal regulations maintained and periodically updated, e.g., Food and Drug Administration, Nuclear Regulatory Commission (NRC), Department of Transportation? What text books, library resources, and/or journals are available to the RPO? Are necessary National Bureau of Standards (NBS), American National Standards Institute (ANSI), and National Council on Radiation Protection and Measurements (NCRP) reports and handbooks maintained by the RPO? (Paragraph 1-26a, AR 385-11.)

6. Has the use or storage of eating, drinking, chewing, smoking, and cosmetic materials in the immediate areas containing radioactive material been prohibited? (Paragraph 9c, US Army Materiel Command Regulation (AMCR) 385-25.)

7. Have operations and facilities involving radioactive materials been planned to limit the spread of radioactive materials? (Paragraph 9f, AMCR 385-25.)

8. Have operations using remote-control devices to control sealed sources of radiation been designed to prevent leakage or rupture of source capsules, providing a positive means of containment of contamination in case of leakage, rupture, or other damage to the capsule; a positive control of sources from "safe" to "exposed" position, and an interlock, visual, or audible alarm system to prevent entry of personnel into the radiation field while in the exposed position? (Paragraph 9i, AMCR 385-25.)

9. For "Protective Installation" and "Enclosed Installation" classes of X-ray and Gamma operations (ANSI N543-1974), have the following been accomplished?

a. Have fail safe audible or visible warning signals (preferably of the rotating beacon type) been provided within the enclosure? (Paragraphs 3.1.3.1 and 3.2.3.1, ANSI N543-1974.)

b. Is there a suitable means of exit, so that any person who may accidentally be shut in car leave the enclosure without delay? (Paragraphs 3.1.3.2 and 3.2.3.2, ANSI N543-1974.)

c. Is there an effective means (device) within the enclosure for quickly interrupting the irradiation, and is the use and function of the device clearly labeled? (Paragraphs 3.1.3.3 and 3.2.3.3, ANSI N543-1974.)

10. Are decontamination (personnel and area) procedures for the specific isotopes involved complete and comprehensive? (Paragraph 8b(10), AMCR 385-25.)

11. Do the emergency procedures for radiation casualties include medical procedures for handling alleged overexposures and for possible contaminated casualties? (Paragraph 30c, AMCR 385-25.)

12. Are radiological emergency procedures preplanned and rehearsed at least once each year? (Paragraph 30d, AMCR 385-25.)

13. Are radiological emergency procedures incorporated into the local Disaster Control Plan? (Paragraph 2-12, AR 385-11.)

14. Have pre-placement and termination medical examinations been given to radiation workers, with the pre-placement exam to include a baseline blood count? (Paragraph 6a, AR 40-14.)

15. Have periodic medical and opthalmic examinations been given to radiation workers, at a frequency and thoroughness determined by the medical commander or staff medical officer in coordination with the RPO? (Paragraph 6b, AR 40-14.)

16. Have Standing Operating Procedures (SOP's) been generated for potentially hazardous operations? Is there a management level check and enforcement of the SOP? (Paragraph 6d(8), AMCR 385-25.)

17. Does the Commander receive a periodic report on the status of the radiation protection program through his representative on the Radiation Control Committee or the RPO? (Paragraph 6c(2)(a), AMCR 385-25.)

18. Have sufficient and necessary manpower and equipment resources been provided to carry out an effective program? (Consider manpower and resources that have been supplied by other organizations, e.g., tenant activities, Health Service Command, contractors.) (Paragraph 1-20, AR 385-11.)

19. Does the formal radiation safety program document address indoctrination of new or newly assigned radiation workers, emergency procedures, how the Radiation Control Committee functions, and the method for developing, reviewing, and approving SOP's? (Paragraph 6c, AMCR 385-25.)

20. Have radiological protection files been established and maintained in accordance with AR 340-18-6?

21. Is an inventory of radioactive materials and ionizing radiation devices maintained (accurate, up-to-date, sufficient information)? (Paragraph 1-20h, AR 385-11.)

22. Generally, the following administrative records and documents should be maintained in an up-to-date fashion by the RPO and readily accessible.

a. NRC licenses, Department of the Army (DA) permits/authorizations, and supporting documents as specified on the license/permit/authorization.

b. Physical inventory records. (AR 700-64, AR 385-11.)

c. Leak test records. (AR 385-11.)

d. Radiation survey records. (AR 385-11, AR 700-64.)

e. Records of training and instruction to workers. (AMCR 385-25.)

f. Standing Operating Procedures.

g. Copies of accident investigation reports and transmittals to NRC. (Title 10, AR 385-40.)

h. Inspection reports.

i. Minutes of Radiation Control Committee meetings. (AMCR 385-25.)

j. Regulations and directives.

k. Registry of ionizing radiation producing devices. (AR 385-11.)

II. Personnel Dosimetry. (DESCOM/FSA Survey Element)

1. Is a person designated in writing by the Commander to be responsible for preparing and maintaining the exposure records? (Paragraph 5e(8), AR 40-14.)

2. Are personnel who may receive an accumulated dose equivalent in excess of 5 percent of the applicable quarterly radiation exposure standard, specified in paragraph 7, AR 40-14, wearing personnel monitoring devices (film badges, Thermoluminescent Dosimetry (TLD) badges)? (Paragraph 8a, AR 40-14.)

3. Are bioassay measurements performed when it is possible for a person to acquire 5 percent or more of the annual radiation standard for a specific radionuclide as established by NCRP/International Commission on Radiological Protection (NRC Regulatory Guides 8.9, 8.11, 8.15, 8.20, and 8.22)? (Paragraph 8c, AR 40-14.)

4. Is monitoring of personnel who work only with soft beta emitters (Tritium, carbon-14, calcium-45, and sulfur-35) and alpha emitters performed by bioassay as prescribed by the RPO? (Paragraph 8b, AR 40-14.)

5. Are Department of Defense (DD) Forms 1141 and 1952 prepared and maintained for each person occupationally exposed? (Paragraph 11, AR 40-14.)

6. Are procedures established for centralized issue and control of dosimetric devices? (Paragraph 5e(6), AR 40-14.)

7. Does the RPO review and evaluate DD Form 1141 at intervals not to exceed one calendar quarter, and note the DD Form 1141 accordingly? (Paragraph 13, AR 40-14.)

8. Is DD Form 1141 annotated in accordance with (IAW) instructions on the reverse side at least once each quarter by the person responsible for the exposure records? (Paragraph 8i, AR 40-14.)

9. Has each person who enters a high radiation area worn, in addition to a film badge, one of the following near the film badge to monitor the whole-body exposure: pocket chamber, self-reading pocket dosimeter, or TLD? (Paragraph 8e, AR 40-14.)

10. Are the personnel monitoring devices worn properly? (Paragraph 9, AR 40-14.)

11. Are film badges properly stored? (Paragraph 10, AR 40-14.)

12. Has the storage location been approved in writing by the RPO? (Paragraph 10a, AR 40-14.)

13. Is a control dosimeter stored in each approved personnel dosimeter storage location? (Paragraph 10a, AR 40-14.)

14. Do personnel monitoring devices display some individual identification (to assure that persons wear only their own dosimeter IAW paragraph 10b, AR 40-14)? (Paragraph 10a, AR 40-14.)

15. Has a Chargeout Record (Optional Form 23) been placed in each record when the DD Form 1141 is maintained separately from the health record or civilian employee medical file? (Paragraph 11, AR 40-14.)

16. Is a separate DD Form 1141 maintained to record other than whole-body or skin of the whole-body exposure? (Paragraph 11e, AR 40-14.)

17. Are unissued dosimeter film and TLD stored properly? (Paragraph 10d, AR 40-14.)

18. Has the RPO forwarded dosimetry information to the gaining organization upon notification of transfer of a radiation worker? (Paragraph 11b, AR 40-14.)

19. Has the RPO submitted personnel monitoring reports to NRC if required by Title 10, Code of Federal Regulations, Part 20.407 (10 CFR 20.407) (annual), and 10 CFR 20.408 (termination of employment or work)? (Paragraph 15, AR 40-14.)

20. Has the terminated or reassigned employee been provided, at his request, with a report of his exposure to ionizing radiation, within 30 days from the time the request is made, to cover each quarter he was occupationally exposed? (Paragraph 14, AR 40-14.)

21. Are bioassay results recorded on DD Form 1141 as whole-body exposure in terms of dose equivalent (rems)? (Paragraph 11e, AR 40-14.)

22. Are bioassay results referenced in item 16 of DD Form 1141 (Remarks)? (Paragraph 11e, AR 40-14.)

23. Are personnel over exposures, resulting in or caused by accidents/ incidents, investigated and reported properly? (Paragraph 13a, AR 40-14, and Chapter 10, AR 385-40.)

24. Have administrative doses been assigned by the RPO correctly, and has the method used to determine the dose been recorded in item 16 (Remarks) of DD Form 1141? (Paragraph 13i, AR 40-14.)

25. Has DD Form 1141 been maintained and posted properly? (Paragraph 11g, AR 40-14.)

26. Has a Radiation Work Permit (RWP) been properly prepared to control ingress and egress from a high radiation area or other controlled (restricted) areas that have been so designated by the RPO? (Paragraph 8f, AR 40-14.)

27. Has the RPO reviewed entries on the RWP periodically to ensure that complete exposure records are maintained for all persons using personnel monitoring devices issued by him? (Paragraph 8g, AR 40-14.)

28. When RWP's are used, are exposures recorded by supplemental monitoring devices recorded on the permits? (Paragraph 11h, AR 40-14.)

29. Are records of exposures other than whole-body or skin of the whole-body (e.g., thyroid, head and neck, wrist, and fingers) cross referenced with the whole-body record? (Paragraph 11e, AR 40-14.)

III. Licenses and Authorizations. (DESCOM/FSA Survey Element) Have the necessary NRC licenses and/or DA authorizations/permits been obtained IAW AR 385-11, and NRC Title 10, and are they current, complete, readily available and signed by the Commander (if affecting more than one command)? (Chapter 2, AR 385-11.)

IV. Radiation Exposure Control. (MSC Survey Element)

1. Are all work and/or storage areas posted correctly for the presence of radioactive materials and external radiation fields? (10 CFR 20.203 and 20.204, paragraph 3, AR 40-14, and Chapter 4, AR 385-30.)

2. Are all containers properly labeled to indicate the presence of radioactive material? (10 CFR 20.203(f).)

3. Are copies of the following posted in work and/or storage areas?

a. Copy of 10 CFR 19, 10 CFR 20, NRC license (with license conditions, referenced documents, and amendments), SOP's, and any notice of violation, civil penalty, or NRC order and response, and Form NRC-3. (10 CFR 19.11.)

b. Copy of 10 CFR 21, Section 206 of the Energy Reorganization Act of 1974, and procedures for reporting defects and noncompliance to NRC? (10 CFR 21.6.)

4. Are there signs prohibiting eating, drinking, smoking, chewing, etc., and storage of such items in immediate areas where radioactive material is used or stored, and are they enforced? (Paragraph 9, AMCR 385-25.)

5. Is there adequate instrumentation available for routine monitoring of radioactive contaminants and excess external radiation fields and for emergencies? (Paragraph 29, AMCR 385-25.)

6. Are personnel exposure monitoring devices being worn as required? (Paragraph 8a, AR 40-14.)

7. Are the outer boundaries of restricted areas of external radiation fields posted with a "Caution-Radiation Area" sign at the 2 milliroentgen per hour isodose line? (Paragraph 3x, AR 40-14, and paragraph 4-1a, AR 385-30.)

8. Are proper warning devices (lights, buzzers) and safety equipment (interlocks, panic buttons, limiting devices) in place and operating properly? (10 CFR 20.203, 10 CFR 34, and ANSI N543-1974.)

9. Are personnel working with ionizing radiation aware of radiological safety aspects of the operations? (Paragraph 1-26b, AR 385-11, and paragraph 6d(4), AMCR 385-25.)

10. Are all work and/or storage areas adequately shielded IAW the NRC "As Low As Reasonably Achievable" concept? (NRC Regulatory Guide 8.10.)

11. Is ventilation adequate to prevent the spread of contamination? (Paragraph 19c, AMCR 385-25.)

12. When ventilated hoods are used, is air flow at least 100 linear foot per minute? (Paragraph 5-36b, AR 40-5.)

V. Survey and Reporting Requirements. (DESCOM/FSA Survey Element)

1. Have health physics surveys been made of areas where ionizing radiation materials/devices are used or stored, at the frequency required by license, authorization, or regulation? (Paragraph 1-26c, AR 385-11, paragraph 17, AMCR 385-25, and paragraph 5-9c, AR 700-64.)

2. Do the health physics surveys contain information adequate to document the hazards related to the specific operations? (Paragraph 1-26c, AR 385-11, and paragraph 7.6.4, ANSI N543.)

3. Are all sealed sources leak tested, at least every 3 months for alpha, and every 6 months for beta/gamma? (Paragraph 2-7c, AR 385-11.)

4. Are leak test results of sealed sources forwarded to other offices if so required? (Paragraph 3-4, AR 385-11.)

5. Have all accidents/incidents been investigated and a complete history forwarded to Headquarters DARCOM (DRCSF-P) and NRC? (Titles 19, 20, and 21, Title 10 CFR, Chapter 10, AR 385-40, and DARCOM Supplement 1 to AR 385-40.)

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6. Does the local accident reporting procedures for radiation accidents/ incidents refer to Parts 19, 20, and 21 of Title 10 CFR, and AR 385-40, with DARCOM Supplement 1? (Paragraph 1-20b(2), AR 385-11.)

7. Have written procedures, which delineate the responsibilities for reporting of defects and noncompliance IAW Section 206 of the Energy Reorganization Act of 1974, been written and approved? (10 CFR 21.)

VI. Radiac Instrumentation. (MSC Survey Element)

1. Does the installation have radiation detection instruments capable of detecting the emitted radiation from the material or equipment being utilized? (Paragraph 29, AMCR 385-25.)

2. Have all instruments used for radiation protection been properly calibrated at least every 3 months? (Paragraph 29c, AMCR 385-25, and Technical Bulletin 43-180.)

3. Is there an SOP for local calibration of the survey instrument? (Paragraph 6d(8), AMCR 385-25.)

4. Is properly calibrated radiac instrumentation available to measure the specific isotope involved, to both the RPO and key emergency personnel (Fire Department), independent of the presence of the RPO? (Paragraph 32, AMCR 385-25.)

5. Is each instrument used for radiation protection provided with a check source or test sample to assure its accuracy prior to use? (Paragraph 29e, AMCR 385-25.)

6. Are duplicate radiation protection instruments available to avoid the necessity of shutting down a radiological operation until an instrument can be repaired or replaced? (Paragraph 29i, AMCR 385-25.)

VII. Personnel Training and Training Material. (DESCOM/FSA Survey Element)

1. Are the training and experience of the RPO and his alternate commensurate with the types and hazard of the radiation sources for which they are responsible? (Paragraph 6c, AMCR 385-25.)

2. Has training commensurate with the extent and complexity of the program been provided the radiation safety personnel? (Paragraph 6d, AMCR 385-25.)

3. Has current training in radiation safety been included in the training/ experience resume of the RPO? Members of the Radiation Control Committee? (Paragraph 6b(3), AMCR 385-25.)

4. Are visitors, who will be exposed to radiation, briefed on the hazards associated with the activities? (Paragraph 15a, AMCR 385-25.)

5. Are safety procedures included in specific operational instructions each individual worker receives? (Paragraph 15b, AMCR 385-25.)

6. Have records of training required by AMCR 385-25 to qualify an individual to perform tasks involving radioactive material been included in the employee's personnel folder? (Paragraph 15f, AMCR 385-25.)

7. Do the instructions to workers include all the elements listed in Part 19.12 of 10 CFR 19 (NRC Regulatory Guide 8.24), to include instructions to female workers concerning prenatal radiation exposure (NRC Regulatory Guide 8.13)?

8. Have professional training assistance and training materials been requested from the local installation training function, when required? (Paragraph 1-20b(1), AR 385-11.)

VIII. X-Ray/Accelerator/Neutron Protection. (MSC Survey Element)

1. Industrial X-Ray Protection.

a. Have the x-ray units been classified IAW paragraph 3 of NBS Handbook 114?

b. Have the structural shielding requirements been reviewed by qualified experts as required in paragraph 5 of NBS Handbook 114?

c. Have radiation protection surveys and inspections been performed IAW the requirements listed in paragraph 7 of NBS Handbook 114?

d. Are the operating procedures for the X-ray units in conformance with the hazard classification of the unit?

NOTE: Operation requirements according to classification of the unit are listed in paragraph 8 of NBS Handbook 114.

e. Have the personnel monitoring requirements as listed in paragraph 8 of NBS Handbook 114 and in the personnel dosimetry section of this checklist been instituted?

2. Particle Accelerator Protection.

a. Radiation Design Criteria.

(1) Have the design considerations listed in NBS Handbook 107 been considered and implemented?

(2) Have the plans and specifications been reviewed and approved by a qualified expert on radiation shielding prior to construction?

(3) Has safety approval of the site plans been received from Headquarters Safety Office prior to final design?

b. Operational Health Physics.

(1) Have the radiation safety responsibilities listed in paragraph 5 of AMCR 385-30 been fulfilled at the installation level?

(2) Have the radiation safety procedures for operation of an accelerator listed in paragraph 1.3 of NCRP Report Number 51, paragraph 2.3 of NBS Handbook 107, and in paragraph 8 of AMCR 385-30 been implemented?

(3) Are the area monitoring requirements of paragraph 2.5 of NBS Handbook 107 and paragraph 8e of AMCR 385-30 been documented?

(4) Are the ventilation system, waste disposal system, and radioactive material handling systems operating according to design specifications?

3. X-Ray Diffraction and Fluorescence Analysis.

a. Installation Requirements.

(1) Are areas around the X-ray equipment designated radiation controlled areas as defined by paragraph 5.1.2. of NBS Handbook 111?

(2) Have the general requirements for all X-ray systems as stated in paragraph 5.2.2, NBS Handbook 111, been complied with?

(3) Have the requirements for open beam X-ray systems as listed in paragraph 5.2.2.2 of NBS Handbook 111, been implemented?

(4) Have the requirements for enclosed beam X-ray systems as stated in paragraph 5.2.2.3, Handbook 111, been implemented?

b. Operational Requirements.

(1) Are radiation surveys and inspections performed IAW paragraph 7, NBS Handbook 114?

(2) Are radiation inspections performed by qualified personnel (paragraph 8.2, NBS Handbook 114) on at least a 6-month interval?

(3) Are the medical surveillance and personnel monitoring requirements as described in paragraph 7, NBS Handbook 111, implemented?

(4) Have the low energy characteristics (5-17 keV) and small beam evaluation problems been considered in choosing a radiation survey meter? (See Appendix, NBS Handbook 111)

(5) Is the survey instrument correctly calibrated in order to accurately measure the low energy radiation emitted by the diffraction/fluorescence equipment?

4. Neutron Sources and Generators.

a. What types of neutron emitting devices are on hand at the installation? What neutron energies are emitted from the source? During use? During storage?

b. Does the RPO have a table which equates the neutron flux of neutrons at a certain energy and the corresponding radiation equivalent dose, e.g., Table 2, Chapter 7, NCRP Report Number 38, Protection Against Neutron Radiation; or Title 10 CFR 20, Standards for Protection Against Radiation Section 20.4?

c. Does the RPO have sufficient radiological survey instruments to measure the neutron flux or radiation equivalent level? Will the instrumentation distinguish between slow and fast neutrons? Is the radiological survey instrumentation affected by a gamma ray exposure? Is the gamma component in neutron sources measured?

d. Do the personnel exposed or working with neutron radiation receive physical examinations which include an ophthalmological examination of the lens of the eye at least every 3 years? Where is the opthalmological examination performed? Are the results or a statement of the results of ophthalmological examinations included in the individual's medical file?

NOTE: Chapter 21, NCRP Report Number 38, describes some aspects of a medical examination for a worker exposed to neutron radiation.

e. Do the personnel exposed to or working with neutrons wear neutron film badges? Are the film badges sent to Lexington-Blue Grass Depot Activity for analysis? What is the minimum level of radiation equivalent dose which can be read from a neutron badge?

f. Have the plans and specifications for the neutron generator been reviewed and approved by a qualified person prior to the start of construction? Has a complete survey been performed of the neutron generator or particle accelerator by a qualified person prior to routine operation? (Checklist on Particle Accelerators would apply to neutron generators.)

IX. Non-ionizing Radiation. (DESCOM/FSA Survey Element)

1. Is an inventory of non-ionizing radiation equipment available?

2. Does examination of the US Army Environmental Hygiene Agency (USAEHA) survey indicate that a further USAEHA survey is required.

APPENDIX B

EVALUATION GUIDE FOR

COMMODITY-ORIENTED

RADIATION PROTECTION PROGRAM ELEMENTS

I. Inventory Records.

1. SPEEDEX inventory reports will be reviewed by each major subordinate command representative. At least three copies of the latest report should be available.

2. Determine what is stored by National Stock Number (NSN), quantity, condition code, and location. This information will be used to inspect warehouse facilities to determine the adequacy of supply recordkeeping procedures and also the degree of compliance with commodity command quality assurance requirements.

3. Assure compliance with annual physical inventory count requirements.

II. Shipment and Receipt of Radioactive Commodities. (US Army Communications-Electronics Command (CECOM) Item)

1. Review shipping forms/records to determine if applicable information is contained thereon, including radiation survey and wipe test results.

2. Review receiving forms/records for similar information.

3. Determine if logbooks are maintained that document: all wipe tests made on packages received and/or shipped by Transportation Control Number or Government Bill of Lading; date of analysis; gross count per minute (cpm); background cpm; net cpm; disintegrations per minute; and initials of individuals performing the analysis.

III. Improper Shipment Records Review. (CECOM Item)

1. Standard Form 361, Discrepancy of Shipment Report.

2. Standard Form 364, Report of Discrepancy.

3. The above records should be reviewed to determine if appropriate actions were taken.

IV. Review a sampling of Material Release Order (MRO)-DOD Single Line Item Release/Receipt Documents, DD Forms 1348-1, to determine if they contain the words "RADIOACTIVE" or "RADIOACTIVE ITEM" for items identified as radioactive on the Army Master Data File.

V. Inspection of Radioactive Material Storage Areas.

1. To determine their adequacy.

2. To determine the accuracy of latest SPEEDEX report vis-a-vis on-hand quantities.

VI. Quality Surveillance Program. Assure testing procedures on radioactive commodities are in accordance with (IAW) the commodity command NRC licenses, Department of the Army Radiation Authorizations (DARA's), and Army Regulation (AR) 700-64.

VII. Disposal of Radioactive Material. (US Army Armament, Munitions, and Chemical Command (AMCCOM) Item)

1. Inspect radioactive waste storage area to determine its adequacy and compliance with regulations and good health physics practice.

2. Review MRO records on excess radioactive commodities or equipment containing radioactive components or parts. All turn-in documents must indicate that all radioactive materials/components were removed and that the items were free of contamination before transfer to the Defense Property Disposal Office (DPDO).

3. Assure requests for disposal instructions are submitted to the US Army Armament, Munitions, and Chemical Command.

4. Assure requests for disposal of radioactive materials contain the information required by AR 385-11.

5. Assure local disposal of radioactive materials is IAW Title 10, Code of Federal Regulations, Part 20 (10 CFR 20) and/or AR 385-11.

VIII. DPDO. Inspect DPDO facilities to assure radioactive commodities, components, or parts are not being physically transferred to the DPDO. Conduct a walk-through survey of the DPDO warehouse facilities.

IX. Maintenance Facilities.

1. Determine the operations performed, i.e., repair/refurbishment.

2. Determine if Radium-226 in equipment is being properly labeled with "Radioactive Material Controlled Disposal Required" labels.

3. Determine the adequacy of activities regarding the inspection/determination of radioactive materials.

4. Determine the adequacy of receipt, repair, and removal of radioactive materials.

X. Surveys of Workplaces.

1. Assure all radiation work and/or storage areas are posted IAW 10 CFR 20 and AR 385-30.

2. Assure all containers are properly labeled to indicate the presence of radioactive material IAW 10 CFR 20 and AR 385-30.

3. Assure copies of the following are posted in work and storage areas IAW 10 CFR.

a. NRC licenses, and DA permits and authorizations.

b. 10 CFR 19, 10 CFR 20, 10 CFR 21, and NRC Form 3.

c. SOP's.

4. Determine if the installation has radiation detection instruments capable of detecting the radiation emitted from the material or equipment being utilized and if the instruments have been calibrated within the last 90 days IAW US Army Materiel Command Regulation (AMCR) 385-25.

5. Assure that film badges are used in the manner required and that a control film badge is used.

6. Determine if all work and storage areas are shielded IAW the NRC "As Low As Reasonably Achievable" concept.

7. Assure that "High Radiation" areas, i.e., those in excess of 100 mr/hour, have alarms, interlocks, etc., IAW AMCR 385-25, and that unnecessary personnel are excluded from these areas.

8. Assure that signs prohibiting eating, drinking, smoking, etc., are posted in areas and buildings where radioactive material is stored or used, and that they are enforced IAW AMCR 385-25.

9. Assure there is adequate ventilation in all work and storage areas, especially where tritium is used or stored.

* This radiation protection program element will be addressed by other survey participants in the absence of a CECOM or an AMCCOM representative.

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CHAPTER 4. RADIATION SURVEY PROGRAMS

Routine survey programs are used to evaluate actual or potential radiation hazards at facilities where radiation sources are used. Surveying and monitoring are ways of maintaining radiation exposure to personnel and the environment at a level that is as low as is reasonably achievable (ALARA) within applicable dose-equivalent limits.

The terms "radiation survey" and "radiation monitoring," although frequently used interchangeably, are not synonymous. A radiation survey is an evaluation, under specific conditions, of the radiation hazard associated with the production, use, or storage of radioactive materials or other sources of radiation. Radiation surveys are conducted both in the working environment and in the environment surrounding a facility. Radiation monitoring, an activity frequently performed during a survey, is the measurement of radiation fields or radioactive contamination using fixed or portable instruments. Radioactive contamination can be defined as any radioactive material that has escaped from its intended location or container, or as the deposition of radioactive material in any place where it is not desired, and particularly in any place where its presence might be harmful. Radioactive contamination can be any combination of alpha-, beta-, gamma-, or neutron-emitting radionuclides. Radiation surveys and radiation monitoring are usually performed by the Radiation Protection Officer (RPO) or a member of the radiation protection staff.

Survey requirements and procedures for facilities where radiation sources or radioactive materials are produced, used, or stored are discussed in this chapter. Specific radiation monitoring procedures are also described, as are special requirements for facilities that house nonmedical x-ray units. The objectives and development of environmental survey programs are discussed briefly at the end of the chapter.

Section 4.1 SURVEY REQUIREMENTS

Radiation surveys are recommended or required for certain types of facilities and for specific areas within those facilities. The frequency of surveys varies depending on the facility, area, and other factors.

4.1.1 Facilities That Require a Survey Program

A routine survey program should be considered for any facility where the radiation level may be higher than the natural background level. A survey program is required for facilities that contain the following specific sources:

1. radioactive solids that exceed 1 μCi in activity, that have a specific radioactivity exceeding 0.002 μCi/g, or that emit radiation at a dose rate of 0.1 mrad/hr or more at contact
2. materials controlled by the Nuclear Regulatory Commission (NRC), in quantities that exceed those listed in Title 10 of the U.S. Code of Federal Regulations, Section 30.71, Schedule B (10 CFR 30.71)
3. machines that produce radiation, for example, x-ray devices, accelerators, and electron microscopes
4. radioactive gases or liquids in concentrations that exceed the values listed in 10 CFR 20, Appendix B, Table II
5. items activated in nuclear reactors, by accelerators, or by nuclear weapons.

4.1.2 Areas Within a Facility That Require a Survey Program

Facilities are generally divided into a series of sequential areas according to the radiation hazard in each area. The designations of these areas helps control personnel exposure to radiation. The areas used are: 1) radiation areas, 2) controlled areas, and 3) uncontrolled areas. Each of these areas should be surveyed by a member of the radiation protection staff. The areas are described briefly below and more fully in Chapter 8, "Selection of Radiation Facilities."

A. Radiation Areas. Radiation areas include three subclassifications: radiation areas, high-radiation areas, and airborne-radioactivity areas.

A radiation area is defined in 10 CFR 20 as any area accessible to personnel in which radiation levels could result in a major portion of the body receiving a dose in excess of 5 mrem in any 1 hour or 100 mrem in any 5 consecutive days. Practically, this would be any area in which the dose-equivalent rate is greater than 2 mrem/hr but less than 100 mrem/hr. A high-radiation area is any area accessible to personnel in which radiation levels could result in a major portion of the body receiving a dose in excess of 100 mrem in any 1 hour. An airborne-radioactivity area is any area, enclosure, or operating area in which airborne radioactivity exceeds the concentrations specified in 10 CFR 20, Appendix B, Table 1, Column 1 or in which the concentration of airborne radionuclides, averaged over the number of hours an individual works, will exceed 25% of the amounts specified in 10 CFR 20, Appendix B, Table 1, Column 1.

B. Controlled Areas. Controlled areas are areas controlled for the purpose of protecting personnel from exposure to radiation. Normally, they are areas adjacent to radiation areas. They are usually free of contamination, but they could become contaminated because of accidental spreads or releases from the radiation area or because radionuclides and contaminated equipment may be transported through them.

C. Uncontrolled Areas. Uncontrolled areas are areas where direct radiation exposure is not necessary or anticipated in the performance of a job. These areas include "cold" laboratories (those containing no activity), offices, lunchrooms, conference rooms, and reception areas. Access to these areas does not need to be restricted for radiological reasons.

4.1.3 Frequency of Surveys

Radiation areas, high-radiation areas, and airborne-radioactivity areas should be surveyed at least once each month. Permanent storage areas may be exempted from monthly surveys at the discretion of the Ionizing Radiation Control Committee (IRCC). However, the time between surveys of storage areas may not exceed 12 months. Controlled areas should be surveyed on a routine basis.

The frequency of surveys should increase if changes in conditions or procedures could increase the possibility of personnel exposure. Daily surveys

or continuous monitoring may be required if conditions are highly variable or unpredictable, if unsealed radioactive materials are being handled directly, if a radiation accident has occurred.

Surveys should be conducted before an operation involving radiation sources is begun and before changes in an existing operation are approved. A survey is also required at the termination of a project involving the use of radiation, to verify that no contamination exists and that radiation sources and radioactive materials have been properly stored or disposed of.

All sealed sources in quantities larger than the quantities listed in 10 CFR 30.71, Schedule B, must be leak tested at least every 6 months, unless specifically exempted by a DA authorization or an NRC license. Alpha sources in quantities larger than those listed must be tested every 3 months, unless otherwise exempted.

Section 4.2 ROUTINE SURVEY PROCEDURES

An effective routine survey program includes the following steps: 1) preparation, 2) inspection and measurement, 3) evaluation and recommendations, and 4) completion of records and reports. These steps are described in detail below. Special considerations for the survey of facilities containing nonmedical x-ray devices are considered in Section 4.4.4.

4.2.1 Preparation

It is essential that adequate preparation be made before any routine survey is conducted. The member of the radiation protection staff who is conducting the survey must be thoroughly familiar with the sources of radiation and the nature and purpose of the work performed in the facility. The steps for complete preparation are: 1) gathering information, 2) diagramming the installation, 3) preparing an inspection list, and 4) obtaining necessary equipment and material.

A. Gathering Information. Preparation for a survey should begin with the gathering of information about the radiation sources present, their intended use, and the physical safeguards and written procedural controls used to

minimize personnel exposure to radiation. This information can be obtained by talking to personnel and by examining plans, drawings, records, and written procedures. A file containing all information pertinent to a particular facility or work area should be maintained. Examples of the types of information to be obtained and filed are:

1. the types and numbers of sources used (e.g., sealed sources, unsealed sources, or radiation-generating devices)
2. the types and energies of radiation produced by the sources, together with any information about absorbers or moderators used to alter the initial energy spectra
3. the geometry, size, and position of radiation fields
4. the direction of beams produced by radiation-generating devices
5. the chemical composition and physical form of radioactive materials
6. the expected type(s) of radiation and/or contamination (e.g., alpha, beta, gamma, neutron)
7. the potential for release or dispersion of radioactive material
8. the procedures and the nature of the facilities used for the storage, handling, transportation, and disposal of radiation sources and radioactive material
9. the design and construction of devices for containing unsealed radioactive materials and sources (e.g., hoods or glove boxes)
10. the design of ventilation and exhaust systems
11. the design of interlock, alarm, and emergency shutdown systems
12. the nature of fixed monitoring equipment used in the facility
13. the locations inside and outside the facility that are occupied by personnel, and whether persons potentially exposed there are classified as occupationally or nonoccupationally exposed
14. protective barriers used for exposure control
15. standing operating procedures (SOPs)
16. previous survey records

17. emergency plans

18. the training and experience of personnel working with the radiation sources.

B. Diagramming the Facility. The second step in preparing for a survey is to make a diagram of the facility showing the location of radiation areas, controlled areas, and uncontrolled areas. The relative position of sources, work areas, waste storage areas, and disposal areas within radiation areas should also be shown. Such a diagram can be useful in identifying locations where radiation measurements should be made. The location of the following items should be included on the diagram when appropriate:

1. radiation sources, radiation-generating devices, and radioactive materials

2. the direction of beams produced by radiation-generating devices

3. radiation areas, controlled areas, and uncontrolled areas

4. protective barriers (e.g., ropes, shielding)

5. interlocks, alarms, emergency shutdown systems, and warning signs

6. equipment, such as hoods and glove boxes, used to contain unsealed radioactive sources and materials

7. waste storage and disposal areas

8. ventilation and exhaust systems

9. monitoring equipment.

C. Preparing an Inspection List. After reviewing all the information related to the facility, the radiation protection staff member conducting the survey should list all the items to be inspected during the survey. The inspection should include a review of the adequacy of procedural controls and physical safeguards used to control personnel exposure, and verification that all radiation protection procedures are being complied with. A review of the lists above can be useful in preparing the inspection list. Examples of items that could be included are:

1. the presence, location, use, and physical integrity of each radiation source

2. the means of identifying each radiation source (e.g., serial number, type, activity, size, room location)
3. the presence and adequacy of required protective barriers (e.g., ropes, shielding)
4. the possibility of inadvertent movement or removal of shields
5. the possibility of change in the orientation of beams produced by radiation-generating devices, or of any change in the position of sources
6. the availability, condition, and use of safety and special-handling equipment (e.g., portable shields, remote-control devices, hoods, protective clothing, showers)
7. the possibility of the introduction of radioactive materials into the facility's effluent stream because of improper air flow or water drainage
8. the adequacy of facilities and procedures for retaining and/or disposing of radioactive waste
9. the facility's design, including traffic flow, any restriction of access or exits, ventilation, the type of surface finish, the location and type of water outlets, and the accessibility of shutoff valves or switches for air conditioning, electricity, water, gas, etc.
10. the presence, correct functioning, and use of protective devices (e.g., interlocks, warnings devices, evacuation alarms, ventilation failure alarms, emergency shutoff switches)
11. the possibility of bypassing protective devices without adequate warning
12. the posting of radiation areas
13. the correct labeling of radioactive materials and radiation sources
14. the adequacy of and compliance with procedures for controlling personnel radiation exposure and for controlling the spread of contamination during the handling, storage, transportation, and disposal of radioactive sources

15. the availability, adequacy, and correct functioning, calibration, and use of survey and monitoring equipment

16. the adequacy of and compliance with routine survey and monitoring procedures

17. the existence, adequacy, and display of emergency plans and the familiarity of personnel with these plans

18. the status of personnel radiation protection training.

D. Obtaining Equipment and Material. After evaluating what type of radiation and/or contamination (alpha, beta, gamma, neutron) can be expected, the surveyor should decide what radiation detection and measurement equipment is needed. The information in Chapter 2 of this manual, "Radiation Instrumentation," is useful for this determination. Other miscellaneous equipment and materials may be needed, for example, clipboards, survey report forms, smears, protective clothing, shoe covers, and disposable plastic gloves.

4.2.2 Inspection and Measurement

When adequate preparation has been made, the inspection can be started and measurements made. The radiation protection staff member who is responsible for conducting the inspection and making radiation measurements should be aware of the controls needed to ensure that his/her own radiation exposure is kept ALARA. Personnel dosimeters, protective clothing, and respiratory equipment should be used when appropriate, and the surveyor should ensure that radiation generators, source-shielding mechanisms, or source-handling equipment cannot be operated except under his/her control during the survey.

A. Inspection. The inspection of a facility is conducted to: 1) provide firsthand knowledge of the installation, personnel, surroundings, radiation sources, and equipment; 2) assess where radiation measurements should be made; and 3) assess the presence and effectiveness of each physical safeguard and the extent of compliance with procedural controls used for radiation protection. The checklist prepared prior to the start of the survey should be useful in identifying the items to be inspected. The surveyor should be alert for any deviation from written plans and procedures.

B. Measurements. The places identified for measurements during the facility inspection should be monitored for contamination, and measurements of the radiation field produced by sources should then be made. Specific monitoring procedures are described later in this chapter.

4.2.3 Evaluation and Recommendations

When all inspections and measurements have been made, the results should be evaluated to determine the overall radiological status of the facility. The evaluation should include a determination of any significant levels of contamination and any significant dose rates produced by sources, and the identification of any deficiencies in the radiation protection program. Recommendations for corrective action should be made so that dose equivalents are kept ALARA. Such recommendations may include changes in:

1. operational factors (e.g., time spent by personnel in radiation areas, equipment use time, or methods of operation)
2. shielding (e.g., size, thickness, type of material, or location)
3. manipulative equipment, particularly relating to the equipment's speed of operation and the distance of personnel from sources
4. procedural controls, particularly those that eliminate unnecessary personnel exposure or contamination
5. personnel protection or warning devices
6. survey and monitoring procedures
7. personnel monitoring and survey equipment
8. plans of action for accidents or emergencies
9. personnel training.

A resurvey may be needed after corrective action is taken, to ensure that the changes made are effective.

4.2.4 Survey Records and Reports

Records of radiation surveys are needed for assessing the effectiveness of the radiation protection program. They may also be useful in interpreting the

results of personnel monitoring. Survey reports should contain the following information:

1. date and time of the survey
2. general location of the survey (building and room)
3. specific locations and objects where radiation measurements were made
4. purpose of the survey (e.g., leak test of sealed source; routine survey for contamination on floors and other surfaces; or survey to establish dose rates to personnel)
5. identification (type and serial number) of the radiation detection instruments used to perform the survey
6. measurement results and conditions observed (e.g., dose rates and contamination levels)
7. conclusions and recommendations
8. identification of the individual performing the survey.

A facility diagram may be attached directly to the report and used to note the dose rates and contamination levels observed during the survey.

More information on records of surveying and monitoring activities can be found in Chapter 13, "Recordkeeping." The degree of detail included in survey records must be sufficient to make them meaningful after the passage of several years. Records should be kept for at least 5 years.

Section 4.3 SPECIFIC MONITORING PROCEDURES

Procedures for measuring radiation fields and contamination, for leak testing sealed sources, and for personnel monitoring, air monitoring, and tritium monitoring are described below. Information on the instrumentation for these procedures is given in Chapter 2, "Radiation Instrumentation."

4.3.1 Measurements of Radiation Fields

Measurements of radiation fields--the areas around sources that receive radiation from the sources--are made to provide a basis for estimating personnel exposure and for determining the effectiveness of procedures used for radiation protection. The number of measurements to be made depends on how much people move about within a given field and how much the field varies in space and time. If the radiation field is fixed, as in many x-ray installations, few measurements are required. However, if the radiation pattern is variable, such as during the removal of a source from a shielded container, more measurements are required. In the extreme case, it may be necessary to continuously monitor work in progress. The intensity of the radiation should be measured using dose rate instruments in locations occupied by personnel. The measurements should be recorded on a data sheet or on a floor plan corresponding to the area monitored and should be compared with specified limits.

Procedures for calculating external exposure are discussed in Chapter 6. It may be useful, when planning the control of an individual's occupational exposure, to compare short-term measurements in a radiation field with estimates of the dose equivalent that would be received by an individual who worked in that field for extended periods of time. For example, if the maximum dose-equivalent rate for a particular radiation field is 10 mrem/hr, and if an individual worked in that field for 5 hours each week, the expected dose-equivalent rate would be: 10 mrem/hr x 5 hr/wk = 50 mrem/wk. The results of this type of conversion can be compared directly with applicable administrative or regulatory limits.

4.3.2 Measurements of Contamination

Familiarity with the work performed in a radiation area is essential for determining what type of surface contamination is most likely to be present, where it is likely to be, and whether it is likely to be fixed or removable. Fixed, or nonremovable, contamination contributes to external exposure. Removable contamination can enter the body and contribute to internal exposure.

Because removable contamination can be spread and presents an internal hazard, the member of the radiation protection staff who is measuring the contamination must be careful to avoid both exposure to himself and the spread

of contamination. The surveyor should wear adequate protective clothing during the survey, taking care to avoid contamination of hands, clothing, and radiation detection instruments. When only gamma radiation is present, the detection instrument can be entirely covered by a thin plastic material for contamination control. The sensitive areas of the detector must not be covered when alpha radiation is present. Shoe covers, gloves, instruments, and other equipment used during an extensive survey should be monitored periodically during the survey. As soon as the entire survey has been completed, protective clothing should be removed and surveyed for contamination, together with the instruments and equipment used.

Direct measurements using portable instruments can be used to determine the total amount of fixed and removable contamination present. An indirect measurement technique is used to detect removable contamination. These two techniques are described below.

A. Direct Measurements. Any area within a facility where there may be contamination should be systematically monitored with a sensitive detection instrument. During the measurement, the probe should be held close to (within 0.6 cm of) the surface. To prevent instrument contamination and damage, the probe must not contact the surface. The probe should be moved slowly over the surface to allow the instrument time to respond. Instrument readings should be recorded on a data sheet or on a floor plan of the area being monitored.

B. Indirect Measurements. A smear taken from a surface that may be contaminated can be used to monitor for removable contamination. A smear test is considered an indirect measurement of contamination.

To perform a smear test, a floor plan of the facility to be monitored is needed, as well as small pieces of paper, such as filter paper discs, to be used as smears. A smear is taken by wiping a 100-cm^2 portion of the surface to be monitored. The items or areas from which smears are taken are identified on the floor plan. The smear should be removed from the facility being monitored and counted according to specified laboratory procedures.

Care should be taken to avoid touching either the surface being monitored or the contaminated side of the smear, and to keep the probe from touching the smear. Cross-contamination of the smears can be avoided by placing each smear

in an individual envelope immediately after the smear is taken. Smears should be treated as radiation sources and handled according to radiological safety procedures.

C. Action Levels and Reporting. The results of monitoring for both fixed and removable contamination should be compared with the contamination limits given in Appendix A. The actions to be taken if the levels found exceed the limits are also identified in the table.

4.3.3 Leak Testing Sealed Sources

The instruments and supplies needed for leak testing sealed sources are 1) a remote-handling tool, 2) sheets of paper with impermeable backing (or sheets of ordinary paper and sheets of polyethylene film), 3) discs of filter paper that have a high wet strength (for making smears), 4) envelopes, 5) rods of wood, plexiglass, aluminum, or some other material, 6) adhesive tape, and 7) a radiation detection instrument.

Before a leak test is begun, a data sheet should be started that includes a description of the source, the type of leak test to be performed, the date of the leak test, and the name of the person performing the test. Space should be left on the data sheet so that the results of the leak test in μCi and any action taken as a result of the test can be recorded later.

Leak testing should be planned so that the surveyor's exposure is kept to a mimimum. The dose rates at given distances from the source should be calculated so that shielding needs, the length of the remote-handling tool needed, and the time allowable near the source can be determined. A rule of thumb is to plan an operation so that the person performing a test or a series of tests does not receive a whole-body dose in excess of 5 mrem. "Dry runs" can be performed if desired.

It is always a safe procedure to assume that a source is leaking and to assess the physical provisions and operations that would be needed to deal with a contamination incident. Knowing the construction of the source is important so that leak testing does not damage the source. Protective rubber gloves should be worn during the test.

A. Direct Leak Testing. This method is applicable to sealed sources that are not in a container, or that are in a container but are not fastened in it, and that can be handled safely with available equipment and facilities. The total whole-body dose received during the test should not exceed 5 mrem. This procedure must be performed in a hood or glove box rather than on an open bench top to prevent possible contamination of the work area.

A sheet of impermeable paper (or paper backed with a polyethylene sheet) should be placed on the working surface and taped down if necessary, to prevent contamination of the working surface if the source is leaking. A clean filter paper disc should be marked to indicate the particular source being leak tested. If the source contains water-soluble radioactive material, the filter paper smear should be dampened with distilled water.

When a contained source has been removed from its shielded container, using the appropriate remote-handling tool and observing applicable radiological safety procedures, all of its surfaces should be carefully wiped. The source should then immediately be replaced in its container. Dry smears (or wet smears that have been allowed to dry) should be checked with an instrument that monitors low levels of alpha or beta-gamma radiation, as appropriate. Readings should be taken with the open window of the probe near the smear but not touching it. If contamination is detected, the source is likely to be leaking, and precautionary measures should be taken to avoid unnecessary exposure of personnel until the situation has been fully evaluated. The smear should be counted according to specified laboratory procedures in order to obtain quantitative results.

B. Indirect Leak Testing (Container Interior). This method is applicable to sealed sources that are not in a container, or that are in a container but are not fastened in it, and that have activity levels that prevent safe direct leak testing with existing equipment and facilities. The test or series of tests should be planned so that the radiation protection staff member performing it does not receive a whole-body dose in excess of 5 mrem.

For this test, a contained source is removed from its normal shielded container and transferred to an alternate shielded container or temporary shielding set up specifically for this purpose. An appropriate monitoring

instrument should be used to ensure that the source in the temporary housing is adequately shielded. In addition, instruments for monitoring low-range beta-gamma or alpha radiation should be used to monitor accessible surfaces of the empty container. Any positive readings should be recorded, and if contamination is detected, further precautionary measures should be taken before the leak test is continued.

For this test, smears of the inside surfaces of the empty source container are taken, particularly of areas normally in direct contact with the source. The smearing device should consist of a rod (of wood, plexiglass, aluminum, or other material) long enough to reach the area to be wiped, with a filter paper smear attached to one end. If the source contains water-soluble radioactive material, the filter paper should be moistened with distilled water. The wet or dry smear should be rubbed on the inside surfaces of the empty container, especially on the surfaces that most closely contact the source. Dry smears, or dried wet smears, should be checked with a low-range beta-gamma or alpha-monitoring instrument, the readings taken with the open window of the probe near the smear. If contamination is detected, steps should be taken to prevent unnecessary exposure of personnel until the situation has been fully evaluated. The smear should be counted according to specified laboratory techniques in order to obtain quantitative measurements.

C. Indirect Leak Testing (Container Exterior). This method is applicable to sealed sources that are fastened in a container. It is also applicable to other sealed sources that cannot be leak tested safely with existing facilities and equipment.

The portions of the shielded container or device where contamination would be expected to appear if the sealed source were leaking should be smeared using the rod-and-smear device described above. All applicable radiological safety procedures should be observed, and the smear should be counted in the same manner as used for the interior indirect leak test.

4.3.4 Personnel Monitoring

Personnel are monitored to determine whether contamination is present on them and to measure internal and external exposure. Personnel monitoring

serves two purposes: 1) to assure that all exposures are maintained ALARA, and 2) to identify any unsuspected source of exposure so that prompt corrective action can be taken.

A. Contamination. Personnel must be monitored for contamination before leaving any area in which radioactive materials or sources are used or stored. If an individual is contaminated, follow-up surveys must be made to determine the source of contamination and to detect any contamination that may have been spread by the individual. Prompt corrective action must be taken to eliminate the source of contamination.

A sensitive detection instrument should be used to monitor personnel. Skin and clothing should be carefully monitored, with an emphasis on the head, hands, and feet. Any point that shows visible signs of contact, such as dirt, grease, or liquid stains, should be monitored. In addition, any surface known to have come in contact with equipment or contaminated surfaces should be monitored.

The probe of the instrument should be held close to the individual's skin or clothing but must not be allowed to contact it. The probe should be moved slowly to allow time for the instrument to respond.

B. Internal Exposure. The principal objective of internal personnel monitoring is to determine whether radionuclides have entered the body. The routine determination of internal contamination is necessary only in facilities where unsealed radioactive materials may become airborne. Internal personnel monitoring should also be considered whenever a routine survey indicates significant levels of contamination.

Internal dose is determined using two indirect methods: 1) radiochemical analysis, which is the measurement of radioactivity in urine, feces, blood, secretions, and body tissues; and 2) in-vivo (or whole-body) counting, which is the measurement of radiation emitted from the body, using an external detector. These procedures are highly specialized. More information on their use and on the control of internal exposures is provided in Chapter 5, "Internal Exposure."

C. External Exposure. The external whole-body dose to an individual is estimated using personnel dosimeters. A personnel dosimeter should be worn by each individual who is occupationally exposed to sources of ionizing radiation. Dosimeters must be worn in radiation areas and should be worn by anyone who periodically enters a controlled area and is likely to receive more than 5% of the quarterly dose-equivalent limit listed in Table 3.2 (Chapter 3). An individual under the age of 18 who enters a controlled area and is likely to receive more than 5% of the quarterly dose-equivalent limit for minors should also use a personnel dosimeter. The dosimeters designated by the DA and other methods of controlling external exposures are described in Chapter 6, "External Exposure."

4.3.5 Air Monitoring

The purpose of air monitoring is to determine the cleanliness of the air in the work area. The need for stringent controls on airborne radioactivity should be stressed in SOPs. High concentrations of airborne radioactive contamination can lead to contamination of surfaces in a facility or the environment, and can result in internal exposure to personnel.

Inhalation is the principal means by which radioactive materials can enter the body. The amount of material deposited in the body depends largely upon the concentration in the air inhaled, the particle size of the contaminant, and the length of time the individual is exposed. Control levels for various isotopes are given in 10 CFR 20, Appendix B, Table I. To determine whether control levels are being met, routine air samples are collected and evaluated.

Criteria for the development of an air monitoring program are given in Chapter 5. Several useful references are included in the bibliography. Equipment used to monitor air is discussed in Chapter 2, "Radiation Instrumentation."

4.3.6 Tritium Monitoring

Tritium is a radioisotope of hydrogen that decays to helium by the emission of a beta particle with a maximum energy of 18 keV and an average energy of 5.7 keV. The weak beta particle has a maximum range of 6 μm in water or

0.5 cm in air. When released to the environment, tritium can enter biological materials by several routes. It can be taken into the body in water, in foods, or as tritium or tritium oxide in inhaled air. In both gaseous and liquid forms, tritium can readily penetrate directly through human skin surfaces. Tritium's ability to be readily incorporated into biological systems makes it of concern from the standpoint of internal exposure.

The low energy of the beta particle emitted by tritium creates a special monitoring problem. Portable detection instruments cannot be used because the distance between the tritium source and the detector is usually greater than the particle's range, and even in detectors with a window, the window may be too thick to be penetrated by the beta particle. Windowless gas-flow proportional counters and liquid scintillation counters are therefore used to assay, or test, for tritium. In the special case of tritium gas, ionization chambers may be used. These instruments are described in Chapter 2, and their application for monitoring tritium levels in water, in urine, on surfaces, and in air is reviewed briefly below. Additional references specific to tritium measurements are provided in the bibliography at the end of the manual.

A. Water. The maximum permissible concentration (MPC) of tritium in drinking water is 3×10^{-9} µCi/ml (10 CFR 20, Appendix B). This MPC corresponds to 110 disintegrations per second in each ml of water (dps/ml). Liquid scintillation counting is the method of choice for measuring tritium in water.

B. Urine. A radioassay for tritium in urine should be performed every 2 weeks for all personnel who routinely work with tritium, and immediately following any unusual occurrence involving the spread of tritium contamination. If tritium is found in urine, additional urine samples should be obtained daily to determine the biological half-life of the tritium deposited in the body. Biological half-lives between 7 and 12 days are commonly observed.

Several hours are needed before tritiated water becomes equally distributed throughout the body. Consequently, urine samples should not be taken immediately after a potential tritium inhalation. Generally, 2 to 4 hours should elapse between the time of the exposure and the time of sample collection. When a urine sample is collected, personnel should remove all protective

clothing and wash their hands to avoid contaminating the sample. The urine sample should be placed in an air-tight container and refrigerated. Liquid scintillation counting is used for the radioassay of tritium in urine.

C. Surfaces. Because the energy of the beta particle emitted by tritium is too low to allow the particle to enter portable detectors, a smear test should be used to monitor for surface contamination. The procedure is similar to that described in Section 4.3.2 except that the smear should be lightly coated with glycerin or moistened with water to increase its efficiency in collecting contamination. Smears should be placed into vials immediately after each sample is taken. The sample can be counted using liquid scintillation.

D. Air. In air, tritium occurs primarily as water vapor or hydrogen gas. Flow-through ionization chambers and proportional counters can be used to monitor air for tritium. Ionization chambers cannot distinguish tritium from some other types of radioactive particles and are sensitive to interference from cigarette smoke, aerosols, and external gamma fields. Gas-flow proportional counters can partially discriminate against other radionuclides and are less sensitive to aerosols. The sensitivity of ion chambers is similar to that of gas-flow proportional counters (in the pCi/cm^3 range). To detect tritium levels much below about 1 pCi/cm^3 in air, it is necessary to remove tritiated water vapor from the air using silica gels and bubblers. Information on this procedure is given in Report No. 47 of the National Council on Radiation Protection and Measurements (NCRP 1976). Liquid scintillation counting can be used to assay the water vapor samples.

Section 4.4 NONMEDICAL X-RAY INSTALLATIONS[a]

X-ray equipment poses a potential hazard, both for those who operate it and for those who may be in the vicinity, because of the extremely high dose rates generated by the devices at the flip of a switch. Extensive engineered safeguards and administrative controls are used to minimize normal operating

(a) For this section of the manual, an installation is defined as the space occupied by a radiation-generating source with its associated equipment.

exposures and prevent accidental exposures. Radiation protection is accomplished through the combined efforts of the manufacturers of the devices, the designers and builders of the installations where the devices are used, the operators of the equipment, and radiation protection personnel.

Requirements for the design and operation of x-ray installations are discussed in two reports of the American National Standards Institute, ANSI N543-1974 and ANSI N537-1976. Installations, including necessary shielding, should be designed by a qualified expert and should meet applicable regulations of federal, state, and local agencies.

This section describes the classification of nonmedical x-ray installations, the engineered and administrative safeguards used in them to minimize exposures, and procedures for surveying them. A discussion of surveys for medical x-ray installations is beyond the scope of this manual; information on this topic can be found in NCRP Report No. 33 (1968).

4.4.1 Classification of Nonmedical X-Ray Installations

Installations are divided into four classes, which are described briefly below and in greater detail in ANSI 543-1974. A separate classification for x-ray diffraction and fluorescence analysis equipment is described in ANSI N43.2-1977.

A. Protective Installation. An x-ray unit within a permanent, shielded enclosure is considered a protective installation if the exposure rate at any accessible surface of the enclosure is less than 0.5 mR/hr during operation of the device. Personnel may not remain inside the enclosure during irradiation.

B. Enclosed Installation. An enclosed installation is similar to a protective installation in that the x-ray unit is within a permanent, shielded enclosure. However, a higher exposure level is allowed for this class of installation. The exposure rate at any accessible, occupied area 30 cm from the outside surface of the enclosure must not exceed 10 mR/hr and the exposure rate at any accessible but normally unoccupied area may not exceed 100 mR/hr. During operation of the device, personnel may not remain inside the enclosure.

C. Unattended Installation. An x-ray unit in a shielded enclosure that is small enough to prohibit personnel occupancy is considered an unattended

installation if the exposure rate 30 cm from the outside surface of the device does not exceed 2 mR/hr during operation of the unit. The shielded enclosure may not be used for any purpose other than to enclose the x-ray unit.

D. Open Installation. An x-ray unit that is not in a shielded enclosure and that is located in an area that may potentially be occupied by personnel during operation of the device is considered an open installation.

4.4.2 Engineered Safeguards

Engineered safeguards are safety systems such as warning devices, shields, and interlocks that are built into either the x-ray installation or the x-ray device itself. They should be designed by a qualified expert in accordance with the requirements of the installation class. The fail-safe principle is used whenever possible in the design and construction of safety systems. A fail-safe system is a system in which any malfunction, including malfunction of the safety system, causes the device to stop functioning or to fail in a manner that does not expose personnel to radiation.

Examples of the engineered safeguards required for each installation class are described below. Greater detail can be found in ANSI N543-1974. Engineered safeguards for x-ray diffraction and fluorescence analysis equipment are described in ANSI N43.2-1977.

A. Protective Installation.

1. Each machine must be totally enclosed within physical barriers that have sufficient shielding to reduce exposure rates during operation to less than 0.5 mR/hr at all points accessible to personnel.
2. All entrances to the installation must have a fail-safe interlock system that prevents inadvertent entry during machine operation.
3. The enclosure must be equipped for emergency exit when the doors are locked from the outside. A least one clearly marked scram button (emergency power-cutoff switch) must be located conspicuously in the exposure room. Enough switches must be installed to allow a person to reach a switch within 5 sec after a warning alarm is activated. The purpose of the scram button must be clearly marked.

4. Fail-safe visible and audible warning signals within the enclosure must be actuated at least 20 sec before irradiation begins. The visible signal must stay on during the entire operation of the equipment. Specifications for audible signals are provided in ANSI N2.3-1967.

5. A steady red light activated by the control circuit must be located outside the entrance to each enclosure. A warning sign showing the radiation symbol and the words "Caution: Entering Radiation Exposure Room" must also be posted.

B. Enclosed Installation. The engineered safeguards for protective installations also apply to enclosed installations with the exception of item 1 pertaining to exposure rates. For enclosed installations, each machine must be totally enclosed within physical barriers that have sufficient shielding to reduce operational exposure rates at all accessible and occupied points to less than 10 mR/hr and at all accessible but normally unoccupied points to less than 100 mR/hr. The following additional safeguards are also necessary:

1. All accessible areas in which the exposure rate exceeds 5 mR/hr must be posted with a sign showing the radiation symbol and the words "Caution: Radiation Area."

2. All entrances to the installation must have a sign posted showing the radiation symbol and the words "Caution: Entering Radiation Area."

C. Unattended Installation.

1. The exposure rate at any accessible area 30 cm from the outside surface of the shielded device may not exceed 2 mR/hr during operation. Service doors to areas with exposure levels higher than 2 mR/hr must be locked.

2. The device must be posted with a sign showing the radiation symbol and the words "Caution: X-Rays."

3. A steady red light that is activated by the control circuit must be installed near the head and beam port(s) of each device.

4. All beam ports that are not in use must be secured in a closed position in a manner that prevents their casual opening.

5. The shielding must be secured in a manner that prevents its casual removal or the exposure of personnel.

D. Open Installation.

1. A steady red light that is activated by the control circuit must be mounted on or near the source of radiation.

2. Steady or flashing red lights activated when the device is operating must be located at the radiation area boundary in sufficient numbers to ensure that at least one is visible from each avenue of approach.

3. The perimeter of any area where the radiation level exceeds 5 mR/hr must be posted with a sign displaying the radiation symbol and the words "Caution: Radiation Area."

4. The radiation source and all exposed objects must be within a conspicuously posted perimeter that limits access to areas where the exposure rate is greater than 100 mR/hr. A sign displaying the radiation symbol and the words "Danger: High-Radiation Area" must be posted at the perimeter of this area. During periods of unattended irradiation, this area must be locked to prevent access.

4.4.3 Administrative Controls

Administrative controls are procedures used to minimize the radiation exposure of operating personnel. These procedures require the cooperation of radiation protection and operations personnel. Enclosed, unattended, and open installations require more extensive administrative controls than protective installations because of their higher potential exposure rate.

A. Training. All individuals who use x-ray equipment must be trained to operate it safely. Information on the content of a training program can be found in NCRP Report No. 61 (1978).

B. Standing Operating Procedures. An SOP should be prepared for each x-ray device. The SOP should be posted where it is easy to see, on or next to the console for the device, and should contain the following information:

1. the class of the installation
2. survey and monitoring requirements
3. a list of all required administrative and engineered safeguards
4. operating procedures
5. emergency procedures
6. a list of trained operators
7. the name of the individual responsible for the device.

C. Operation and Maintenance Logs. The individual responsible for an x-ray device should keep two log books: an operations log and a maintenance log. The operations log should contain a complete description of all work performed with the device. The maintenance log should contain a description of all maintenance work. All log entries should be signed and dated.

D. Radiation Area Requirements. X-ray units must be operated only within a radiation area. When a qualified operator is not present, the area must be locked or else the device must be locked prevent its unauthorized operation. Before using the device, the operator must make sure that only required personnel are present within the area and that any exposure of personnel within the area will be minimal.

4.4.4 Surveys of Nonmedical X-Ray Installations

Surveys of nonmedical x-ray installations should include both physical inspection of the facility and measurement of radiation levels. Each installation should be inspected to verify the current and expected occupancy of all areas surrounding the installation. Devices that affect radiation protection (e.g., audible and visible warning signals, shielding, interlocks, and devices that restrict the positioning of radiation sources) should be inspected to determine whether they are operating properly. Administrative controls for each class of installation should be reviewed.

A. Frequency. All new installations must be surveyed before routine operation is begun. Existing facilities should be surveyed every 6 months or whenever changes in the installation could affect radiation protection procedures.

B. Procedure. The RPO should maintain a list of all engineered and administrative safeguards necessary for the safe operation of each nonmedical x-ray installation. Before beginning a survey of an installation, the RPO or a member of the radiation protection staff should review this list and the general procedures outlined in Section 4.2. The following items should be included on the check list for the inspection:

1. Check for a posted, up-to-date SOP. All operators' names must be listed on the SOP.
2. Check for modifications to the device that may affect any safety system (e.g., shielding, interlocks).
3. With the device operating at full power, check for measurable beams of radiation at all appropriate locations. Measurements should be taken at all points accessible to personnel and in other normally occupied spaces, such as offices not related to machine operation. A strong effort must be made to maintain exposure rates ALARA even if they fall within stated guidelines. Thus, it is important to determine and document any exposure rate that could be reduced by administrative or engineered safeguards.
4. Test all engineered safeguards listed on the SOP, including interlocks, warning lights, alarms, and scram buttons.
5. Verify that the device is operated within a radiation area that is adequately posted.
6. Determine that all operators are trained.

C. Radiation Survey Report. A report of a radiation survey of an installation should include:

1. who conducted the survey and the date of the survey
2. the device and installation being surveyed, identified by suitable means (e.g., serial number, room number, and building number or name)
3. the survey instrument used and the date of its last calibration
4. the potential and current at which an x-ray tube was operated during the survey, and any measured x-ray beams

5. the classification of the installation

6. the location of the x-ray source and the orientation of the x-ray beam in relation to each exposure measurement (a diagram may be useful)

7. a description of all engineered and administrative safeguards along with a verification that they were tested or inspected

8. all deficiencies found during the survey and the corrective action to be taken.

Section 4.5 ENVIRONMENTAL SURVEY PROGRAMS

An environmental survey is a systematic investigation and measurement of radiation levels and radioactive contamination levels in the environment surrounding a facility. The objectives of an environmental survey program include:

1. assessment of the natural radiation and radioactivity levels in the environment before operations begin

2. assessment of the actual or potential exposure of man from the additional radioactive materials or radiation contributed to the environment by the facility, or estimation of the probable upper limits of such exposure

3. determination of the fate of contaminants released to the environment

4. detection of sudden changes and evaluation of long-term trends, which can indicate failure or lack of adequate control in the operation of the facility

5. demonstration of compliance with applicable regulations and legal requirements concerning releases to the environment.

The extent of an environmental survey program depends on several factors, including the nature of the facility, the type and quantity of radionuclides handled, and the potential for the release of radioactivity to the environment.

Environmental surveys should be conducted prior to the initiation of radiological operations at a facility and at least once a year thereafter. More frequent surveys may be needed depending on the scope and nature of the facility's activities. The results of an environmental survey should be used to determine any need to modify controls or operations.

The development of a survey program should include the following general steps:

1. Evaluate the facility as a source of direct radiation and radionuclides, especially the composition, concentrations, release rates, points of release, and physical and chemical forms of the nuclides.
2. Identify the pathways leading to exposure to man, using analytical models, the experience gained at other sites, and preoperational data on local meteorology, hydrology, and population distribution and diet.
3. Select the pathways (e.g., water, food, air) that may be most critical in terms of their contributions to exposure, and determine the critical population groups.
4. Determine the measurements required to provide data for dose assessment for normal and abnormal conditions.
5. Allow for flexibility in the program design. As operational experience is accumulated, other types of measurements or measurement frequencies may be desirable.

Details on establishing and carrying out environmental survey programs can be found in the bibliography.

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APPENDIX A

MAXIMUM PERMISSIBLE CONTAMINATION LEVELS FOR INANIMATE OBJECTS[a]

Contaminated Item	Corrective Action	Maximum Alpha		Maximum Beta	
		Fixed[b] (dpm/100 cm^2)	Removable[c] (dpm/100 cm^2)	Fixed[b] (mrad/hr at 2.5 cm)	Removable[c] (dpm/100 cm^2)
1) Personal clothing, including shoes	Replace, decontaminate, or store until radioactive contamination has decayed if above:	200	None	0.05	None
2) Protective clothing					
a. General	Replace, decontaminate, or store until radioactive contamination has decayed if above:	1000	200	0.02	1000
b. Respirators	Replace, decontaminate, or store until radioactive contamination has decayed if above:	200	None	0.6	None
c. Laundry	Release only to licensed launderer if contaminated	-	-	-	-
3) Work areas and equipment[d]					
a. Uncontrolled	Control and post, then decontaminate if above:	200	30	0.05	100
b. Controlled	Decontaminate (or if				
(1) Areas	decontamination is	1000	200	0.2	400
(2) Hoods	impossible, fix and	1000	200	2.0	2000
(3) Glove boxes	then check fixation	5000	1000	2.5	5000
(4) Workbench surfaces	periodically) if above:	1000	200	0.5	400
(5) Other equipment		1000	200	2.0	2000
4) Tools, equipment, containers	Prior to nonradioactive use, decontaminate if above:	200	50	0.25	100
5) Vehicles					
a. Used in controlled areas	Decontaminate (or if decontamination is impossible, fix and then check fixation periodically) if above:	1000	300	0.4	500
b. Used in uncontrolled areas	Decontaminate if above:	500	30	0.25	100

(a) Reference: AMC 385-25 and AR 385-11. (Note: These limits may be changed to reflect those found in ANSI 13.12.)
(b) Measured with a calibrated radiation measurement instrument.
(c) Determined using smears analyzed with a calibrated counting system.
(d) For natural and depleted uranium and for ^{238}U, levels for alpha contamination should be increased by a factor of 5, in accordance with NRC guidelines. If ^{226}Ra is a contaminant, levels for alpha contamination should be reduced by a factor of 2.

SENECA ARMY DEPOT

APPLICATION FOR MATERIAL LICENSE

SUPPLEMENT 11

Waste Management.

Radioactive waste may be generated from the demilitarization process. Demilitarization will consist of removing the DU projectile assembly from the aluminum cartidge case. The DU penetrator will remain encapsulated in the aluminum windscreen and aluminum body. The DU projectile assembly will be disposed of, either by transfer to an NRC Licensee or to an authorized burial site. This will be accomplished in accordance with current NRC and DOT regulations. At the present time, the U.S. Army Armament, Munitions and Chemical Command is the focal point and issues instructions to all Army users on proper packaging and marking of shipments of radioactive wastes. This headquarters also conducts on-site audits of prospective radioactive waste shipments. The shipments are audited for full compliance with DOT, NRC and burial site criteria.