

Rec 2/5/80 40-8598



DEPARTMENT OF THE ARMY
HEADQUARTERS US ARMY MATERIEL DEVELOPMENT AND READINESS COMMAND
5001 EISENHOWER AVE., ALEXANDRIA, VA. 22333

URGENT

DRCSF-P/80-0011

5 February 1980

Director
Nuclear Material Safety and Safeguards
ATTN: Radiosotopes Licensing Branch
US Nuclear Regulatory Commission
Washington, DC 20555

Gentlemen:

1. Forwarded is an application from US Army Communications and Electronics Materiel Readiness Command which requires priority processing as discussed with Mr. Miller of your office. The request is to amend Source Material License number SMB-1300 to add the components listed in attached table 1 to those already authorized under SMB-1300.
2. As these systems are critical components of XM-1 tank which must be deployed 28 February 1980, request License authority be granted prior to 21 February 1980
3. Please acknowledge receipt on attached DA Form 209.

Sincerely,

DARWIN TARAS
Chief, Health Physics
Safety Office

2 Incl
as

CF:
HQDA (DASG-PSP-E) WASH DC 20310
DIR, DARGOM, FSA, Charlestown IN 47111

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INSPECTION AND ENFORCEMENT

E/7

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40-8598



DEPARTMENT OF THE ARMY
HEADQUARTERS US ARMY COMMUNICATIONS AND ELECTRONICS
MATERIEL READINESS COMMAND AND FORT MONMOUTH
FORT MONMOUTH, NEW JERSEY 07703

REPLY TO
ATTENTION OF:

DRSEL-SF-H

4 FEB 1980

SUBJECT: US Nuclear Regulatory Commission (NRC) Source Material License
Number SMB-1300

THRU: Commander
US Army Materiel Development and
Readiness Command
ATTN: DRCSF-P
5001 Eisenhower Avenue
Alexandria, Virginia 22333

TO: Director
Nuclear Material Safety and Safeguards
ATTN: Radioisotopes Licensing Branch
US Nuclear Regulatory Commission
Washington, DC 20555

1. Reference is made to the following:

- a. Letter, DRSEL-SF-H, dated 1 March 1978, subject: Memorandum of Understanding (MOU) Manportable Common Thermal Night Sight (MCTNS).
- b. Message, DRCDMR, DTG 111600Z Sep 78, subject: Materiel Readiness Command Fire Control System Responsibilities.
- c. Message, DRCPM-GCM-SW, DTG 282000Z Jan 80, subject: NRC License - XMI Tank System.
- d. Letter, DRSEL-SF-H, dated 11 April 1977, subject: Additional Supporting Information Pertaining to the Nuclear Regulatory Commission Source Material License Application.

2. The US Army Communications and Electronics Materiel Readiness Command (CERCOM) hereby requests an amendment to subject NRC license for the possession and use of ²³²Thorium Floride in multi-layer anti-reflective

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DRSEL-SF-H

SUBJECT: US Nuclear Regulatory Commission (NRC) Source Material License
Number SMB-1300

lens coatings on thermal imaging lenses of the Forward Looking Infra Red (FLIR) imaging systems. The purpose of the amendment is to increase the types of FLIR imaging systems and subsystems presently authorized under this license. The maximum quantity of ²³²Thorium currently possessed under this license will continue to be 1.85 grams per optical system and a total of 80 pounds at any one time.

3. Reference 1a is a memorandum of understanding between this command and Commander, US Army Missile Command (MICOM) stipulating responsibilities as it relates to the AN/TAS-5 FLIR imaging system. In essence, it designates this command as NRC license manager as required by paragraph 1-4(i) of AR 700-64 for FLIR imaging systems which includes all radiation protection management responsibilities. Further, it stipulates MICOM's responsibilities for compliance to subject license. It is to be noted that it is Department of the Army philosophy for one US Army Materiel Development and Readiness Command (DARCOM) Major Subordinate Command (MSC) to obtain the NRC license for the possession and use of a single commodity containing radioactive material by the Department of Army installations and activities worldwide.

4. Reference 1b stipulates responsibilities to DARCOM MSCs as it relates to the management fire control systems. In essence, it states that in the case of fire control systems, the primary armament subsystem manager will have the fire control responsibility for the weapon system. He, in turn, will be supported by the secondary armament materiel readiness manager and any other materiel readiness managers as required. This means that the weapon system manager will maintain full responsibility for its fire control system and ancillary subsystems.

5. Reference 1c requested this command to incorporate the XMI FLIR imaging system under subject license.

6. This command is designated Primary Inventory Control Activity (PICA) and Secondary Inventory Control Activity (SICA) for Federal Supply Classification (FSC) 5855 commodities which includes all Night Vision equipment. As indicated in paragraph 4 above, the primary armament subsystem manager maintains full responsibility for the fire control system and ancillary subsystems. For FSC 5855 thermal imaging systems authorized under subject license used as ancillary subsystems to fire control systems managed by other commands, CERCOM only maintains SICA responsibilities whereas these managers maintain PICA responsibilities. Table I contains a listing by Radioactive Item, National Stock Number (NSN), Maximum Activity in nano-curries, PICA, End Article Application (EAA), EAA NSN, and EAA PICA, for all

DRSEL-SF-H

SUBJECT: US Nuclear Regulatory Commission (NRC) Source Material License
Number SMB-1300

equipment to be authorized under subject license. This serves as an explanation as to which command is designated the management responsibility for the various thermal imaging subsystems and complete systems.

7. The program for control of the FLIR imaging systems is similar to the radiation protection program originally stipulated in reference 1d and included in subject license. Further, all technical manuals (TM) associated with these equipment will contain radiation warning statements and appropriate warning statements with relation to cleaning and troubleshooting instructions. The following warning instructions appear in both operator's manuals, the Direct Support and General Support Maintenance Manuals and in Depot Maintenance Work Requirements manuals for all thermal imaging devices. These instructions will also appear in all future manuals.

WARNING

RADIATION HAZARD

The anti-reflective coating on all infrared optics contain thorium fluoride which is slightly radioactive. The only potential hazard involves ingestion (swallowing or inhaling) of this coating material. Dispose of broken lenses, etc., in accordance with AR 755-15.

8. The program for control of thermal imaging devices as it relates to this command and the weapon system managers, i.e., MICOM and the US Army Armament Materiel Readiness Command (ARRCOM) in addition to reference 1d is as follows:

A. CERCOM will:

1. Perform all duties as indicated in reference 1d.
2. Maintain required NRC license.
3. Review proposed design and literature changes that may effect the NRC license.
4. Coordinate with MICOM and ARRCOM at the time of renewals/ amendments of NRC license.
5. Assure that all radioactive components are coded on the Army Master Data File (AMDF) with a Special Control Item Code (SCIC) of 8 meaning Radioactive Item.

DRSEL-SF-H

SUBJECT: US Nuclear Regulatory Commission (NRC) Source Material License
Number SMB-1300

B. MICOM and ARRCOM will:

1. Insure that the thermal imaging systems and subsystems assigned to them are coded in the AMDF with an SCIC of either 8, A meaning Regulated and Contains a Radioactive Item, or B meaning Regulated-Principal and Contains a Radioactive Item.

2. Insure that the CBS World-wide Asset Quarterly Posture pertaining to these items are furnished to the CERCOM Safety Office.

3. Insure that all procurements pertaining to these items are coordinated with the CERCOM Safety Office.

4. Insure that all radioactive items assigned to them are disposed of as radioactive waste and notify the CERCOM Safety Office annually of the total number disposed.

5. Insure that the technical literature contain the required radiation warnings and that proposed changes effecting these warnings are coordinated with the CERCOM Safety Office.

6. Inspect depots not inspected by CERCOM annually to determine compliance with NRC licenses and regulations. This shall include annual quality assurance inspections of MICOM or ARRCOM thermal imaging systems and subsystems.

7. Insure that all optical elements and lens coatings of thermal imaging systems and subsystems are in compliance with Title 10, Code of Federal Regulations and with NRC license requirements and regulations.

9. Based upon the above, it is requested that subject license be amended to include all thermal imaging systems and subsystems as incorporated into the inclosed Table 1.

FOR THE COMMANDER:

1 Incl


LOUIS A. REINKEN, Jr.
Colonel, GS
Chief of Staff

Quantities based on specific activity of 1.07×10^{-7} Ci/gm

TABLE 1

<u>RADIOACTIVE ITEM</u>	<u>NATIONAL STOCK NUMBER (NSN)</u>	<u>MAXIMUM ACTIVITY (NANO CURIES)</u>	<u>PICA</u>	<u>END ARTICLE APPLICATION (EAA)</u>	<u>EAA NSN</u>	<u>EAA PICA</u>
1. Detector-Dewar DT-591/UA	5855-01-030-8595	1.0 1.0 1.0	CERCOM	AN/TAS-4 AN/TAS-5 AN/TAS-6	5855-01-037-7339 5855-01-045-3459 5855-01-037-7340	CERCOM MICOM CERCOM
2. Detector-Dewar DT-594/UA	5855-01-061-6751	2.0	CERCOM	AN/VSG-2 XM-1	5855-01-060-8521 *	ARRCOM ARRCOM
3. Imager, Optical SU-97/UA	5855-01-030-8601	10.0	CERCOM	AN/TAS-4 AN/TAS-5 AN/TAS-6	5855-01-037-7339 5855-01-045-3459 5855-01-037-7340	CERCOM MICOM CERCOM
4. Imager, Optical SU-103/UA	5855-01-058-6687	20.0	CERCOM	AN/VSG-2 XM-1	5855-01-060-8521 *	ARRCOM ARRCOM
5. Afocal-Cover SU-94/TAS-4	5855-01-029-8732	40.0	CERCOM	AN/TAS-4	5855-01-037-7339	CERCOM
6. Afocal-Cover *	*	10.0	MICOM	AN/TAS-5	5855-01-045-3459	MICOM
7. Afocal-Cover SU-95/TAS-6	5855-01-030-8596	40.0	CERCOM	AN/TAS-6	5855-01-037-7340	CERCOM
8. Afocal-Cover *	5855-01-062-3115	81.0	ARRCOM	AN/VSG-2	5855-01-060-8521	ARRCOM
9. Afocal-Telescope *	*	12.0	ARRCOM	XM-1	*	ARRCOM
10. IR Window Assembly	5855-01-063-1346	44.0	ARRCOM	AN/VSG-2	5855-01-060-8521	ARRCOM
11. IR Window Assembly	*	23.0	ARRCOM	XM-1	*	ARRCOM

<u>RADIOACTIVE ITEM</u>	<u>NATIONAL STOCK NUMBER (NSN)</u>	<u>MAXIMUM ACTIVITY (NANO CURIES)</u>	<u>PICA</u>	<u>END ARTICLE APPLICATION (EAA)</u>	<u>EAA NSN</u>	<u>EAA PICA</u>
12. Boresight Collimator SU-93/TAS	5855-01-029-8730	6.0	CERCOM	AN/TAS-4 AN/TAS-6	5855-01-037-7339 5855-01-037-7340	CERCOM CERCOM

* Nomenclature identification and NSN have not as yet been assigned. When assigned, this information will be forwarded as part of the license file.

15360

AUG 8 1978

FCRL:EGW
(SMB-1300)

Department of the Army
Headquarters US Army Materiel Development
and Readiness Command
ATTN: Mr. Darwin N. Taras
Chief, Health Physics
Safety Office
5001 Eisenhower Avenue
Alexandria, VA 22333

Gentlemen:

Enclosed is Amendment No. 02 to License No. SMB-1300, issued in response to your letters dated June 8 and June 16, 1978.

Amendment No. 02 provides for distribution of night vision equipment to authorized recipients of Department of Defense and relieves you of the responsibility for labeling the items as specified in your letter of April 21, 1977. These changes are based on a revision of the general license of Section 40.22. This revision allows governmental agencies to possess, use and transfer up to 15 pounds of source material for operational purposes. Further, in the Commissions statements of consideration (40-SC-10) concerning this revision, it was pointed out that paragraph (a)(4) of this general license is applicable to any size unit, other than individuals which is physically separate from other units.

If you have questions concerning your license, please contact us.

Sincerely,

Earl G. Wright
Radioisotopes Licensing Branch
Division of Fuel Cycle and
Material Safety

Enclosure: Amendment No. 02 to
License No. SMB-1300

OFFICE →	FCRL					
SURNAME →	EGWright:bjp					
DATE →	8/2/78					



Regulatory Docket File

40-8598

DEPARTMENT OF THE ARMY

HEADQUARTERS US ARMY MATERIEL DEVELOPMENT AND READINESS COMMAND
5001 EISENHOWER AVE., ALEXANDRIA, VA. 22333

DRCSF-P/78-0067

16 June 1978

Director
Nuclear Material Safety and Safeguards
ATTN: Radioisotopes Licensing Branch
US Nuclear Regulatory Commission
Washington, DC 20555



Gentlemen:

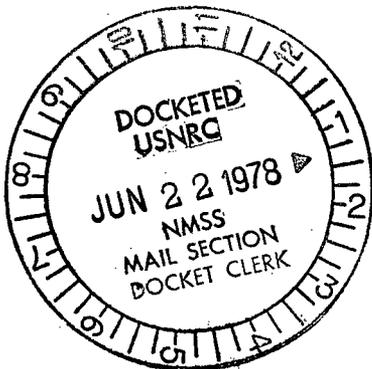
Forwarded is a request from US Army Communications and Electronics Materiel Readiness Command for official reinterpretation of paragraph 40.22 of 10 CFR 40 relating to consideration of Department of the Army agency subdivisions such as separate laboratories and activities as being separate "persons" for the purposes of the general license. Also request that FLIR imaging systems be exempted from labeling requirements in accordance with paragraph 40.22(b) of 10 CFR 40, if these materials presently covered by Source Material License Number SUB-1300 are exempt from specific licensing.

Please acknowledge receipt of correspondence on enclosed NRC-46 Reply Card.

Sincerely,


DARWIN N. TARAS
Chief, Health Physics
Safety Office

1 Incl
(as dupe)



RECEIVED
JUN 22 1978
MAIL SECTION
DOCKET CLERK

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DEPARTMENT OF THE ARMY
HEADQUARTERS US ARMY COMMUNICATIONS AND ELECTRONICS
MATERIEL READINESS COMMAND AND FORT MONMOUTH
FORT MONMOUTH, NEW JERSEY 07703

DRSEL-SF-H

8 June 1978

SUBJECT: Interpretation of US Nuclear Regulatory Commission (NRC)
Regulations

Commander
US Army Materiel Development
and Readiness Command
ATTN: DRCSF-P
5001 Eisenhower Avenue
Alexandria, Virginia 22333

1. Reference is made to the following:

- a. NRC Source Materiel License Number SMB-1300 dated 2 May 1977.
- b. Title 10, Chapter 1, Code of Federal Regulations (10 CFR), Part 40.
- c. Proposed amendment, 10 CFR Part 40, Federal Register, Volume 42, November 170, dated 1 September 1977.
- d. Letter, DRSEL-SF-H, dated 11 April 1977.
- e. US Atomic Energy Commission (AEC) letter dated 2 September 1964, signed by Howard K. Shapar, Assistant General Counsel, Licensing and Compliance.
- f. 42 FR 61853 contained in Statements Of Consideration, 10 CFR Part 40, page 40-SC-10, dated 24 March 1978.
- g. FONECON between Mr. Robert Barker and Ms. Deborah A. Bozik, Office of Standards Development, NRC, and Messrs Steven A. Horne and Barry J. Silber, CERCOM Safety Office, on 10 February 1978.

2. Reference 1a license authorized the storage, distribution, use and disposal of $^{232}\text{Thorium}$ Fluoride in multi-layer anti-reflective lens coatings on thermal imaging lenses of the Forward Looking Infra Red (FLIR) imaging systems. The maximum quantity of $^{232}\text{Thorium}$ possessed under this license is 1.85 grams per optical system and a total of 80 pounds at any one time.

DRSEL-SF-H

8 June 1978

SUBJECT: Interpretation of US Nuclear Regulatory Commission (NRC)
Regulations

The FLIR imaging systems are authorized to be used throughout Department of Defense installations and activities world-wide possessed under the control of Department of the Army personnel. This license also requires the labeling of the modules containing these lenses.

3. Paragraph 40.22(a) of reference 1b, states in part that "a general license is hereby issued authorizing use and the transfer of not more than fifteen (15) pounds of source material at any one time by persons incommercial and industrial firms and research, educational and medical institutions and Federal, State and local governmental agencies for research, development, educational, commercial or operational purposes; and provided, that no such person shall pursuant to this general license receive more than a total of 150 pounds of source material in any one calendar year. This is based upon reference 1c requested by the US Air Force Radioisotope Committee which specifically states that the major hazard associated with source material arises from inhalation or ingestion and not to external radiation. The operational uses which may be made of less than 15 pounds of source material make the inhalation or ingestion of significant quantities of material unlikely. The ²³²Thorium Fluoride coated lenses authorized under reference 1a license present a negligible, if any, radiation hazard. This has been previously established in reference 1d letter to the NRC. This letter was made part of the supporting documentation to reference 1a license.

4. Reference 1e letter previously rendered a negative interpretation to paragraph 40.22 of reference 1b relating to AEC consideration of Department of the Army agency subdivisions such as separate laboratories and activities as being separate "persons" for the purposes of the general license.

5. Reference 1f states in part thatin order to permit the greatest flexibility in use of small quantities of source material under the general license, the rule does not restrict application of the general license to the largest unit in any class of persons specified. Rather, paragraph (a)(4) of this general license is applicable to any size unit, other than individuals, which is physically separate from other units. The purpose of the physical separation is to make it unlikely that more than 15 pounds of source material could be brought together in a single location".

6. The Office of Standards Development, NRC, indicated by reference 1g FONECON that they were of the opinion that each Army laboratory and/or activity can be considered as a "person" referred to in paragraph 40.22(a) of 10 CFR Part 40 and that each laboratory and/or activity can possess up to 15 pounds of source material at any one time. The NRC is concerned of

DRSEL-SF-H

8 June 1978

SUBJECT: Interpretation of US Nuclear Regulatory Commission (NRC)
Regulations

instances where a Army laboratory may consist of more than one building and each building may possess 15 pounds of source material. This may lead to the possibility of combining the source material thereby increasing the radiological health hazard associated with this increased quantity. In addition, the FLIR imaging systems authorized under reference 1a, are exempted from 10 CFR Part 20 as it relates to the labeling requirements. However, it was recommended that this command request an official reinterpretation to paragraph 40.22 of 10 CFR Part 40.

7. Based upon paragraphs 2 and 4 above, request that the NRC provide reinterpretation of paragraph 40.22 of 10 CFR Part 40 relating to consideration of Department of the Army agency subdivisions such as separate laboratories and activities as being separate "persons" for the purposes of the general license. Considering the above, also request that FLIR imaging systems be exempted from the labeling requirements in accordance with paragraph 40.22(b) of 10 CFR Part 40.

FOR THE COMMANDER:



BERNARD M. SAVAIKO
Chief, Safety Office

NRC FORM 218 (4-76) NRCM 0240		U.S. NUCLEAR REGULATORY COMMISSION		DATE <i>7/14/78</i>	
MEMO FOR FILE TELEPHONE OR VERBAL CONVERSATION RECORD				TIME <input type="checkbox"/> A.M. <input type="checkbox"/> P.M.	
<input type="checkbox"/> INCOMING CALL		<input type="checkbox"/> OUTGOING CALL		<input type="checkbox"/> VISIT	
PERSON CALLING		OFFICE/ADDRESS		PHONE NUMBER	EXTENSION
PERSON CALLED		OFFICE/ADDRESS		PHONE NUMBER	EXTENSION
CONVERSATION					
SUBJECT <i>Interpretation of 40.22 as it applies</i>					
SUMMARY TO <i>Lic 5MB-1300.</i>					
<p><i>I discussed the Army letter with Mr Henry of standards. He referred me to the statement of considerations relative to the amended 40.22 of 10CFR 40. (40-SC-70 dated May 5, 1977) Based upon this and section 20.203 (f)(3)(ii), 10CFR 20 it appears appropriate to allow the request of D.A. dated Jun 8, 1978.</i></p> <p style="text-align: right;"><i>Earl B Wright</i></p>					
REFERRED TO:				<input type="checkbox"/> ADVISE ME OF ACTION TAKEN.	
ACTION REQUESTED				INITIALS	
				DATE	
ACTION TAKEN				INITIALS	
				DATE	

7/14/28

TCT Mr. Jakes ELD

Re: Definition of "natural" as it applies to Thorium and Uranium

His general impression (mine also)

is that natural means in the isotopic concentration as it occurs in nature.

Probably does not apply to the percentage of total uranium or Thorium found in a given sample. For example ore might contain .6% total Thorium and a Thorium nitrate might contain

30% Thorium and Thorium-mag Alloy might contain 4% Th and Thorium metal a 100% Th. However in all cases

the Thorium in the compound, mixture alloy etc would be referred to

as natural Thorium because the isotopic concentration has not been altered from the way they occur in nature.



DEPARTMENT OF THE ARMY
HEADQUARTERS US ARMY MATERIEL DEVELOPMENT AND READINESS COMMAND
5001 EISENHOWER AVE., ALEXANDRIA, VA. 22333

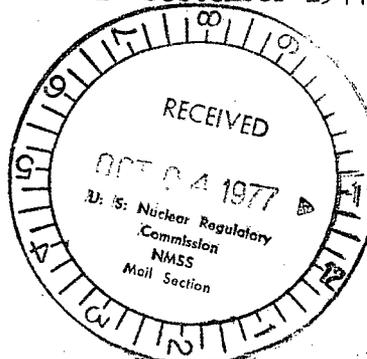
40-8598

07763

DRCSE-P

29 September 1977

Director
Nuclear Material Safety and Safeguards
US Nuclear Regulatory Commission
ATTN: Radioisotopes Licensing Branch
Mr. N. Bassin
Washington, DC 20555



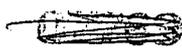
Dear Mr. Bassin:

Reference is made to our telephone call this date concerning US Army Electronics Command teletype, dated 19 Sep 77, requesting amendment to NRC License SMB-1300 to delete need to label devices containing thorium fluoride lenses used for other than eyepieces. Mr. Bernard Savaiko, US Army Electronics Command, has concurred via telephone, this date, in this headquarters' withdrawing the request for amendment.

Sincerely yours,

DARWIN N. TARAS
Chief, Health Physics
Safety Office

Cy Furn:
Cdr, ECOM, ATTN: DRSEL-SF-H, Ft. Monmouth, NJ 07703





Regulatory Docket File

DEPARTMENT OF THE ARMY
HEADQUARTERS US ARMY MATERIEL DEVELOPMENT AND READINESS COMMAND
5001 EISENHOWER AVE., ALEXANDRIA, VA. 22333

40-8598

DRCSF-P/78-0060

25 May 1978

Director
Nuclear Material Safety and Safeguards
ATTN: Radioisotopes Licensing Branch
US Nuclear Regulatory Commission
Washington DC 20555



Gentlemen:

Forwarded is request from US Army Communications and Electronics Command (formerly US Army Electronics Command) for amendment to Source Material License Number ~~SNM-1300~~.

SMR-1300

Changes are in name from US Army Electronics Command to US Army Communications and Electronics Command and the addition of new alternate Radiation Protection Officer.

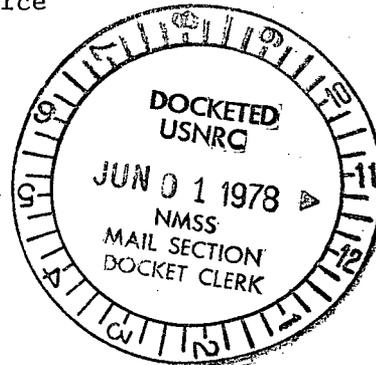
Please acknowledge receipt of correspondence on inclosed NRC-46 Reply Card (Incl 2).

Sincerely,

DARWIN N. TARAS
Chief, Health Physics
Safety Office

2 Incl
as

GF:
HQDA (DASG-HCH-E) WASH DC 20310 w/incl 1 (dupe)
Dir, DARCOM FSA, Charlestown IN 47111 w/incl 1



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10 MAY 27 1978 11 15
15 145

09504

FILE EXEMPT

(per 5170.11(a)(5) 6/11)



DEPARTMENT OF THE ARMY
HEADQUARTERS US ARMY COMMUNICATIONS AND ELECTRONICS
MATERIEL READINESS COMMAND AND FORT MONMOUTH
FORT MONMOUTH, NEW JERSEY 07703

DRSEL-SF-H

4 May 1978

SUBJECT: US Nuclear Regulatory Commission (NRC) Materials License
Number SMB-1300

Commander
US Army Materiel Development
and Readiness Command
ATTN: DRCSF-P
5001 Eisenhower Avenue
Alexandria, Virginia 22333

1. Reference is made to subject NRC license issued to the Department of the Army, Headquarters, US Army Electronics Command, Fort Monmouth, New Jersey 07703.
2. Due to the recent Army Materiel Acquisition Review Committee re-organization, it is requested that Item 1 of subject license be amended as follows:

Department of the Army
US Army Communications and Electronics
Materiel Readiness Command
ATTN: DRSEL-SF

3. It is also requested that subject license be amended to list Mr. Barry J. Silber as alternate Radiation Protection Officer for this command. Mr. Silber's qualifications are inclosed (Incl 1).

FOR THE COMMANDER:

1 Incl
as

Bernard M. Savaiko for
BERNARD M. SAVAIKO
Chief, Safety Office

09504

Incl 1'

BARRY J. SILBER, Health Physicist, US Army Communications and Electronics Materiel Readiness Command (CERCOM), Fort Monmouth, New Jersey.

a. Education:

(1) A.A. - Brooklyn College of the City University of New York, Brooklyn, New York - 1965.

(2) B.S. - Brooklyn College of the City University of New York, Brooklyn, New York - 1969. Major: Chemistry.

b. Professional Experience:

(1) October 1966 - May 1967:

Allen Pharmacal Corporation, 175 Pearl Street, Brooklyn, New York.

Laboratory Technician - Analytical Chemistry Laboratory.

Laboratory analyses of pharmaceuticals at various stages of manufacture to insure compliance with Food and Drug Administration Regulations as well as United States Pharmacopeia and National Formulary Monographs.

(2) June 1967 - March 1970:

EON Corporation, 175 Pearl Street, Brooklyn, New York.

Chemist - Responsible for all health physics activities, including radiation surveys, air sampling and wipe tests, leak testing of sealed sources, decontamination of facilities and equipment, disposal of radioactive wastes, calibration of radiation survey and measurement instrumentation, record-keeping, etc., to insure compliance with US Nuclear Regulatory Commission (NRC) and New York State Regulations; liaison between regulatory agencies and corporate management; authorized radiation worker (user) of multiple types of radioactive materials used in the manufacture of radiation sources for commercial, military and highly specialized (custom-made) use; responsible for all chemistry activities including metallurgical applications on products at various stages of manufacture to meet quality control specifications.

(3) March 1970 - June 1977:

State of New York Department of Labor, Division of Safety and Health, 2 World Trade Center, New York, New York.

Senior Radiophysicist - Radiological Health Unit.

Responsible for the review of applications, including the evaluation of facilities, equipment, personnel and products containing radioactive materials, and in the preparation of State licenses authorizing the possession and use of radioactive materials by persons in industry and related activities in this State; assist in the administration of the licensing program; consult with and assist industrial management personnel and others in establishing radiation protection programs; conduct inspections, special prelicensing investigations, radiation surveys and tests at the sites of licensees and registrants using radiation sources to enforce state regulations and to insure that radiation workers and the general public are fully protected; assemble environmental research data, analyze and interpret this data, assist in the publication of scientific reports, and training of new staff members.

(4) June 1977 - January 1978:

US Army Electronics Command (ECOM), Fort Monmouth, New Jersey.
Health Physicist - Responsible for health physics functions in the establishment and implementation of the ECOM Safety Program aimed at establishing life cycle controls of ECOM commodities utilizing radioactive material and ionizing radiation producing devices; responsible for the evaluation of radiological protection programs and radiation facilities to determine their adequacy and to insure compliance with DA Authorizations and NRC Licenses; perform studies and evaluations necessary to minimize the health risks to personnel; prepare and review applications for DA Authorizations and NRC Licenses; establish and maintain radiation protection records and files.

(5) January 1978 - Present:

CERCOM, Fort Monmouth, New Jersey.
Duties are the same as in Item b(4) above. Name change from ECOM to CERCOM.

c. Formal Training in Radiation Protection Methods, Measurements and Effects:

	<u>Duration of Training</u>	<u>On-The-Job</u>	<u>Formal Course</u>
(1) X-Ray Technology for Radiological Health Personnel-Memorial Hospital for Cancer and Allied Diseases, 444 East 68th Street, New York, New York - 11 January - 14 January 1971.	3 Days	No	Yes
(2) Orientation Course in Regulatory Practices and Procedures - NRC, Bethesda, Maryland - 1 March - 19 March 1971.	3 Weeks	No	Yes
(3) Health Physics and Radiation Protection - Special Training Division, Oak Ridge Associated Universities, Oak Ridge, Tennessee - 12 February 1973 to 20 April 1973. Sponsored by the NRC for Agreement State regulatory personnel.	10 Weeks	No	Yes
(4) Radiological Safety Course - US Army Ordnance and Chemical Center and School, Aberdeen Proving Ground, Maryland - 25 October - 15 November 1977.	3 Weeks	No	Yes

c. Experience with Radiation.

<u>Isotope</u>	<u>Maximum Amount</u>	<u>Duration of Experience</u>	<u>Type of Use</u>
(1) ^{14}C	60 mCi	3 years	For items 1 through 10-manufacture of sealed sources, health physics surveys and wipe tests.
(2) ^{32}P	10 mCi	3 years	
(3) ^{36}Cl	10 mCi	3 years	

<u>Isotope</u>	<u>Maximum Amount</u>	<u>Duration of Experience</u>	<u>Type of Use</u>
(4) ^{63}Ni	10 mCi	3 years	
(5) $^{90}\text{Sr}/^{90}\text{Y}$	50 mCi	3 years	For items 11 and 14- calibration of radiation instrumentation, health physics surveys and wipe tests.
(6) ^{99}Tc	100 mCi	3 years	
(7) $^{106}\text{Ru}/^{106}\text{Rh}$	50 mCi	3 years	
(8) $^{144}\text{Ce}/^{144}\text{Pr}$	500 mCi	3 years	
(9) ^{147}Pm	500 mCi	3 years	For items 12 and 13-health physics surveys and wipe tests.
(10) ^{204}Tl	50 mCi	3 years	
(11) ^{60}Co	10 mCi	3 years	
(12) ^{60}Co	200 Ci	3 years	
(13) ^{137}Cs	250 Ci	3 years	
(14) ^{226}Ra	20 mCi	3 years	

40-8598

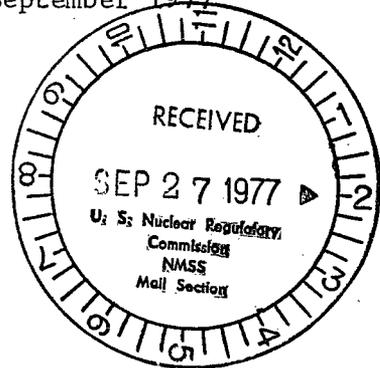


DEPARTMENT OF THE ARMY
HEADQUARTERS US ARMY MATERIEL DEVELOPMENT AND READINESS COMMAND
5001 EISENHOWER AVE., ALEXANDRIA, VA. 22333

DRGSF-P

27 September 1977

Director
Nuclear Material Safety and Safeguards
US Nuclear Regulatory Commission
ATTN: Radioisotopes Licensing Branch
Washington DC 20555



Dear Sir:

Reference is made to telephone conversation between Mrs. Buchholz (NRC NMSS) and Mr. Taras (DARCOM), 27 September 1977, which indicated that NRC had no record of having received the US Army Electronics Command teletype request to amend NRC License SMB-1300 to delete need to label devices containing thorium fluoride lenses used for other than eyepieces.

In view of the dollar impact and urgency in which a decision is needed, a copy of that teletype message is being handcarried to you. Because of pending contractual negotiations, request Messrs. Bernard Savaiko or Steven Horne (AC 201-532-3493/4452) be advised by telephone of your decision prior to 30 September 1977, followed by written confirmation.

Sincerely yours,

DARWIN N. TARAS
Chief, Health Physics
Safety Office

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PRIORITY

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00874/01270509/262A

JD 262/20447

ACT -GS-IL-MM-BSI-DE-PP-CP-RE-PT-IS-DMR-XAM-DMD-ACC-

(SF)

REPRU
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INFO-GS-IL-MM-BSI-DE-PP-CP-RE-PT-IS-DMR-XAM-DMD-ACC- - - -

PTTUZYUW RUEDBIA3589 2621952-UUUU--RUKLDAR.

ZNR UUUUU

P 191910Z SEP 77

FM CDRECOM FT MONMOUTH NJ//DRSEL-SF-H//

TO RUEAUSA/US NUCLEAR REGULATORY COMMISSION//NUCLEAR MATERIAL
SAFETY AND SAFEGUARDS BRANCH//WASHINGTON DC//

INFO RUKLDAR/CDPDARCOM ALEX VA//DRCSEF-P//

RUEOFUA/DIRNVL FT BELVOIR VA//DRSEL-NV-SD (PROJECT OFFICER NVD)//

DRSEL-NV-CM//DRSEL-RD-EV//

BT

UNCLAS

REFERENCE IS MADE TO THE FOLLOWING:

- A. US NUCLEAR REGULATORY COMMISSION (NRC) SOURCE MATERIAL LICENSE NO. SMB-1300 DATED 2 MAY 1977.
- B. DOCKET NO. 40-08598.
- C. PHILIPS BROADCAST EQUIPMENT CORPORATION LETTER TO NRC DATED 6 AUGUST 1974, SIGNED BY MR. T. GUASCONI.
- D. NRC REPLY TO REFERENCE C LETTER DATED 20 AUGUST 1974, SIGNED BY DR. SHLOMO S. YANIV.

IT IS REQUESTED THAT SUBJECT LICENSE, REFERENCE A, BE AMENDED TO ELIMINATE THE MARKING REQUIREMENTS AS REQUIRED BY THE NRC. IN VIEW OF THE URGENCY, THIS HEADQUARTERS HAS BEEN GRANTED AUTHORITY TO COM-

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MUNICATE DIRECTLY WITH THE NRC FROM HEADQUARTERS, DEPARTMENT OF THE
PAGE 2 RUEDRIA3589 UNCLAS

ARMY. A DELAY IN THIS DECISION WILL HAVE SIGNIFICANT DOLLAR IMPACT
ON A MAJOR ARMY PROCUREMENT OF NIGHT VISION THERMAL IMAGING DEVICES.

TITLE 10, CHAPTER 1, CODE OF FEDERAL REGULATIONS (10 CFR), PART
40, PARAGRAPH 40.22, SPECIFICALLY AUTHORIZES PERSON UNDER A GENERAL
LICENSE, TO USE AND STORE SOURCE MATERIAL IN QUANTITIES NOT EXCEEDING
15 POUNDS AT ANY ONE TIME NOR A TOTAL OF 150 POUNDS IN ANY CALENDAR
YEAR. REFERENCE C LETTER TO NRC, PARAGRAPHS 2, 3, 4, AND 5 ARE
QUOTED AS FOLLOWS:

.....PHILIPS BROADCASTING EQUIPMENT CORP. PURCHASES THE COATED OBJEC-
TIVE LENSES FROM AN OUTSIDE VENDOR AND INSTALIS THEM IN AN/TAS-3()
HARDWARE.....

.....THE AMOUNT OF THORIUM CONTAINED IN EACH SET OF LENSES CONTAINS
ABOUT 0.0012 POUNDS OF THORIUM.....

.....IT IS MY UNDERSTANDING THAT THIS ORGANIZATION, AS A COMMERCIAL
USER, MAY BE REQUIRED TO OBTAIN A GENERAL LICENSE TO USE THE ABOVE
LENSES.....

.....PLEASE CONFIRM THIS AS WELL AS WHAT PROCEDURE IF ANY, IS TAKEN
TO MARK AND DISPOSE SUCH LENSES.....

REFERENCE D REPLY LETTER FROM NRC TO PHILIPS BROADCAST EQUIPMENT
CORP., PARAGRAPHS 2 AND 3, ARE QUOTED AS FOLLOWS:

PAGE 3 RUEDRIA3589 UNCLAS

.....PURSUANT TO SECTION 40.22(A)(4) OF 10 CFR PART 40
A GENERAL LICENSE AUTHORIZING THE USE AND TRANSFER OF NOT MORE
THAN FIFTEEN (15) POUNDS OF SOURCE MATERIAL AT ANY ONE TIME HAS BEEN
ISSUED TO COMMERCIAL AND INDUSTRIAL FIRMS, AND RESEARCH, EDUCATIONAL

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AND MEDICAL INSTITUTIONS FOR RESEARCH, DEVELOPMENT, EDUCATIONAL OR
COMMERCIAL PURPOSES. THAT GENERAL LICENSE PUBLISHED IN 10 CFR PART
40 IS EFFECTIVE WITHOUT THE FILING OF APPLICATIONS WITH AEC OR THE
ISSUANCE OF LOCENSING DOCUMENTS TO PARTICULAR PERSONS. AS A COM-
MERCIAL FIRM, YOU ARE THEREFORE LICENSED IN ACCORDANCE WITH 40.22(A)
(4).

.....THIS GENERAL LICENSE LIMITS THE RECEIPT OF SOURCE MATERIAL TO 150
POUNDS IN ANY CALENDAR YEAR AND DOES NOT AUTHORIZE EXPORT OF SOURCE
MATERIAL. UNDER THAT GENERAL LICENSE, THERE ARE NO SPECIFIC RE-
QUIREMENTS REGARDING MARKING AND DISPOSAL OF THORIUM FLUORIDE COATED
INFRARED LENSES.....

SUBJECT LICENSE, REFERENCE A, AUTHORIZES THE STORAGE, DISTRIBUTION,
USE AND DISPOSAL OF THORIUM FLUORIDE COATED LENSES CONTAINING
NOT MORE THAN 1.85 GRAMS PER OPTICAL SYSTEM AND A MAXIMUM QUANTITY OF
80 POUNDS AT ANY ONE TIME, AND REQUIRES THE LABELING OF THE MODULES
CONTAINING THESE LENSES.

PAGE 4 RUEDRIA3589 UNCLAS

THE PROPOSED AMENDMENT TO 10 CFR PART 40, PARAGRAPH 40.22, RE-
QUESTED BY THE US AIR FORCE RADIOISOTOPE COMMITTEE AND PUBLISHED IN
FEDERAL REGISTER, VOLUME 42, NUMBER 170, DATED 1 SEPTEMBER 1977,
SPECIFICALLY STATES THAT THE MAJOR HAZARD ASSOCIATED WITH SOURCE
MATERIAL ARISES FROM INHALATION OR INGESTION AND NOT FROM EXTERNAL
RADIATION. THE OPERATIONAL USES WHICH MAY BE MADE OF LESS THAN 15
POUNDS OF SOURCE MATERIAL MAKE THE INHALATION OR INGESTION OF SIGNIFI-
CANT QUANTITIES OF MATERIAL UNLIKELY. THE THORIUM FLUORIDE COATED
LENSES COVERED IN THE SUBJECT LICENSE PRESENT A NEGLIGIBLE, IF ANY,
RADIATION HAZARD. THIS COMMAND HAS PREVIOUSLY SUBSTANTIATED THIS

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NEGLECTIBLE RADIATION HAZARD IN LETTER DATED 11 APRIL 1977 TO THE COMMISSION. THIS LETTER WAS MADE PART OF THE SUPPORTING DOCUMENTATION TO SUBJECT LICENSE.

REQUEST THIS COMMAND BE WAIVED THE LABELING REQUIREMENTS BASED UPON THE AFOREMENTIONED INFORMATION. IT IS FELT THAT UNDUE RESTRICTIONS ARE BEING PLACED UPON THE MILITARY CONSIDERING THE NEGLECTIBLE HAZARD POTENTIAL AS WELL AS THE QUANTITIES INVOLVED.

IN VIEW OF THE URGENCY FOR A DECISION IN THIS MATTER, A VERBAL RESPONSE WOULD BE ACCEPTABLE FOLLOWED UP BY WRITTEN CONFIRMATION BY 26 SEPTEMBER 1976. MR. STEVEN A. HORNE, HEALTH PHYSICIST, IS POINT PAGE 5 RUEDRIA3589 UNCLAS OF CONTACT AT THIS HEADQUARTERS. TELEPHONE NUMBER IS AREA CODE (201) 532-3493/4452.

BT
#3589
NNNN

PRIORITY

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• U N C L A S S I F I E D •
.....

07683

NAME Philip Broadbent
Equip Corp

Renewal/Amendment

Mail Control _____

License No. SMB-1300

Docket No. 40-8598

Enter log

Category

Stamp correspondence/application

EX

Check returned w/ltr

2C

EXPIRATION DATE

Dept of Army
77 Monmouth NJ

Return file to: Clara Dorsey

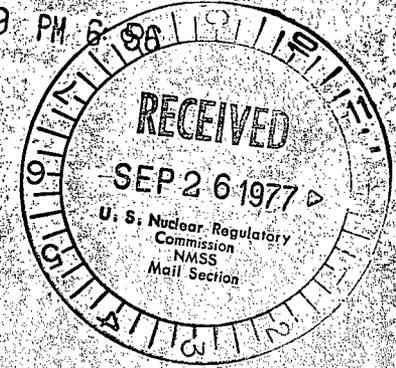
Eloise Barry

Glenda Jackson

40-8598

RECEIVED

1977 SEP 19 PM 6 58



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PTTUZOVW RUEAUSA3589 2621952-UUUU--RHEGGTN.

ZNR UUUUU ZOV RUEAUSA REROUTE OF RUEDBIA3589 2621952

RHEGGTN T US NUCLEAR REG COMM WASHDC

P 191910Z SEP 77

FM CDRECOM FT MONMOUTH NJ//DRSEL-SF-H//

TO RUEAUSA/US NUCLEAR REGULATORY COMMISSION//NUCLEAR MATERIAL SAFETY AND SAFEGUARDS BRANCH//WASHINGTON DC//

INFO RUKLDAR/CDRDARCOM ALEX VA//DRCSF-P//

RUEOFUA/DIRNVL FT BELVOIR VA//DRSEL-NV-SD (PROJECT OFFICER NVD)//

DRSEL-NV-CM//DRSEL-RD-EV//

BT

UNCLAS

REFERENCE IS MADE TO THE FOLLOWING:

A. US NUCLEAR REGULATORY COMMISSION (NRC) SOURCE MATERIAL LICENSE NO. SMB-1300 DATED 2 MAY 1977.

B. DOCKET NO. 40-08598.

C. PHILIPS BROADCAST EQUIPMENT CORPORATION LETTER TO NRC DATED 6 AUGUST 1974, SIGNED BY MR. T. GUASCONI.

D. NRC REPLY TO REFERENCE C LETTER DATED 20 AUGUST 1974, SIGNED BY DR. SHLOMO S. YANIV.

IT IS REQUESTED THAT SUBJECT LICENSE, REFERENCE A, BE AMENDED TO ELIMINATE THE MARKING REQUIREMENTS AS REQUIRED BY THE NRC. IN VIEW OF THE URGENCY, THIS HEADQUARTERS HAS BEEN GRANTED AUTHORITY TO COMMUNICATE DIRECTLY WITH THE NRC FROM HEADQUARTERS, DEPARTMENT OF THE

RECEIVED BY LEMB	
Date	9/29/77
Time	6pm
By	Chess
From	
Cy to	
Action Compl.	9-29-77

Sent 77 P-21

ARMY. A DELAY IN THIS DECISION WILL HAVE SIGNIFICANT DOLLAR IMPACT ON A MAJOR ARMY PROCUREMENT OF NIGHT VISION THERMAL IMAGING DEVICES.

TITLE 10, CHAPTER 1, CODE OF FEDERAL REGULATIONS (10 CFR), PART 40, PARAGRAPH 40.22, SPECIFICALLY AUTHORIZES PERSON UNDER A GENERAL LICENSE, TO USE AND STORE SOURCE MATERIAL IN QUANTITIES NOT EXCEEDING 15 POUNDS AT ANY ONE TIME NOR A TOTAL OF 150 POUNDS IN ANY CALENDAR YEAR. REFERENCE C LETTER TO NRC, PARAGRAPHS 2, 3, 4, AND 5 ARE QUOTED AS FOLLOWS:

.....PHILIPS BROADCASTING EQUIPMENT CORP. PURCHASES THE COATED OBJECTIVE LENSES FROM AN OUTSIDE VENDOR AND INSTALLS THEM IN AN/TAS-3() HARDWARE.....

.....THE AMOUNT OF THORIUM CONTAINED IN EACH SET OF LENSES CONTAINS ABOUT 0.0012 POUNDS OF THORIUM.....

.....IT IS MY UNDERSTANDING THAT THIS ORGANIZATION, AS A COMMERCIAL USER, MAY BE REQUIRED TO OBTAIN A GENERAL LICENSE TO USE THE ABOVE LENSES.....

.....PLEASE CONFIRM THIS AS WELL AS WHAT PROCEDURE IF ANY, IS TAKEN TO MARK AND DISPOSE SUCH LENSES.....

REFERENCE D REPLY LETTER FROM NRC TO PHILIPS BROADCAST EQUIPMENT CORP., PARAGRAPHS 2 AND 3, ARE QUOTED AS FOLLOWS:

.....PURSUANT TO SECTION 40.22(A)(4) OF 10 CFR PART 40 A GENERAL LICENSE AUTHORIZING THE USE AND TRANSFER OF NOT MORE THAN FIFTEEN (15) POUNDS OF SOURCE MATERIAL AT ANY ONE TIME HAS BEEN ISSUED TO COMMERCIAL AND INDUSTRIAL FIRMS, AND RESEARCH, EDUCATIONAL AND MEDICAL INSTITUTIONS FOR RESEARCH, DEVELOPMENT, EDUCATIONAL OR COMMERCIAL PURPOSES. THAT GENERAL LICENSE PUBLISHED IN 10 CFR PART 40 IS EFFECTIVE WITHOUT THE FILING OF APPLICATIONS WITH AEC OR THE

MERCIAL FIRM, YOU ARE THEREFORE LICENSED IN ACCORDANCE WITH 40.22(A)

(4).

.....THIS GENERAL LICENSE LIMITS THE RECEIPT OF SOURCE MATERIAL TO 150 POUNDS IN ANY CALENDAR YEAR AND DOES NOT AUTHORIZE EXPORT OF SOURCE MATERIAL. UNDER THAT GENERAL LICENSE, THERE ARE NO SPECIFIC REQUIREMENTS REGARDING MARKING AND DISPOSAL OF THORIUM FLUORIDE COATED INFRARED LENSES.....

SUBJECT LICENSE, REFERENCE A, AUTHORIZES THE STORAGE, DISTRIBUTION, USE AND DISPOSAL OF THORIUM FLUORIDE COATED LENSES CONTAINING NOT MORE THAN 1.85 GRAMS PER OPTICAL SYSTEM AND A MAXIMUM QUANTITY OF 80 POUNDS AT ANY ONE TIME, AND REQUIRES THE LABELING OF THE MODULES CONTAINING THESE LENSES.

PAGE 4 RUEDBIA3589 UNCLAS

THE PROPOSED AMENDMENT TO 10 CFR PART 40, PARAGRAPH 40.22, REQUESTED BY THE US AIR FORCE RADIOISOTOPE COMMITTEE AND PUBLISHED IN FEDERAL REGISTER, VOLUME 42, NUMBER 170, DATED 1 SEPTEMBER 1977, SPECIFICALLY STATES THAT THE MAJOR HAZARD ASSOCIATED WITH SOURCE MATERIAL ARISES FROM INHALATION OR INGESTION AND NOT FROM EXTERNAL RADIATION. THE OPERATIONAL USES WHICH MAY BE MADE OF LESS THAN 15 POUNDS OF SOURCE MATERIAL MAKE THE INHALATION OR INGESTION OF SIGNIFICANT QUANTITIES OF MATERIAL UNLIKELY. THE THORIUM FLUORIDE COATED LENSES COVERED IN THE SUBJECT LICENSE PRESENT A NEGLIGIBLE, IF ANY, RADIATION HAZARD. THIS COMMAND HAS PREVIOUSLY SUBSTANTIATED THIS NEGLIGIBLE RADIATION HAZARD IN LETTER DATED 11 APRIL 1977 TO THE COMMISSION. THIS LETTER WAS MADE PART OF THE SUPPORTING DOCUMENTATION TO SUBJECT LICENSE.

REQUEST THIS COMMAND BE WAIVED THE LABELING REQUIREMENTS BASED UPON THE AFOREMENTIONED INFORMATION. IT IS FELT THAT UNDUE RESTRICTIONS ARE BEING PLACED UPON THE MILITARY CONSIDERING THE NEGLIGIBLE

IN VIEW OF THE URGENCY FOR A DECISION IN THIS MATTER, A VERBAL
RESPONSE WOULD BE ACCEPTABLE FOLLOWED UP BY WRITTEN CONFIRMATION BY
26 SEPTEMBER 1976. MR. STEVEN A. HORNE, HEALTH PHYSICIST, IS POINT

PAGE 5 RUEDBIA3589 UNCLAS

OF CONTACT AT THIS HEADQUARTERS, TELEPHONE NUMBER IS AREA CODE
(201) 532-3493/4452.

BT

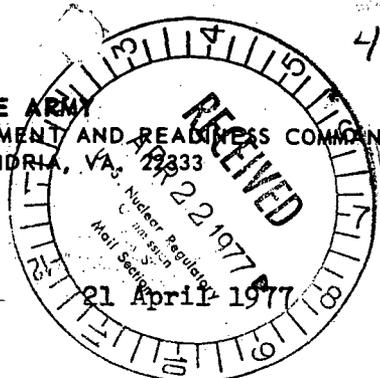
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DEPARTMENT OF THE ARMY
HEADQUARTERS US ARMY MATERIEL DEVELOPMENT AND READINESS COMMAND
5001 EISENHOWER AVE., ALEXANDRIA, VA 22333

40-8598

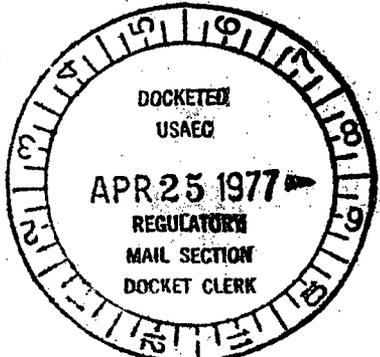


DRCSF-P/76-0116

REGULATORY FILE CY

21 April 1977

Director
Nuclear Material Safety and Safeguards
US Nuclear Regulatory Commission
AFTN: Radioisotopes Licensing Branch
Mr. Earl Wright
Washington, DC 20555



6395

Reference: Control Number 05035

Dear Mr. Wright:

Inclosed is detailed reply from US Army Electronics Command in response to letter, US Nuclear Regulatory Commission, FCRL:EGW, dated 1 April 1977, subject: Additional Supporting Information.

This headquarters has reviewed the Electronics Command reply and submits the following summary of the key points:

and

1. US Army Electronics Command is the designated National *Maintenance* Inventory Control Point (NICP) and has full life cycle management responsibilities for the devices. The NICP functions are delineated in the Electronics Command reply.

2. The Radiation Protection Officer (Health Physicist) has the responsibility to render radiation safety assistance to all elements involved with the night vision devices listed in the initial license application throughout the full life cycle of the devices.

3. The license manager is responsible for administering the license, informing all commanders of the limitations, constraints, and conditions for these radioactive commodities. Also, he is responsible for monitoring program compliance.

4. Users of the night vision devices will be target observers and fire control units.

5. Records are processed initially by computers and then are manually processed to verify that the requisitioners are authorized to receive these night vision devices. Material Release Orders are

DRCSF-P/76-0116

21 April 1977

Reference: Control Number 05035

transmitted by the NICP to Sacramento Army Depot authorizing shipment of devices. Records are maintained both by the NICP and Sacramento Army Depot. Due to the CONFIDENTIAL security classification and the high dollar value of the devices, requests and records for issue and disposition are more carefully screened and controlled than is required for radiation safety.

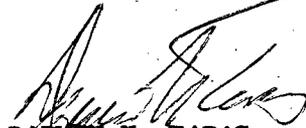
6. Specific instructions to be placed in the operator and maintenance manuals are contained in the Electronics Command reply.

7. Subsequent to the mailing of the Electronics Command reply, the labelling was revised. The common modules containing the thorium coated optics will be labelled with the following information:

"Controlled Radioactive Item
NRC License No. _____
Thorium-coated optics
Dispose as Radioactive Waste"
If found, notify military authorities.

The above label is considered adequate for control purposes in view of the exemption in 10CFR20.203f(3).

Sincerely,



DARWIN N. TARAS
Chief, Health Physics
Safety Office

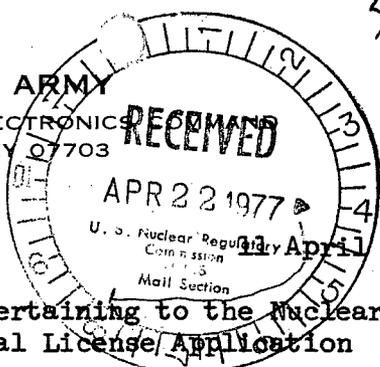
1 Incl
ECOM ltr dtd 11 Apr 77

Cy Furn:
HQDA (DASG-HCH-E) WASH DC 20310
Dir, DARCOMFSA, Charlestown, IN 47111

40-8598



DEPARTMENT OF THE ARMY
HEADQUARTERS UNITED STATES ARMY ELECTRONICS
FORT MONMOUTH, NEW JERSEY 07703



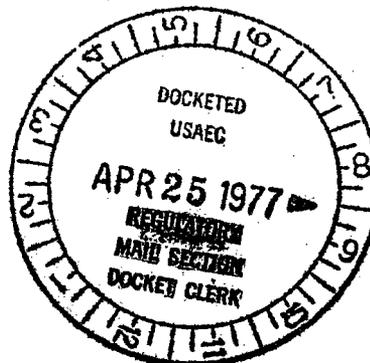
6393

DRSEL-SF-H

REGULATORY FILE CY

SUBJECT: Additional Supporting Information Pertaining to the Nuclear
Regulatory Commission Source Material License Application

Commander
US Army Materiel Development
and Readiness Command
ATTN: DRCSF-P
5001 Eisenhower Avenue
Alexandria, Virginia 22333



1. Reference is made to the following:

a. Letter, DRSEL-SF-H, dated 14 December 1976, subject: Initial Request for a Nuclear Regulatory Commission Source Material License.

b. Letter, US Nuclear Regulatory Commission, FCRL:EGW, dated 1 April 1977, subject: Additional Supporting Information.

c. FONECON on 6 April 1977, between Mr. Earl Wright, US Nuclear Regulatory Commission and Mr. Steven Horne, this command, subject: Clarification of Additional Supporting Information.

d. Nuclear Regulatory Commission Control No. 05035.

2. Reference Table 5-1, Chapter 5 of Army Regulation 708-1, entitled: Cataloging and Supply Management Data, dated 1 April 1971, which assigns the supervisory command/activity responsibility for the Federal Supply Class 5855, i.e. Night Vision Equipment, Emitted and Reflected radiation to the Army Electronics Command. By this regulation, this headquarters is assigned both the Material Inventory and Maintenance Control Points with full life cycle management responsibilities (Incl 1).

3. The functions for the manager of the Nuclear Regulatory Commission (NRC) License are designated to the Chief, Safety Office of the Command Staff of this headquarters. The responsibilities as manager are to:

a. Coordinate, obtain, administer, review, amend, and maintain necessary licenses for radioactive commodities managed by this command.

DRSEL-SF-H

11 April 1977

SUBJECT: Additional Supporting Information Pertaining to the Nuclear
Regulatory Commission Source Material License Application

b. Provide information and guidance to all Commanders, with respect to limitations, constraints, conditions or procedures which affect the responsibilities of those Commanders for the radioactive commodity.

c. Monitor the various elements of the life cycle program of the radioactive commodities to assure compliance with conditions of the applicable license.

d. Assure that licensed material is not transferred to unauthorized persons or organizations.

4. The Health Physicist serves as the Electronics Command's staff contact for radiological control and licensing matters to the Army Materiel Development and Readiness Command, other major commands and Department of the Army elements, other services and federal agencies; provides advice and assistance to other Electronics Command elements involved in the development and fielding of radioactive items, the National Inventory Control Point (NICP) (an element of the Electronics Command), depots and other Army elements; prepares applications for NRC Licenses for Army wide distribution of assigned items as designated by Army Regulation 708-1; prepares radiological safety instructions for incorporation in technical literature and other published guidance pertaining to the items; coordinates with the NICP to assure that requisitioning elements are authorized to and technically capable of receiving the item and that procurements do not exceed the quantity or use limitations imposed by the various licenses; performs pre-award and post award health physics surveys of contractors; provides health physics advice to be included in instructions for disposal of radioactive waste, and serves as the staff officer for notification, investigation and preparation of reports required in the event of an accident or incident in which this command's radioactive items may be involved.

5. The Electronics Command NICP located at Fort Monmouth, New Jersey, has adopted special procedures for individually controlled radioactive items that are in addition to standard Army supply practices used for all type classified items. The control point maintains records of procurements, receipts, ^{with SAH} storage locations, shipments, using locations, authorizes, issues, and assures adequate supply. It reviews requisitions submitted and when approved, issues material release orders to the designated depot for shipment of the material to the requisitioner. Requisitions are submitted through various command control channels. The control point bases its approval on previously established authorization of the requisitioner to receive the item from the supply standpoint such as an approved Table of Allowances. Upon approval of the requisition, the control point issues a material release order to the depot storing the item. The depot ships the item directly to the requisitioner, notifies the control point and furnishes other shipping data which is forwarded also through supply property office channels.

DRSEL-SF-H

11 April 1977

SUBJECT: Additional Supporting Information Pertaining to the Nuclear
Regulatory Commission Source Material License Application

6. Reports of excess items are submitted through various command channels to the NICP for review for serviceability, turn-in or disposal as radioactive waste. Requests for disposition instructions of radioactive waste are submitted through radiological command channels to the NICP.

7. Sacramento Army Depot (SAAD), Sacramento, California will provide bulk storage, maintenance, serviceability, surveillance and issue of the various Night Vision devices as listed in Table 1 of Supplement A to Form NRC-2 License Application dated 14 December 1976, when approved by the NICP. Where radioactive materials are involved, SAAD has established special warehousing facilities and handling procedures. SAAD has established a formal radiation protection program administered by a qualified health physicist. As with nonradioactive items, items are inspected when received, at intervals during storage and immediately before shipment. The inspections are conducted according to established surveillance procedures as determined by the Electronics Command for each item. SAAD will provide the NICP with notification of individually controlled item receipts, inspections and shipments.

8. The program for control of the various Night Vision devices, as with other radioactive items is, to the extent practical, the same logistics procedures applied to other Army supplies. Regulatory guidance has been established by the Department of the Army, and implemented by the various commands, governing the management process, life-cycle management of material, logistics management and support, procurement, maintenance, storage transportation, including packaging, and disposal. For radioactive items the procedures are augmented by specific regulatory controls pertaining to the possession and use of radioactive materials, control of personnel radiation exposure, safe storage, handling, maintenance, transportation, and disposal of the items. For the various Night Vision devices as cited in the initial application dated 14 December 1976, more stringent controls have been established as these devices are classified confidential and due to their high dollar value, distribution of these devices are limited. The distribution data information for these devices are also classified confidential.

9. Warning instructions as contained in both the operator's manuals and the Direct Support, and General Support Maintenance Manual's for all Night Vision devices which utilizes $^{232}\text{ThF}_4$ in the multi-layer anti-reflection coatings contain the following notices:

Warning
Radiation Hazard

The antireflective coating on all infrared optics contain thorium fluoride which is slightly radioactive. The only potential hazard involves ingestion (swallowing or inhaling) of this coating material. Dispose of broken lenses etc in accordance with AR 755-15.

DRSEL-SF-H

11 April 1977

SUBJECT: Additional Supporting Information Pertaining to the Nuclear
Regulatory Commission Source Material License Application

10. The following operating instructions are listed in all operators manuals for the various Night Vision devices:

Caution

This equipment is a precision electro-optical instrument and must be handled carefully.

Caution

Do not use M1 antifogging kit on front lens of night sight, as this will degrade the infrared image. See lens cleaning instructions, table 3-1.

Caution

The boresight collimator is a precision optical instrument and must be handled carefully. Do not drop.

11. The maintenance instructions for the operator's preventive maintenance checks and services for eyepiece and front lenses contain the following information:

a. Examine lenses for scratches, chips, or cracks. Report any damage to direct support/general support maintenance. Inspect for dirt, dust, oil, and fingerprints.

b. Clean lenses (if necessary).

Caution

To avoid scratches on lens coating, do not rub cleaning solution on surface. Use only approved materials and procedures for cleaning lenses.

(1) Flush off surface of lens with potable water (clean water, suitable for drinking) to remove dust and grit.

(2) Thoroughly moisten a pad of cotton from night sight lens cleaning kit with lens cleaning solution.

(3) Apply lens cleaning solution to lens by dabbing lightly (do not rub) until surface is evenly covered.

(4) Wait one to three minutes depending on condition for solution to loosen heavy contamination (do not allow solution to dry).

DRSEL-SF-H

11 April 1977

SUBJECT: Additional Supporting Information Pertaining to the Nuclear
Regulatory Commission Source Material License Application

- (5) Flush off the solution with potable water.
- (6) Repeat steps 2 through 4 until heavy contamination is removed.
- (7) Clean lens in small sections by applying cleaning solution and gently wiping with clean pad.

Caution

Wiping motion should be accomplished in one direction only. The pad thus contaminated should be immediately discarded and not used for further cleaning.

- (8) Rinse lens with potable water.
- (9) Dry lens by wiping lightly in a single direction only with clean cotton pad.
- (10) During freezing weather, the lenses may be cleaned by using warm (not hot) potable water and cleaning solution mixed with warm potable water.

12. The operator's troubleshooting is limited to the replacement of the battery, replacement of the coolant cartridge, and cleaning of the lenses. If these steps do not restore the night sight to operation, refer to Direct Support/General Support maintenance.

Caution

The lens surface coating is easily damaged. Use extreme care to protect it from dirt, dust, fingerprints and humidity whenever possible. Do not breathe on lens surface, or use any cleaning or defogging material that is not specially approved for this application.

13. The maintenance concept for the various end item night vision devices as listed in the initial license application dated 14 December 1976, authorizes only Direct Support/General Support personnel to perform any required maintenance functions. The only common modules authorized at this maintenance level for replacements are the Detector-Dewar, DT-591 and 594/UA and the Imager, Optical, SU-97 and 103/UA. All other maintenance functions pertaining to those devices will be performed at SAAD. This maintenance will not include grinding or the removing of the $^{232}\text{ThF}_4$ coatings off of the common modules.

DRSEL-SF-H

SUBJECT: Additional Supporting Information Pertaining to the Nuclear
Regulatory Commission Source Material License Application

14. In previous meetings with representatives of the NRC, it was indicated that any Night Vision instruments using $^{232}\text{ThF}_4$ coatings would have to be labeled externally at least on the shipping/carrying case, and that the lens cell internally would have to have a radioactive marker/indication and reference to Army Regulations describing disposal instructions.

15. Assuming that if a soldier were to ingest all of the thorium contained in the AN/VSG-2, which is approximately 146 nanocuries, using ICRP data, the activity deposited to the bone is approximately 12 pico-curies and 15 pico-curies to the whole body is obtained. This compares to the maximum permissible body burden for $^{232}\text{thorium}$ of 40 nanocuries to the whole body based on the bone being exposed as the critical organ. The probability of a soldier ingesting all of the thorium can be shown to be in the order of 10^{-6} for this occurrence.

16. Based on the above, the Army would prefer not to add any additional labels, since it can be shown that there exist no significant radiation hazard to the user and maintenance personnel, also all of the common modules containing the $^{232}\text{ThF}_4$ coatings are already marked and labeled to identify these devices as containing radioactive material.

FOR THE COMMANDER

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as


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CATALOGING OF SUPPLIES AND EQUIPMENT

**CATALOGING AND SUPPLY
MANAGEMENT DATA**

Effective 1 April 1971

CHAPTER 5
MATERIAL MANAGEMENT RESPONSIBILITIES
FEDERAL SUPPLY CLASSIFICATION (FSC) CLASS ASSIGNMENTS

5-1. General. ★The Army agency of primary responsibility for this chapter is the US Army Materiel Command. Users of this regulation should send requests for clarification of the material in this chapter to the Commander, US Army Materiel Command, ATTN: AMCSU-I, 5001 Eisenhower Avenue, Alexandria, VA 22333.

5-2. Applicability. ★This chapter is applicable to:

- a. Headquarters, Department of the Army.
- b. Commander, US Army Materiel Command.
- c. Commander, US Army Security Agency.
- d. Commander, US Army Computer Systems Command.

5-3. Scope. a. This chapter announces materiel management assignment policy within the Department of the Army. It assigns responsibilities for cataloging, requirements computation, procurement, distribution, stock control and accountability, depot storage and issue, maintenance in CONUS, disposal, and budgeting of materiel. It also prescribes the method for materiel management transfers within the Department of the Army.

b. The chapter pertains to all National stock-numbered items authorized for issue to or used by Army units, organizations, installations, and activities, and other agencies for which the Army provides logistic support. It also includes those items required for International Logistics Programs.

c. Excluded from the provisions of this chapter to the extent indicated is the logistic support of items required for the following functional areas and activities:

(1) *Public works construction.* Materials and equipment required for construction undertaken as a public works function and "built-in" civilian type end items necessary for the proper functioning of the building or structure (AR 415-10). Items for which other activities are the item managers, which are to be used in the building or structure, such as power generation and environmental control equipment, will be procured through the appropriate/designated item management activity. Additionally, construction equipment, material handling equipment, refrigeration equipment, crash, fire and rescue equipment provided camps, posts, and stations (or amortized during construction facilities) will be procured through the appropriate/designated item manager.

(2) *Army research and industrial activities.* Materials not normally procured, stored, or issued for use in the Army supply system which are used for research or by industrial activities in the manufacture of end items are excluded, except that Government-furnished property items are subject to assignment when such items are used on supply contracts. (For example, FSC Class 6810 includes sulfuric acid. Assignment herein will pertain only to sulfuric acid which is procured, stocked, stored and issued for use within the Army supply system. The assignment will not pertain to the sulfuric acids used in the production of explosives.)

(3) *Civil functions.* Requirements and funds for civil functions are excluded except for items procured by the Army in support of the Defense Information Distribution System-Civil Defense as stated in DOD Directive 5105.43. All other logistic support will be

obtained from supply activities of the supervisory command activity assigned therein.

(4) *Special services supplies and equipment.* The assignment of logistic responsibilities for requirements and funds in this regulation does not include special services supplies and equipment procured with appropriated funds for off-duty recreation programs. The Adjutant General's Office is responsible for determination of requirements and for the provision of appropriated funds for off-duty recreation programs. Items for which other activities are the appropriate/designated item manager will be procured through the designated item manager.

(5) *Nonappropriated fund activities.* Logistic support of nonappropriated fund activities as defined in AR 210-53 is limited to that authorized by law and regulations.

(6) *Facilities engineering activities.* Supplies authorized for local purchase in AR 420-30.

(7) *Intelligence property.* Special intelligence materiel procured and managed under the provisions of AR 381-143.

★5-4. Policy. *a.* Assignment of materiel management responsibilities will be made on a Federal supply classification class basis to an organizational element of the Army consistent with missions assigned by Headquarters, Department of the Army and within the US Army Materiel Command, by the Commander, US Army Materiel Command. Materiel management responsibilities as assigned in this regulation do not alter these mission assignments nor materiel management function assignments made by a mission assignee to subordinate elements of their respective command or activity.

b. The inventory control point designated as the class manager will perform assigned materiel management function for all items within the FSC classes assigned by this regulation exclusive of the following:

(1) Items approved as exceptions under criteria outlined in paragraph 5-6c(2).

(2) Medical materiel (para 1-4 and 5-5a).

(3) Unique cryptologic items (para 1-4 and 5-5c).

c. No item in the Army supply system will

be managed by more than one item manager.

d. Each item used by the Army and managed by Defense Supply Agency (DSA) or the General Services Administration (GSA), or another service, will be under the cognizance of the class manager designated in this regulation.

e. The manager of the preferred item will also manage the applicable substitute and/or interchangeable items.

f. The military department designated as the lead service (hereafter referred to as the Primary Inventory Control Activity (PICA)) for wholesale life cycle management of multiservice used nonconsumable items of equipment and/or systems by OSD, JCS or DCA will perform those cataloging and materiel management functions agreed to by the Joint Logistic Commanders in appropriate documents and DOD 4140.26-M.

5-5. Mission assignees. The following commands or activities are designated mission assignees for the commodity groups and classes indicated:

a. The Surgeon General is designated mission assignee for medical materiel regardless of the FSC class in which the medical item is classified. Medical items are primarily assigned to FSC Group 65.

b. The Vice Chief of Staff, Army, Management Information Systems Directorate, is designated mission assignee for regulated items of General Purpose Automatic Data Processing Equipment. Data processing equipment is assigned to FSC classes 7010, 7020, 7021, 7022, 7025, 7030, 7035, 7040, 7045, and 7050.

★c. The Commander, US Army Security Agency (USASA) is designated mission assignee for FSC class 5811, Other Cryptologic Equipment and Components, and for other assigned unique cryptologic items regardless of FSC class in which the items are classified. In this limited mission the USASA will only assume management responsibility for:

(1) Items assigned to FSC 5811.

(2) Items for which NSA retains control as the executive agent.

(3) Items under the design control of

NSA or ASA and used exclusively for cryptologic purposes.

(4) Items for which ASA is designated as the developer in AR 70-1 and that are of the type cited in (1), (2), and (3) above.

★*d.* The Commander, US Army Materiel Command is designated as the mission assignee for all materiel not assigned to the above mission assignees or excluded by appropriate reference in this regulation or by other regulations.

5-6. Responsibilities. *a. Mission assignees.* Mission assignees (para 5-5) are responsible for:

(1) Designating the supervisory command/activity and/or the class manager for the FSC classes listed in table 5-1.

(2) Assigning responsibility for performing materiel management functions to subordinate elements of their respective organizations.

b. Supervisory command/activity. The supervisory command/activity is responsible for staff supervision of its respective class manager(s).

★*c. Class manager.* The responsibilities of the Service Item Control Center (SICC) for FSC classes/items assigned to DSA, GSA or another service for integrated materiel management are prescribed by AR 710-1. The class manager of an FSC class retained for Army management is responsible for preparing the Identification List (IL) DA supply catalogs as prescribed in chapter 12, AR 310-3, and for—

(1) Performing assigned materiel management functions for all items within each assigned class other than items approved as exceptions: medical items (para 5-5a) and unique cryptologic items (para 5-5c).

(2) Approving assignment of exceptions to other inventory control points provided the exceptions are not authorized for local purchase and qualify under the following criteria:

(a) Items subject to continuous redesign and modifications during the production phase.

(b) Items in a development stage and not approved for operational use.

(c) Items peculiar to atomic ordnance

materiel which, because of design characteristics or because of special test inspection requirements, are controlled by the Atomic Energy Commission.

(d) Items with a security classification of CONFIDENTIAL or higher.

(e) Items whose specialized design limits their application and/or which are given individual consideration in materiel management actions.

(f) Items directly related to, designed for, and exclusively applicable to a major end item(s) and/or component(s) of a major end item(s) or system(s).

★(3) Referring disagreements on request for assignment of exceptions through command channels to the Commander, US Army Materiel Command, ATTN: AMCSU-I, 5001 Eisenhower Avenue, Alexandria, VA 22333.

d. Item manager. The item manager is responsible for performing assigned materiel management functions for assigned items. He will furnish data to the applicable activity for the preparation of the IL DA supply catalogs.

5-7. Processing materiel management transfers. *a.* The losing and gaining item manager(s) will provide for concurrent processing of materiel management transfers. Distribution of related procurement, technical, and materiel management data throughout the Army supply system will be based on an established effective date of transfer.

b. The gaining and losing item managers will coordinate all actions required to accomplish materiel management transfer in compliance with chapter 6. They will establish an effective date of transfer designed to provide adequate leadtime for:

(1) Dissemination of change notices to the Army Master Data File (chap 7).

★(2) Preparation and distribution of changes to DA Supply Catalogs (AR 310-3).

(3) Processing of DA Form 3141 (Change to Army Adopted Items of Materiel and List of Reportable Items (SB 700-20)), when appropriate, in accordance with chapter 9 of this regulation.

5-8. Assignment of FSC classes to Army activities. *a.* Army activities are assigned re-

sponsibilities for materiel management of FSC classes as shown in table 5-1.

abbreviations of commands and installations.

b. Figure 5-1 lists names, addresses, and codes of class managers.

c. Figure 5-2 lists names, addresses, and codes of class managers.

Table 5-1. Assignment of FSC Classes to Army Activities

	<i>FSC Class and Title</i>	<i>Supervisory Command/Activity</i>	<i>Class Manager Activity Code</i>	<i>Integrated Materiel Manager</i>
1005	Guns, through 30mm -----	ARMCOM	BF	
1010	Guns, over 30mm up to 75mm -----	ARMCOM	BF	
1015	Guns, 75mm through 125mm -----	ARMCOM	BF	
1020	Guns, over 125mm through 150mm -----	ARMCOM	BF	
1025	Guns, over 150mm through 200mm -----	ARMCOM	BF	
1030	Guns, over 200mm through 300mm -----	ARMCOM	BF	
1035	Guns, over 300mm -----	ARMCOM	BF	
★1040	Chemical Weapons and Equipment -----	ARMCOM	BF	
1045	Launchers, Torpedo and Depth Charge -----	ARMCOM	BF	
1055	Launchers, Rocket and Pyrotechnic -----	ARMCOM	BF	
1070	Nets and Booms, Ordnance -----	TROSCOM	AJ	
1075	Degaussing and Mine Sweeping Equipment -----	TROSCOM	AJ	
1080	Camouflage and Deception Equipment -----	TROSCOM	AJ	
1090	Assemblies Interchangeable Between Weapons in Two or More Classes -----	ARMCOM	BF	
1095	Miscellaneous Weapons -----	ARMCOM	BF	
★1105	Nuclear Bombs -----	ARMCOM	BF	
★1110	Nuclear Projectiles -----	ARMCOM	BF	
★1115	Nuclear Warheads and Warhead Sections -----	ARMCOM	BF	
★1125	Nuclear Demolition Charges -----	ARMCOM	BF	
★1127	Nuclear Rockets -----	ARMCOM	BF	
★1130	Conversion Kits, Nuclear Ordnance -----	ARMCOM	BF	
★1135	Fuzing and Firing Devices, Nuclear Ordnance -----	ARMCOM	BF	
★1140	Nuclear Components -----	ARMCOM	BF	
★1145	Explosive and Pyrotechnic Components, Nuclear Ordnance -----	ARMCOM	BF	
★1190	Specialized Test and Handling Equipment, Nuclear Ordnance -----	ARMCOM	BF	
★1195	Miscellaneous Nuclear Ordnance -----	ARMCOM	BF	
1210	Fire Control Directors -----	ARMCOM	BF	
1220	Fire Control Computing Sights & Devices -----	ARMCOM	BF	
1230	Fire Control Systems, Complete -----	ARMCOM	BF	
1240	Optical Sighting and Ranging Equipment -----	ARMCOM	BF	
1250	Fire Control Stabilizing Mechanisms -----	ARMCOM	BF	

Table 5-1. Assignment of FSC Classes to Army Activities—Continued

	<i>FSC Class and Title</i>	<i>Supervisory Command/ Activity</i>	<i>Class Manager Activity Code</i>	<i>Integrated Materiel Manager</i>
1260	Fire Control Designating and Indicating Equipment	ARMCOM	BF	
1265	Fire Control Transmitting & Receiving Equipment, except Airborne	ARMCOM	BF	
1270	Aircraft Gunnery Fire Control Components	ARMCOM	BF	
1280	Aircraft Bombing Fire Control Components	MICOM	BD	
1285	Fire Control Radar Equipment, except Airborne	ARMCOM	BF	
1287	Fire Control Sonar Equipment	ARMCOM	BF	
1290	Miscellaneous Fire Control Equipment	ARMCOM	BF	
★1305	Ammunition, through 30mm	ARMCOM	BF	
★1310	Ammunition, over 30mm up to 75mm	ARMCOM	BF	
★1315	Ammunition, 75mm through 125mm	ARMCOM	BF	
★1320	Ammunition, over 125mm	ARMCOM	BF	
★1325	Bombs	ARMCOM	BF	
★1330	Grenades	ARMCOM	BF	
1336	Guided Missile Warheads and Explosive Components	MICOM	BD	
1337	Guided Missile and Space Vehicle Explosive Propulsion Units, Solid Fuel & Components	MICOM	BD	
1338	Guided Missile and Space Vehicle Inert Propulsion Units, Solid Fuel & Components	MICOM	BD	
★1340	Rockets, Rocket Ammunition and Rocket Components	ARMCOM	BF	
★1345	Land Mines	ARMCOM	BF	
★1350	Underwater Miner Inert Components	ARMCOM	BF	
★1351	Underwater Mine Explosive Components	ARMCOM	BF	
★1355	Torpedo Inert Components	ARMCOM	BF	
★1356	Torpedo Explosive Components	ARMCOM	BF	
★1360	Depth Charge Inert Components	ARMCOM	BF	
★1361	Depth Charge Explosive Components	ARMCOM	BF	
★1365	Military Chemical Agents	ARMCOM	BF	
★1370	Pyrotechnics	ARMCOM	BF	
★1375	Demolition Materials	ARMCOM	BF	
★1376	Bulk Explosives	ARMCOM	BF	
★1377	Cartridge and Propellant Actuated Devices and Components	ARMCOM	BF	

See footnotes at end of table.

Table 5-1. Assignment of FSC Classes to Army Activities—Continued

	<i>FSC Class and Title</i>	<i>Supervisory Command/ Activity</i>	<i>Class Manager Activity Code</i>	<i>Integrated Materiel Manager</i>
★1380	Military Biological Agents -----	ARMCOM	BF	
★1385	Explosive Ordnance Disposal Tools, Surface ---	ARMCOM	BF	
★1386	Explosive Ordnance Disposal Tools, Under- water -----	ARMCOM	BF	
★1390	Fuzes and Primers -----	ARMCOM	BF	
★1395	Miscellaneous Ammunition -----	ARMCOM	BF	
★1398	Specialized Ammunition Handling and Serv- icing Equipment -----	ARMCOM	BF	
1410	Guided Missiles -----	MICOM	BD	
1420	Guided Missile Components -----	MICOM	BD	
1425	Guided Missile Systems, Complete -----	MICOM	BD	
1427	Guided Missile Subsystems -----	MICOM	BD	
1430	Guided Missile Remote Control Systems -----	MICOM	BD	
1440	Launchers, Guided Missile -----	MICOM	BD	
1450	Guided Missile Handling and Servicing Equip- ment -----	MICOM	BD	
1510	Aircraft, Fixed Wing -----	AVSCOM	CT	
1520	Aircraft, Rotary Wing -----	AVSCOM	CT	
1540	Gliders -----	AVSCOM	CT	
1550	Drones -----	AVSCOM	CT	
1560	Airframe Structural Components -----	AVSCOM	CT	
1610	Aircraft Propellers -----	AVSCOM	CT	
1615	Helicopter Rotor Blades, Drive Mechanisms and Components -----	AVSCOM	CT	
1620	Aircraft Landing Gear Components -----	AVSCOM	CT	
1630	Aircraft Wheel and Brake Systems -----	AVSCOM	CT	
1650	Aircraft Hydraulic, Vacuum, and De-Icing Sys- tem Components -----	AVSCOM	CT	
1660	Aircraft Air Conditioning, Heating, and Pres- surizing Equipment -----	AVSCOM	CT	
1670	Parachutes; Aerial Pick-Up, Delivery, Recovery System; and Cargo Tie Down Equipment ---	AVSCOM	CT	
1680	Miscellaneous Aircraft Accessories and Compo- nents -----	AVSCOM	CT	
1710	Aircraft Arresting Barrier, and Barricade Equipment -----	AVSCOM	CT	
1720	Aircraft Launching Equipment -----	AVSCOM	CT	
1730	Aircraft Ground Servicing Equipment -----	AVSCOM	CT	

Table 5-1. Assignment of FSC Classes to Army Activities—Continued

	<i>FSC Class and Title</i>	<i>Supervisory Command/ Activity</i>	<i>Class Manager Activity Code</i>	<i>Integrated Materiel Manager</i>
1740	Airfield Specialized Trucks and Trailers-----	AVSCOM	CT	
1810	Space Vehicles-----	MICOM	BD	
1820	Space Vehicle Components-----	MICOM	BD	
1830	Space Vehicle Remote Control Systems-----	MICOM	BD	
1840	Space Vehicle Launchers-----	MICOM	BD	
1850	Space Vehicle Handling and Servicing Equip- ment-----	MICOM	BD	
1860	Space Survival Equipment-----	TROSCOM	AJ	
1905	Combat Ships and Landing Vessels-----	TROSCOM	AJ	
1910	Transport Vessels, Passenger and Troop-----	TROSCOM	AJ	
1915	Cargo and Tanker Vessels-----	TROSCOM	AJ	
1920	Fishing Vessels-----	TROSCOM	AJ	
1925	Special Service Vessels-----	TROSCOM	AJ	
1930	Barges and Lighters, Cargo-----	TROSCOM	AJ	
1935	Barges and Lighters, Special Purpose-----	TROSCOM	AJ	
1940	Small Craft-----	TROSCOM	AJ	
1945	Pontoons and Floating Docks-----	TROSCOM	AJ	
1950	Floating Drydocks-----	TROSCOM	AJ	
1955	Dredges-----	TROSCOM	AJ	
1990	Miscellaneous Vessels-----	TROSCOM	AJ	
2010	Ship and Boat Propulsion Components-----	TROSCOM	AJ	
2020	Rigging and Rigging Gear-----	TROSCOM	AJ	
2030	Deck Machinery-----	TROSCOM	AJ	
2040	Marine Hardware and Hull Items-----	TROSCOM	AJ	
2050	Buoys-----	TROSCOM	AJ	
2060	Commercial Fishing Equipment-----	TROSCOM	AJ	
2090	Miscellaneous Ship and Marine Equipment-----	TROSCOM	AJ	
2210	Locomotives-----	TROSCOM	AJ	
2220	Rail Cars-----	TROSCOM	AJ	
2230	Right-of-Way Construction and Maintenance Equipment Railroad	TROSCOM	CD	DCSC
2240	Locomotive and Rail Car Accessories and Com- ponents-----	TROSCOM	AJ	
2250	Track Materials, Railroad-----	TROSCOM	AJ	
2305	Ground Effect Vehicles-----	AVSCOM	CT	
2310	Passenger Motor Vehicles-----	TACOM ²	AZ	

See footnotes at end of table.

Table 5-1. Assignment of FSC Classes to Army Activities—Continued

<i>FSC Class and Title</i>	<i>Supervisory Command/ Activity</i>	<i>Class Manager Activity Code</i>	<i>Integrated Materiel Manager</i>
2320 Trucks and Truck Tractors, Wheeled-----	TACOM ²	AZ	
2330 Trailers-----	TACOM ²	AZ	
2340 Motorcycles, Motor Scooters, and Bicycles-----	TACOM ²	AZ	
2350 Combat, Assault and Tactical Vehicles, Tracked-----	ARMCOM	BF	
2410 Tractors, Full Track, Low Speed-----	TROSCOM	CD	DCSC
2420 Tractors, Wheeled-----	TROSCOM	CD	DCSC
2430 Tractors, Track Laying, High Speed-----	TACOM	AZ	
2510 Vehicular Cab, Body and Frame Structural Components-----	TROSCOM	CD	DCSC/TACOM ³
2520 Vehicular Power Transmission Components---	TROSCOM	CD	DCSC/TACOM ³
2530 Vehicular Brake, Steering, Axle, Wheel, and Track Components-----	TROSCOM	CD	DCSC/TACOM ³
2540 Vehicular Furniture and Accessories-----	TROSCOM	CD	DCSC/TACOM ³
2590 Miscellaneous Vehicular Components-----	TROSCOM	CD	DCSC/TACOM ³
2610 Tires and Tubes, Pneumatic, Except Aircraft---	TACOM	AZ	TACOM ⁴
2620 Tire and Tubes, Pneumatic, Aircraft-----	AVSCOM	CT	
2630 Tires, Solid and Cushion-----	TACOM	AZ	TACOM ⁴
2640 Tire Rebuilding and Tire and Tube Repair Ma- terials-----	TACOM	AZ	TACOM ⁴
2805 Gasoline Reciprocating Engines, Except Air- craft and Components-----	TROSCOM	CD	DCSC/TACOM ³
2810 Gasoline Reciprocating Engines, Aircraft; and Components-----	AVSCOM	CT	
2815 Diesel Engines and Components-----	TROSCOM	CD	DCSC
2820 Steam Engines, Reciprocating; and Compo- nents-----	TROSCOM	AJ	
2825 Steam Turbines and Components-----	TROSCOM	AJ	
2830 Water Turbines and Water Wheels; and Compo- nents-----	TROSCOM	AJ	
2835 Gas Turbines and Jet Engines, Except Aircraft; and Components-----	TROSCOM	AJ	
2840 Gas Turbines and Jet Engines, Aircraft; and Components-----	AVSCOM	CT	
2845 Rocket Engines and Components-----	MICOM	BD	
2850 Gasoline Rotary Engines and Components---	TROSCOM	CD	DCSC
2895 Miscellaneous Engines and Components-----	TROSCOM	CD	SCSC
2910 Engine Fuel System Components, Nonaircraft---	TROSCOM	CD	DCSC/TACOM ³
2915 Engine Fuel System Components, Aircraft---	AVSCOM	CT	

See footnotes at end of table.

Table 5-1. Assignment of FSC Classes to Army Activities—Continued

	<i>FSC Class and Title</i>	<i>Supervisory Command/ Activity</i>	<i>Class Manager Activity Code</i>	<i>Integrated Materiel Manager</i>
2920	Engine Electrical System Components, Nonaircraft	TROSCOM	CD	DCSC/TACOM ³
2925	Engine Electrical System Components, Aircraft	AVSCOM	CT	
2930	Engine Cooling System Components, Nonaircraft	TROSCOM	CD	DCSC/TACOM ³
2935	Engine Cooling System Components, Aircraft	AVSCOM	CT	
2940	Engine Air and Oil Filters, Strainers, and Cleaners, Nonaircraft	TROSCOM	CD	DCSC/TACOM ³
2945	Engine Air and Oil Filters, Strainers, and Cleaners, Aircraft	AVSCOM	CT	
2950	Turbosuperchargers	TROSCOM	AJ	
2990	Miscellaneous Engine Accessories, Nonaircraft	TROSCOM	CD	DCSC/TACOM ³
2995	Miscellaneous Engine Accessories, Aircraft	AVSCOM	CT	
3010	Torque Converters and Speed Changers	TROSCOM	CD	DCSC
3020	Gears, Pulleys, Sprockets, and Transmission Chain	TROSCOM	CD	DCSC
3030	Belting, Drive Belts, Fan Belts, and Accessories	TROSCOM	CD	DCSC
3040	Miscellaneous Power Transmission Equipment	TROSCOM	CD	DCSC
3110	Bearings, Antifriction Unmounted	TROSCOM	CD	DISC
3120	Bearings, Plain, Unmounted	TROSCOM	CD	DISC
3130	Bearings, Mounted	TROSCOM	CD	DISC
3210	Sawmill and Planing Mill Machinery	TROSCOM	CD	DGSC
3220	Woodworking Machines	TROSCOM	CD	DGSC
3230	Tools and Attachments for Woodworking Machinery	TROSCOM	CD	DGSC
3405	Saws and Filing Machines	TROSCOM	CD	DGSC ⁵
3408	Machining Centers and Way-Type Machines	TROSCOM	CD	DGSC ⁵
3410	Electrical and Ultrasonic Erosion Machines	TROSCOM	CD	DGSC ⁵
3411	Boring Machines	TROSCOM	CD	DGSC ⁵
3412	Broaching Machines	TROSCOM	CD	DGSC ⁵
3413	Drilling and Tapping Machines	TROSCOM	CD	DGSC ⁵
3414	Gear Cutting and Finishing Machines	TROSCOM	CD	DGSC ⁵
3415	Grinding Machines	TROSCOM	CD	DGSC ⁵
3416	Lathes	TROSCOM	CD	DGSC ⁵
3417	Milling Machines	TROSCOM	CD	DGSC ⁵
3418	Planers and Shapers	TROSCOM	CD	DGSC ⁵
3419	Miscellaneous Machine Tools	TROSCOM	CD	DGSC ⁵

See footnotes at end of table.

Table 5-1. Assignment of FSC Classes to Army Activities—Continued

	<i>FSC Class and Title</i>	<i>Supervisory Command/ Activity</i>	<i>Class Manager Activity Code</i>	<i>Integrated Materiel Manager</i>
3422	Rolling Mills and Drawing Machines-----	TROSCOM	CD	DGSC ⁵
3424	Metal Heat Treating and Non-Thermal Treat- ing Equipment-----	TROSCOM	CD	DGSC ⁵
3426	Metal Finishing Equipment-----	TROSCOM	CD	DGSC ⁵
3431	Electric Arc Welding Equipment-----	TROSCOM	CD	DGSC ⁵
3432	Electric Resistance Welding Equipment-----	TROSCOM	CD	DGSC ⁵
3433	Gas Welding, Heat Cutting, and Metalizing Equipment-----	TROSCOM	CD	DGSC ⁵
3436	Welding Positioners and Manipulators-----	TROSCOM	CD	DGSC ⁵
3438	Miscellaneous Welding Equipment-----	TROSCOM	CD	DGSC ⁵
3439	Miscellaneous Welding, Soldering, and Brazing Supplies and Accessories-----	TROSCOM	CD	DGSC
3441	Bending and Forming Machines-----	TROSCOM	CD	DGSC ⁵
★3442	Hydraulic and Pneumatic Presses, Power Driven-----	TROSCOM	CD	DGSC ⁵
3443	Mechanical Presses, Power Driven-----	TROSCOM	CD	DGSC ⁵
3444	Manual Presses-----	TROSCOM	CD	DGSC ⁵
3445	Punching and Shearing Machines-----	TROSCOM	CD	DGSC ⁵
3446	Forging Machinery and Hammers-----	TROSCOM	CD	DGSC ⁵
3447	Wire and Metal Ribbon Forming Machines-----	TROSCOM	CD	DGSC ⁵
3448	Riveting Machines-----	TROSCOM	CD	DGSC ⁵
3449	Miscellaneous Secondary Metal Forming and Cutting Machines-----	TROSCOM	CD	DGSC ⁵
3450	Machine Tools, Portable-----	TROSCOM	CD	DGSC ⁵
3455	Cutting Tools for Machine Tools-----	TROSCOM	CD	DGSC
3456	Cutting and Forming Tools for Secondary Metalworking Machinery-----	TROSCOM	CD	DGSC
3460	Machine Tool Accessories-----	TROSCOM	CD	DGSC
3461	Accessories for Secondary Metalworking Ma- chinery-----	TROSCOM	CD	DGSC
3465	Production Jigs, Fixtures, and Templates-----	TROSCOM	CD	DGSC
3470	Machine Shop Sets, Kits, and Outfits-----	TROSCOM	CD	DGSC
3510	Laundry and Dry Cleaning-----	TROSCOM	CD	DGSC
3520	Shoe Repairing Equipment-----	TROSCOM	CD	DGSC
3530	Industrial Sewing Machines and Mobile Textile Repair Shops-----	TROSCOM	CD	DGSC
3540	Wrapping and Packaging Machinery-----	TROSCOM	CD	GSA
3550	Vending and Coin Operated Machines-----	TROSCOM	CD	GSA

See footnotes at end of table.

Table 5-1. Assignment of FSC Classes to Army Activities—Continued

	<i>FSC Class and Title</i>	<i>Supervisory Command/ Activity</i>	<i>Class Manager Activity Code</i>	<i>Integrated Materiel Manager</i>
3590	Miscellaneous Service and Trade Equipment ..	TROSCOM	CD	GSA
★3605	Food Products Machinery and Equipment	TROSCOM	CD	DGSC
3610	Printing, Duplicating, and Bookbinding Equip- ment	TROSCOM	CD	DGSC
3611	Industrial Marking Machines	TROSCOM	CD	DGSC ⁵
★3615	Pulp and Paper Industries Machines	TROSCOM	CD	DGSC
3620	Rubber and Plastics Working Machinery	TROSCOM	CD	DGSC ⁵
★3625	Textile Industries Machinery	TROSCOM	CD	DGSC
★3630	Clay and Concrete Products Industries Ma- chinery	TROSCOM	CD	DGSC
3635	Crystal and Glass Industries Machinery	TROSCOM	CD	DGSC ⁵
★3640	Tobacco Manufacturing Machinery	TROSCOM	CD	DGSC
★3645	Leather Tanning and Leather Working Indus- tries Machinery	TROSCOM	CD	DGSC
3650	Chemical and Pharmaceutical Products Man- ufacturing Machinery	TROSCOM	CD	DGSC ⁵
3655	Gas Generating and Dispensing Systems, Fixed or Mobile	TROSCOM	CD	DGSC
3660	Industrial Size Reduction Machinery	TROSCOM	CD	DGSC ⁵
3670	Specialized Semiconductor Microcircuit and Printed Circuit Board Manufacturing Ma- chinery	TROSCOM	CD	DGSC ⁵
3680	Foundry Machinery, Related Equipment and Supplies	TROSCOM	CD	DGSC ⁵
3685	Specialized Metal Container Manufacturing Machinery and Related Equipment	TROSCOM	CD	DGSC ⁵
★3690	Specialized Ammunition Ordnance Machinery and Related Equipment	ARMCOM	BF	
3693	Industrial Assembly Machines	TROSCOM	CD	DGSC ⁵
3694	Clean Work Stations, Controlled Environment, and Related Equipment	TROSCOM	CD	DGSC ⁵
3695	Miscellaneous Special Industry Machinery	TROSCOM	CD	DGSC ⁵
3710	Soil Preparation Equipment	TROSCOM	CD	DCSC
3720	Harvesting Equipment	TROSCOM	CD	DCSC
3730	Dairy, Poultry, and Livestock Equipment	TROSCOM	CD	DCSC
3740	Pest, Disease, and Frost Control Equipment ...	TROSCOM	CD	DCSC
3750	Gardening Implements and Tools	TROSCOM	CD	GSA
3760	Animal Drawn Vehicle and Farm Trailers	TROSCOM	CD	DCSC
3770	Saddlery, Harness, Whips, and Related Animal Furnishings	TROSCOM	CD	DCSC

See footnotes at end of table.

Table 5-1. Assignment of FSC Classes to Army Activities—Continued

	<i>FSC Class and Title</i>	<i>Supervisory Command/ Activity</i>	<i>Class Manager Activity Code</i>	<i>Integrated Materiel Manager</i>
3805	Earth Moving and Excavating Equipment -----	TROSCOM	CD	DCSC
3810	Cranes and Crane-Shovels -----	TROSCOM	CD	DCSC
3815	Crane and Crane-Shovel Attachments -----	TROSCOM	CD	DCSC
3820	Mining, Rock Drilling, Earth Boring, and Re- lated Equipment -----	TROSCOM	CD	DCSC
3825	Road Clearing and Cleaning Equipment -----	TROSCOM	CD	DCSC
3830	Truck and Tractor Attachments -----	TROSCOM	CD	DCSC
3835	Petroleum Production and Distribution Equip- ment -----	TROSCOM	CD	DCSC
3895	Miscellaneous Construction Equipment -----	TROSCOM	CD	DCSC
3910	Conveyors -----	TROSCOM	CD	DCSC
★3915	Materiels Feeders -----	TROSCOM	CD	DCSC
3920	Materiels Handling Equipment Non-Self- Propelled -----	TROSCOM	CD	DGSC
3930	Warehouse Trucks and Tractors, Self-Propelled	TROSCOM	CD	DCSC
3940	Blocks, Tackle, Rigging, and Slings -----	TROSCOM	CD	DISC
3950	Winches, Hoists, Cranes, and Derricks -----	TROSCOM	CD	DCSC
3960	Elevators and Escalators -----	TROSCOM	AJ	
3990	Miscellaneous Materiels Handling Equipment	TROSCOM	CD	DGSC
4010	Chain and Wire Rope -----	TROSCOM	CD	DISC
4020	Fiber Rope, Cordage, and Twine -----	TROSCOM	CD	DISC
4030	Fittings for Rope, Cable, and Chain -----	TROSCOM	CD	DISC
4110	Refrigeration Equipment -----	TROSCOM	CD	DGSC
4120	Air Conditioning Equipment -----	TROSCOM	CD	DGSC
4130	Refrigeration and Air Conditioning Compo- nents -----	TROSCOM	CD	DGSC
4140	Fans, Air Circulators, Blower Equipment -----	TROSCOM	CD	DGSC
4210	Fire Fighting Equipment -----	TROSCOM	CD	DCSC
4220	Marine Lifesaving and Diving Equipment -----	TROSCOM	CD	DCSC
★4230	Decontaminating and Impregnating Equip- ment -----	TROSCOM	CD	DGSC
4240	Safety and Rescue Equipment -----	TROSCOM	CD	DGSC
4310	Compressors and Vacuum Pumps -----	TROSCOM	CD	DCSC
4320	Power and Hand Pumps -----	TROSCOM	CD	DCSC
4330	Centrifugals, Separators, and Pressure and Vacuum Filters -----	TROSCOM	CD	DCSC
4410	Industrial Boilers -----	TROSCOM	AJ	

Table 5-1. Assignment of FSC Classes to Army Activities—Continued

	<i>FSC Class and Title</i>	<i>Supervisory Command/ Activity</i>	<i>Class Manager Activity Code</i>	<i>Integrated Materiel Manager</i>
4420	Heat Exchangers and Steam Condensers -----	TROSCOM	AJ	
★4430	Industrial Furnaces, Kilns Lehrs, and Ovens --	TROSCOM	CD	DCSC
4440	Driers, Dehydrators, and Anhydrators -----	TROSCOM	CD	DCSC
4460	Air Purification Equipment -----	TROSCOM	CD	DCSC
4470	Nuclear Reactors -----	TROSCOM	AJ	
4510	Plumbing Fixtures and Accessories -----	TROSCOM	CD	DCSC
4520	Space Heating Equipment and Domestic Water Heaters -----	TROSCOM	CD	DCSC
4530	Fuel Burning Equipment Units -----	TROSCOM	CD	DCSC
4540	Miscellaneous Plumbing, Heating, and Sanita- tion Equipment -----	TROSCOM	CD	DCSC
4610	Water Purification Equipment -----	TROSCOM	CD	DCSC
4620	Water Distillation Equipment, Marine and In- dustrial -----	TROSCOM	CD	DCSC
4630	Sewage Treatment Equipment -----	TROSCOM	CD	DCSC
4710	Pipe and Tube -----	TROSCOM	CD	DCSC
4720	Hose and Tubing, Flexible -----	TROSCOM	CD	DCSC
4730	Fittings and Specialties; Hose, Pipe & Tube --	TROSCOM	CD	DCSC
4810	Valves, Powered -----	TROSCOM	CD	DCSC
4820	Valves, Nonpowered -----	TROSCOM	CD	DCSC
4910	Motor Vehicle Maintenance and Repair Shop Specialized Equipment -----	ARMCOM	BF	
4920	Aircraft Maintenance and Repair Shop Special- ized Equipment -----	AVSCOM	CT	
★4921	Torpedo Maintenance, Repair and Checkout Specialized Equipment -----	ARMCOM	BF	
★4923	Depth Charges and Underwater Mines Main- tenance, Repair and Checkout Specialized Equipment -----	ARMCOM	BF	
★4925	Ammunition Maintenance, Repair and Check- out Specialized Equipment -----	ARMCOM	BF	
★4927	Rocket Maintenance, Repair and Checkout Spe- cialized Equipment -----	ARMCOM	BF	
4930	Lubrication and Fuel Dispensing Equipment --	TROSCOM	CD	DCSC
4931	Fire Control Maintenance and Repair Shop Specialized Equipment -----	ARMCOM	BF	
4933	Weapons Maintenance and Repair Shop Spe- cialized Equipment -----	ARMCOM	BF	
4935	Guided Missile Maintenance, Repair, and Checkout Specialized Equipment -----	MICOM	BD	

Table 5-1. Assignment of FSC Classes to Army Activities—Continued

	<i>FSC Class and Title</i>	<i>Supervisory Command/ Activity</i>	<i>Class Manager Activity Code</i>	<i>Integrated Materiel Manager</i>
4940	Miscellaneous Maintenance and Repair Shop Specialized Equipment -----	ARMCOM	BF	
4960	Space Vehicle Maintenance, Repair and Check- out Specialized Equipment -----	MICOM	BD	
5110	Hand Tools, Edged, Nonpowered -----	TROSCOM	CD	GSA
5120	Hand Tools, Nonedged, Nonpowered -----	TROSCOM	CD	GSA
5130	Hand Tools, Power Driven -----	TROSCOM	CD	GSA
5133	Drill, Bits, Counterbores, and Countersinks: Hand and Machine -----	TROSCOM	CD	GSA
5136	Taps, Dies, and Collets: Hand and Machine ----	TROSCOM	CD	GSA
5140	Tool and Hardware Boxes -----	TROSCOM	CD	GSA
5180	Sets, Kits, and Outfits of Hand Tools -----	TROSCOM	CD	GSA
5210	Measuring Tools, Craftmen's -----	TROSCOM	CD	GSA
*5220	Inspection Gages and Precision Layouts Tools -----	ARMCOM	BF	
5280	Sets, Kits, and Outfits of Measuring Tools -----	ARMCOM	BF	
5305	Screws -----	TROSCOM	CD	DISC
5306	Bolts -----	TROSCOM	CD	DISC
5307	Studs -----	TROSCOM	CD	DISC
5310	Nuts and Washers -----	TROSCOM	CD	DISC
5315	Nails, Keys, and Pins -----	TROSCOM	CD	DISC
5320	Rivets -----	TROSCOM	CD	DISC
5325	Fastening Devices -----	TROSCOM	CD	DISC
5330	Packing and Gasket Materials -----	TROSCOM	CD	DISC
5335	Metal Screening -----	TROSCOM	CD	DISC
5340	Miscellaneous Hardware -----	TROSCOM	CD	DISC
5345	Disks and Stones, Abrasive -----	TROSCOM	CD	GSA
5350	Abrasive Materials -----	TROSCOM	CD	GSA
5355	Knobs and Pointers -----	TROSCOM	CD	DISC
5360	Coil, Flat, and Wire Springs -----	TROSCOM	CD	DISC
5365	Rings, Shims, and Spacers -----	TROSCOM	CD	DISC
5410	Prefabricated and Portable Buildings -----	TROSCOM	CD	DCSC
5420	Bridges, Fixed and Floating -----	TROSCOM	AJ	
5430	Storage Tanks -----	TROSCOM	CD	DCSC
5440	Scaffolding Equipment and Concrete Forms ----	TROSCOM	CD	DCSC
5445	Prefabricated Tower Structures -----	TROSCOM	AJ	
5450	Miscellaneous Prefabricated Structures -----	TROSCOM	CD	DCSC
5510	Lumber and Related Basic Wood Materials -----	TROSCOM	CD	DCSC

Table 5-1. Assignment of FSC Classes to Army Activities—Continued

	<i>FSC Class and Title</i>	<i>Supervisory Command/ Activity</i>	<i>Class Manager Activity Code</i>	<i>Integrated Materiel Manager</i>
5520	Millwork	TROSCOM	CD	DCSC
5530	Plywood and Veneer	TROSCOM	CD	DCSC
5610	Mineral Construction Materials, Bulk	TROSCOM	CD	GSA
5620	Building Glass, Tile, Brick, and Block	TROSCOM	CD	GSA
5630	Pipe and Conduit, Nonmetallic	TROSCOM	CD	GSA
5640	Wallboard, Building Paper, and Thermal In- sulation Materials	TROSCOM	CD	GSA
5650	Roofing and Siding Materials	TROSCOM	CD	GSA
5660	Fencing, Fences, and Gates	TROSCOM	CD	DCSC
5670	Architectural and Related Metal Products	TROSCOM	CD	GSA
5680	Miscellaneous Construction Materials	TROSCOM	CD	GSA
5805	Telephone and Telegraph Equipment	ECOM	CL	DESC
5810	Communications Security Equipment and Com- ponents	ECOM ⁶	CM	
5811	Other Cryptologic Equipment and Components	ASA ⁷	CU	
5815	Teletype and Facsimile Equipment	ECOM	CL	DESC
5820	Radio and Television Communication Equip- ment, Except Airborne	ECOM	CL	DESC
5821	Radio and Television Communication Equip- ment Airborne	ECOM	CL	DESC
5825	Radio Navigation Equipment, Except Airborne	ECOM	CL	DESC
5826	Radio Navigation Equipment, Airborne	ECOM	CL	
5830	Intercommunication and Public Address Sys- tems, Except Airborne	ECOM	CL	DESC
5831	Intercommunication and Public Address Sys- tems, Airborne	ECOM	CL	DESC
5835	Sound Recording and Reproducing Equipment	ECOM	CL	DESC
5840	Radar Equipment, Except Airborne	ECOM	CL	
5841	Radar Equipment, Airborne	ECOM	CL	
5845	Underwater Sound Equipment	ECOM	CL	
5850	Visible and Invisible Light Communication Equipment	ECOM	CL	
5855	Night Vision Equipment, Emitted and Reflected Radiation	ECOM	CL	
5860	Stimulated Coherent Radiation Devices, Com- ponents and Accessories	ECOM	CL	
5865	Electronic Countermeasures Equipment	ECOM	CL	
5895	Miscellaneous Communication Equipment (less ECM, ECCM, & QRC)	ECOM	CL	DESC
5905	Resistors	ECOM	CL	DESC

See footnotes at end of table.

Table 5-1. Assignment of FSC Classes to Army Activities—Continued

	<i>FSC Class and Title</i>	<i>Supervisory Command/ Activity</i>	<i>Class Manager Activity Code</i>	<i>Integrated Materiel Manager</i>
5910	Capacitors -----	ECOM	CL	DESC
5915	Filters and Networks -----	ECOM	CL	DESC
5920	Fuses and Lightning Arrestors -----	ECOM	CL	DESC
5925	Circuit Breakers -----	ECOM	CL	DESC
5930	Switches -----	ECOM	CL	DESC
5935	Connectors, Electrical -----	ECOM	CL	DESC
5940	Lugs, Terminals, and Terminal Strips -----	ECOM	CL	DGSC
★5945	Relays and Solenoids -----	ECOM	CL	DESC
5950	Coils and Transformers -----	ECOM	CL	DESC
5955	Piezoelectric Crystals -----	ECOM	CL	DESC
5960	Electron Tubes and Associated Hardware -----	ECOM	CL	DESC
5961	Semiconductor Devices and Associated Hardware -----	ECOM	CL	DESC
5962	Microcircuits, Electronic -----	ECOM	CL	DESC
5965	Headsets, Handsets, Microphones and Speakers -----	ECOM	CL	DESC
5970	Electrical Insulators and Insulating Materials -----	ECOM	CL	DGSC
5975	Electrical Hardware and Supplies -----	ECOM	CL	DGSC
5977	Electrical Contact Brushes and Electrodes -----	ECOM	CL	DGSC
5985	Antennas, Waveguides, and Related Equipment -----	ECOM	CL	DESC
5990	Synchros and Resolvers -----	ECOM	CL	DESC
5995	Cable, Cord, and Wire Assemblies; Communication Equipment -----	ECOM	CL	DGSC
5999	Miscellaneous Electrical and Electronic Components -----	ECOM	CL	DESC
6105	Motors, Electrical -----	TROSCOM	CD	DGSC
6110	Electrical Control Equipment -----	TROSCOM	CD	DGSC
6115	Generators and Generator Sets, Electrical -----	TROSCOM	CD	DGSC
6116	Fuel Cell Power Units, Components, and Accessories -----	TROSCOM	AJ	
6120	Transformer: Distribution and Power Station -----	TROSCOM	CD	DGSC
6125	Converters, Electrical, Rotating -----	ECOM	CL	DGSC
6130	Converters, Electrical, Nonrotating -----	ECOM	CL	DGSC
6135	Batteries, Primary -----	ECOM	CL	
6140	Batteries, Secondary -----	ECOM	CL	DGSC
6145	Wire and Cable, Electrical -----	ECOM	CL	DISC
6150	Miscellaneous Electrical Power and Distribution Equipment -----	TROSCOM	CD	DGSC

Table 5-1. Assignment of FSC Classes to Army Activities—Continued

	<i>FSC Class and Title</i>	<i>Supervisory Command/ Activity</i>	<i>Class Manager Activity Code</i>	<i>Integrated Materiel Manager</i>
6210	Indoor and Outdoor Electrical Lighting Fixtures.....	TROSCOM	CD	DGSC
6220	Electrical Vehicular Lights and Fixtures.....	TROSCOM	CD	DGSC
6230	Electric Portable and Hand Lighting Equipment.....	TROSCOM	CD	DGSC
6240	Electric Lamps.....	TROSCOM	CD	DGSC
6250	Ballasts, Lampholders, and Starters.....	TROSCOM	CD	DGSC
6260	Nonelectric Lighting Fixtures.....	TROSCOM	CD	DGSC
★6310	Traffic and Transit Signal Systems.....	TROSCOM	CD	DGSC
6320	Shipboard Alarm and Signal Systems.....	TROSCOM	AJ	
★6330	Railroad Signal and Warning Devices.....	TROSCOM	CD	DGSC
6340	Aircraft Alarm and Signal Systems.....	AVSCOM	CT	
6350	Miscellaneous Alarm and Signal Systems.....	TROSCOM	CD	DGSC
6505	Drugs, Biologicals and Official Reagents.....	TSG	AS ¹⁰	DPSC
6508	Medicated Cosmetics and Toiletries.....	TSG	AS ¹⁰	DPSC
6510	Surgical Dressing Materials.....	TSG	AS ¹⁰	DPSC
6515	Medical and Surgical Instruments, Equipment and Supplies.....	TSG	AS ¹⁰	DPSC
6520	Dental Instruments, Equipment and Supplies.....	TSG	AS ¹⁰	DPSC
6525	X-Ray Equipment and Supplies; Medical, Dental, Veterinary.....	TSG	AS ¹⁰	DPSC
6530	Hospital Furniture, Equipment, Utensils, and Supplies.....	TSG	AS ¹⁰	DPSC
6532	Hospital and Surgical Clothing and Related Special Purpose Items.....	TSG	AS ¹⁰	DPSC
6540	Opticians' Instruments, Equipment, and Supplies.....	TSG	AS ¹⁰	DPSC
6545	Medical Sets, Kits, and Outfits.....	TSG	AS ¹⁰	DPSC
6605	Navigational Instruments.....	TROSCOM	AJ	
6610	Flight Instruments.....	AVSCOM	CT	
6615	Automatic Pilot Mechanism and Airborne Gyro Components.....	ECOM	CL	
6620	Engine Instruments.....	AVSCOM	CT	
6625	Electrical and Electronic Properties Measuring and Testing Instruments.....	ECOM	CL	DESC
6630	Chemical Analysis Instruments.....	TSG/ TROSCOM ⁸	AS ¹⁰ /CD	DPSC
6635	Physical Properties Testing Equipment.....	TROSCOM	CD	DGSC

See footnotes at end of table.

Table 5-1. Assignment of FSC Classes to Army Activities—Continued

	<i>FSC Class and Title</i>	<i>Supervisory Command/ Activity</i>	<i>Class Manager Activity Code</i>	<i>Integrated Materiel Manager</i>
6636	Environmental Chambers and Related Equip- ment-----	TROSCOM	AJ	
6640	Laboratory Equipment and Supplies-----	TSG/ TROSCOM ^a	AS ¹⁰ /CD	DPSC
6645	Time Measuring Instruments-----	TROSCOM	CD	DGSC
6650	Optical Instruments-----	ARMCOM	BF	
6655	Geophysical and Astronomical Instruments---	TROSCOM	CD	DGSC
6660	Meteorological Instruments and Apparatus---	ECOM	CL	DGSC
★6665	Hazard-Detecting Instruments and Apparatus.	ARMCOM	BF	
6670	Scales and Balances-----	TROSCOM	CD	DGSC
★6675	Drafting, Surveying, and Mapping Instruments.	TROSCOM	CD	DGSC
6680	Liquid and Gas Flow, Liquid Level, and Mechanical Motion Measuring Instruments---	TROSCOM	CD	DGSC
6685	Pressure, Temperature, and Humidity Measur- ing and Controlling Instruments-----	TROSCOM	CD	DGSC
6695	Combination and Miscellaneous Instruments--	ECOM	CL	DGSC
6710	Cameras, Motion Picture-----	ECOM	CL	DGSC
6720	Cameras, Still Picture-----	ECOM	CL	DGSC
6730	Photographic Projection Equipment-----	ECOM	CL	DGSC
6740	Photographic Developing and Finishing Equip- ment-----	ECOM	CL	DGSC
6750	Photographic Supplies-----	ECOM	CL	DGSC
6760	Photographic Equipment and Accessories-----	ECOM	CL	DGSC
★6770	Film, Processed-----	ECOM	CL	DGSC
6780	Photographic Sets, Kits, and Outfits-----	ECOM	CL	
6810	Chemicals-----	TROSCOM	CD	DGSC
6820	Dyes-----	TROSCOM	CD	DGSC
6830	Gases: Compressed and Liquefied-----	TROSCOM	CD	DGSC
6840	Pest Control Agents and Disinfectants-----	TROSCOM	CD	DGSC
6850	Miscellaneous Chemical Specialties-----	TROSCOM	CD	DGSC
6910	Training Aids-----	TROSCOM	AJ	
6920	Armament Training Devices-----	MICOM	BD	
6930	Operational Training Devices-----	AVSCOM	CT	
6940	Communication Training Devices-----	ECOM	CL	
7010	ADPE Configuration-----	VCSA/ECOM	VCSA/CL ⁹	
7020	ADP Central Processing Unit (CPU, Computer), Analog-----	VCSA/ECOM	VCSA/CL ⁹	
7021	ADP Central Processing Unit (CPU, Computer), Digital-----	VCSA/ECOM	VCSA/CL ⁹	

See footnotes at end of table.

Table 5-1. Assignment of FSC Classes to Army Activities—Continued

	<i>FSC Class and Title</i>	<i>Supervisory Command/ Activity</i>	<i>Class Manager Activity Code</i>	<i>Integrated Materiel Manager</i>
7022	ADP Central Processing Unit (CPU, Computer) Hybrid	VCSA/ECOM	VCSA/CL ⁹	
7025	ADP Input/Output and Storage Devices	VCSA/ECOM	VCSA/CL ⁹	
7030	ADP Software	VCSA/ECOM	VCSA/CL ⁹	
7035	ADP Accessorial Equipment	VCSA/ECOM	VCSA/CL ⁹	
7040	Punched Card Equipment	VCSA/ECOM	VCSA/CL ⁹	
7045	ADP Supplies and Support Equipment	VCSA/ECOM	VCSA/CL ⁹	
7050	ADP Components	VCSA/ECOM	VCSA/CL ⁹	
7105	Household Furniture	TROSCOM	CD	GSA
7110	Office Furniture	TROSCOM	CD	GSA
7125	Cabinets, Lockers, Bins, and Shelving	TROSCOM	CD	GSA
7195	Miscellaneous Furniture and Fixtures	TROSCOM	CD	GSA
7210	Household Furnishings	TROSCOM	CA	DPSC
7220	Floor Coverings	TROSCOM	CD	GSA
7230	Draperies, Awnings, and Shades	TROSCOM	CD	GSA
7240	Household and Commercial Utility Containers	TROSCOM	CD	GSA
7290	Miscellaneous Household and Commercial Fur- nishings and Appliances	TROSCOM	CD	GSA
7310	Food Cooking, Baking, and Serving Equipment	TROSCOM	CD	DGSC
7320	Kitchen Equipment and Appliances	TROSCOM	CD	DGSC
7330	Kitchen Hand Tools and Utensils	TROSCOM	CD	GSA
7340	Cutlery and Flatware	TROSCOM	CD	GSA
7350	Tableware	TROSCOM	CD	GSA
7360	Sets, Kits, and Outfits: Food Preparation and Serving	TROSCOM	CD	DGSC
7420	Accounting and Calculating Machines	TROSCOM	CD	GSA
7430	Typewriters and Office Type Composing Ma- chines	TROSCOM	CD	GSA
7450	Office Type Sound Recording and Reproducing Machines	ECOM	CL	
7460	Visible Record Equipment	TROSCOM	CD	GSA
7490	Miscellaneous Office Machines	TROSCOM	CD	GSA
7510	Office supplies	TROSCOM	CD	GSA
7520	Office Devices and Accessories	TROSCOM	CD	GSA
7530	Stationery and Record Forms	TROSCOM	CD	GSA
★7540	Standard Forms	TROSCOM	CD	GSA
7610	Books and Pamphlets	TROSCOM	CD	DGSC

See footnotes at end of table.

Table 5-1. Assignment of FSC Classes to Army Activities—Continued

<i>FSC Class and Title</i>	<i>Supervisory Command/ Activity</i>	<i>Class Manager Activity Code</i>	<i>Integrated Materiel Manager</i>
7630 Newspaper and Periodicals -----	TROSCOM	CD	DGSC
7640 Maps, Atlases, Charts, and Globes -----	TROSCOM	CD	DGSC
★7650 Drawings and Specifications -----	TROSCOM	CD	DGSC
7660 Sheet and Book Music -----	TROSCOM	CD	DGSC
7670 Microfilm, Processed -----	TROSCOM	CD	DGSC
7690 Miscellaneous Printer Matter -----	TROSCOM	CD	DGSC
7710 Musical Instruments -----	TROSCOM	CD	GSA
7720 Musical Instrument Parts and Accessories ----	TROSCOM	CD	GSA
7730 Phonographs, Radios, and Television Sets: Home Type -----	TROSCOM	CD	GSA
7740 Phonograph Records -----	TROSCOM	CD	GSA
7810 Athletic and Sporting Equipment -----	TROSCOM	CD	GSA
7820 Games, Toys, and Wheeled Goods -----	TROSCOM	CD	GSA
7830 Recreational and Gymnastic Equipment -----	TROSCOM	CD	GSA
7910 Floor Polishers and Vacuum Equipment -----	TROSCOM	CD	GSA
7920 Brooms, Brushes, Mops, and Sponges -----	TROSCOM	CD	GSA
7930 Cleaning and Polishing Compounds and Prep- arations -----	TROSCOM	CD	GSA
8010 Paints, Dopes, Varnishes, and Related Products --	TROSCOM	CD	GSA
8020 Paint and Artists Brushes -----	TROSCOM	CD	GSA
8030 Preservative and Sealing Compounds -----	TROSCOM	CD	GSA
8040 Adhesives -----	TROSCOM	CD	GSA
8105 Bags and Sacks -----	TROSCOM	CD	GSA
8110 Drums and Cans -----	TROSCOM	CD	DGSC
8115 Boxes, Cartons, and Crates -----	TROSCOM	CD	GSA
8120 Commercial and Industrial Gas Cylinders -----	TROSCOM	CD	DGSC
8125 Bottles and Jars -----	TROSCOM	CD	DGSC
★8130 Reels and Spools -----	ECOM	CL	DGSC
8135 Packaging and Packing Bulk Materials -----	TROSCOM	CD	GSA
8140 Ammunition and Nuclear Ordnance Boxes, Packages and Special Containers -----	MICOM	BD	
8145 Specialized Shipping and Storage Containers --	AVSCOM	CT	
8305 Textile Fabrics -----	TROSCOM	CA	DPSC
8310 Yarn and Thread -----	TROSCOM	CA	DPSC
8315 Notions and Apparel Findings -----	TROSCOM	CA	DPSC
★8320 Padding and Stuffing Material -----	TROSCOM	CA	DPSC

Table 5-1. Assignment of FSC Classes to Army Activities—Continued

	<i>FSC Class and Title</i>	<i>Supervisory Command/ Activity</i>	<i>Class Manager Activity Code</i>	<i>Integrated Material Manager</i>
8325	Fur Materials -----	TROSCOM	CA	DPSC
8330	Leather -----	TROSCOM	CA	DPSC
8335	Shoe Findings and Soling Materials -----	TROSCOM	CA	DPSC
8340	Tents and Tarpaulins -----	TROSCOM	CA	DPSC
8345	Flags and Pennants -----	TROSCOM	CA	DPSC
8405	Outerwear, Men's -----	TROSCOM	CA	DPSC
8410	Outerwear, Women's -----	TROSCOM	CA	DPSC
8415	Clothing, Special Purpose -----	TROSCOM	CA	DPSC
8420	Underwear and Nightwear, Men's -----	TROSCOM	CA	DPSC
8425	Underwear and Nightwear, Women's -----	TROSCOM	CA	DPSC
8430	Footwear, Men's -----	TROSCOM	CA	DPSC
8435	Footwear, Women's -----	TROSCOM	CA	DPSC
8440	Hosiery, Handwear, and Clothing Accessories Men's -----	TROSCOM	CA	DPSC
8445	Hosiery, Handwear, and Clothing Accessories, Women's -----	TROSCOM	CA	DPSC
8450	Children's and Infants' Apparel and Acces- sories -----	TROSCOM	CA	DPSC
8455	Badges and Insignia -----	TROSCOM	CA	DPSC
8460	Luggage -----	TROSCOM	CA	DPSC
8465	Individual Equipment -----	TROSCOM	CA	DPSC
8470	Armor, Personal -----	TROSCOM	CA	DPSC
8475	Specialized Flight Clothing and Accessories ---	TROSCOM	CA	
8510	Perfume, Toilet Preparations, and Powders ----	TROSCOM	CA	GSA
8520	Toilet Soap, Shaving Preparations, and Denti- frices -----	TROSCOM	CA	GSA
8530	Personal Toiletry Articles -----	TROSCOM	CA	GSA
8540	Toiletry Paper Products -----	TROSCOM	CA	GSA
8710	Forage and Feed -----	TROSCOM	CD	GSA
8720	Fertilizers -----	TROSCOM	CD	GSA
8730	Seeds and Nursery Stocks -----	TROSCOM	CD	GSA
8810	Live Animals, Raised for Food -----	TROSCOM	CA	DPSC
★8820	Live Animals, Not Raised for Food -----	TROSCOM	AJ	
8905	Meat, Poultry, and Fish -----	TROSCOM	CA	DPSC
8910	Dairy Foods and Eggs -----	TROSCOM	CA	DPSC
8915	Fruits and Vegetables -----	TROSCOM	CA	DPSC

Table 5-1. Assignment of FSC Classes to Army Activities—Continued

	<i>FSC Class and Title</i>	<i>Supervisory Command/ Activity</i>	<i>Class Manager Activity Code</i>	<i>Integrated Material Manager</i>
8920	Bakery and Cereal Products -----	TROSCOM	CA	DPSC
8925	Sugar, Confectionery, and Nuts -----	TROSCOM	CA	DPSC
8930	Jams, Jellies, and Preserves -----	TROSCOM	CA	DPSC
8935	Soups and Bouillons -----	TROSCOM	CA	DPSC
8940	Special Dietary Foods and Food Specialty Pre- parations -----	TROSCOM	CA	DPSC
8945	Food Oil and Fats -----	TROSCOM	CA	DPSC
8950	Condiments and Related Products -----	TROSCOM	CA	DPSC
8955	Coffee, Tea, and Cocoa -----	TROSCOM	CA	DPSC
8960	Beverages, Nonalcoholic -----	TROSCOM	CA	DPSC
8965	Beverages, Alcoholic -----	TROSCOM	CA	DGSC
8970	Composite Food Packages -----	TROSCOM	CA	DPSC
8975	Tobacco Products -----	TROSCOM	CA	DPSC
9110	Fuels, Solid -----	TROSCOM	CD	DGSC
9130	Liquid Propellants and Fuels, Petroleum Base -----	TROSCOM	CD	DFSC
9135	Liquid Propellants Fuels and Oxidizers, Chem- ical Base -----	MICOM	BD	
9140	Fuel Oils -----	TROSCOM	CD	DFSC
9150	Oils and Grease: Cutting, Lubricating and Hy- draulic -----	TROSCOM	CD	DFSC/DGSC "
9160	Miscellaneous Waxes, Oils, and Fats -----	TROSCOM	CD	DGSC
9310	Paper and Paperboard -----	TROSCOM	CD	GSA
9320	Rubber Fabricated Materials -----	TROSCOM	CD	DGSC
9330	Plastics Fabricated Materials -----	TROSCOM	CD	DGSC
9340	Glass Fabricated Materials -----	TROSCOM	CD	DGSC
9350	Refractories and Fire Surfacing Materials -----	TROSCOM	CD	DGSC
9390	Miscellaneous Fabricated Nonmetallic Mate- rials -----	TROSCOM	CD	DGSC
*9410	Crude Grades of Plant Materials -----	TROSCOM	CA	DPSC
*9420	Fibers: Vegetable, Animal, and Synthetic -----	TROSCOM	CA	DPSC
*9430	Miscellaneous Crude Animal Products, Inedible -----	TROSCOM	CA	DPSC
*9440	Miscellaneous Crude Agricultural and Forestry Products -----	TROSCOM	CD	DGSC
*9450	Nonmetallic Scrap, Except Textile -----	TROSCOM	CD	DGSC
9505	Wire, Nonelectrical, Iron and Steel -----	TROSCOM	CD	DISC
9510	Bars and Rods, Iron and Steel -----	TROSCOM	CD	DISC

See footnotes at end of table.

Table 5-1. Assignment of FSC Classes to Army Activities—Continued

	<i>FSC Class and Title</i>	<i>Supervisory Command/ Activity</i>	<i>Class Manager Activity Code</i>	<i>Integrated Materiel Manager</i>
★9515	Plate, Sheet, Strip and Foil: Iron and Steel ----	TROSCOM	CD	DISC
9520	Structural Shapes, Iron and Steel -----	TROSCOM	CD	DISC
9525	Wire, Nonelectrical, Nonferrous Base Metal ---	TROSCOM	CD	DISC
9530	Bars and Rods, Nonferrous Base Metal -----	TROSCOM	CD	DISC
9535	Plate, Sheet, Strip, and Foil: Nonferrous Base Metal -----	TROSCOM	CD	DISC
9540	Structural Shapes, Nonferrous Base Metal ----	TROSCOM	CD	DISC
9545	Plate, Sheet, Strip, Foil, and Wire: Precious Metal -----	TROSCOM	CD	DISC
9610	Ores -----	TROSCOM	CD	DISC
9620	Minerals, Natural and Synthetic -----	TROSCOM	CD	DISC
9630	Additive Metal Materials and Master Alloys ---	TROSCOM	CD	DISC
9640	Iron and Steel Primary and Semifinished Prod- ucts -----	TROSCOM	CD	DISC
9650	Nonferrous Base Metal Refinery and Interme- diate Forms -----	TROSCOM	CD	DISC
9660	Precious Metals Primary Forms -----	TROSCOM	CD	DISC
9670	Iron and Steel Scrap -----	TROSCOM	CD	DISC
9680	Nonferrous Metal Scrap -----	TROSCOM	CD	DISC
9905	Signs, Advertising Displays, and Identification Plates -----	TROSCOM	CD	GSA
9910	Jewelry -----	TROSCOM	CD	GSA
9915	Collectors' Items -----	TROSCOM	CD	GSA
9920	Smokers' Articles and Matches -----	TROSCOM	CD	GSA
9925	Ecclesiastical Equipment, Furnishings, and Supplies -----	TROSCOM	CD	DGSC
9930	Memorials: Cemeterial and Mortuary Equip- ment and Supplies -----	TROSCOM	CD	DGSC
9999	Miscellaneous Items -----	TROSCOM	CD	DGSC

¹ Free rockets are the responsibility of MICOM.

² The US Army Tank-Automotive Command (Activity Code AZ) is designated the mission assignee for commercial design motor vehicles in FSC classes 2310 and 2340 and for general purpose commercial design vehicles in FSC classes 2320 and 2330.

★ ³ The US Army General Materiel and Petroleum Activity (Activity Code CD) is the central point of contact and the activity assigned Army retail management responsibility for all items in these 11 automotive classes, except for items peculiar to combat tactical vehicles of Army design. For items peculiar to combat and tactical vehicles of Army design, the US Army Tank-Automotive Command is the DOD Integrated Materiel Manager in accordance with AR 710-26.

⁴ US Army Tank-Automotive Command is the DOD Integrated Materiel Manager for all items in FSC classes 2610, 2630 and 2640.

20 October 1975

★⁵ Defense General Supply Center is the Integrated Materiel Manager for these 41 FSC's in FSG 34 and 36, formerly assigned to Defense Industrial Plant Equipment Center (DIPEC). Effective 1 May 1972, the US Army General Materiel and Petroleum Activity assumed Army retail management responsibility for the Defense General Supply Center managed items in these classes. Also effective 1 May 1972, US Army Armament Command assumed management responsibility for those items formerly managed by DIPEC which have an acquisition cost of \$,1000 or more and qualify as Industrial Plant Equipment and for all reparable end items.

★⁶ The Commander, US Army Materiel Command is designated the mission assignee for FSC 5810-Communications Security Equipment and Components, and for other assigned unique communications security items regardless of FSC class in which the items are classified. The US Army Communications Security Logistics Agency (Activity Code CM), an activity under Commander, US Army Electronics Command, the supervisory command, is designated class manager. Accountable items in FSC 5810 will be managed by Activity Code CM and nonaccountable items will be managed by Activity Code CL in accordance with AR 380-40.

★⁷ Paragraph 5-5c designates the Commander, US Army Security Agency as the mission assignee for FSC class 5811-Other Cryptologic Equipment and Components, and for other assigned unique cryptologic items regardless of FSC class in which the items are classified.

★⁸ Paragraph 5-5a designates The Surgeon General, Department of the Army, as the mission assignee for medical materiel regardless of the FSC class in which the medical items are classified. Medical items are primarily assigned to FSC Group 65. The Commander, US Army Troop Support Command is assigned as the supervisory command for nonmedical items in FSC classes 6630 and 6640.

★⁹ Regulated items of data processing equipment are managed by the Vice Chief of Staff, Army, Management Information Systems Directorate (DACS-DIR), through the US Army Computer Systems Command.

★¹⁰ The Medical Materiel Agency (Activity Code AM) performs the SICC functions delegated by The Surgeon General.

¹¹ DFSC will manage the bulk products and DGSC will manage the packaged products in FSC 9150.

<i>Abbreviations</i>	<i>Name and Address</i>
★AMC	Commander, US Army Materiel Command, 5001 Eisenhower Avenue, Alexandria, VA 22333
ARMCOM	Commander, US Army Armament Command, Rock Island Arsenal, Rock Island, IL 61201
AVSCOM	Commander, US Army Aviation Systems Command, St. Louis, MO 63166.
ECOM	Commander, US Army Electronics Command, Fort Monmouth, NJ 07703
MICOM	Commander, US Army Missile Command, Redstone Arsenal, AL 35809
USASA	Commander, US Army Security Agency, Arlington Hall Station, Arlington, VA 22212
USACSLA	Commander, US Army Communications Security Logistics Agency, Fort Huachuca, AZ 85613
★USACSC	Commander, US Army Computer Systems Command, Ft. Belvoir, VA 22060
TACOM	Commander, US Army Tank-Automotive Command, Warren, MI 48089
TROSCOM	Commander, US Army Troop Support Command, St. Louis, MO 63120
DSA	Director, Defense Supply Agency, Cameron Station, Alexandria, VA 22314
DCSC	Commander, Defense Construction Supply Center, 52 Starling Street, Columbus, OH 43215
DESC	Commander, Defense Electronics Supply Center, 1507 Wilmington Pike, Dayton, OH 45401
DFSC	Commander, Defense Fuel Supply Center, Cameron Station, Alexandria, VA 22314
DGSC	Commander, Defense General Supply Center, Richmond, VA 23297
DISC	Commander, Defense Industrial Supply Center, 700 Robbins Avenue, Philadelphia, PA 19111
DPSC	Commander, Defense Personnel Support Center, 2800 South 20th Street, Philadelphia, PA 19101
TSG	The Surgeon General, Department of the Army, Washington, DC 20310
GSA	General Services Administration, ATTN: Commissioner of Federal Supply Service, 18th & F Streets NW Washington, DC 20315 202-343-1100
VCSA	Vice Chief of Staff, Army, Department of the Army, Washington, DC 20310

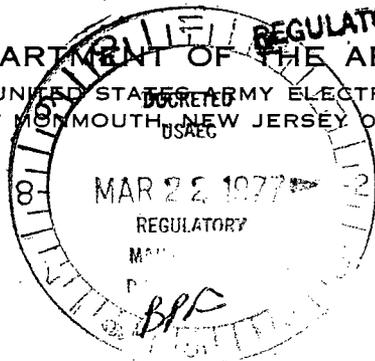
Figure 5-1

<i>Code</i>	<i>Name and Address</i>
★BF	US Army Armament Command, ATTN: AMSAR-MMC, Rock Island Arsenal, Rock Island, IL 61201
AJ	US Army Troop Support Command, ATTN: AMSTS-ST, St. Louis, MO 63120
★AM	US Army Medical Materiel Agency, ATTN: USAMMA-LC, Frederick, MD 21701
AN	US Army Catalog Data Agency (USACDA), ATTN: AMXCA-O, New Cumber- land Army Depot, New Cumberland, PA 17070
★AS	The Surgeon General, Department of the Army, HQDA (DASG-HCL) Wash- ington, DC 20310
AZ	US Army Tank-Automotive Command, ATTN: AMSTA-F (NICP) Warren, MI 48089
BD	US Army Missile Command, ATTN: AMSMI-SSC (NICP), Redstone Arsenal, Huntsville, AL 35809
★CA	US Army Support Activity, Philadelphia, ATTN: AMXCP-AC, (Subsistence, Clothing, and Textiles), 2800 South 20th Street, Philadelphia, PA 19101
★CD	US Army General Materiel and Petroleum Activity, ATTN: STSGP, New Cum- berland Army Depot, New Cumberland, PA 17070
★CL	US Army Electronics Command, ATTN: AMSEL-MM-C, Fort Monmouth, NJ 07703
★CM	US Army Communications Security Logistics Agency, ATTN: AMSEL-CCM- NICP-LS, Ft. Huachuca, AZ 85613
CT	US Army Aviation Systems Command, ATTN: AMSAV-QC, PO Box 209, Main Office, St. Louis, MO 63166
CU	US Army Security Agency, Materiel Support Command, ATTN: IAMIC/C, Vint Hill Farms Station, Warrenton, VA 22186

Figure 5-2



REGULATORY FILE 40-8598
 DEPARTMENT OF THE ARMY
 HEADQUARTERS UNITED STATES ARMY ELECTRONICS COMMAND
 FORT MONMOUTH, NEW JERSEY 07703



~~50857~~
 6275

DRSEL-SF-H

17 MAR 1977

US Nuclear Regulatory Commission
 Radioisotope Licensing Branch
 Division of Fuel Cycle and Material Safety
 ATTN: Control Number 5035
 Washington, DC 20555



Dear Sir:

Reference is made to a telephone conversation on 10 March 1977, between Mr. Earl Wright, License Reviewer, US Nuclear Regulatory Commission and Mr. Steven Horne, this command, subject: Additional Requested Information for a Nuclear Regulatory Commission Source Material License.

The maximum amount of source material that would be used in any one system is 1.85 grams of 232Thorium.

Due to the urgent military requirements for these Night Vision Devices, it is requested that the Source Material License be issued by 30 April 1977 in order to exercise options in various procurements for manportable common thermal night sights in May 1977.

Inclosed are the requested copies of Army Regulation 755-15, Disposal of Unwanted Radioactive Material; Military Specifications MIL-C-675A, Coating of Glass Optical Elements (Anti-Reflection); MIL-M-13508C, Mirror, Front Surfaced Aluminized: For Optical Elements; and MIL-STD-810C, Environmental Test Methods.

Sincerely,

RHM Savaiton

ROBERT H. MARCRUM
 Colonel, GS
 Chief of Staff

4 Incl
 As stated

Copy furnished:
 Cdr, DARCOM
 ATTN: DRCSE-P (w incl/4 cy)

COPIES SENT TO OFF. OF
 INSPECTION AND ENFORCEMENT

ARMY REGULATION

No. 755-15

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D.C., 4 November 1966

DISPOSAL OF SUPPLIES AND EQUIPMENT

DISPOSAL OF UNWANTED RADIOACTIVE MATERIAL

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Section I. GENERAL

1. Purpose. This regulation establishes responsibility and provides policy and instructions for the storage shipment, and disposal of unwanted radioactive material.

2. Scope. This regulation has Army-wide application, but does not apply to combat areas.

3. Definitions. For the purpose of this regulation, the following definitions apply:

a. Accumulating organization. Any Army activity, other than radioactive material disposal facility, which generates, accumulates, and/or stores unwanted radioactive material.

b. Local storage. Storage of unwanted radioactive material, on temporary basis only, at places other than the Army radioactive material disposal facility.

c. Army radioactive material disposal facility. A facility which receives unwanted radioactive

material from accumulating organizations and which also stores, concentrates, packages, marks, labels, ships, and effects the ultimate disposal of this material.

d. Radioactive material. Any material or combination of materials that spontaneously emit ionizing radiation.

(1) *Radioisotope.* Any isotope which is radioactive.

(2) *Byproduct material.* Any material, except special nuclear material, which has become radioactive by exposure to the radiation incident to or which is yielded during the process of producing or utilizing special nuclear material. Cobalt-60 and strontium-90 are examples of byproduct material.

*This regulation supersedes AR 755-380, 10 April 1962.

Encl

- (3) *Special nuclear material.* Plutonium, uranium-233, uranium enriched with the isotopes 233 or 235, and any other material which the U.S. Atomic Energy Commission determines to be special nuclear material, or any material artificially enriched with any of the aforementioned.
- (4) *Source material.* Any material, except special nuclear material, which contains by weight one twentieth of one percent (0.05%) or more of uranium, or thorium, or any combination thereof.
- (5) *SS material.* Collective term for both source and special nuclear material. Source and special material includes plutonium, thorium, uranium-233, uranium-235, and uranium-238. In addition, whenever deuterium, tritium, enriched lithium or compounds of these materials are employed in special weapons applications, they are considered to be source and special material and must be controlled and accounted for as such.

- (a) *Collectible amounts of source and special material.* Tuballoy oxide or alloy, plutonium oxides or mixtures of or alloy and tuballoy oxides that can be separated from those materials with which they were picked up or collected.
- (b) *Returnable amounts of source and special material.* Those amounts of source and special nuclear materials that are to be returned automatically to the nearest national stockpile site or operational storage site without specific authority of Commander, Field Command, Defense Atomic Support Agency (FC/DASA). The following amounts are considered minimum returnable quantities:

1. Any part made of tuballoy, or alloy, or plutonium which has not lost its identity even though it may be severely damaged.
2. Any piece of tuballoy, even though its identity as a part is no longer recognizable, which weighs 100 grams or more. This amount corresponds to a square of metal 1 inch on a side, approximately $\frac{5}{16}$ of an inch thick.

3. Any collectible amounts of tuballoy oxide in quantities of 1000 grams (a volume of approximately 42 cubic inches or 2.75 cupfuls) or more.
4. Any piece of or alloy or plutonium metal which weighs 1.0 gram or more, even though its identity as a part is no longer recognizable. This amount corresponds to a bit of metal $\frac{1}{4}$ inch by $\frac{1}{4}$ inch by $\frac{1}{16}$ inch (0.64 cm X 0.64 cm X 0.16 cm).
5. Any collectible amounts of or alloy or plutonium oxides or mixture of or alloy and tuballoy oxides, in quantities of 1 gram or more.

e. Disposal of radioactive material. The act of getting rid of unwanted radioactive material under proper authority. Disposal may be accomplished by removal from man's immediate habitat or by transfer, donation, or sale to persons authorized to receive it under AR 700-52.

f. Ultimate disposal. Ultimate disposal includes burial in the sea or land which removes the radioactive material from man's immediate habitat. It also includes incineration, release into sanitary sewerage systems, and dispersal into air or water under carefully controlled conditions. It does not include action taken to return source and special nuclear material to FC/DASA or the U.S. Atomic Energy Commission (AEC) for reprocessing.

g. Radioactive waste. Excess and surplus unwanted radioactive material and material contaminated with radioisotopes, including source and special waste as defined in *h* below, special weapons radioactive waste and radioactive waste associated with the production, possession, and use of radioactive material. Radioactive waste will include property which, while originally nonradioactive, has become contaminated to such an extent that it is economically unsound to decontaminate or the contamination cannot be reduced to an acceptable level for its intended use.

h. Source and special nuclear waste. Source and special nuclear residues which cannot be economically separated from those materials which have been contaminated.

i. Radiation controlled area. Any area, access into which is controlled for the purposes of protection of personnel from exposure to radiation or to radioactive materials.

4. **Responsibilities.** *a. Commanding General, U.S. Army Materiel Command.* The Commanding General, U.S. Army Materiel Command, is responsible for—

- (1) Formulating policies, procedures, and methods for disposal of unwanted radioactive materials.
- (2) Establishing Army radioactive material disposal facilities in CONUS.
- (3) Conducting research and development programs to provide improved methods, techniques, and hardware for the disposal of unwanted radioactive material.
- (4) Designing and developing specifications for special containers for radioactive waste, and producing such containers when a requirement is established.
- (5) Providing technical assistance with regard to special radiological disposal problems.
- (6) Providing technical advice for the establishment and operation of Army radioactive material disposal facilities overseas.
- (7) Providing qualified technical escort personnel to accompany shipments of unwanted radioactive material when requested.
- (8) Conducting an annual command inspection of the Army radioactive material disposal facilities located within CONUS.

b. The Surgeon General. The Surgeon General is responsible for providing advice, guidance, and medical assistance on the health hazards associated with and resulting from the disposal of unwanted radioactive materials. Requests for medical advice and assistance will be forwarded through command channels to The Surgeon General, ATTN: MEDPS-PE, Department of the Army, Washington, D.C. 20315.

c. Director of Transportation, ODCSLOG.

- (1) The Director of Transportation, ODCSLOG, is responsible for—
 - (a) Providing staff supervision and policy guidance for transportation, movement, and related safety during transport of radioactive and fissile materials other than weapons.
 - (b) Reviewing designs, specifications, and test reports of shipping containers for

unwanted radioactive and fissile materials.

- (c) Providing the means for securing special permits from applicable Federal regulatory agencies.

- (2) The above applies to the safe movement of radioactive and fissile materials other than weapons by the Army, within CONUS, and between CONUS, Alaska, Hawaii, and U.S. territories.

d. Oversea commanders. Major oversea commanders are responsible for the following:

- (1) The establishment of oversea radioactive material disposal facilities as required. (*Exception:* Commander, U.S. Army Forces, Southern Command.)
- (2) Operation of the radioactive material disposal facility in strict accordance with policies, procedures, and methods established by the Commanding General, U.S. Army Materiel Command, and published in pertinent DA directives, including technical manuals. (*Exception:* Commander, U.S. Army Forces, Southern Command.)
- (3) The establishment of qualified escort of unwanted radioactive material shipments within the oversea theater as may be required.
- (4) Safe transportation of unwanted radioactive materials. In oversea areas, Army commanders will be guided by this regulation and AR 55-55, except where sovereign states have requirements which differ from those contained in this regulation. In such cases, Army commanders will observe the more restrictive requirements of either regulation.
- (5) Preparation of administrative procedures consistent with this regulation.
- (6) Conducting an annual command inspection of the Army radioactive material disposal facilities located within their respective commands.

e. Local commanders. Commanders of organizations, units, and activities which generate and/or accumulate disposable radioactive waste and materials will—

- (1) Insure that, in the case of property which is contaminated with radioactive

material, all possible efforts are made to decontaminate the items before taking disposal action. In the event it is economically unsound to decontaminate the property or if the contamination cannot be reduced to a safe level, the contaminated property will be treated as radioactive waste. Decontamination procedures and techniques are contained in TM 3-220.

- (2) Provide for the local storage, the preparation for shipment, and subsequent shipment of radioactive material to the appropriate radioactive material disposal facility.
- (3) Maintain an SOP to cover these activities at all times. Additional guidance is furnished in TM 3-261.

f. The Inspector General. The Inspector General, Headquarters, Department of the Army will be responsible for conducting inspections of all radioactive material disposal facilities. The Inspector General will assume this responsibility on 1 July 1967.

5. Implementation. Commanding Generals of U.S. Army Materiel Command; U.S. Continental Army Command; U.S. Army Combat Developments Command; U.S. Army Air Defense Command; U.S. Army Security Agency; U.S. Army Strategic Communications Command; U.S. Army Intelligence Command; U.S. Army Forces, Strike Command, the major oversea commands, the heads of Department of the Army staff agencies, the Commander, Military Traffic Management and Terminal Service, and Superintendent, U.S. Army Military Academy will issue instructions implementing this regulation. As a minimum, the implementing instructions will designate channels for requests for radioactive materials disposal assistance.

6. Security. *a.* The security plan for disposal of unwanted radioactive material will be prepared by the command, activity, or project manager responsible for the material. The security plan for disposal will be incorporated into the technical literature for the item. The plan will provide the continuity of security protection for the radioactive material which is commensurate with the level of security classification involved, and will provide procedures for declassification.

b. Activities preparing to ship classified radioactive material will alert the consignee, in advance of shipment, of the security classification involved

and the procedures for declassification after receipt.

c. Areas in CONUS in which unwanted radioactive material is stored, either temporarily pending shipment, in a consolidation storage area, or in an ultimate land disposal area, will be designated, posted, and protected as Restricted Areas, in accordance with AR 380-20. Physical safeguards which are appropriate to the degree of hazard or security classification involved will be employed, as described in AR 380-20. Commanders outside CONUS will use the provisions of AR 380-20 as guidance in the establishment of area protection and physical safeguards for radioactive material in storage.

7. Budgeting and funding. *a.* The disposal of unwanted radioactive material will be budgeted and reported under account 2290.2, in accordance with AR 37-1. Functions include handling, processing, packaging, escort service, transportation of unwanted radioactive material for shipment to radioactive disposal facilities. All costs for the above functions will be financed by the shipping installation or activity. Costs for ultimate disposal will be borne by the command operating the radioactive material disposal facility.

b. Oversea commanders are responsible for budgeting and funding for all costs incurred in processing, shipment, and ultimate disposal overseas or return to CONUS Army radioactive material disposal facilities, including technical escort but excluding ocean transportation costs which are initially financed by the Military Sea Transportation Service and which will be budgeted and funded by the ODCSLOG, Director of Transportation.

8. Support of equipment. Each commander responsible for the procurement and issue of items of equipment which contain radioactive materials will insure that the specifications and technical literature for the item contain information as to the quantity and type of radioactive material contained and procedures for safe handling, storing, and disposal of these items.

9. Special problems. Special radioactive material disposal problems requiring logistical assistance will be directed to the Commanding General, U.S. Army Materiel Command, ATTN: AMCMA-DA, Washington, D.C. 20315. Radioactive material disposal problems involving licensing regulations, decontamination, and/or radiological safety will be routed to Commanding General, U.S. Army Materiel Command, ATTN: AMCAD-S.

Section II. ACTION BY ORGANIZATIONS HAVING UNWANTED RADIOACTIVE MATERIAL

10. Holding action. Activities generating or accumulating radioactive material, including waste, will place such material in a secure local storage area pending shipment to a radioactive material disposal facility. It is more economical to process large quantities of radioactive material for ultimate disposal than to process small quantities. Therefore, installations which have radiological protection officers (AR 40-14) and which are able to store and safely consolidate radioactive material intended for ultimate disposal are encouraged to consolidate their waste before requesting shipping instructions. Additional guidance is furnished in TM 3-261.

11. Local storage. *a.* A radiation controlled area will be established to store accumulated radioactive material on a temporary basis. This area will be posted according to AR 385-30 to restrict entry and adequate security must be provided to prevent unauthorized access into and/or removal of the radioactive material. Until such time as the material is received by the radioactive material disposal facility, radiation safety associated with the material will be the responsibility of the Army element which was authorized to use the material under an AEC license or Department of the Army radioactive material authorization issued in accordance with AR 700-52.

b. Where practicable, material will be segregated as follows:

- (1) Combustible.
 - (a) Liquid.
 - (b) Solid.
 - (c) Gases.
- (2) Noncombustible.
 - (a) Liquid.
 - (b) Solid.
 - (c) Gases.

c. Materials will be stored in covered containers. Each container having radioactive materials stored therein will display a DA Label 15 (Caution: Radioactive Materials) and, if applicable, a radioactive waste container log. The following information, if unclassified, will be shown on DA Label 15 or on the log:

- (1) Radiation symbol and words "Caution—Radioactive Material."
- (2) Nomenclature, Federal stock number, and, where applicable, serial number.

(3) Physical description.

(a) Solid, liquid, or gas.

(b) Quantity (number, weight, volume, and, if gaseous, pressure at standard conditions).

(4) Chemical description.

(a) Hazardous chemicals present.

(b) For liquids, solvent present.

(5) Radiological description.

(a) Radioisotopes.

(b) Millicuries of activity per radioisotope and date measured or determined.

(c) Maximum dose rates (mrad/hr) at the surface and at 1 meter from the surface of the storage container.

d. The local fire department will be kept currently advised as to location and types of stored radioactive material and procedures for fighting fires adjacent to or involving radioactive material.

12. Serviceable or economically repairable items. Accountable radioactive property (source sets, etc.) which is serviceable or economically repairable will be reported to the appropriate national inventory control point (NICP) for disposition instructions unless otherwise instructed in the technical literature pertaining to the item. The national inventory control point should take one of the following actions:

a. Direct that the property be transferred for further utilization to another Army installation or agency which is authorized to receive such material.

b. Request authority through command channels from the Deputy Chief of Staff for Logistics, PEMA Execution Division, to transfer this property to authorized agency outside the control of the Army. (After a policy has been established for a particular type of equipment, further coordination is unnecessary for transfers of items covered by such policy.) Upon receipt of Department of the Army approval, the transfer of the material can be accomplished.

c. Direct the possessor of the property to decontaminate it or to process it for ultimate disposal as radioactive waste in accordance with paragraph 15. Guidance on decontamination is contained in TM 3-220.

13. Waste from special weapons. Radioactive waste such as paper, clothing, and dust contaminated with source and special material will be

packaged and labeled in accordance with TM 39-20-6.

14. Returnable amounts of source and special nuclear material. Returnable amounts of source and special nuclear material from special weapons will be packaged, labeled and shipped in accordance with instructions in TM 39-N-11.

15. Disposition instructions for radioactive materials intended for ultimate disposal. *a.* Requests for disposition instructions should be submitted as follows:

- (1) *CONUS, U.S. Army Forces, Southern Command and Greenland.* Installations and activities located in CONUS, U.S. Army Forces, Southern Command, and Greenland will forward disposal requests to Commanding Officer, U.S. Army Edgewood Arsenal, ATTN: SMUEA-ISDO, Edgewood Arsenal, Md., 21010.
- (2) *Oversea commands.* Army installations and activities located outside CONUS, other than Greenland and the U.S. Army Forces, Southern Command, will forward disposal requests in accordance with instructions of the theater commander.

b. Requests for disposal will contain the following information:

- (1) Nomenclature and Federal stock number and, where applicable, serial numbers.
- (2) Physical description of items to include—
 - (a) Solid, liquid, or gases.
 - (b) Quantity (number, weight, and volume and, if gaseous, the standard pressure).
 - (c) Number of individual items per package and type of package.
 - (d) Number of shipping containers.
 - (e) Exterior dimensions and weight of packaged shipping container.
 - (f) Shielding material and thickness, if applicable.
 - (g) ICC, USCG, or CAB permit or waiver number, if applicable.
- (3) Chemical and radioisotopic description, to include—
 - (a) Hazardous chemicals present.
 - (b) For liquids, the solvent present.
 - (c) Radioisotopes present.
- (4) Radioactivity and radiation measurements, to include—
 - (a) Millicuries of activity of each radioisotope.
 - (b) Maximum radiation dose rates (mrad/hr) at the surface and at 1 meter

from the surface of the radioactive items, if practical. If dose rate at 1 meter is undetectable, report dose rate at 1 foot from surface. For alpha sources, report counts per minute at surface.

- (c) Maximum radiation dose rates (mrad/hr) at the surface and (mrad/hr) at 1 meter from the surface of the package.
- (d) Security consideration.
 1. Classification.
 2. Procedures for declassification.

c. Emergency requests will be made by the most expeditious means available.

16. Replies to disposal requests. Replies to ultimate disposal requests will furnish the following minimum information:

- a.* Any packaging, labeling, shipping, and special transportation information beyond that established by AR 55-55 and AR 55-355.
- b.* Adequate radiation safety requirements to be observed.
- c.* Preferred date and time for receiving shipment.
- d.* Special instructions to be observed during transit and at transfer points.

17. Shipment of unwanted radioactive material. *a.* Containers for radioactive material will be substantial enough to endure the shocks of transportation without allowing escape of radioactive material. Containers should comply with ICC container specifications.

b. Unwanted radioactive materials for disposal, when moved locally within an installation, may be moved by unit transportation under the supervision of a technically qualified officer, enlisted person, or Department of the Army civilian of the installation.

c. The post transportation officer will arrange for shipments of all unwanted radioactive material to be transported beyond the limits of an installation. Certification of the contents as to hazards, special requirements, safety precautions, will be made to the post transportation officer in accordance with AR 55-55. The post transportation officer will insure compliance with AR 55-55, AR 55-162, and AR 55-355 and will take such other actions as are necessary under existing regulations to insure safe and secure transport from origin to destination.

d. Use of U.S. mails including parcel post is prohibited for forwarding unwanted radioactive material.

18. Special shipping instructions for CONUS, Alaska, and Hawaii. *a.* Transportation of radioactive material and waste materials can be accomplished by either military or common carrier, whichever is more advantageous to the Government, and in strict accordance with applicable regulations. If, in the best interests of the Government, a waiver or permit is required for a given shipment, application for waiver or permit will be made to the Deputy Chief of Staff for Logistics, ATTN: Director of Transportation, for approval prior to submission in accordance with paragraph 203019 or 216035, AR 55-355.

b. When radioactive material is shipped by common carrier, marking and labeling will conform to AR 380-20, 55-55, and 55-355. In addition, the following supplementary information, if unclassified, will also be marked on each package:

- (1) Radiation symbol and "CAUTION RADIOACTIVE MATERIAL."
- (2) Consignee.
- (3) Maximum dose rate in mrad/hr at surface of package.
- (4) Maximum dose rate in mrad/hr at 1 meter from package.
- (5) Radioisotopes present.
- (6) Amount of radioactivity, i.e., number of curies, millicuries, or microcuries contained in the package.
- (7) Words "No removable surface contamination".

c. Shipments to or passing through Canada will also conform to Canadian requirements.

19. Special shipping instructions for overseas areas other than Alaska and Hawaii. *a.* In overseas theaters, local national or international regulations in force within the country of origin

and countries through which the unwanted radioactive materials are moved will apply.

b. Shipments of radioactive material destined for CONUS, Alaska, and Hawaii will be labeled and marked as required in paragraph 18.

c. Shipments not destined for CONUS, Alaska, and Hawaii will be marked in accordance with the requirements of the regulations of those areas to which and through which the shipments are to be made. In addition, information indicated in paragraph 18*b* if unclassified, will be marked on each package containing radioactive material.

20. Escort of shipments of unwanted radioactive material. *a.* In special situations, material will be escorted from the point of shipment into the radioactive material disposal facility. This is done in the following cases when—

- (1) The material cannot be packaged and shipped without waiver of an ICC, CAB, or USCG requirement. Requests for waivers for such shipments, will list Deputy Chief of Staff for Logistics, ATTN: Director of Transportation, Department of the Army, as an intermediate address.
- (2) Security considerations require an escort.
- (3) The commanding officer of the shipping agency considers an escort is in the best interests of the Government based on an evaluation of inherent factors of public relations, economics, and degree of hazard involved.

b. Where escort of shipment of unwanted radioactive material is required, escort will be arranged for in accordance with section VI, AR 55-16 and AR 55-55. If qualified personnel are not available, escort assistance can be obtained from Commanding Officer, U.S. Army Technical Escort Unit, Edgewood Arsenal, Md., 21010.

Section III. ULTIMATE DISPOSAL

21. Disposal by radioactive material disposal facilities. *a.* Local disposal of AEC licensed radioactive materials will be in accordance with Sections 20.106, 20.301a and b and 20.303 of 10 CFR, Part 20; with regulations of local civil regulatory bodies; and where applicable, with international agreement. In overseas areas, the more restrictive regulations, domestic or foreign, will be followed.

Note. Copies of 10 CFR 20 are available from the U.S. Atomic Energy Commission, Director of Materials Licensing, Washington, D.C. 20545.

b. The type of ultimate disposal operations conducted by each of the radioactive material disposal facilities located in CONUS or overseas will be coordinated with the Commanding General, U.S. Army Materiel Command. The operations of the radioactive material disposal facilities will be in accordance with TM 3-260. The Commanding General, U.S. Army Materiel Command, will conduct such liaison visits as are necessary to Army radioactive material disposal facilities to enable him to carry out his responsibilities, as outlined in

paragraph 4. In addition, he will provide for necessary technical assistance visits at the request of oversea commands.

22. Disposal authorized locally. *a.* Normally, ultimate disposal is limited to radioactive material disposal facilities (TM 3-260). However, units other than authorized radioactive material disposal facilities may dispose of radioactive materials as follows:

- (1) Dispose of specific types and quantities of radioactive material in accordance with disposition instructions obtained in accordance with paragraphs 15 and 16.
- (2) Dispose of effluents (liquids and gases) into unrestricted areas in accordance with Title 10, Code of Federal Regulations, Section 20.106, provided local governments do not prohibit such disposal. Compliance with concentrations established in Appendix B of Title 10, Code of Federal Regulations, Part 20 will be determined by averaging concentrations on a monthly basis instead of on a yearly basis.
- (3) Dispose of liquids into the sanitary sewage system in accordance with Title 10, Code of Federal Regulations, Section 20.303, provided local governments do not prohibit such disposal.

b. Incineration of Atomic Energy Commission (AEC) licensed radioactive material is not authorized except by units possessing a valid AEC license which authorizes incineration of such materials.

c. Incineration of radioactive materials other than AEC licensed material and land burial of radioactive materials on Army installations is not authorized without approval of Commanding [AMCAD]

By Order of the Secretary of the Army:

Official:

KENNETH G. WICKHAM,
Major General, United States Army,
The Adjutant General.

Distribution:

To be distributed in accordance with DA Form 12-9 requirements for Logistics Responsibilities, Functions & Procedures, General:
Active Army: A. NG: B. USAR: A.

General, U.S. Army Materiel Command. Request for such approval will be forwarded through channels to Commanding General, U.S. Army Materiel Command, ATTN: AMCAD-S, Washington, D.C. 20315 and will contain all the information required by paragraph 7n, AR 40-37.

d. Conventional disposal of solid material is authorized for waste material which has been controlled through the period of radioactive decay to a normal background level of activity, i.e., less than 0.002 microcuries per gram. This procedure is recommended for facilities with adequate local storage and for materials containing short, half-life radioisotopes to decay to background level within less than 12 months. This procedure is used by some hospitals and laboratories where short, half-life radioisotopes are used in tracer techniques and the resulting waste contains low level activity in such items as excreta, laboratory animals, infectious waste, absorbent tissue, and sputum.

e. Disposal operations outside the United States, its territories and possessions, will also be subject to the radiological safety requirements of the host nation. In the event of a conflict in regulations, the more severe regulation will govern.

f. Waivers to the above requirements will be granted only for unusual circumstances. Requests for such waivers will be addressed to the Commanding General, U.S. Army Materiel Command, ATTN: AMCAD-S, Washington, D.C. 20315.

23. Transfer, sale, or donation. Transfer, sale, or donation of radioactive materiel to other than authorized Army recipients requires prior approval of the Deputy Chief of Staff for Logistics (see AR 700-52).

HAROLD K. JOHNSON,
General, United States Army,
Chief of Staff.

E-17-25
MIL-M-13508C
19 March 1973
SUPERSEDING
MIL-M-13508B
16 November 1966

MILITARY SPECIFICATION

MIRROR, FRONT SURFACED ALUMINIZED: FOR OPTICAL ELEMENTS

This specification is mandatory for use by all Departments and Agencies of the Department of Defense

1. SCOPE

1.1 Scope.- This specification covers a mirror coating consisting of a deposited aluminum reflective film overlaid with a transparent dielectric protective film applied on the front surface of optical elements.

2. APPLICABLE DOCUMENTS

2.1 The following documents of the issue in effect on date of invitation for bids or request for proposal, form a part of this specification to the extent specified herein.

SPECIFICATIONS

* Federal

L-R-90

Tape, Pressure-Sensitive, Adhesive (Cellophane and cellulose acetate)

CCC-C-440

Cloth, Cheesecloth, Cotton, Bleached and unbleached

Military

MIL-O-13830

Optical Components for Fire Control Instruments; General Specification Governing the Manufacture, Assembly, and Inspection of

FSC 6650

THIS DOCUMENT CONTAINS 6 PAGES

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STANDARDS

Federal

Federal Test Method, Metals; Test Methods
Standard No. 151

Military

MIL-STD-105

Sampling Procedures and Tables for Inspection
by Attributes

MIL-STD-1241

Optical Terms and Definitions

(Copies of specifications, standards, drawings, and publications required by suppliers in connection with specific procurement functions should be obtained from the procuring activity or as directed by the contracting officer.)

3. REQUIREMENTS

3.1 Optical terms and definitions.- Reference shall be made to MIL-STD-1241 to define optical terms used.

3.2 Optical elements.- The supplier is responsible for the quality of the optical elements used as backing for a front surface mirrored finish. Optical elements shall have been manufactured, tested and approved for use in accordance with the applicable element drawing and referenced specifications prior to the coating process.

3.3 Coating process.- The coating process producing the front surface mirror finish shall cause no impairment to the optical element. Optical elements which have met the requirements of 3.2 shall not be rejected because of fine hair lines, scratches, digs or stains which are made more visible by the coating process.

3.3.1 Aluminum film.- The deposited film shall be of high quality aluminum. There shall be no visible discontinuities or blemishes that adversely affect the field of view as seen with the eye in the specified viewing position.

* 3.3.2 Protective film.- The front surface aluminum film shall be protected by a film of high quality uniform magnesium fluoride or silicon monoxide or as otherwise specified on the applicable drawing. The film shall be free from holes, foreign matter and perceptible variations in density.

3.4 Reflectance.- The finished coated surface, for visible use, shall have more than 86 percent luminous reflectance when measured at required angle of incidence, or a reflectance as otherwise specified on the applicable drawing.

MIL-M-13508C

3.5 Optical quality.- The finished coated surface shall conform to the pertinent optical requirements set forth on the applicable drawing.

3.6 Coated area.- The optical element shall be coated over its entire effective aperture or as otherwise specified by the applicable drawing.

3.7 Temperature influence.- The coated surface shall show no signs of deterioration or removal of films after being subjected to ambient temperature of -80°F and also $+160^{\circ}\text{F}$ for a period of five hours at each temperature.

3.8 Hardness.- The coated surface shall show no signs of deterioration such as streaks or hairline scratches as defined in MIL-O-13830 after being hand rubbed with a dry cloth.

3.9 Adherence.- No part of the aluminum or protective films shall be removed when cellulose tape is pressed against the coated surface and slowly removed.

3.10 Humidity and salt spray.- When specified in the contract the coated surface shall show no evidence of corrosion or pitting when exposed to a relative humidity of 95 to 100 percent at $120^{\circ}\text{F} + 4^{\circ}\text{F}$ for a period of 24 hours and when exposed to a salt spray for the same time period. (See 6.1)

4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for inspection. - Unless otherwise specified in the contract or purchase order, the supplier is responsible for the performance of all inspection requirements as specified herein. Except as otherwise specified in the contract or order, the supplier may use his own or any other facilities suitable for the performance of the inspection requirements specified herein, unless disapproved by the Government. The Government reserves the right to perform any of the inspections set forth in the specification where such inspections are deemed necessary to assure supplies and services conform to prescribed requirements.

4.2 General provisions

4.2.1 Submission of product. - Unless otherwise specified in the contract inspection lot size, lot formation and presentation for acceptance shall be in accordance with MIL-STD-105.

4.3 Examination and tests. - Examination and tests related to Section 3 herein shall be performed on a single defect (individual characteristic) basis in accordance with MIL-STD-105 and Table I specified herein.

MIL-M-13508C

TABLE 1. CLASSIFICATION OF DEFECTS

Class	Requirement	Test Procedure
Critical: None defined		
Major: AQL 0.65% defective		
101. Aluminum film	3.3.1	4.4.1
102. Protective film	3.3.2	4.4.1
103. Reflectance	3.4	4.4.2
104. Optical quality	3.5	4.4.3
105. Coated area	3.6	4.4.1
106. Temperature influence	3.7	4.4.4
107. Hardness	3.8	4.4.5
108. Adherence	3.9	4.4.6
109. Humidity	3.10	4.4.7
110. Salt spray	3.10	4.4.8

Minor: None defined

4.4 Test Methods and procedures.

4.4.1 Coating process.- Use a visual inspection and procedures set forth in MIL-0-13830 to determine compliance with requirements 3.3.1, 3.3.2, and 3.6.

* 4.4.2 Reflectance.- The reflectance of the finished mirror at the required angle of incidence shall be measured either with a photometer device shown in Figure 1 for luminous reflectance or an instrument (spectrophotometer) capable of measuring nonvisual reflectance as otherwise specified on the applicable drawing to determine conformance with the requirements of 3.4.

4.4.3 Optical quality.- Use testing procedures as specified in MIL-0-13830 or as otherwise specified on applicable drawing to determine compliance with requirement 3.5.

4.4.4 Temperature influence.- The element shall be exposed to ambient temperatures of -80 and +160°F for a period of 5 hours at each specified temperature. A visual inspection shall be made after the element is returned to standard ambient temperature (+60° to 90°F) to determine compliance with the requirement 3.7.

* 4.4.5 Hardness. - This test shall be performed using a pad of clean dry lamdered cheesecloth, conforming to CCC-C-440, approximately 3/8 inch diameter and approximately 1/2 inch thick. Bearing with a force of one pound \pm 1/4 lb on the protected clean surface of the element, rub a minimum of 50 strokes across the surface in straight lines or circular motions. Subsequent to this procedure the protective coating must meet the requirements of 3.8.

* 4.4.6 Adherence. - Place the sticky surface of cellulose tape, conforming to TYPE I, Class A of L-T-90, over a portion of the coated surface. Press the tape firmly against the coated surface. Pull the tape down over the edges of the element and then slowly remove the tape. A visual inspection shall be made of the tested area to assure that the films have not been removed from the substrate material to determine compliance with 3.9. Edges not forming a part of the reflecting surface shall not be considered when inspection is being performed.

* 4.4.7 Humidity. - The coated elements shall be exposed for a period of 24 hours in a thermostatically controlled humidity chamber having a relative humidity of between 95 and 100 percent of $120^{\circ} \pm 4^{\circ}\text{F}$. The elements shall be removed from the chamber and dried with lens tissue or soft cloth, then visually inspected to determine compliance with the requirements of 3.10. (See 6.1).

* 4.4.8 Salt spray. - A visual inspection of the element shall be made of the coating after exposure to the salt spray test described in Federal Test Method Std No. 151 to determine compliance with the requirements of 3.10 (See 6.1).

5. PREPARATION FOR DELIVERY - This section not applicable to this specification.

6. NOTES

* 6.1 Humidity and salt spray. - Humidity and salt spray requirements and tests are applicable only when specifically required by contract. The contract shall also prescribe the specific protective coating that will meet the environmental requirements of 3.10. Federal Test Method Std No. 151 Metals, Test Methods, should be furnished as part of applicable documents required under 2.1.

Custodians:

Army - MU
Air Force - 82

User activity:

Army - EL, ME, MI
Navy - OS, SH
Air Force - None

Review activity:

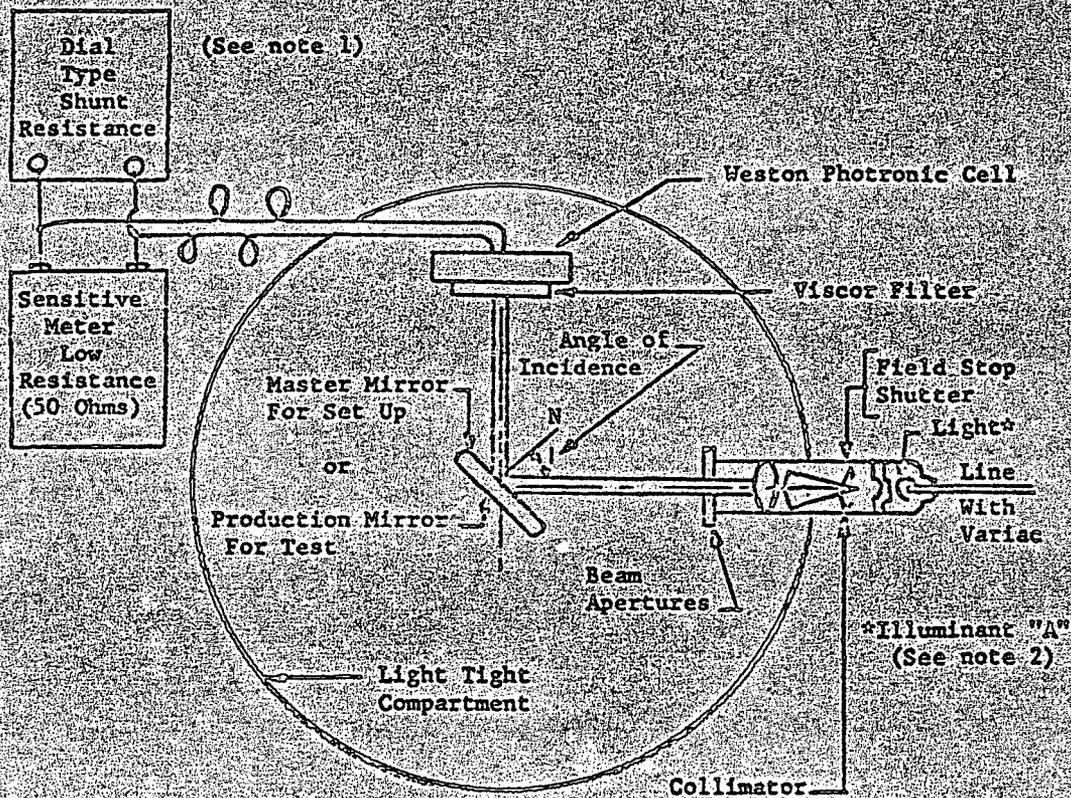
Army - MU
Air Force - 82

Preparing activity:

Army - MU (FA)

Project No. 6650-0060

MIL-M-13508C



Notes: 1. The load resistance of the photocell is reduced by meter adjustment shunt.

2. Illuminant "A" is an incandescent tungsten lamp having a spectral distribution corresponding to a black body at a temperature at 2848°K.

Figure 1. Weston Photronic Cell, Viscor Filter and Tungsten Light

09-11-15
MIL-C-675A
6 JANUARY 1964
SUPERSEDING
JAN-F-675
17 SEPTEMBER 1948

MILITARY SPECIFICATION
COATING OF GLASS OPTICAL ELEMENTS
(ANTI-REFLECTION)

This specification has been approved by the Department of Defense and is mandatory for use by the Departments of the Army, the Navy, and the Air Force.

1. SCOPE

1.1 This specification covers the application and tests of magnesium fluoride coating (hereinafter referred to as film) having a wavelength between 450 millimicrons and 600 millimicrons (see 6.1).

2. APPLICABLE DOCUMENTS

2.1 The following documents, of the issue in effect on date of invitation for bids or request for proposal, form a part of this specification to the extent specified herein.

SPECIFICATIONS

FEDERAL

QQ-M-151 —Metals, General Specifications for

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JAN-M-621 —Magnesium Fluoride (Optical Use)

MIL-E-12397 —Eraser, Rubber-Pumice for Testing Coated Optical Elements

MIL-O-13830 —Optical Components for the Fire Control Instruments; General Specification Governing the Manufacture Assembly and Inspection of

MIL-I-45208 —Inspection Requirements, General Specification for

STANDARDS

MILITARY

MIL-STD-105 —Sampling Procedure and Tables for Inspection by Attributes

MIL-STD-1241 —Optical, Terms and Definitions

DRAWINGS

U.S. ARMY MUNITIONS COMMAND

C7641866 —Surface Quality Comparison Standards

D7680600 —Optical Coating Standard

D7680606 —Coating, Eraser Abrasion Tester

(Copies of specifications, standards, drawings, and publications required by suppliers in connection with specific procurement functions should be obtained from the procuring activity or as directed by the contracting officer.)

3. REQUIREMENTS

3.1 Material. The material used for the film shall be magnesium fluoride in accordance with Specification JAN-M-621.

3.2 Coating process. The coating process used to apply the film shall not cause impairment of the optical surface which would cause rejection of the optical element when inspected in accordance with Specification MIL-O-13830.

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3.3 Light absorption. There shall be no more than 0.5 percent light absorption allowed within the wavelength range from 440 to 650 millimicrons when tested as specified in 4.6.2.

3.4 Film thickness. The optical thickness of the film on each treated surface shall be more than a 0.25 wavelength of light having a wavelength of 450 millimicrons but less than 0.25 wavelength of light having a wavelength of 600 millimicrons, when inspected as specified in 4.6.3.

3.5 Color range. When white light strikes the coated surface at any angle of incidence from 0 to 30 degrees, the rays reflected from the coated surface shall appear yellow-red yellow from films having the minimum permissible optical thickness (0.25 wavelength of 450 millimicrons) and purple-blue from film having the maximum permissible optical thickness (0.25 wavelength of 600 millimicrons) when tested as specified in 4.6.3.

3.5.1 Color variations. Color variations over a coated surface shall be allowed provided they are within the color range specified in 3.5. Films on elements having severely curved surfaces shall be acceptable provided the thickness and colors at the central areas are within 500 to 560 millimicrons range even though the total color range from centers to peripheries are not within the 450 to 600 millimicron range. The central area shall be considered that area that has a projected diameter equal to 85 percent of the radius of curvature on the surface.

3.6 Reflectance.

3.6.1 Position of minimum point. The minimum point on the spectrophotometric curve of a reflectance for each coated surface shall lie between the wavelength limits of 450 and 600 millimicrons.

3.6.2 Reflectance at the minimum point. The magnitude of the specular reflectance at the minimum point on the spectrophotometric curve of reflectance of each coated surface shall not exceed the following value:

TABLE I

Index of refraction of glass	Maximum percent reflectance
1.51	1.6
1.52	1.5
1.54	1.4
1.58	1.3
1.61	1.0
1.62	0.9
1.65	0.8
1.70	0.6

3.6.3 Reflectance at limits. The specular reflectance of each coated surface at the wavelengths of 450 and 600 millimicrons shall not exceed the values in the following table:

TABLE II

Index of refraction of glass	Maximum percent reflectance	
	450 millimicrons	600 millimicrons
1.51	2.5	2.1
1.52	2.5	2.0
1.54	2.5	1.9
1.58	2.5	1.8
1.61	2.5	1.7
1.62	2.5	1.7
1.65	2.5	1.7
1.70	2.5	1.6

3.7 Coated area. Each optical element shall be coated over its entire effective aperture except that coating closer than $\frac{3}{4}$ millimeter to an edge of an element shall not be required. Unless otherwise specified, areas outside the effective aperture may be coated at the discretion of the contractor.

3.7.1 Cemented surfaces. A glass surface or portion thereof which is to be cemented to another glass surface or portion thereof shall not be coated on the area to be cemented. A film on such a surface shall be cause for rejection of the element.

3.8 Surface quality. Films shall be sensibly free from holes, solid particles of the coating material and other imperfections arising from dust and dirt or stained glass surfaces beneath the film.

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3.9 Durability.

3.9.1 *Solubility.* There shall be no visible evidence of film destruction after being subjected to the solubility test specified in 4.6.8.

3.9.2 *Humidity.* There shall be no visible evidence of film deterioration after being subjected to the conditions specified in 4.6.9.

3.9.3 *Salt spray fog.* There shall be no visible evidence of film deterioration after the coated optical element has been subjected to the salt spray fog specified in 4.6.10 for a continuous period of 24 hours.

3.9.4 *Abrasion resistance.* There shall be no visible damage to the rubbed area of a coated surface after being subjected to the abrasion resistance test specified in 4.6.11.

4. QUALITY ASSURANCE PROVISIONS

4.1 *Responsibility for inspection.* Unless otherwise specified in the contract or purchase order, the supplier is responsible for the performance of all inspection requirements as specified herein. Except as otherwise specified, the supplier may utilize his own facilities or any commercial laboratory acceptable to the Government. The Government reserves the right to perform any of the inspections set forth in the specification where such inspections are deemed necessary to assure supplies and services conform to prescribed requirements.

4.2 *General requirements.* Except where otherwise specified herein, the contractor's inspection system shall be in accordance with Specification MIL-I-45208.

4.3 *Lot formation.* When inspection lot sizes and lot formations are applicable, they shall be in accordance with Standard MIL-STD-105 and shall also be defined in the contractor's inspection system.

4.3.1 *Defective units and lots.* Defective units and lots shall be processed as specified in Standard MIL-STD-105 and shall not be included as a part of the quantity specified in the contract until formal approval is obtained.

4.4 *Inspection provisions.* Components coated with magnesium fluoride shall be examined in accordance with the inspection provisions contained in Specification MIL-O-13830 and 4.4.1 herein. Test and control of materials not covered by Supplementary Quality Assurance Provisions (SQAP's) shall be in accordance with "Test Data" provisions of Specification MIL-I-45208. Inspection related to Section 3 of this specification shall be performed in accordance with 4.4.1. The control sampling specified herein shall constitute the minimum inspection to be performed by the contractor prior to Government acceptance. The Government reserves the right to inspect for any applicable requirement, and to reject individual nonconforming items.

4.4.1 *Control inspection.* The first 25 coated elements produced, and 5 selected at random from every 100 subsequently produced (or from each month's production, whichever occurs first) shall represent the control samples for control inspection. Control samples shall be subjected to the examinations and tests specified herein to determine compliance with all requirements specified in section 3. The examinations and tests shall be conducted by the contractor under surveillance of the Government representative at the contractor's facility or Government approved laboratory, using test equipment authorized for use by the contract, or otherwise approved by the contracting officer.

4.4.1.1 *Control sample failure.* Should a control sample fail to meet the requirements specified in 4.4.1, the contractor shall cease those operations causing rejection until necessary corrections have been made by the contractor and approved by the Government. When production has resumed, inspection of those requirements that have previously caused rejection shall be performed on a 100 percent basis until 25 consecutively produced coated elements meet these requirements. When this is accomplished, control inspection (4.4.1) may be continued.

4.5 *Inspection equipment.* Supply, calibration, maintenance and use of inspection

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equipment shall be in accordance with Specification MIL-I-45208. The Government reserves the right to use all approved test equipment, both Government furnished and contractor acquired, for verification inspection.

4.5.1 Equipment to perform durability test. The standard Test Equipment Drawing D7680606 Coating Tester used for testing the durability of the film or coating deposited on the optical elements is the hand held type, which can be used on all optical elements curved or flat, i.e., lenses, prisms or reflectors. The device shall be equipped with an eraser that shall comply to Military Specification MIL-E-12397 and shall be used as described in 4.6.11.

The Abrasion Resistance Instrument (fig. 1.) illustrated is one of several types, commercially available, that will test the durability of the film or coating deposited on flat optical elements. The rubbing arm is adjustable on a rotating disk and is adjustable to various diameters. A rubbing pad on the arm is rotated at 100 rpm with a total weight of 1.5 to 1.6 P.S.I., and shall be used as described in 4.6.11.

4.6 Test methods and procedures.

4.6.1 Coating process and surface quality. A visual inspection shall be made at the completion of each coating process. A comparison shall be made using the surface quality scratch and dig Standard C7641866 of the film only, any imperfections in the glass shall not be considered by this inspection. This has been performed with Specification Standard MIL-O-13830. There shall not be more than the allowable scratches or digs in the central zone (what appears to be scratches or pin holes in the film usually are caused by dirt or lint left or deposited in the process) and they shall not exceed the allowable size designated as surface quality requirements on the element drawing and as required by 3.2 and 3.8 when checked with white light or equivalent.

4.6.2 Light absorption. This inspection test shall be performed using a standard spec-

trophotometer. The specular reflectance and transmittance curves shall be obtained for the wavelength range required by 3.3 for samples coated on both sides. Plotted curves from uncoated samples will determine how much absorption of light the film has made. Absorption in films can be computed as illustrated:

$$A \text{ (Percent)} = 100 - R \text{ (Percent)} + T \text{ (Percent)} = \text{Glass Absorption (Percent)}$$

(R) = Specular Reflectance
(T) = Specular Transmittance
(A) = Light Losses Due to Film

One half of the result of (A) is absorption per coated surface

4.6.3 Film thickness and color range. A visual inspection of the film or coating shall be made to determine compliance with 3.4 and 3.5. Using an optical coating comparison Standard D7680600 and a fluorescent lamp (white) positioned so that both the sample and the color standard are reflecting the image of the fluorescent tube. The sample can then be compared to each of the lenses in the standard for the acceptable range, a variance of color over the coated area is permissible as long as it is within the range and area specified in 3.5.1.

4.6.4 Position and reflectance of minimum point. This test shall be mandatory when the optical coating comparison standard is not available. The inspection shall be made with the aid of a standard spectrophotometer by plotting a typical reflectance curve from the samples selected. The curve shall indicate the minimum point position specified for the wavelengths specified in 3.6.1. In case of discrepancy 4.6.4 takes precedence over 4.6.3. The reflectance at the minimum point shall match the tolerance at maximum percent reflectance for the index of refraction of the glass being inspected as required by table I.

4.6.5 Reflectance limits. The limits of reflectance will be inspected for each coated

surface with a standard spectrophotometer for the wavelengths specified in table II for the samples with the index listed. Reflectance shall not exceed the percentage factor listed under maximum percent reflectance column.

4.6.6 Coated area. A visual inspection shall be made of the coated area and the uncoated area of the element. The uncoated area usually at the extreme edge of the element shall not exceed the tolerance specified in 3.7. This uncoated area is caused by the holding adapter of the coating machine during process.

4.6.7 Cemented surfaces. A visual inspection shall be made of all elements to be cemented (crowns, flints, prisms, etc.) to a mating element. These elements shall not have coating material on the surface or surfaces to be cemented together. Coating material may prevent the adhesive from making the proper seizure and cause separation.

4.6.8 Solubility. The coated optical elements shall be immersed for a period of 24 hours in a solution of water and common table salt (sodium chloride). The mixture shall be 6 ounces of salt per gallon of water at room temperature. After the required period of time the samples shall be removed from the solution and dried with lens tissue or soft cloth, then visually inspected for deterioration or removal of the coating. The coating shall meet the requirements of 3.9.1.

4.6.9 Humidity. The coated optical elements shall be exposed for a period of 24 hours in a thermostatically controlled humidity chamber having a relative humidity of between 95 and 100 percent of $120^{\circ} \pm 4^{\circ}$ F. The elements shall be removed from the chamber and dried with lens tissue or soft cloth, then visually inspected for deterioration or removal of the coating. The coating shall meet the requirements of 3.9.2.

4.6.10 Salt spray (fog). A visual inspection of the element shall be made of the coating after exposure to the salt spray test described in Specification QQ-V-151. The method as described, the equipment and the time cycle

are mandatory, and the elements must survive the test described in 4.6.11 and shall meet the requirements of 3.9.3.

4.6.11 Abrasion resistance. The coated optical elements shall be visually inspected for deterioration of removal of coating after being subjected to the following test:

The coating or film shall be tested by holding a standard holding device in the hand and rubbing the coated surface with a standard eraser mounted in the holding device, Drawing D7680606. A force of approximately 2.0 to 2.5 pounds at a rotating speed of 100 revolutions per minute shall be applied. Strokes of about one inch shall be made if the size of the element will permit it, smaller strokes for smaller elements. All strokes shall be made on one path for 20 complete strokes. After the rubbing has been completed the element shall be cleaned and inspected visually in accordance with 3.9.4.

An alternative method may be employed, if available. The abrasion resistance instrument Fig. I may be used in lieu of the hand rubbing method. The instrument uses a rubbing pad at the contact point using pure powdered magnesium fluoride as an abrasive agent. Some other instruments have replaced the rubbing pad with the holder and eraser to complete the required tests.

5. PREPARATION FOR DELIVERY

This section not applicable to this specification.

6. NOTES

6.1 Intended use. The film covered by the specification is applied to the surface of optical elements for reducing reflections and increasing light transmission.

6.2 Definitions. Words, terms and expressions used in this specification which are peculiar to the general field of optics are defined in MIL-STD-1241, Optical, Terms and Definitions.

MIL-C-675A

6.3 Ordering data. Procurement documents should specify the following:

(a) Title, number and date of this spec-

ification.

(b) When areas outside the effective aperture are to be coated.

Custodians:
Army—MU
Navy—Ships
Air Force—MAA

Preparing activity:
Army—MU
Project No. 6650-0096

Interest:
Review
MO, Sh, 67
User
ML, MC

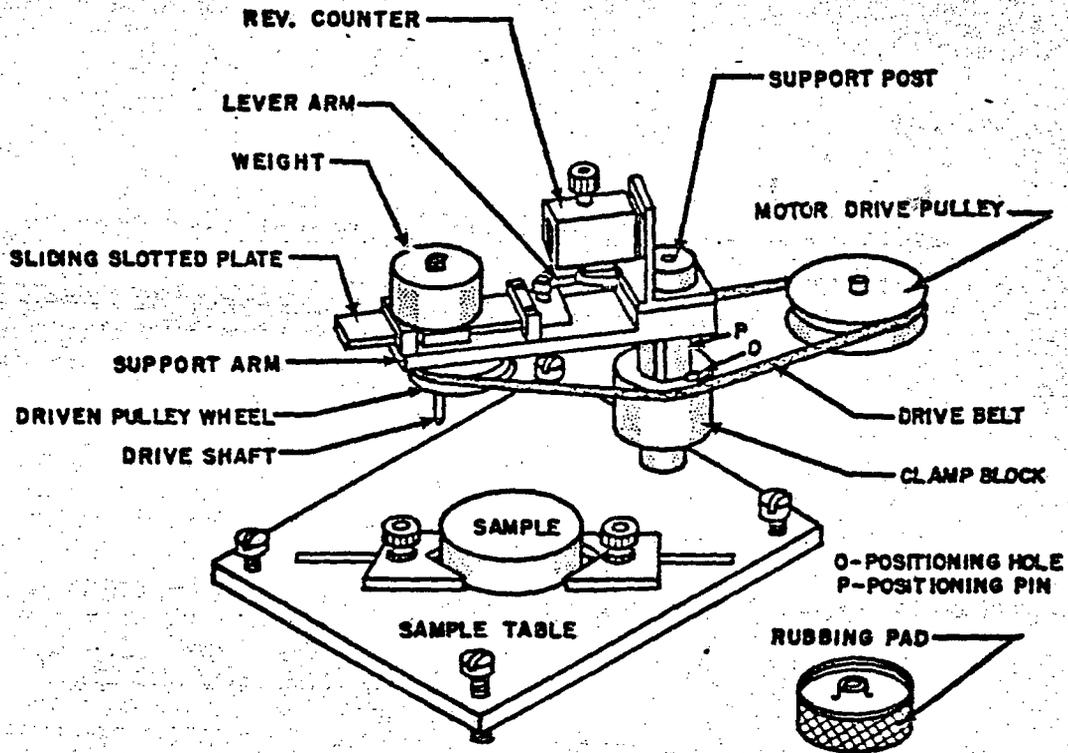


FIGURE 1. Abrasion-resistance instrument.

MIL-STD-810C
10 March 1975
SUPERSEDING
MIL-STD-810B
15 June 1967

MILITARY STANDARD

ENVIRONMENTAL TEST METHODS



FSC MISC

1004

MIL-STD-810C
10 March 1975

Environmental Test Methods

MIL-STD-810C

1. This Military Standard is approved for use by all Departments and Agencies of the Department of Defense.
2. Recommended corrections, additions, or deletions should be addressed to Commander, Aeronautical Systems Division, Attn: ASD/ENYESA, Wright-Patterson Air Force Base, Ohio 45433.

METHOD 507.1

HUMIDITY

1. PURPOSE. The humidity test is conducted to determine the resistance of equipment to the effects of exposure to warm, highly humid atmosphere such as is encountered in tropical areas. This is an exaggerated environmental test, accomplished by the continuous exposure of the equipment to high relative humidity at cycling elevated temperatures. These conditions impose a vapor pressure on the equipment under test which constitutes the major force behind the moisture migration and penetration.

1.1 General effects. Corrosion is one of the principal effects of humidity. Hygroscopic materials are sensitive to moisture and may deteriorate rapidly under humid conditions. Absorption of moisture by many materials results in swelling, which destroys their functional utility and causes loss of physical strength and changes in other important mechanical properties. Insulating materials which absorb moisture may suffer degradation of their electrical and thermal properties. Cycling temperature and humidity may cause condensation of moisture inside of the equipment which could cause the equipment to malfunction due to electrical shorts or cause binding due to corrosion or fouling of lubricants between moving parts.

2. APPARATUS. Humidity-temperature chamber and associated equipment.

2.1 Chamber. The chamber and accessories shall be constructed and arranged in such a manner as to avoid condensate dripping on the test item. The chamber shall be trap-vented to the atmosphere to prevent the buildup of total pressure. Relative humidity shall be determined from the dry bulb-wet bulb thermometer comparison method or an equivalent method approved by the procuring activity. When readout charts are used, they shall be capable of being read with a resolution within 0.6°C (1°F). When the wet bulb control method is used, the wet bulb and tank shall be cleaned and a new wick installed at least every 30 days. The air velocity flowing across the wet bulb shall be not less than 900 feet per minute. Provisions shall be made for controlling the flow of air throughout the internal chamber test space where the velocity of air shall not exceed 150 feet per minute. Steam or distilled, demineralized, or deionized water having a pH value between 6.0 and 7.2 at 23°C (73°F) shall be used to obtain the specified humidity. No rust or corrosive contaminants shall be imposed on the test item by the test facility.

3. PROCEDURES

3.1 Procedure I. Airborne electronic equipment.

- Step 1 - Prepare the test item in accordance with General Requirements, 3.2. Prior to starting the test, the internal chamber temperature shall be at standard ambient with uncontrolled humidity.
- Step 2 - Gradually raise internal chamber temperature to 65°C (149°F) and the relative humidity to 95 +5 -3 percent over a period of 2 hours.
- Step 3 - Maintain conditions of step 2 for not less than 6 hours.
- Step 4 - Maintain 85 percent, or greater, relative humidity and reduce internal chamber temperature in 16 hours to 30°C (86°F).
- Step 5 - Repeat steps 2, 3, and 4 for a total of 10 cycles (not less than 240 hours). Figure 507.1-1 is an outline of the humidity cycle for this procedure.
- Step 6 - At the end of the tenth cycle, while still at 30°C (86°F) and 85 percent relative humidity, operate the test item and obtain results in accordance with General Requirements, 3.2.
- Step 7 - Remove and inspect the test item and obtain results in accordance with General Requirements, 3.2.

3.2 Procedure II. Ground and airborne electronic equipment.

- Step 1 - Prepare the test item in accordance with General Requirements, 3.2, except that initial measurements are taken in step 4.
- Step 2 - Dry the test item at 54°C (129°F) for 24 hours.
- Step 3 - Condition the test item at 23°C (73°F) and 50 ±10 percent relative humidity for 24 hours.
- Step 4 - Take initial measurements in accordance with General Requirements, 3.2.1

NOTE: The test item may be readjusted or realigned, as necessary, to meet specification requirements. No further realignment or readjustment shall be permitted throughout the test period, other than with accessible controls employed for operation of the test item. No repair or replacement of parts shall be permitted. Equipment shall be operated only when specified test measurements are being performed.

Step 5 - Raise the internal chamber temperature to 30°C (86°F) and the relative humidity to 94 ±4 percent.

Step 6 - Subject the test item to five continuous 48-hour cycles in accordance with figure 507.1-2. Take measurements in accordance with General Requirements, 3.2.3 at the periods shown on figure 507.1-2, unless otherwise specified in the equipment specification. Prior to measurements, accumulated moisture may be removed by turning the test item upside down or shaking. Wiping is not permitted. (Certain operating procedures require an effective preconditioning of the test item environment prior to operation. When this occurs, the period of measurement shall be kept as short as possible.)

Step 7 - After completion of step 6 cycling, condition the test item for 24 hours at 23°C (73°F) and 50 ±10 percent relative humidity.

Step 8 - Operate the test item, adjusting for optimum performance only as permitted in step 4 note, and compare with data obtained in step 4.

Step 9 - Inspect the test item in accordance with General Requirements, 3.2.4 within an hour.

3.3 Procedure III. Ground and airborne sealed electronic equipment (other than hermetic sealed).

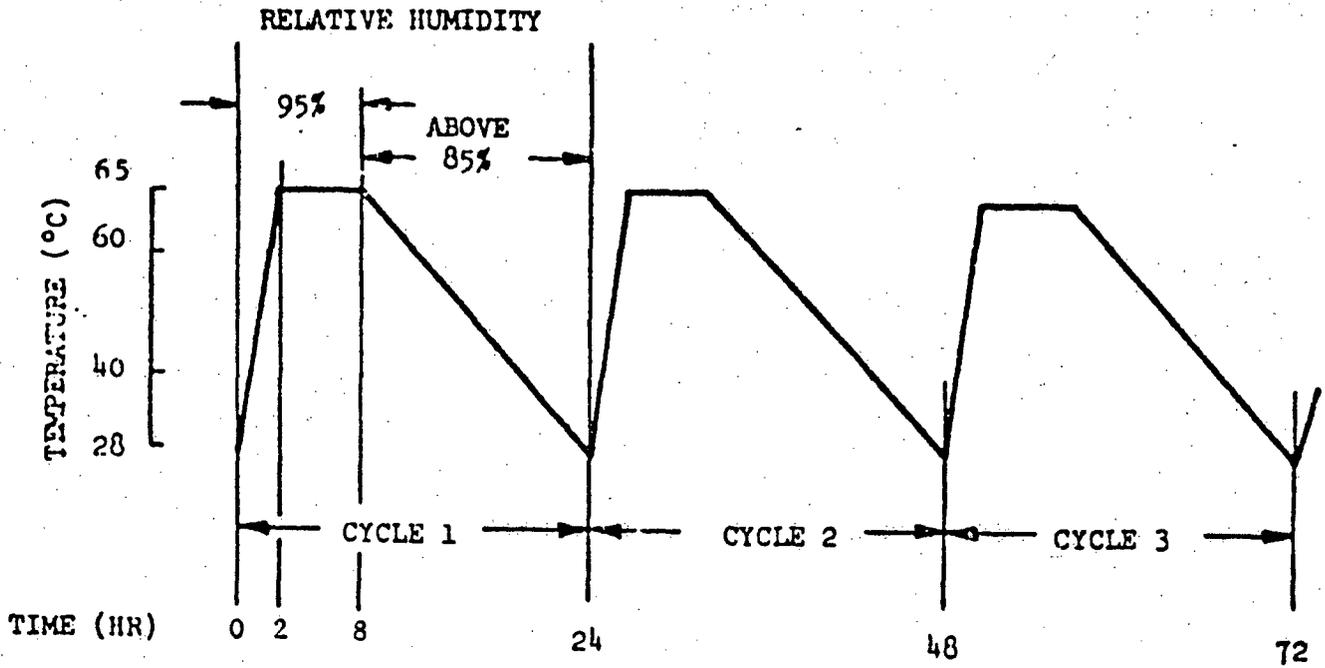
Step 1 - Prepare the test item in accordance with General Requirements, 3.2.

Step 2 - Dry the test item at 54°C (129°F) for 24 hours.

Step 3 - Condition the test item at 23°C (73°F) and 50 ±10 percent relative humidity for 24 hours.

Step 4 - Take initial measurements in accordance with General Requirements, 3.2.1.

NOTE: The test item may be realigned or readjusted as necessary to meet specification requirements. No further realignment or readjustment shall be



CONTINUE FOR A TOTAL OF 10 CYCLES (240 HR)

FIGURE 507.1-1. Humidity Cycle - Procedure I

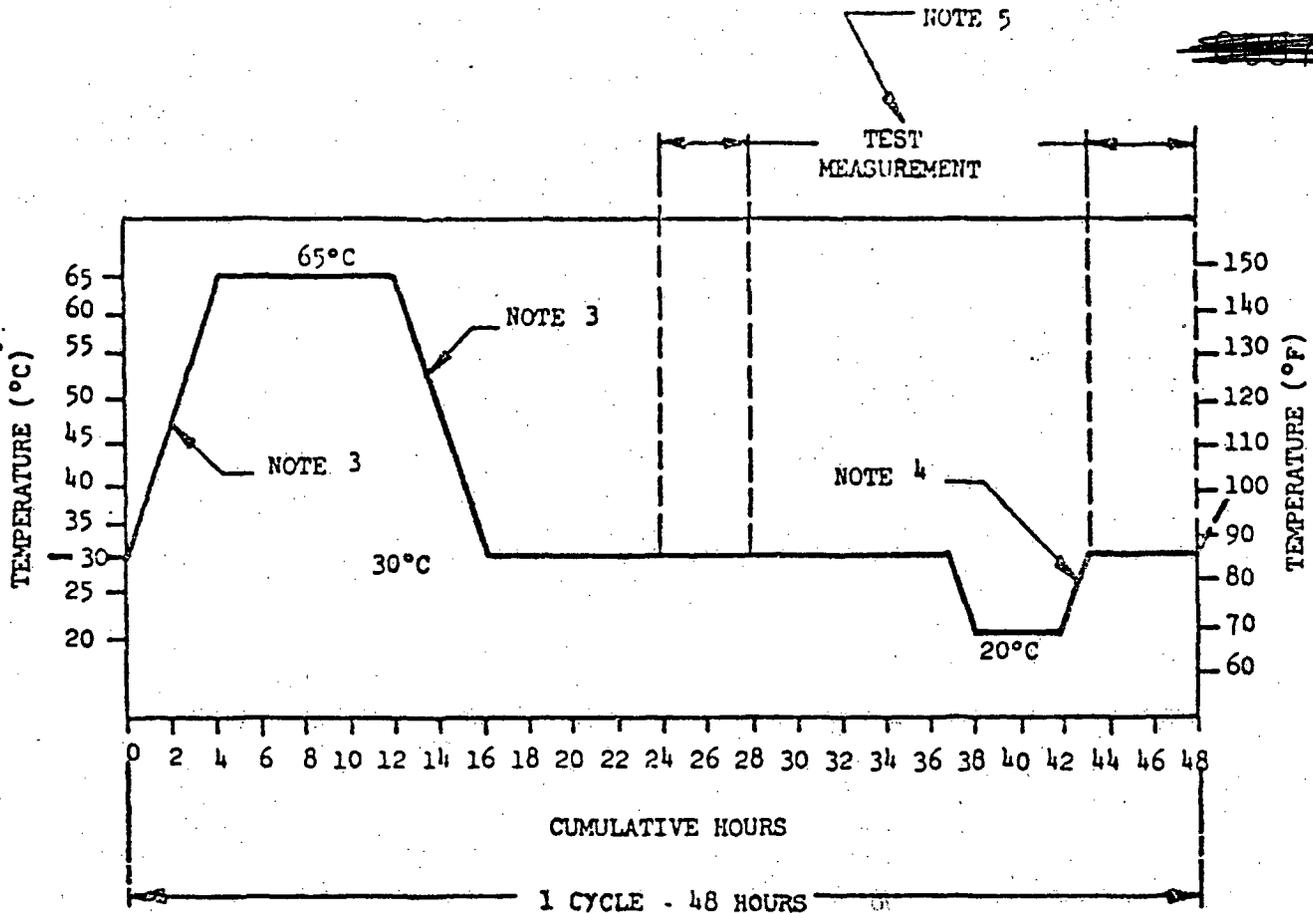


FIGURE 507.1-2. Humidity Cycle Procedures II and III

NOTES:

1. Tolerance during temperature change shall be not greater than 3°C (5°F).
2. Relative humidity shall be maintained at 94 +4 percent at all times, except that during the descending temperature period, the relative humidity may be permitted to drop as low as 85 percent.
3. Rate of temperature change between 30° and 65°C (86° and 149°F) shall be not less than 8°C (14.4°F) per hour.
4. The temperature increase in this portion of the curve shall be not less than 10°C (18°F).
5. Test measurements shall be taken only at the period specified in the applicable equipment or system specification.

METHOD 507.1

permitted throughout the test period other than with accessible controls employed for operation of the test item. No repair or replacement of parts shall be permitted. Equipment shall not be operated, except when specified test measurements are being performed.

- Step 5 - Raise the internal chamber temperature to 30°C (86°F) and the relative humidity to 94 ±4 percent.
- Step 6 - Subject the test item to five continuous 48-hour cycles in accordance with figure 507.1-2. The relative humidity shall be maintained at 94 ±4 percent at all times. Take measurements in accordance with General Requirements, 3.2.3 at the periods shown on figure 507.1-2 unless otherwise specified in the equipment specification. Prior to measurements, accumulated moisture may be removed by turning the test item upside down or shaking. Wiping is not permitted. (Certain operating procedures require an effective preconditioning of the test item environment prior to operation. When this occurs, the period of measurement shall be kept as short as possible.)
- Step 7 - After completion of the step 6 cycling, open the test item and remove the chassis from its enclosure, in the test chamber.
- Step 8 - Maintain the internal test chamber temperature at 30°C (86°F) with the relative humidity at 94 ±4 percent for 480 hours. During the last 5 hours of exposure, take measurements as specified in the equipment specification. Additional measurements may be made at the end of each 24-hour period, if so specified in the equipment specification. Prior to measurements, accumulated moisture may be removed by turning the test item upside down or shaking. Wiping is not permitted. For electronic equipment, if removal of the test chassis from its enclosure will, of itself, adversely affect the operation of the test item, the test item may be replaced in its enclosure for measurements.
- Step 9 - After completion of the 480-hour test, condition the test item at 23°C (73°F) and 50 ±10 percent relative humidity for 24 hours.
- Step 10 - Adjust the test item to optimum performance only as permitted in the step 4 note.
- Step 11 - Operate and inspect the test item, and obtain results in accordance with General Requirements, 3.2, within 1 hour.

3.4 Procedure IV. Ground fire control and shipboard equipment.

- Step 1 - Prepare the test item in accordance with General Requirements 3.2.
- Step 2 - Dry the test item at a temperature of not less than 40°C (104°F) nor more than 50°C (122°F) for not less than 2 hours.
- Step 3 - Condition the test item at 25° ±5°C (77° ±9°F) and 50 percent relative humidity for 24 hours.
- Step 4 - Take initial measurements as specified in the equipment specification in accordance with General Requirements, 3.2.

NOTE: The test item may be readjusted or realigned as necessary to conform to the equipment specification requirements. No further realignment or readjustment shall be permitted throughout the test period other than with accessible controls, external to the test item, employed for operation of the test item. If repairs, replacement of parts, or adjustments other than by the accessible external controls are made at any time prior to completion of the measurements required at the end of the fifth cycle, all five of the 24-hour cycles shall be repeated. Repairs include any change to the test item that is not made by use of the accessible controls external to the test item. The test item shall only be operated when specified test measurements are being performed.

- Step 5 - Subject the test item to five 24-hour cycles in accordance with figure 507.1-3. A 24-hour cycle consists of 16 hours at 60° ±5°C (140° ±9°F) and approximately 8 hours at 30° ±5°C (86° ±9°F) (includes transition times). The relative humidity shall be maintained at 95 percent, or greater, at both temperatures. Each transition time between 30° ±5°C (86° ±9°F) and 60° ±5°C (140° ±9°F) shall be not greater than 1-1/2 hours. The relative humidity during each transition need not be controlled. Approximately 2 hours after stabilization during the high temperature and low temperature portions of the first or second cycle, a sampling of the atmosphere in the chamber shall be made to determine that the conditions of temperature and relative humidity are uniform throughout the chamber.

Measurements as specified in the equipment specification shall be made during the second cycle at 60° ±5°C (140° ±9°F) immediately prior to decreasing to 30° ±5°C (86° ±9°F).

The test item shall be energized only a sufficient time to allow the required warmup and measurements specified in the equipment specification.

- ~~SECRET~~
- Step 6 - After completion of the fifth cycle with the test item in the chamber and the chamber at $30^{\circ} \pm 5^{\circ}\text{C}$ ($86^{\circ} \pm 9^{\circ}\text{F}$) and a relative humidity of not less than 95 percent, take measurements specified in the equipment specification (no repair, realignment, readjustment or replacement of parts shall be made, except as specified herein). Obtain results in accordance with General Requirements, 3.2.
 - Step 7 - Condition the test item at $25^{\circ} \pm 5^{\circ}\text{C}$ ($77^{\circ} \pm 9^{\circ}\text{F}$) and 50 ± 5 percent relative humidity for not less than 12 hours nor more than 24 hours.
 - Step 8 - While at $25^{\circ} \pm 5^{\circ}\text{C}$ ($77^{\circ} \pm 9^{\circ}\text{F}$) and 50 percent relative humidity, take measurements as specified in the equipment specification.
 - Step 9 - Inspect test item to detect evidence of physical degradation (such as corrosion of metal parts, distortion of plastic parts, and insufficient lubrication of moving parts) in accordance with General Requirements, 3.2.

3.5 Procedure V. Ammunition and natural environment cycles.

- Step 1 - Prepare the test item in accordance with General Requirements, 3.2, except that initial measurements are taken in step 5.
- Step 2 - Dry the test item at 54°C (129°F) for 24 hours.
- Step 3 - Condition the test item at 23°C (73°F) and $50^{\circ} \pm 10$ percent relative humidity for 24 hours.
- Step 4 - Gradually raise the internal chamber temperature to 40.5°C (105°F) and 90 percent relative humidity in 2 hours.
- Step 5 - Take initial measurements in accordance with General Requirements, 3.2.

NOTE: The test item may be readjusted or realigned as necessary to meet specification requirements. No further readjustment or realignment shall be permitted throughout the test period other than with accessible controls employed for operation of the test item. No repair or replacement of parts shall be permitted. Equipment shall be operated only when specified test measurements are being performed.

- Step 6 - Maintain the internal chamber temperature at 40.5°C (105°F) and the relative humidity at 90 percent for 16 hours.
- Step 7 - Gradually decrease the internal chamber temperature to 21°C (70°F) and increase the relative humidity to 95 percent in 2 hours.
- Step 8 - Maintain the internal chamber temperature at 21°C (70°F) and the relative humidity at 95 percent for 4 hours.
- Step 9 - Repeat steps 4, 6, 7, and 8 for a total of 20 cycles (480 hours). Take measurements as specified in the equipment specification. Prior to measurements, accumulated moisture may be removed by turning the test item upside down or shaking. Wiping is not permitted. Figure 507.1-4 is an outline of the humidity cycle for this procedure.
- Step 10 - After completion of step 9 cycling, operate the test item adjusting for optimum performance only as permitted in step 5 note, and inspect the test item to obtain results in accordance with General Requirements, 3.2 within 1 hour.

4. SUMMARY. The following details shall be specified in the equipment specification:

- a. Procedure number
- b. Pretest data required
- c. Failure criteria
- d. Periods at which measurements are to be taken
- e. Method for determining purity of water if a more precise method is desired. (An alternate to pH criteria is to perform a conductivity measurement. The maximum acceptable value would be that resistance which is equivalent to 3.5 parts per million total ionized solids.)
- f. If test item must be exposed to extreme temperature prior to test (procedure I).
- g. Number of cycles if other than 20 (procedure V, step 9).
- h. Whether cycle is to be limited to first 24 hours (procedure II, step 6).

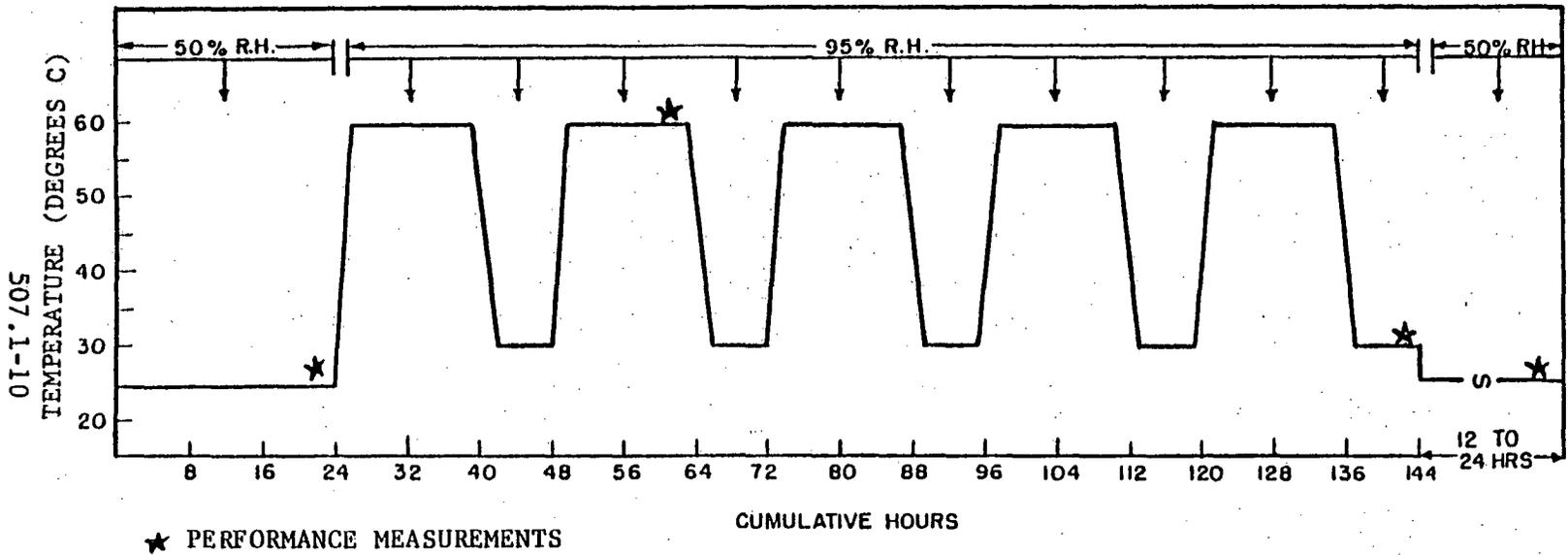


FIGURE 507.1-3. Humidity Cycle - Procedure IV

507.1-11

METHOD 507.1

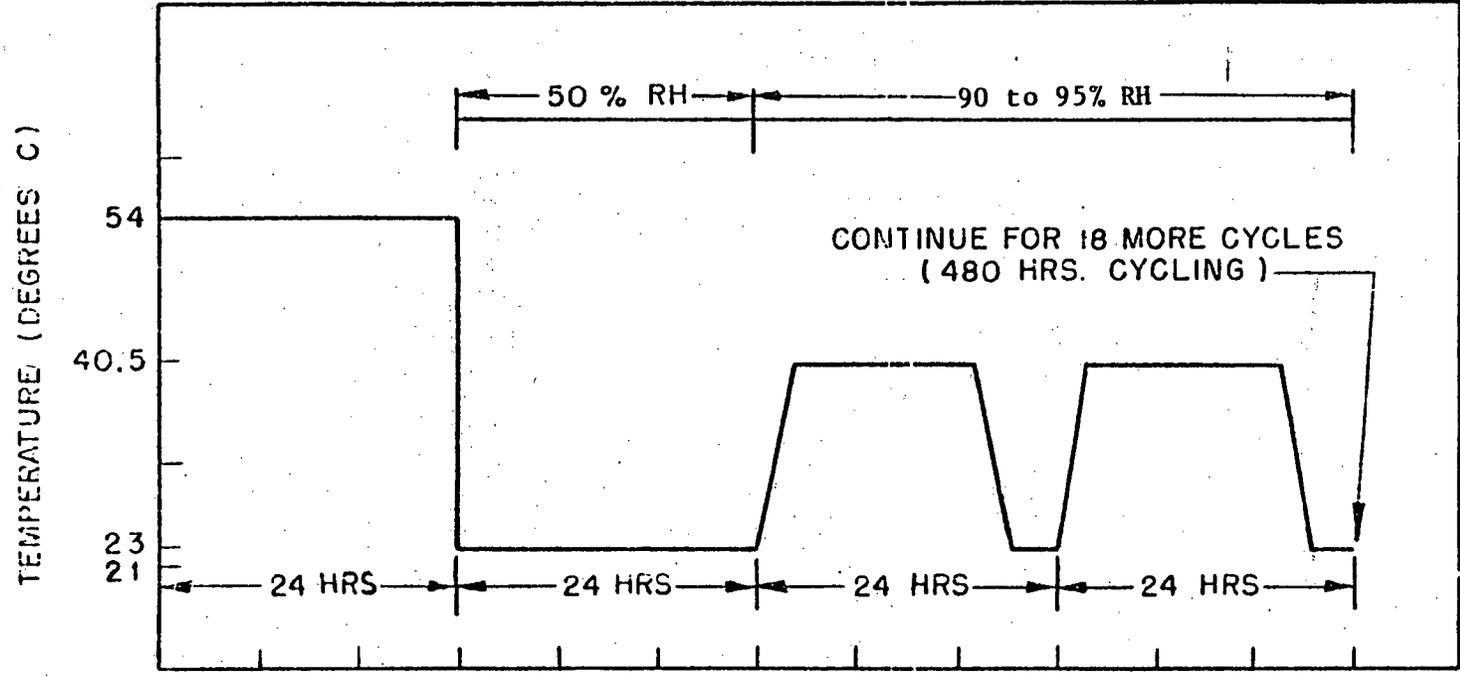


FIGURE 507.1-4. Humidity Cycle - Procedure V

MIL-STD-810C

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U.S. ATOMIC ENERGY COMMISSION
MATERIALS DATA INPUT S/SNM

4 - SOURCE AND SNM
REFERENCE COPY

A. TYPE OF ACTION AND IDENTIFICATION CODES

<input checked="" type="checkbox"/> NEW LICENSE	<input type="checkbox"/> AMENDMENT TO RENEW LICENSE	<input type="checkbox"/> AMENDMENT TO TERMINATE	<input type="checkbox"/> VOID	DOCKET NUMBER 040-08598	MAIL CONTROL NUMBER 05035	CHANGE NAME/ ADDRESS <input type="checkbox"/>
<input type="checkbox"/> NEW LICENSE AND NEW LICENSEE	<input type="checkbox"/> OTHER AMENDMENT	<input type="checkbox"/> CLERICAL CHANGE NO AMENDMENT				

B. INDICATIVE INFORMATION:

1 INDIVIDUAL LICENSEE	NAME (LAST, FIRST, MIDDLE)	NAME (LAST, FIRST, MIDDLE)
	NAME (LAST, FIRST, MIDDLE)	NAME (LAST, FIRST, MIDDLE)
	NAME (LAST, FIRST, MIDDLE)	NAME (LAST, FIRST, MIDDLE)

2 ORGANIZATION NAME (ALPHABETIC SEQUENCE)
Army, Department of the

DEPARTMENT OR BUREAU
Headquarters, U.S. Army Electronics Command

3 ADDRESS

BUILDING, STREET	CITY St. Monmouth	STATE NJ	ZIP CODE 07703
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4

TYPE OF APPLICANT <input checked="" type="checkbox"/> U.S. GOVERNMENT AGENCY <input type="checkbox"/> INDIVIDUAL LICENSEE <input type="checkbox"/> ORGANIZATIONAL LICENSEE	DATE REQUEST RECEIVED 01/12/77	INSTITUTION CODE 01022	PENDING PROG. CODE 11200	ACTUAL PROG. CODE
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SECONDARY PROGRAM CODES AS REQUIRED:

#1	#2	#3	#4	#5
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LICENSE NUMBER	DATE LICENSE ISSUED OR ACTION COMPLETED	EXPIRATION DATE
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APPLICANT'S COMMUNICATION DATED:	CLASSIFICATION	ASSIGNED TO:	RESULTING AMD. NO.
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ENCLOSURES:

UNCLASSIFIED DESCRIPTION:

DISTRIBUTION:

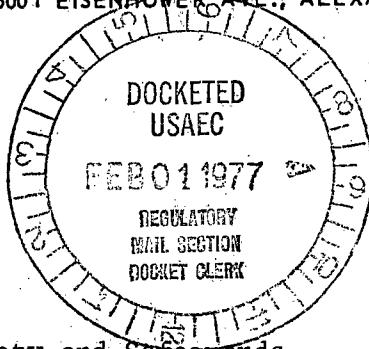
OTHER REFERRALS

NAME	DATE	NAME	DATE



DEPARTMENT OF THE ARMY
 HEADQUARTERS US ARMY MATERIEL DEVELOPMENT AND READINESS COMMAND
 5001 EISENHOWER AVE., ALEXANDRIA, VA. 22333

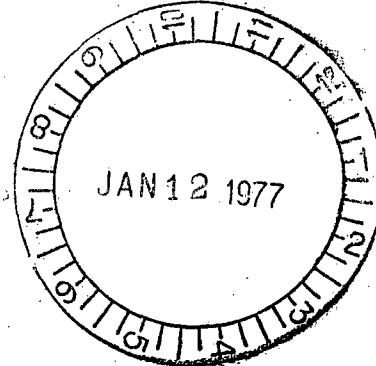
DRGSF-P/76-0116



REGULATORY FILE CY

40-8598

6 January 1977



Director
 Nuclear Material Safety and Safeguards
 US Nuclear Regulatory Commission
 ATTN: Materials Branch
 Washington, DC 20555

Gentlemen:

Forwarded is a request from US Army Electronics Command, Fort Monmouth, New Jersey, for Source Material License.

This request is for possession and use of thorium fluoride as optical coatings.

Please acknowledge receipt of correspondence on enclosed NRC Form (NRC-46) Reply Card.

Sincerely,

DARWIN N. TARAS
 Chief, Health Physics
 Safety Office

2 Incl
 As stated

Cy Furn:
 HQDA (DASG-HCH-E) WASH DC 20310
 Dir, DARCOMFSA, Charlestown, IN 47111

5035

01022



DEPARTMENT OF THE ARMY
HEADQUARTERS UNITED STATES ARMY ELECTRONICS COMMAND
FORT MONMOUTH, NEW JERSEY 07703

40-8598

Received W/Ltr. Dated

1/6/77

14 DEC 1976

DRSEL-SF-H

SUBJECT: Initial Request for a Nuclear Regulatory Commission
Source Material License

Commander
US Army Materiel Development
and Readiness Command
ATTN: DRCSF-P
5001 Eisenhower Avenue
Alexandria, Virginia 22333

1. The United States Army Electronics Command, Fort Monmouth, New Jersey hereby makes application for a Source Material License to the Nuclear Regulatory Commission.
2. This initial application is submitted for review and forwarding to the Nuclear Regulatory Commission.
3. The inclosed application is submitted in quadruplicate in fulfillment of the requirements of Section 40.32, Title 10, Code of Federal Regulations, Part 40, Licensing of Source Material. Included in the application is a letter of concurrence from Sacramento Army Depot (SAAD) on matters pertaining to SAAD as cited in this initial license.

FOR THE COMMANDER:

1 Incl
as

CF:
DRSEL-NV-SD
DRSEL-RD-EV

Robert H. Marcrum
ROBERT H. MARCRUM
Colonel, GS
Chief of Staff



DEPARTMENT OF THE ARMY Mr. Toyama/mja/839-3285
SACRAMENTO ARMY DEPOT
SACRAMENTO, CALIFORNIA 95813

DRXSA-QMD-1

6 December 1976

SUBJECT: Initial Review Requested by Sacramento Army Depot as Cited in
Initial Request for a Nuclear Regulatory Commission Source
Material License

Commander
US Army Electronics Command
ATTN: DRSEL-SP-H
Ft Monmouth, NJ 07703

1. Reference your letter DRSEL-SP-H, Hq USABCON, subject same as above, dated 3 Dec 76 with inclosure.
2. The inclosed Nuclear Regulatory Commission Source Material License application was reviewed on matters pertaining to Sacramento Army Depot and we are in concurrence.

FOR THE COMMANDER:


FREDERICK T. TOYAMA
Radiological Protection Officer

UNITED STATES ATOMIC ENERGY COMMISSION

APPLICATION FOR SOURCE MATERIAL LICENSE

Pursuant to the regulations in Title 10, Code of Federal Regulations, Chapter 1, Part 40, application is hereby made for a license to receive, possess, use, transfer, deliver or import into the United States, source material for the activity or activities described.

1. (Check one) <input checked="" type="checkbox"/> (a) New license <input type="checkbox"/> (b) Amendment to License No. _____ <input type="checkbox"/> (c) Renewal of License No. _____ <input type="checkbox"/> (d) Previous License No. _____	2. NAME OF APPLICANT Department of the Army Headquarters, US Army Electronics Command 3. PRINCIPAL BUSINESS ADDRESS ATTN: DRSEL-SF-H Fort Monmouth, New Jersey 07703
--	---

4. STATE THE ADDRESS(ES) AT WHICH SOURCE MATERIAL WILL BE POSSESSED OR USED
US Department of Defense Installations and Activities World-Wide
possessed under the control of Army personnel

5. BUSINESS OR OCCUPATION US Government Agency	6. (a) IF APPLICANT IS AN INDIVIDUAL, STATE CITIZENSHIP N/A	(b) AGE N/A
---	--	----------------

7. DESCRIBE PURPOSE FOR WHICH SOURCE MATERIAL WILL BE USED
See Supplement A

8. STATE THE TYPE OR TYPES, CHEMICAL FORM OR FORMS, AND QUANTITIES OF SOURCE MATERIAL YOU PROPOSE TO RECEIVE, POSSESS, USE, OR TRANSFER UNDER THE LICENSE

(a) TYPE	(b) CHEMICAL FORM	(c) PHYSICAL FORM (Including % U or Th.)	(d) MAXIMUM AMOUNT AT ANY ONE TIME (in pounds)
NATURAL URANIUM			
URANIUM DEPLETED IN THE U-235 ISOTOPE			
THORIUM (ISOTOPE)	²³² Th	Optical Coatings Less than 76 percent	80 pounds

9. (c) MAXIMUM TOTAL QUANTITY OF SOURCE MATERIAL YOU WILL HAVE ON HAND AT ANY TIME (in pounds)
80 pounds

9. DESCRIBE THE CHEMICAL, PHYSICAL, METALLURGICAL, OR NUCLEAR PROCESS OR PROCESSES IN WHICH THE SOURCE MATERIAL WILL BE USED, INDICATING THE MAXIMUM AMOUNT OF SOURCE MATERIAL INVOLVED IN EACH PROCESS AT ANY ONE TIME, AND PROVIDING A THOROUGH EVALUATION OF THE POTENTIAL RADIATION HAZARDS ASSOCIATED WITH EACH STEP OF THOSE PROCESSES
See Supplement B

10. DESCRIBE THE MINIMUM TECHNICAL QUALIFICATIONS INCLUDING TRAINING AND EXPERIENCE THAT WILL BE REQUIRED OF APPLICANT'S SUPERVISORY PERSONNEL INCLUDING PERSON RESPONSIBLE FOR RADIATION SAFETY PROGRAM (OR OF APPLICANT IF APPLICANT IS AN INDIVIDUAL)
See Supplement C

11. DESCRIBE THE EQUIPMENT AND FACILITIES WHICH WILL BE USED TO PROTECT HEALTH AND MINIMIZE DANGER TO LIFE OR PROPERTY AND RELATE THE USE OF THE EQUIPMENT AND FACILITIES TO THE OPERATIONS LISTED IN ITEM 9; INCLUDE: (a) RADIATION DETECTION AND RELATED INSTRUMENTS (including film badges, dosimeters, counters, air sampling, and other survey equipment as appropriate. The description of radiation detection instruments should include the instrument characteristics such as type of radiation detected, window thickness, and the range(s) of each instrument)
See Supplement D

(b) METHOD, FREQUENCY, AND STANDARDS USED IN CALIBRATING INSTRUMENTS LISTED IN (a) ABOVE, INCLUDING AIR SAMPLING EQUIPMENT (for film badges, specify method of calibrating and processing, or name supplier).
See Supplement E

11(c) VENTILATION EQUIPMENT WHICH WILL BE USED IN OPERATIONS WHICH PRODUCE DUST, FUMES, MISTS, OR GASES, INCLUDING PLAN VIEW SHOWING TYPE AND LOCATION OF HOOD AND FILTERS, MINIMUM VELOCITIES MAINTAINED AT HOOD OPENINGS AND PROCEDURES FOR TESTING SUCH EQUIPMENT.

No Equipment

12. DESCRIBE PROPOSED PROCEDURES TO PROTECT HEALTH AND MINIMIZE DANGER TO LIFE AND PROPERTY AND RELATE THESE PROCEDURES TO THE OPERATIONS LISTED IN ITEM 9. INCLUDE: (a) SAFETY FEATURES AND PROCEDURES TO AVOID NONNUCLEAR ACCIDENTS, SUCH AS FIRE, EXPLOSION, ETC., IN SOURCE MATERIAL STORAGE AND PROCESSING AREAS.

See Supplement F

(b) EMERGENCY PROCEDURES IN THE EVENT OF ACCIDENTS WHICH MIGHT INVOLVE SOURCE MATERIAL.

See Supplement C

See Supplement G

14. (c) DETAILED DESCRIPTION OF RADIATION SURVEY PROGRAM AND PROCEDURES.

See Supplement H

13. WASTE PRODUCTS: If none will be generated, state "None" opposite (a), below. If waste products will be generated, check here and explain on a supplemental sheet:

(a) Quantity and type of radioactive waste that will be generated. None

(b) Detailed procedures for waste disposal. See Supplement I

14. (f) PRODUCTS FOR DISTRIBUTION TO THE GENERAL PUBLIC UNDER AN EXEMPTION CONTAINED IN 10 CFR 40 ARE TO BE MANUFACTURED, USE A SUPPLEMENTAL SHEET TO FURNISH A DETAILED DESCRIPTION OF THE PRODUCT, INCLUDING:

(a) PERCENT SOURCE MATERIAL IN THE PRODUCT AND ITS LOCATION IN THE PRODUCT.

(b) PHYSICAL DESCRIPTION OF THE PRODUCT INCLUDING CHARACTERISTICS, IF ANY, THAT WILL PREVENT INHALATION OR INGESTION OF SOURCE MATERIAL THAT MIGHT BE SEPARATED FROM THE PRODUCT.

(c) BETA AND BETA PLUS GAMMA RADIATION LEVELS (Specify instrument used, date of calibration and calibration technique used) AT THE SURFACE OF THE PRODUCT AND AT 12 INCHES.

(d) METHOD OF ASSURING THAT SOURCE MATERIAL CANNOT BE DISSOCIATED FROM THE MANUFACTURED PRODUCT.

CERTIFICATE

(This item must be completed by applicant)

15. The applicant, and any official executing this certificate on behalf of the applicant named in Item 2, certify that this application is prepared in conformity with Title 10, Code of Federal Regulations, Part 40, and that all information contained herein, including any supplements attached hereto, is true and correct to the best of our knowledge and belief.

Department of the Army
US Army Electronics Command

(Applicant named in Item 2)

14 DEC 1976

Dated

BY

Robert H. Marcum

ROBERT H. MARCRUM
Colonel, GS
Chief of Staff

(Title of certifying official authorized to act on behalf of the applicant)

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.

SUPPLEMENT A

1. Reference: Item 7 of Form AEC-2..
2. Thorium Fluoride ($^{232}\text{ThF}_4$) will be used as optical coatings on objective lenses in various Night Vision Devices. A list of common modules containing such lenses is provided for in Table 1.
3. ^{232}Th Thorium fluoride as used in Infrared Spectrum (IR) has a low index of refraction and is used extensively in the manufacturing of wideband multi-layer anti-reflection (MLAR) coatings.
4. Thorium fluoride is extremely stable, exhibiting no appreciable decomposition in the coating deposition process. The melting point is greater than 900°C .
5. Thorium fluoride has very low water solubility which is very important since $^{232}\text{ThF}_4$ films are used as the outer layer of IR MLAR coatings and offer good environmental protection.
6. Thorium fluoride was selected for its transmission to the infrared spectral region. All ionic crystals exhibit lattice vibration absorption at predictable wavelengths in the infrared region. The absorption regions move toward longer wavelengths with increasing atomic weight. Thorium fluoride is very useful since it is nearly the heaviest fluoride compound available and its lattice absorption region is well beyond the 8-14 micron operating region of the IR systems of military interest.
7. Due to the stringent military requirements for maximum IR transmission and high performance in adverse environments, ThF_4 offers one of the best components for MLAR coatings.

TABLE 1

Common Modules Containing $^{232}\text{ThF}_4$ Coatings

<u>Assembly/ Nomenclature</u>	<u>End Item Nomenclature</u>	<u>Maximum Activity (nano-curies)</u>
1. Detector-Dewar, DT-591/UA	AN/TAS-4, 5, and 6	1.0
2. Detector-Dewar, DT-594/UA	AN/VSG-2	2.0
3. Imager, Optical, SU-97/UA	AN/TAS-4, 5, and 6	10.0
4. Imager, Optical, SU-103/UA	AN/VSG-2	20.0
5. Afocal-Cover SU-94/TAS-4 and SU- 95/TAS-6	AN/TAS-4 and 6	40.0
6. Afocal-Cover, *	AN/TAS-5	10.0
7. Afocal-Cover, *, W/IR Window	AN/VSG-2	124
8. Boresight Collimator, SU-93/TAS (ancillary equipment)	AN/TAS-4 and 6	6.0

*Nomenclature identification has not been assigned. When assigned, this information will be forwarded as part of the license file.

SUPPLEMENT B

1. Reference: Item 9 of Form AEC-2.
2. The objective lenses will be procured with the wideband MLAR ($^{232}\text{ThF}_4$) coating already applied.
3. In the field, normal optical cleaning procedures will be utilized by the users. The Army will not perform any maintenance involving the removal of the MLAR coatings or its replacements.
4. Common module replacements at the Direct Support/General Support levels may be performed. This is the intermediate maintenance level between the user and Sacramento Army Depot (SAAD).
5. Maintenance of the Night Vision Devices containing the $^{232}\text{ThF}_4$ coatings will be performed at SAAD. This maintenance will not include grinding or the removing of the $^{232}\text{ThF}_4$ coatings off of the common modules.

SUPPLEMENT C

1. Reference: Item 10 of Form AEC-2.

SAA 2. Steven A. Horne, Health Physicist, US Army Electronics Command, Fort Monmouth, New Jersey.

a. Education:

(1) 1964 - AAS Nucleonics, Old Dominion University, Norfolk, Virginia.

(2) 1975 - BSE Nuclear Science & Engineering, Catholic University of America, Washington, DC.

(3) 1975 - 6 semester hours graduate work in Nuclear Science and Engineering, Catholic University of America, Washington, DC.

b. Radiation Experience:

(1) 1964-1965 - Virginia Associated Research Center, NASA, Langley Station, Virginia. Twelve months of training, which include the use of such items as Van-De-Graff Accelerators, Neutron Generator, Dynamitron Accelerator, Linear Electron Accelerator, and a Synchrocyclotron Accelerator. Radioactive sources used include 100 mCi ^{60}Co , 10 mCi ^{241}Am , and micro quantity check sources. The above mentioned include all aspects of Health Physics.

(2) 1965-1966 - E. R. Squibb, New Brunswick, New Jersey. The production and manufacturing of radio-pharmaceuticals and Health Physics. This includes the use of such radioactive material as ^{198}Au , ^{57}Co , ^{60}Co , ^{51}Cr , ^{59}Fe , ^3HTO , ^{197}Hg , ^{203}Hg , ^{125}I , ^{131}I , ^{192}Ir , ^{85}Kr , ^{22}Na , ^{32}P , ^{75}Se , ^{85}Sr , ^{99}Tc , and ^{125}Te .

(3) 1967-1968 - Nuclear Division of Flow Corporation, Fort Belvoir, Virginia. Two months of formal training which includes radiation safety, radiation detection instrumentation, isotopic handling equipment, and pertinent Federal regulations. Experimental programs were performed by the use of radioactive sources ranging from 0.1 to 1200 Ci of ^{60}Co to determine the nuclear shielding effectiveness of real and ideal structures.

(4) 1968-1976 - US Army Mobility Equipment Research and Development Command, Fort Belvoir, Virginia. As health physicist responsible for the accomplishment of the USAMERADCOM

and USANVL Radiation Protection Program. Performed research studies basic and applied on complete projects or on major phases of long and/or short term projects in the field of Health Physics.

(5) 1976-Present - US Army Electronics Command, Fort Monmouth, New Jersey. As health physicist responsible for the accomplishment of the Electronics Command radioactive commodity program. Responsibility includes development, initiates and administering programs to assure life cycle management control of numerous radioactive commodities.

c. Radiation training:

(1) 1961-1975 - 56 semester hours in formal courses pertaining to radiation, including College Physics, Environmental Aspects of Nuclear Power Plant Management, Environmental Radioactivity, Nucleonic Fundamentals, Nuclear Properties and Interactions, Nuclear Physics, Nuclear Radiation Detection, Nuclear Reactor Physics, Radiation Biology, Radioisotope Techniques, and Radiological Physics.

(2) August 1969 - Radiological Safety Course pertaining to Nuclear Density Instrumentation. Seman Nuclear Corporation, Milwaukee, Wisconsin.

(3) September 1969 - 80 hours Occupational Radiation Protection Course 212 covering principles and practices of radiation protection, evaluation of external and internal exposure to radionuclides and methods for protection against these hazards. Public Health Service, Las Vegas, Nevada.

(4) November 1969 - 40 hours Fundamentals of Non-Ionizing Radiation Protection Course 264, consisted of technical principles essential to the control of non-ionizing radiation. Also included were concepts and techniques for minimizing exposure to personnel operating lasers and microwave generators and established protection standards. Public Health Service, Rockville, Maryland.

(5) June 1970 - 40 hours, DARCOM Field Safety Activity Laser Safety Course, covered laser theory, laser systems, effects on skin and internal organs, ocular effects, threshold levels for MRD safe exposure criteria, measurement of laser radiation, hazard evaluation of military laser installations, secondary hazard evaluation, medical surveillance, and survey methods and evaluation. University of Cincinnati, Cincinnati, Ohio.

(6) October 1970 - 80 hours Radionuclide Analysis by Gamma Spectroscopy Course 208 covering principles and practices of qualitative and quantitative analysis of environmental samples by gamma spectroscopy. Public Health Service, Winchester, Massachusetts.

(7) November 1971 - 80 hours Radiation Guides and Dose Assessment Course 272, consisted of radiation protection guides, internal dose calculations, and comparison of dosimetry data with appropriate guides for radiation protection. Environmental Protection Agency, Las Vegas, Nevada.

3. Mr. Horne is the responsible person for the radiation safety aspects of $^{232}\text{ThF}_4$ coatings throughout the Army.

PMS 4. Mr. Bernard Savaiko, Chief, Safety Office, US Army Electronics Command, Fort Monmouth, New Jersey is designated as the manager of this Nuclear Regulatory Commission License.

SUPPLEMENT D

1. Reference: Item 11(a) of Form AEC-2.
2. Inclosed in Annex D-1 is the list of radiation detection instruments for use by SAAD where bulk storage and maintenance will be performed associated with Night Vision devices and common modules containing $^{232}\text{ThF}_4$ coated objective lenses.

ANNEX D-1

<u>TYPE OF INSTRUMENTS</u>	<u>AVAILABLE</u>	<u>RADIATION SELECTED</u>	<u>SENSITIVITY RANGE</u>	<u>WINDOW THICKNESS</u>	<u>USE</u>
1. AN/PDR-27()	2	Beta, Gamma and X-ray	0-5x10 ² mR/hr	5 mg·cm ⁻²	Monitoring
2. Eberline Instrument Company model SAC-3A Scintillation Counter	1	Alpha	0-6x10 ⁶ counts per minute (CPM)	Windowless	Measuring
3. Eberline Instrument Company model PAC-1SA	2	Alpha	0-2x10 ⁶ CPM	1.5 mg·cm ⁻²	Monitoring
4. Nuclear Measurements Corporation model PC-3A	1	Alpha, Beta and Gamma	0-1.5x10 ⁶ CPM	Windowless	Measuring

SUPPLEMENT E

1. Reference: Item 11(b) of Form AEC-2.
2. Radiation detection instruments as listed in Annex D-1 of Supplement D are calibrated either quarterly or as recommended by the manufacturer for daily calibration against standards traceable to the National Bureau of Standards.

SUPPLEMENT F

1. Reference: Item 12(a) of Form AEC-2.
 2. All specifications for MLAR coatings of IR optical elements must conform to the following environmental tests:
 - a. A witness sample from each coating run shall be subjected to the adherence and hardness tests as specified in paragraphs 4.4.5 and 4.4.6 of MIL-M-13508.
 - b. A witness sample from each coating run shall be subjected to the 10 day humidity test of Method 507.1 of MIL-STD-810.
 - c. A witness sample from each coating run shall be subjected to the salt spray (fog) test as specified in paragraph 4.6.10 of MIL-C-675.
 3. In addition, the durability of all IR coatings shall be tested to insure that a sample from every batch of coated optical elements meets or exceeds the scotch tape, eraser rub and environmental tests as specified in the following Military Specifications and/or Standards: MIL-C-675, MIL-M-13508 and MIL-STD-810.
 4. Procurement contracts for Night Vision devices as used in the 8-14 micron region having infrared optical elements using $^{232}\text{ThF}_4$ as the MLAR coatings shall contain the following requirements:
 - a. Markings
 - (1) Carrying and shipping cases shall be marked on the outside with the following statement per MIL-STD-1458:

"Elements of the IR optical system are thorium coated."
 - (2) Assemblies within the system which contain $^{232}\text{ThF}_4$ coated elements shall be labeled with the following:

"Dispose per AR 755-15" (followed by a small radioactive wheel insignia).
- This shall apply to all MLAR coated elements contained in common modules as listed in Table 1 of Supplement A.
5. The following notices will be used in all Technical Manuals for equipment which contain $^{232}\text{ThF}_4$ coated lenses:

Radiation Hazard

The anti-reflective coating on all infrared optics contain thorium fluoride which is slightly radioactive. The only potential hazard involves ingestion (swallowing or inhaling) of this coated material. Dispose of broken lenses, etc. in accordance with AR 755-15.

SUPPLEMENT G

1. Reference: Item 12(b) of Form AEC-2.
2. In the event that any common module coated optics are badly scratched, deformed or otherwise defective, these common modules will be returned to SAAD for disposition.

SUPPLEMENT H

1. Reference: Item 12(c) of Form AEC-2.
2. In determining the radiation hazard assessment for $^{232}\text{ThF}_4$ coated objective lenses in Night Vision devices, a dose calculation was performed using a maximum activity of 146 nano-curies as contained in the AN/VSG-2. Using a conservative approach, a calculated value of less than $37 \text{ uRads}\cdot\text{hr}^{-1}\cdot\text{ft}^{-1}$ was obtained. Inclosed in Annex H-1 is background information on the derivation of this value.
3. Based on the above calculated value, continuous exposure to the user from these devices would result in an annual exposure to less than that prescribed to the General Public.
4. Since the $^{232}\text{ThF}_4$ is used solely on IR objective lenses and would never be used in the proximity of the eye, there does not appear to be any danger to personnel using equipment which contains the coated objective lenses.
5. Based on the low exposure potential, the instructions contained in the technical literature are considered sufficient radiation safety controls over the user.
6. On all procurements, the Army will require that the contractors test the common module coated optics to insure that these devices comply with all specifications and with Title 10, Code of Federal Regulations. The method of testing must be approved by the Government. Additionally, a small number of these devices will be selected at random to be independently tested to insure that the material complies with all specifications. The independent test will be performed either by Government personnel at a Government facility, or by an independent testing contractor.
7. $^{232}\text{Thorium}$ fluoride coated lenses are excepted from specification packaging, markings and labeling, and are excepted from the provisions of Title 49 Code of Federal Regulations, Part 173.393. The technical literature will advise shippers to include the following notice on all shipments:

"This shipment is exempt from DOT specification packaging, marking, and labeling requirements IAW Title 49 CFR 173.393."

8. The purpose of this instruction is to avoid confusing shippers and transportation control personnel as a result of the labeling requirements imposed by the Nuclear Regulatory Commission for the carrying and shipping case and the assemblies within the systems which contain the $^{232}\text{ThF}_4$ coated elements. Army users will not be required to monitor shipping containers and DA Form 2791R will not be used.

ANNEX H-1

1. In order to determine the radiation hazard, the relative energies and intensities of the alpha, beta, and gamma particles must be considered. The relative ranges of these particles in the surrounding material, such as the various aluminum housings in the system, must also be considered.
2. One of the problems involved in determining dosimetry concerns the different kinds of radiation and the differences in radiosensitivity of various organs of the body.
3. The alpha particles are the highest energy particles in the thorium decay series. They produce a particular biological response in the same degree as 10 to 20 times the number of rads of gamma or beta radiation. However, the range of these alpha particles as shown on page 125 of the Radiological Health Handbook(5) is relatively short and well defined since its radiation is monoenergetic. For example, the range of the highest energy alpha particle of the thorium decay series is approximately 8.5 cm in air. The range for this same particle in aluminum would be only 0.005cm. Therefore, the alpha particle dosage will be disregarded, since it is not a consideration in the normal use and maintenance of the IR system.
4. Beta particle ranges in air can be estimated using either Sargent's or Feather's Rule. On page 122 of the Radiological Health Handbook(5), depicts beta particle range as a function of particle energy for several materials. Note that beta particle radiation exposure would only result from the exterior surfaces of a lens assembly.
5. Gamma particle ranges are the most significant of the three particles. To calculate the dose rate at a one foot range from a gamma source the following approximation will be used.

$$\text{Gamma dose rate, rads}\cdot\text{hr}^{-1} \approx 6 \text{ CE } n$$

where

C = Number of curies

E = Gamma ray energy (MeV)

n = Gamma quanta/disintegration

For the AN/VSG-2 system:

$$\begin{aligned}\text{Gamma Dose} &= \sum 6 \times .146 \times 10^{-6} \cdot E \cdot n \\ &= .876 \times 10^{-6} \sum E \cdot n \text{ rads}\cdot\text{hr}^{-1}\end{aligned}$$

The summation calculation for the gamma dosage is listed in Table 1.

6. Assuming that the normal working distance for maintenance personnel is two feet, the $1.627 \mu\text{Rads}\cdot\text{hr}^{-1}$ calculated at one foot is decreased to $0.407 \mu\text{Rads}\cdot\text{hr}^{-1}$ using the inverse square relationship.

7. The beta particle dosage contribution is extremely more complicated to calculate since the attenuation due to surrounding structures must be analyzed. After a visual inspection of the AN/VSG-2 system design, a qualitative judgement indicates that radiation exposure to maintenance personnel is possible if the system is substantially disassembled and arranged to allow maximum exposure to all coated surfaces. The calculated activity associated with these coated surfaces is 0.0505 microcuries.

8. Calculation of the absorbed dose around beta emitting point isotropic sources has been described by Loevinger⁽⁴⁾ and Berger⁽¹⁾. The restrictive assumptions detailed by Berger are adaptable to the situation under analysis, except for the point source geometry. Extended source calculations require integration over point source distributions. However, the dose distribution from a circular disk source cannot be obtained directly by integration of the B-particle point source function. Evaluation by numerical methods of special cases is possible. However, for purposes of initial evaluation of the magnitude of the dosage rate, the point source geometry will be used. These results will indicate a somewhat higher dosage rate than actual.

9. The dose rate at a distance x (cm) from a point isotropic beta source can be written⁽²⁾:

$$R(x) = A \cdot n \cdot K_1 \cdot E_{av} \cdot \phi(x) \text{ rad}\cdot\text{hr}^{-1}$$

where

A = Activity of source in μci

n = Number of betas emitted per disintegration

E_{av} = Mean beta energy MeV

$\phi(x)$ = Specific absorbed fraction per gram

$K_1 = 2.134 \text{ gm} \cdot \text{rad} \cdot \text{hr}^{-1} \cdot \text{MeV} \cdot \mu\text{ci}$

10. Distances are expressed in terms of percentile distances x_p . x_{90} is the conventional term which represents the distance within which 90 percent of the energy emitted from a point source is absorbed. Using this, the scaled absorbed-dose distribution $F\left(\frac{x}{x_{90}}\right)$ is obtained by relating the dimensionless function x/x_{90} to specific absorbed fraction⁽⁴⁾:

$$F\left(\frac{x}{x_{90}}\right) = 4 \cdot \pi \cdot p \cdot x^2 \cdot x_{90} \cdot \phi(x)$$

where

p = Density of the medium in g/cm^3

x = Distance from the source in cm

x_{90} = Percentile distance in cm

Combining these two equations, eliminating $\phi(x)$, gives:

$$R(x) = \frac{A \cdot n \cdot K_1 \cdot E_{av} \cdot F\left(\frac{x}{x_{90}}\right)}{4\pi p \cdot x^2 \cdot x_{90}}$$

11. This expression in its present form must be modified to the proper medium of interest - air. Substantial investigation of the relationship between absorbed-dose distributions in different media has been conducted by Cross⁽³⁾, resulting in the following relationship:

$$x_{90} = a_{21} \frac{p'}{p} x'_{90}$$

where a_{21} is called the relative attenuation factor which is independent of the particle energy or of the distance from the source, provided that the average atomic numbers of the two media are sufficiently close. The attenuation factor relative to water obtained by Cross for air is 0.89⁽²⁾. Including the above conversion to air into the modified formula for $R(x)$ yields:

$$R(x) = \frac{A \cdot n \cdot K_2 \cdot E_{av} \cdot F\left(\frac{x}{x'_{90}}\right)}{x^2 \cdot p' \cdot x'_{90}}$$

where

$$K_2 = \frac{K_1}{4 \pi a_{21}} \quad \text{or} \quad .1908 \frac{\text{gm} \cdot \text{rad}}{\text{hr} \cdot \text{MeV} \cdot \mu\text{ci}}$$

$$p' = .001189 \text{ gm} \cdot \text{cc}^{-1}$$

This relationship is evaluated using Reference (4) as follows:

a. Determine E_{av} and n from Table 4 for the radionuclides listed in Table 1 of this document that are beta emitters.

b. X_{90} is obtained from Table 10 for various radionuclides.

c. X'_{90} is calculated from the expression

$$X'_{90} = X_{90} \frac{p}{a_{21} p'}$$

d. $F\left(\frac{x}{x'_{90}}\right)$ is obtained from Table 12 for the various

radionuclides for the value of $\frac{x}{x'_{90}}$

12. Table 2 includes the values obtained from these steps and the resultant beta dosage rate for the typical disassembled AN/VSG-2 system at a two foot range. This value is $8.67 \mu\text{Rads} \cdot \text{hr}^{-1}$.

13. Therefore, the anticipated total dosage rate at a two foot distance, due to the beta and gamma particles, is $9.077 \mu\text{Rad} \cdot \text{hr}^{-1}$.

14. Assume that an individual is constantly exposed for 40 hr/week for one year. The accumulated dose for an unshielded system is .019 rads. This dose is considered to be non-hazardous since the maximum permissible dose (mpd) for non-radiation workers is 0.5 rems per year. The rem is a

rad equivalent, when using a quality factor of one for both beta and gamma particles. Thus, the accumulated dose from the AN/VSG-2 system is 3.9 percent that of the mpd. It should be noted that this value is greater than the probable actual dose rate due to the following assumptions involved.

a. The lens coating was considered as a point source. This assumption neglected the actual lens configuration, but tends to maximize the resulting dose.

b. The dose calculated assumed whole-body exposure. This assumption tends to maximize the dose, particularly for the beta ray component.

c. No correction for attenuation by passage through a portion of the $^{232}\text{ThF}_4$ coating was used. All radiations were considered to have originated on the surface of the coating. This assumption tends to maximize the dose calculations, particularly for the beta ray component.

Table 1. AN/VSG-2 Gamma Dosage Rate

E, MeV	⁶⁰ C, Curies	n	Total
.340	.876 x 10 ⁻⁶	.15	0.0447 x 10 ⁻⁶
.908	.876 x 10 ⁻⁶	.25	0.1988 x 10 ⁻⁶
.960	.876 x 10 ⁻⁶	.20	0.1682 x 10 ⁻⁶
.084	.876 x 10 ⁻⁶	.016	0.0012 x 10 ⁻⁶
.214	.876 x 10 ⁻⁶	.003	0.0006 x 10 ⁻⁶
.241	.876 x 10 ⁻⁶	.037	0.0078 x 10 ⁻⁶
.550	.876 x 10 ⁻⁶	.0007	0.0003 x 10 ⁻⁶
.239	.876 x 10 ⁻⁶	.47	0.0984 x 10 ⁻⁶
.300	.876 x 10 ⁻⁶	.032	0.0084 x 10 ⁻⁶
.040	.876 x 10 ⁻⁶	.02	0.0007 x 10 ⁻⁶
.727	.876 x 10 ⁻⁶	.07	0.0446 x 10 ⁻⁶
1.620	.876 x 10 ⁻⁶	.0012	0.0017 x 10 ⁻⁶
.511	.876 x 10 ⁻⁶	.23 x .36	0.0371 x 10 ⁻⁶
.583	.876 x 10 ⁻⁶	.86 x .36	0.1581 x 10 ⁻⁶
.860	.876 x 10 ⁻⁶	.12 x .36	0.0325 x 10 ⁻⁶
2.614	.876 x 10 ⁻⁶	1.00 x .36	<u>0.8243 x 10⁻⁶</u>
		Total	1.6274 x 10 ⁻⁶ rads·hr ⁻¹

TABLE 2

Beta Dosage Terms for the AN/VSG-2

Radionuclide	A, μci	E_{av} , MeV	n	X_{90} , cm	x_{90}' , cm	$F\left(\frac{x}{x_{90}'}\right)$	R(x), rad.hr ⁻¹
²²⁸ Ra	5.05×10^{-2}	0.0123	1.000	0.00108	1.01	0.0	
²²⁸ Ac	5.05×10^{-2}	0.4450	0.998	0.313	292.82	1.34	4.43×10^{-6}
²¹² Pb	5.05×10^{-2}	0.1055	1.000	0.0451	42.19	0.08	0.44×10^{-6}
²¹² Bi	5.05×10^{-2}	0.7864	0.639	0.464	434.09	1.25	3.16×10^{-6}
²⁰⁸ Tl	5.05×10^{-2}	0.5839	0.344 x 0.36	0.329	307.79	1.24	0.64×10^{-6}
							<hr/> 8.67×10^{-6}

REFERENCES

- (1) Berger, M.J.: "Beta-Ray Dosimetry with the Use of Point Kernalns." In Medical Radionuclides: Radiation Dose and Effects, (AEC Symposium Series No. 20).
- (2) Berger, M.J.: MIRD Pamphlet No. 7. Journal of Nuclear Medicine, Supplement No. 5, March, 1971, Volume 12.
- (3) Cross, W.G.: Variation of Beta Code Attenuation in Different Media. Physics and Medicine in Biology, 13, 1968.
- (4) Loevinger, R., Holt, J.G., Hine, G.J., Radiation Dosimetry, Hine G.J. Bronnell, G.L., New York: Academic Press, 1956.
- (5) Radiological Health Handbook, US Department of Health, Education, and Welfare, Revised Edition, January, 1970.

SUPPLEMENT I

1. Reference: Item 13(b) of Form AEC-2.
2. Due to the high dollar value of the common module which contains $^{232}\text{ThF}_4$ coated elements, SAAD will obtain commercial contracts with either Nuclear Regulatory Commission or Agreement States licensed contractors for the refurbishment of these devices.
3. If any common modules are beyond repair, they will be disposed of as radioactive waste in accordance with AR 755-15. Such disposal is insured by the following warning affixed to each common module:

"Dispose per AR 755-15" (followed by a small radioactive wheel insignia).

4. The Defense Supply Agency (DSA) assures that designated and identified radioactive materials through a computerized system are not sold, transferred or donated to non-licensed recipients.
5. After National Stock Numbers are assigned for the Night Vision devices and common modules, the Army Electronics Command will notify DSA for the establishment of controls to preclude the sale, transfer and donation to non-licensed recipients. A copy of this correspondence to DSA will be forwarded as part of the license file.

JAN 5 - 1977

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Department of the Army
Headquarters U.S. Army Electronics Command
Fort Monmouth, New Jersey 07703
Attention: Bernard M. Savaiko, Chief
Safety Office

Gentlemen:

This responds to your letter (DRSEL-SF-11) of December 14, 1976, requesting that you be informed of the Commission's decision on PRIL 4-20. In my telephone conversation with Messrs. Savaiko and Horne on January 3, 1977, I indicated that no decision had been made on the Air Force's petition to amend 14 CFR Part 40 to authorize operational use of thorium fluoride coated infra-red lenses.

During our conversation, Mr. Horne noted that, in addition to the requested copy of PRIL 4-20, copies of correspondence stating that the thorium fluoride coated lenses are neither exempt nor generally licensed (for operational use) would be helpful to the Electronic Command's licensing program. The requested documents are enclosed.

Sincerely yours,

Signed by
JAMES J. HENRY

James J. Henry
Transportation and Product Standards Branch
Office of Standards Development

Enclosures:

1. Letter of October 30, 1974, from USAF
2. Letter of April 12, 1973, to Texas
3. Letter of May 23, 1974, to Fenikas

TASK No. TP(PS) 506-3

OFFICE >	SD:T&PSB	SD:T&PSB				
SURNAME >	JJHenry:sac	RFBarker				
DATE >	1/4/77	1/4/77				

Acknowledged by card

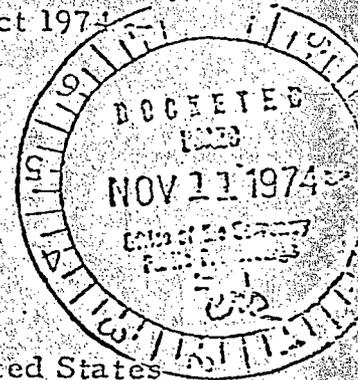
11-12-74, ON

SGPR

30 Oct 1974

SUBJECT: Petition for Rulemaking; 10CFR40.22

TO: Secretary, U. S. Atomic Energy Commission
 Washington, D. C. 20545
 Attn: Chief, Public Proceedings Branch



1. The USAF Radioisotope Committee, in behalf of the United States Air Force, petitions for amendment of Part 40 of Title 10, Chapter I, of the Code of Federal Regulations, in accordance with the provisions of Part 2, Subpart H of the same Title. The Committee requests suspension of licensing requirements pertaining to the material described herein pending disposition of this petition.

2. The Committee requests that the Commission amend its regulation 10CFR Part 40 to authorize use and transfer of not more than fifteen (15) pounds of source material by Federal Agencies for purposes of operational use.

a. In particular, it is requested that the general license issued by Part 40.22 be amended to authorize USAF possession and operational use of Thorium, as the fluoride salt, in anti-reflective coatings on thermal imaging lenses of the Forward Looking Infra Red (FLIR) imaging system.

b. It is suggested that the text of 10CFR 40.22(a)(4) be amended to read:

(4) Federal Agencies, commercial and industrial firms and research, educational and medical institutions for research, development, educational, commercial or operational purposes;

3. The following items are forwarded in support of the petition:

a. The proposed amendment will authorize a use differing in terminology, rather than fact, from currently authorized commercial use.

b. The proposed authorization is comparable to the uses currently specified in the Part cited above in so far as it does not significantly endanger life or property or the common defense or security and is otherwise in the public interest.

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Enclosure 1

c. The proposed amendment will authorize operational use of thermal imaging systems under the same provisions under which the inherently more hazardous procedures of evaporative lens coating and system fabrication are currently performed by system manufacturers.

d. Lenses to be possessed under this part can not be used as ocular lenses.

e. Lenses to be possessed under this part are accessible to personnel only during maintenance procedures and will not be processed or altered in any way while in USAF possession.

f. Lenses to be possessed under this part will not be distributed or marketed to the general public due to the scarcity of lens material. Procedures will be implemented to facilitate salvage of unserviceable or surplus lenses by commercial firms operating under the provisions of this part and in the interest of maintaining lens material as a resource for anticipated Air Force needs. Alternatively, unserviceable or surplus lenses will be disposed as radioactive waste in accordance with USAF regulations.

g. Lenses to be possessed under this part have a Thorium content of 0.9 mg/cm^2 surface area with a maximum content of 33.9 mg per lens. The maximum content is $1.7 \times 10^{-2}\%$ of lens weight.

h. Lenses to be possessed under this part will result in an inventory of 16.4 to 28.2 g of Thorium if full deployment of the current generation thermal imaging system is made. Future imaging systems are expected to be deployed at the expense of current generation systems; extensive reutilization and remanufacture of lenses is anticipated due to the scarcity of lens materials.

4. Please forward any response or request for additional information directly to the USAF Radioisotope Committee.


LAWRENCE T. ODLAND, Col, USAF, MC
Chairman, USAF Radioisotope Committee

APR 13 1973

U. S. Army Material Command
Attention: AMCSF-P
Mr. Darwin H. Taras
5091 Eisenhower Avenue
Alexandria, Virginia 22304

Dear Mr. Taras:

This letter is in response to your recent inquiry regarding thorium fluoride (ThF_4) coating of optical lenses used in thermal imaging systems.

Thorium in chemical mixtures, compounds, solutions or alloys up to 0.05% by weight is exempt from regulation under 10 CFR 40.13(a) and finished optical lenses containing up to 30% of thorium by weight (provided they are not used as eyepieces) are exempt under 10 CFR 40.13(c)(7). In order to be covered by the exemptions under the above paragraphs, the thorium must be distributed in the material.

The coating as referred above contains over 75% thorium by weight and should be considered source material.

Very truly yours,

Original Signed by
Robert F. Barker

Robert F. Barker, Chief
Product Standards Branch
Directorate of Regulatory Standards

Enclosure 2

Lt. Col. Vincent T. Penikas, USAF
Headquarters Air Force Logistics Command
AFTL 800R
Wright Patterson Air Force Base, Ohio 45433

Dear Colonel Penikas:

In your letter of March 4, 1974, you requested a written interpretation pursuant to 10 CFR 40.6 as to whether or not the Air Force possession and use of certain thorium coated lenses is authorized under the provisions of 10 CFR 40.13(a), 10 CFR 40.13(c)(7), or 10 CFR 40.22(c)(4). The Office of the General Counsel has advised you that no interpretation pursuant to 10 CFR 40.6 is necessary because, under the facts of this situation, there is no ambiguity or area of vagueness in the application of the regulations. Accordingly your questions are answered in the nature of administrative determinations.

The thorium coated lenses are not exempt under 10 CFR 40.13(a) because the thorium in the coating is present in a form that is by weight of the coating not more than 0.0001% of the total weight of the coating material distributed in a substance, compound, or mixture of them. In your case, the thorium would have to be distributed within the germanium lens to qualify. The coating material is a liquid in chemical compound of thorium fluoride which contains over 75% thorium by weight.

The thorium coated lenses are not exempt under 10 CFR 40.13(c)(7) because the thorium in question is not contained in the finished lens, but is a coating on the lens.

The use of the thorium coated lenses is not allowed under the general license issued by 10 CFR 40.22. Your letter also asks an operational use for the thorium coated lenses for use in the field of research, development, educational or other non-military purposes and the use of 10 CFR 40.22(c)(4) does not apply here.

Sincerely,

(Name) [Signature]

John T. O'Brien

Director of Licensing

Enclosure 3



DEPARTMENT OF THE ARMY
HEADQUARTERS UNITED STATES ARMY ELECTRONICS COMMAND
FORT MONMOUTH, NEW JERSEY 07703

DRSEL-SF-H

14 December 1976

Director
Rules and Proceedings Branch
Office of Administration-Regulation
US Nuclear Regulatory Commission
Washington, DC 20545

Dear Sir:

It is requested that this office be informed about the Commission's decision on petition for rule making, Docket No. PRM-40-20. A copy of this petition for rule making is also requested.

Sincerely yours,

BERNARD M. SAVAIKO
Chief, Safety Office

APR 1 1977

FCRL:EGW
(05035)

Department of the Army
Headquarters United States Army Electronics Command
ATTN: DRSEL-SF-H
Fort Monmouth, New Jersey 07703

Gentlemen:

This refers to your application dated December 14, 1976 and to your letter of March 17, 1977 supplying additional supporting information.

Prior to issuing your license, the following additional information is needed:

1. A description of the function (mission) which Headquarters Electronics Command will perform as licensee. Also, specify the duties and responsibilities of the staff personnel directly involved with control of the distribution and use of night vision equipment containing thorium components (i.e. Chief Safety Office and the Health Physicist).
2. A description of specific methods used to provide lifetime control of the night vision equipment containing licensed material. (procurement, storage, use, maintenance and disposal).
3. A copy of specific instructions including radiation safety precautions provided to:
 - a. Depot and maintenance personnel who handle and store the equipment.
 - b. Field personnel who use the equipment.
4. The name and address of Army Depots or major supply points having responsibility for storage and issue of the night night vision equipment containing thorium.
5. A description of the proposed label to be affixed to the night vision equipment containing thorium.

The label should contain substantially the following information.

Removal of this label is prohibited.

Caution - Radioactive material.

OFFICE >	Thorium _____ grams.				
SURNAME >	NRC License No. _____				
DATE >	If found notify military or civil authorities at once.				
	Disposal instructions.				

When replying, please furnish the requested information in duplicate and refer to Control No. 05035.

Sincerely,

Earl G. Wright
Radiolotopes Licensing Branch
Division of Fuel Cycle and
Material Safety

cc: Commander, DARCOM
DRCSF-P
5001 Eisenhower Avenue
Alexandria, Virginia 22333

OFFICE >	FCRL	FCRL				
SURNAME >	EGWright:bjp	NBassin				
DATE >	4/1/77	4/1/77				

DATE _____

HEALTH AND SAFETY REVIEW WORKSHEET

APPLICANT DA
Hq. Ft. Monmouth, N.J.

CONTACT: D. Talar

control 6035

TELE NO. 274-8868/8864

LIST COMMENTS AND ACTIONS TAKEN

- Need copy of Technical manual
- Possession Limit

REVIEWER _____

TCT Steve Harna
201-532-3493

Possession Limit

MIL-M-13508

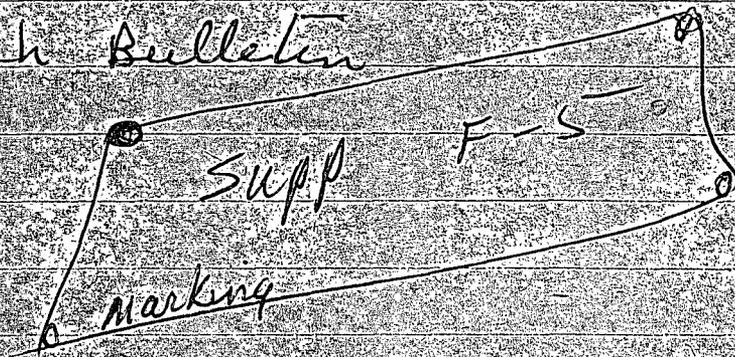
MIL-STD-810

MIL-C-675

~~MIL-C-675~~

MIL-STD-1458

Tech Bulletin



will send LTV

Handle Priority:

100 systems

Night Vision
 call
 lic STB-1243
 murpic

R+D
 Dragonette
 Frank Davis
 Joanna Barnes

MATERIALS LICENSE

Supplementary Sheet

License Number SMB-1300

Docket or Reference No. 040-08598

Amendment No. 04

Department of the Army
U. S. Army Communications and
Electronics Materiel Readiness
Command, DRSEL-SF
Fort Monmouth, New Jersey 07703

In accordance with letter dated January 2, 1981, License Number SMB-1300
is amended as follows:

Items 6., 7., 8. and 9. are amended to read:

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. Thorium 232	A. Thorium coating	A. Not to exceed 1.85 grams per system and 40 kilo-grams total

9. Authorized use

- A. For possession, storage, disposal and use in military imaging equipment and for distribution to Department of Defense activities.

Conditions 10. and 13. are amended to read:

10. Licensed material may be used anywhere in the United States.

13. Except as specifically provided otherwise by this license, the licensee shall possess and use licensed material described in Items 6, 7, and 8 of this license in accordance with statements, representations, and procedures contained in application dated December 4, 1976; and letters dated March 17, 1977, April 11, 1977, April 21, 1977, May 4, 1978, June 8, 1978, February 4, 1980; December 29, 1980, and January 21, 1981. The Nuclear Regulatory Commission's regulations shall govern the licensee's statements in applications or letters, unless the statements are more restrictive than the regulations.

Condition 14. is added:

14. The licensee is exempted from the requirement to label night vision equipment as specified in letter dated April 21, 1977 (Refer to Section 40.22(b), 10 CFR Part 40 and Section 20.203(b) (3) (ii), 10 CFR Part 20.

MAR 16 1981

Date _____

For the U. S. Nuclear Regulatory Commission

Material Licensing Branch

Division of Materials and Fuel Cycle
Facility Licensing
Washington, D. C. 20535