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

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

APPLICATION FOR MATERIAL LICENSE

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

FEDERAL AGENCIES FILE APPLICATIONS WITH:

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

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

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

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

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

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

IF YOU ARE LOCATED IN:

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

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

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

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

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

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

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

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

- [ ] A. NEW LICENSE
- [ ] B. AMENDMENT TO LICENSE NUMBER _____
- [X] C. RENEWAL OF LICENSE NUMBER 20-02079-02E

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

M|A-COM Microwave Components, Inc.
52 South Avenue 7 MS 717
Burlington, MA 01803

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

52 South Avenue (Building - 7), Burlington, MA 01803

4. NAME OF PERSON TO BE CONTACTED ABOUT THIS APPLICATION | TELEPHONE NUMBER

Hagop A. Bedrosian | 617-272-3000 X 3381

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

5. RADIOACTIVE MATERIAL
a. Element and mass number, b. chemical and/or physical form, and c. maximum amount which will be possessed at any one time: See supplemental sheet no. 1

6. PURPOSE(S) FOR WHICH LICENSED MATERIAL WILL BE USED.
See supplemental sheet no. 1

7. INDIVIDUAL(S) RESPONSIBLE FOR RADIATION SAFETY PROGRAM AND THEIR TRAINING AND EXPERIENCE. See supplemental sheet 2.A.1, 2.A.2, 2.B.2.C, 2.D, 2.E and 2.F

8. TRAINING FOR INDIVIDUALS WORKING IN OR FREQUENTING RESTRICTED AREAS.
See supplemental sheet no. 3

9. FACILITIES AND EQUIPMENT.
See supplemental sheets no. 4 through 4.E

10. RADIATION SAFETY PROGRAM
See supplemental sheets No. 5.A through 5.E and attachments 1, 2 and 3

11. WASTE MANAGEMENT.
see supplemental sheet no. 1

12. LICENSEE FEES *(See 10 CFR 170 and Section 170.31)*
FEE CATEGORY 170.31 (3I) | AMOUNT ENCLOSED $ 230.00

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

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

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

SIGNATURE–CERTIFYING OFFICER	TYPED/PRINTED NAME	TITLE	DATE
Hagop A. Bedrosian	Hagop A. Bedrosian	Radiological Safety Officer	3|4|86

14. VOLUNTARY ECONOMIC DATA

a. ANNUAL RECEIPTS

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

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

c. NUMBER OF BEDS

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

- [ ] YES
- [X] NO

FOR NRC USE ONLY

TYPE OF FEE	FEE LOG	FEE CATEGORY	COMMENTS	APPROVED BY
Renewal	HQ Mail	3I	05227	

AMOUNT RECEIVED	CHECK NUMBER		DATE
$410-230 applied	103725	9001170271 881109 NMSS LIC30 20-02079-02E PDR	MAR 2 1 1986 — 3/31/86

PRIVACY ACT STATEMENT ON THE REVERSE

PRIVACY ACT STATEMENT

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

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

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

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

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

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

SUPPLEMENTAL SHEET NO. 1 TO NRC FORM-313

ITEM 5 RADIOACTIVE MATERIAL

(a) ELEMENT AND MASS NUMBER	(b) CHEMICAL AND/OR PHYSICAL FORM	(c) MAXIMUM AMOUNT WHICH WILL BE POSSESSED AT ANY ONE TIME
COBALT-60	CHLORIDE,LIQUID OR SOLID	40 MILLICURIES
PROMETHIUM-147	CHLORIDE,LIQUID OR SOLID	200 MILLICURIES
HYDROGEN-3	TITANIUM TRITIDE ON FOIL	200 CURIES
HYDROGEN-3	ANY	10 CURIES

ITEM 6

PURPOSE (S) FOR WHICH LICENSED MATERIAL WILL BE USED:

The above byproduct materials are used as sources of electrons to initiate the d-c discharge in microwave protector tubes that is essential to the successful function of the receiver protector t be. In some designs of receiver protector tubes a replacement component containing byproduct material inside a quartz bulb or glass cell is used.

ITEM 7

INDIVIDUAL(S) RESPONSIBLE FOR THE RADIATION SAFETY PROGRAM AND THEIR TRAINING AND EXPERIENCE:

1. H. Bedrosian See Supplemental Sheet No. 2.A.1 and 2.A.2
2. M. Brooks See Supplemental Sheet No. 2.B
3. A. LaValle See Supplemental Sheet No. 2.C
4. F. Ganey See Supplemental Sheet No. 2.D
5. A. Parrington See Supplemental Sheet No. 2.E
6. A. Beaudette See Supplemental Sheet No. 2.F

Item 11

WASTE MANAGEMENT: Radioactive waste is collected and disposed into drums that are provided by a commercial disposal Company (HMM Associates, Concord, Ma. 01742).

SUPPLEMENTAL SHEET NO. 2.A.1 TO NRC FORM-313

Hagop A. Bedrosian

TRAINING AND EXPERIENCE OF EACH INDIVIDUAL NAMED IN ITEM 7

8. Type of Training	Where Trained	Duration of Training	On The Job	Formal Course
a. Principles and Practices	M/A-Com Microwave Components, Inc.	24 Years	(Yes) No	Yes (No)
b. Measurement, Monitoring & Instruments	M/A-Com Microwave Components, Inc.	24 Years	(Yes) No	Yes (No)
c. Mathematics & Calculations	M/A-Com Microwave Components, Inc.	24 Years	(Yes) No	Yes (No)
d. Biological Effects	M/A-Com Microwave Components, Inc.	24 Years	(Yes) No	Yes (No)

9. Experience With Radiation (Actual use of radioisotopes or equivalent experience)

Isotope	Maximum Amount	Where Experience Was Gained	Duration Of Experience	Type Of Use
^{60}Co	2 millicuries	M/A-Com Microwave Components, Inc.	24 Years	Fabrication and Testing Electronic Tubes
^{3}H	15 Curies	M/A-Com Microwave Components, Inc.	24 Years	Fabrication and Testing Electronic Tubes

Radiological Safety Officer for M/A-Com Microwave Components, Inc.,
from June 1963 - April 1967
Oct. 1974 - May 1978

M/A-COM MICROWAVE COMPONENTS, INC.

SUPPLEMENTAL SHEET NO. 2.A.2 TO NRC FORM-313

A. RE: ITEM 7 And 10

Hagop A. Bedrosian is responsible to Andrew Beaudette for implementation of M/A-COM's radiation protection program and maintenance of all company procedures to assure compliance with the provisions of the company's license numbers 20-02079-02E and 20-02079-01.

The responsibilities of Mr. Bedrosian include the following:

1. Registration of personnel who handle byproduct materials and their indoctrination in radiation protection.

2. Coordinates personnel film badge and bioassay programs.

3. Performs radiation surveys and wipe tests.

4. Receives, monitors and unpackages incoming shipments of radioactive materials in accordance with 10CFR 20.205.

5. Performs leak tests of sealed sources.

6. Coordinates the calibration of radiation detection instruments.

7. Maintains a running inventory of the possession of radioactive materials.

8. Maintains a running inventory of tubes shipped and the total activity for each nuclide.

9. Supervises the collection and disposal of radioactive waste.

10. Provides advisory consultation on radiation protection to company personnel.

11. Maintains all records relating to the radiation protection program.

B. Re: ITEM 10

Radiological safety consultant Mr. S. Levin interacts with Messrs. H. Bedrosian and A. Beaudette regarding the organization and implementation of M/A-COM's radiation protection program. Mr. Levin's curriculum vitae is on the next page.

SUPPLEMENTAL SHEET NO. 2.A.3 TO NRC FORM-313

Curriculum vitae
Samuel Levin

Date of Birth:	October 4, 1918
Place of Birth:	Cambridge, Massachusetts
Military Service:	U.S. Army, 1940 - 1945
Education:	Massachusetts Institute of Technology, Cambridge, Massachusetts S.B. degree (Physics major), 1948

Professional Activities and Appointments:

1948 to 1979:	M.I.T Radiation Protection Officer
1954 to 1979:	Executive Secretary, M.I.T. Radiation Protection Committee
1957 to present:	Member, M.I.T. Reactor Safeguards Committee
1959 to 1979:	Lecturer, M.I.T. Nuclear Engineering Department
1959 to 1964:	Commissioner, Massachusetts Commission on Atomic Energy
1960 to present:	Consultant to Massachusetts Department of Public Health, Nuclear Incident Advisory Team (N.I.A.T.)
1961 to 1962:	Health Physics Advisor to Massachusetts Department of Public Health
1961 to 1962:	Health Physics Advisor to Massachusetts Department of Labor and Industries
1962 to 1963:	President-Elect, New England Chapter of Health Physics Society
1963 to 1964:	President, New England Chapter of Health Physics Society
1964 to 1979:	Executive Officer of Environmental Medical Service of M.I.T. Medical Department
1969 to 1970:	Member, Advisory Committee on Lasers and Laser Radiation, Massachusetts Department of Public Health
1970 to 1979:	Ex-officio member, Subcommittee on Linear Accelerator Safety, M.I.T. Laboratory of Nuclear Science
1970 to 1979:	Member, Z136 Committee of American National Standards Institute for the Safe Use of Lasers
1974 to 1979	Ex-officio member, M.I.T. Committee on Radiation Exposure to Human Subjects
1978 to present:	Health Physics consultant to Massachusetts Department of Labor and Industries

January 1983

SUPPLEMENTAL SHEET NO. 2.B TO NRC FORM-313

Michael Brooks

TRAINING AND EXPERIENCE OF EACH INDIVIDUAL NAMED IN ITEM 7.

8. Type of Training	Where Trained	Duration of Training	On The Job	Formal Course
a. Principles and Practices	Navy Nuclear Power Sch. Orlando Fl.	6 Months	(Yes) No	(Yes) No
b. Measurement, Monitoring & Instruments	Navy Nuclear Power Sch. Orlando Fl.	6 Months	(Yes) No	(Yes) No
c. Mathematics & Calculations	Navy Nuclear Power Sch. Orlando Fl.	6 Months	(Yes) No	(Yes) No
d. Biological Effects	Navy Nuclear Power Sch. Orlando Fl.	6 Months	(Yes) No	(Yes) No

9. Experience With Radiation (Actual use of radioisotopes or equivalent experience)

Isotope	Maximum Amount	Where Experience Was Gained	Duration Of Experience	Type Of Use
^{60}Co	N/A	U. S. Navy	3 Years	Corrosion byproduct Nuclear Pwr. Plant
^{60}Co	125 microcuries	M/A- Com Inc.	1.5 Years	Electron Tube Engineering
^{147}Pm	20 millicuries	M/A-Com Inc.	1.5 Years	Electron Tube Engineering
^{3}H	200 millicuries	M/A-Com Inc.	6 Months	Electron Tube Engineering

SUPPLEMENTAL SHEET NO. 2.C TO NRC FORM-313

Albert Lavalle

TRAINING AND EXPERIENCE OF EACH INDIVIDUAL NAMED IN ITEM 7

A. Type of Training	Where Trained	Duration of Training	On The Job	Formal Course
a. Principles and Practices	M/A-COM	7 years	Yes No	Yes No
b. Measurement, Monitoring & Instruments	M/A-COM	7 years	Yes No	Yes No
c. Mathematics & Calculations	M/A-COM	7 years	Yes No	Yes No
d. Biological Effects	M/A-COM	7 years	Yes No	Yes No

B. Experience with Radiation (Actual use of radioisotopes or equivalent experience)

Isotope	Maximum Amount	Where Experience Was Gained	Duration Of Experience	Type Of Use
^{60}Co	125 microcuries	M/A-COM	7 years	Electronic tube Production
^{3}H	5 Curies	M/A-COM	7 years	" "

SUPPLEMENTAL SHEET NO. 2.D TO NRC FORM-313

Frank Ganey

TRAINING AND EXPERIENCE OF EACH INDIVIDUAL NAMED IN ITEM 7

A. Type of Training	Where Trained	Duration of Training	On The Job	Formal Course
a. Principles and Practices	M/A-COM	7 years	Yes No	Yes No
b. Measurement, Monitoring & Instruments	M/A-COM	7 years	Yes No	Yes No
c. Mathematics & Calculations	M/A-COM	7 years	Yes No	Yes No
d. Biological Effects	M/A-COM	7 years	Yes No	Yes No

B. Experience With Radiation (Actual use of radioisotopes or equivalent experience)

Isotope	Maximum Amount	Where Experience Was Gained	Duration Of Experience	Type Of Use
^{60}Co	125 microcuries	M/A-COM	7 years	Electronic tube production
^{3}H	5 Curies	M/A-COM	7 years	" "

SUPPLEMENTAL SHEET NO. 2.E TO NRC FORM-313

AL PARRINGTON

TRAINING AND EXPERIENCE OF EACH INDIVIDUAL NAMED IN ITEM 7

8. Type of Training	Where Trained	Duration of Training	On The Job	Formal Course
a. Principles and Practices	M|A-COM, INC.	10 Years	(Yes) No	Yes (No)
b. Measurement, Monitoring & Instruments	M|A-COM, INC.	10 Years	(Yes) No	Yes (No)
c. Mathematics & Calculations	M|A-COM, INC.	10 Years	(Yes) No	Yes (No)
d. Biological Effects	M|A-COM, INC.	10 Years	(Yes) No	Yes (No)

9. Experience With Radiation (Actual use of radioisotopes or equivalent experience)

Isotope	Maximum Amount	Where Experience Was Gained	Duration Of Experience	Type Of Use
^{60}Co	125 microcuries	M|A-COM, INC.	10 Years	Electronic Tube Production
^{3}H	5 Curies	M|A-COM, INC.	7 Years	Electronic Tube Production

SUPPLEMENTAL SHEET NO. 2.F TO NRC FORM-313

Andrew Beaudette

TRAINING AND EXPERIENCE OF EACH INDIVIDUAL NAMED IN ITEM 7

8. Type of Training	Where Trained	Duration of Training	On The Job	Formal Course
a. Principles and Practices	M/A-Com Microwave Components, Inc.	1 Year	(Yes) No	Yes (No)
b. Measurement, Monitoring & Instruments	M/A-Com Microwave Components, Inc.	1 Year	(Yes) No	Yes (No)
c. Mathematics & Calculations	M/A-Com Microwave Components, Inc.	1 Year	(Yes) No	Yes (No)
d. Biological Effects	M/A-Com Microwave Components, Inc.	1 Year	(Yes) No	Yes (No)

9. Experience With Radiation (Actual use of radioisotopes or equivalent experience)

Isotope	Maximum Amount	Where Experience Was Gained	Duration Of Experience	Type Of Use
^{60}Co	125 microcuries	M/A-Com Inc.	1 Year	Electron Tube Engineering
^{3}H	5 Curies	M/A-Com Inc.	1 Year	Electron Tube Engineering

SUPPLEMENTAL SHEET NO. 3 TO NRC FORM-313

ITEM 8

TRAINING FOR INDIVIDUAL(S) WORKING IN OR FREQUENTING RESTRICTED AREAS:

1. Prior to work with byproduct material, each such individual is required to be registered with the radiological safety officer and receive appropriate training for the assigned tasks from the radiological safety officer and one of the individuals listed in item 7.

2. Each individual receives appropriate training and/or informational documents, including the following:

   (a) "Radiological Safety Rules and Required Procedures"

   (b) NRC Regulatory Guide 8.13

   (c) M/A-Com limits for surface contamination of radioactive materials

3. Prior to handling byproduct material and during each individual's training for assignments and/or tasks each worker receives radiation protection information and/or training that includes the following concepts:

   (a) Control of external radiation exposure

   (b) Control of internal radiation exposure

   (c) Control of radioactive contamination

   (d) Maintenance of (a), (b) and (c) as low as reasonably achievable.

   (e) Procedures for radioactive waste disposal

   (f) Use of radiation detection instruments

   (g) Use and storage of personal dosimeters

   (h) Bioassay procedures

   (i) Emergency procedures involving radioactive material

SUPPLEMENTAL SHEET NO. 4 TO NRC FORM-313

ITEM 9 FACILITIES AND EQUIPMENT
(See Fig. 1 for Building Location)

I. Tritium Lab (Area Location 1)
(Restricted Area) (See Figure 4 for Tritium Lab. layout and Figure 5 for Tritium Lab. Exhaust Ventilation)

A. Floor area approximately 80 square feet

B. Equipment and Supplies

1. One glove-box ventilated enclosure and one ventilated enclosure, both equipped with stack and operational air monitoring sample collection systems.
2. Disposable laboratory coats
3. Disposable gloves
4. Appropriate handling tools and trays
5. Tritium storage cabinet
6. Foot operated sink
7. Collection containers for radioactive waste

II. TR-Production Dispensing Station (Area Location 2) (Figure 2)

A. Floor area approximately 50 square feet

B. Equipment and Supplies:

1. Lead-shielded storage box for byproduct material
2. Appropriate handling tools and trays
3. Protective gloves
4. Protective clothing
5. Mechanical pipetters

III. Central Storage Facility (Area Location 4) (Figure 3)

A. Floor area approximately 190 square feet (basement floor)

B. Concrete walls with approximately 15 foot high ceiling

C. Lead lined storage box and cement block compartments

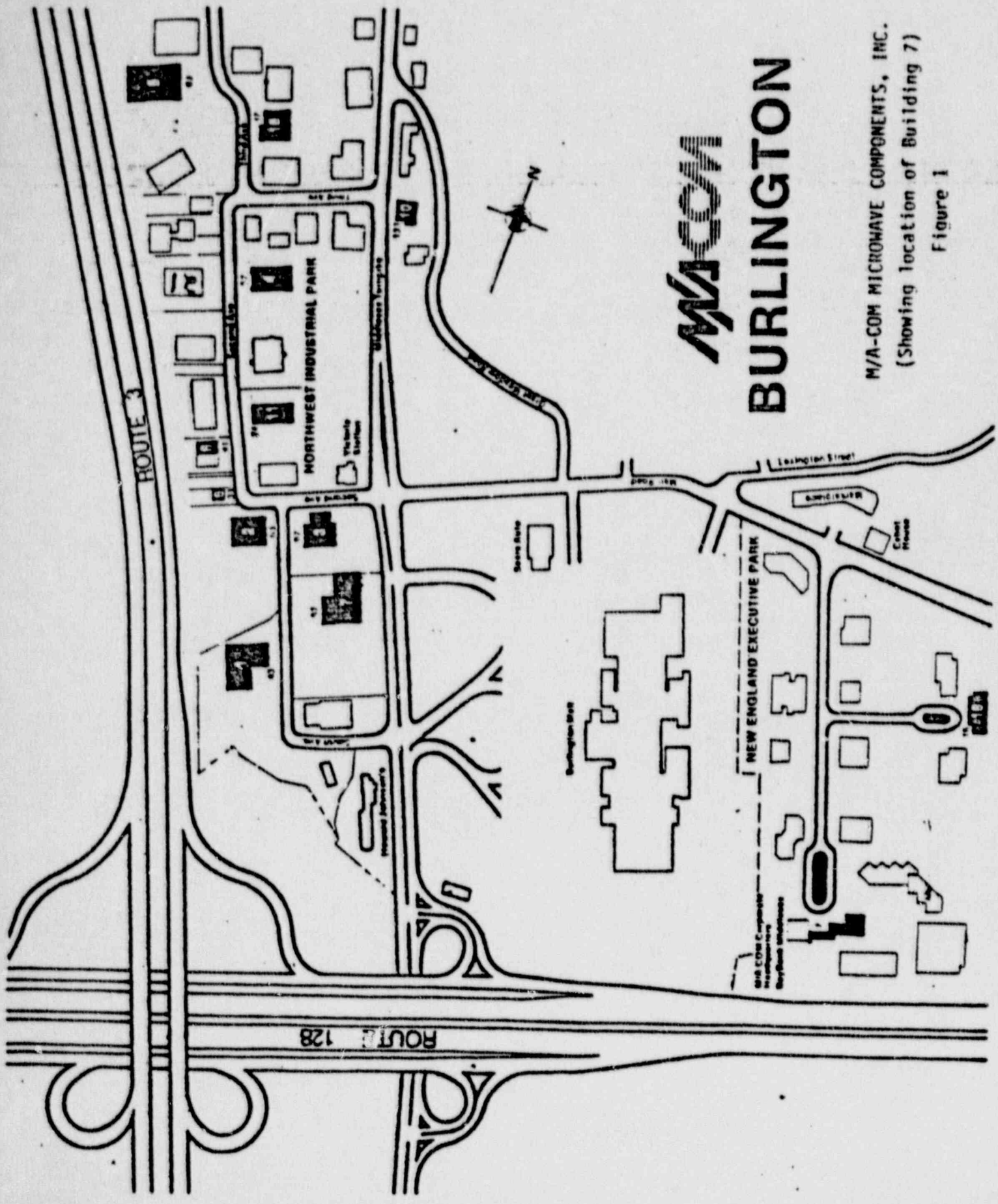
D. Locked door and storage box

E. Drums for radioactive waste

(Revised February 1984)

SUPPLEMENTAL SHEET NO. 4.A TO NRC FORM-313

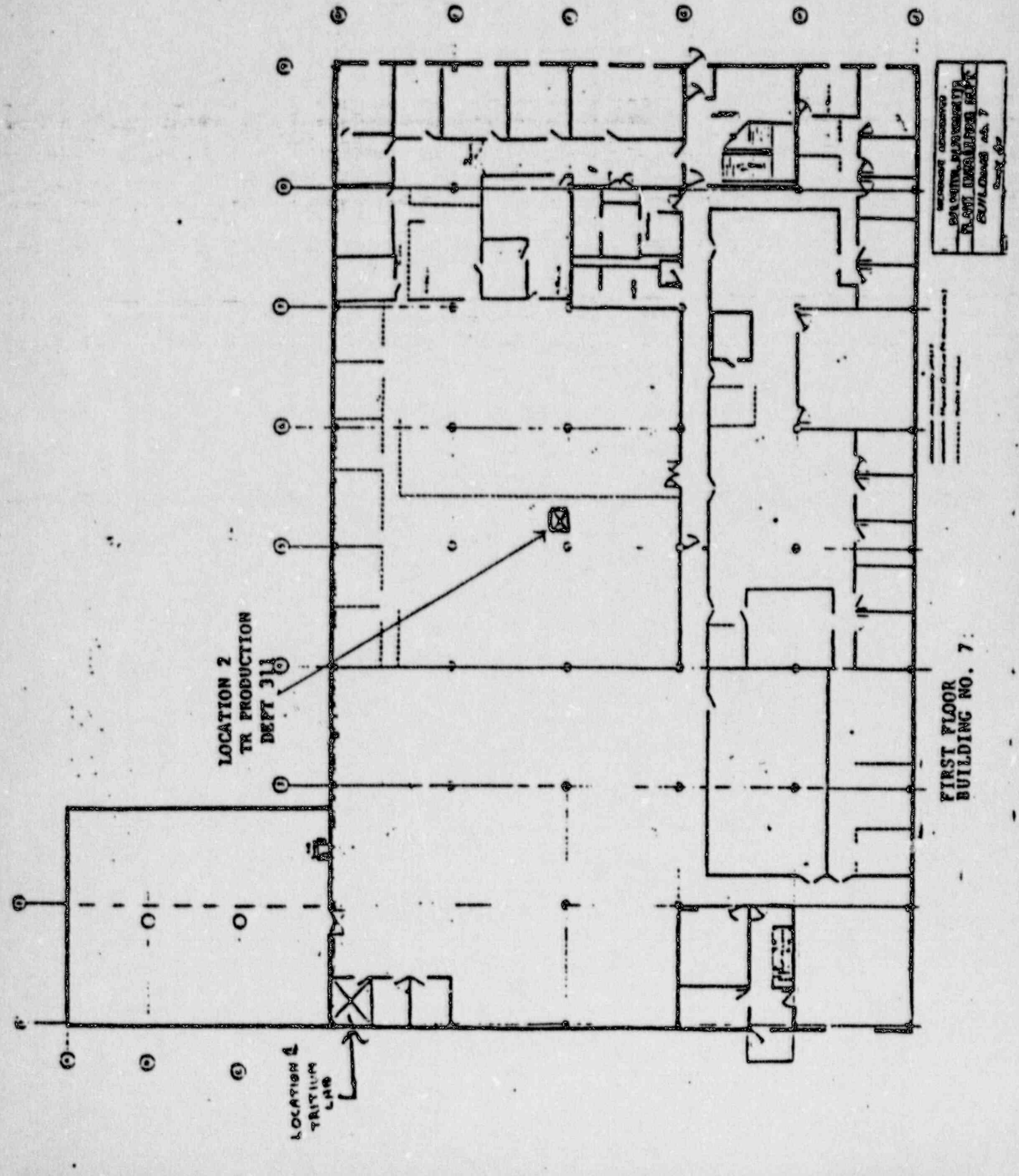
ITEM 9 FACILITIES AND EQUIPMENT (Figure 1)



M/A-COM MICROWAVE COMPONENTS, INC.
(Showing location of Building 7)
Figure 1

SUPPLEMENTAL SHEET NO. 4.B TO NRC FORM-313
(FIG. 2)

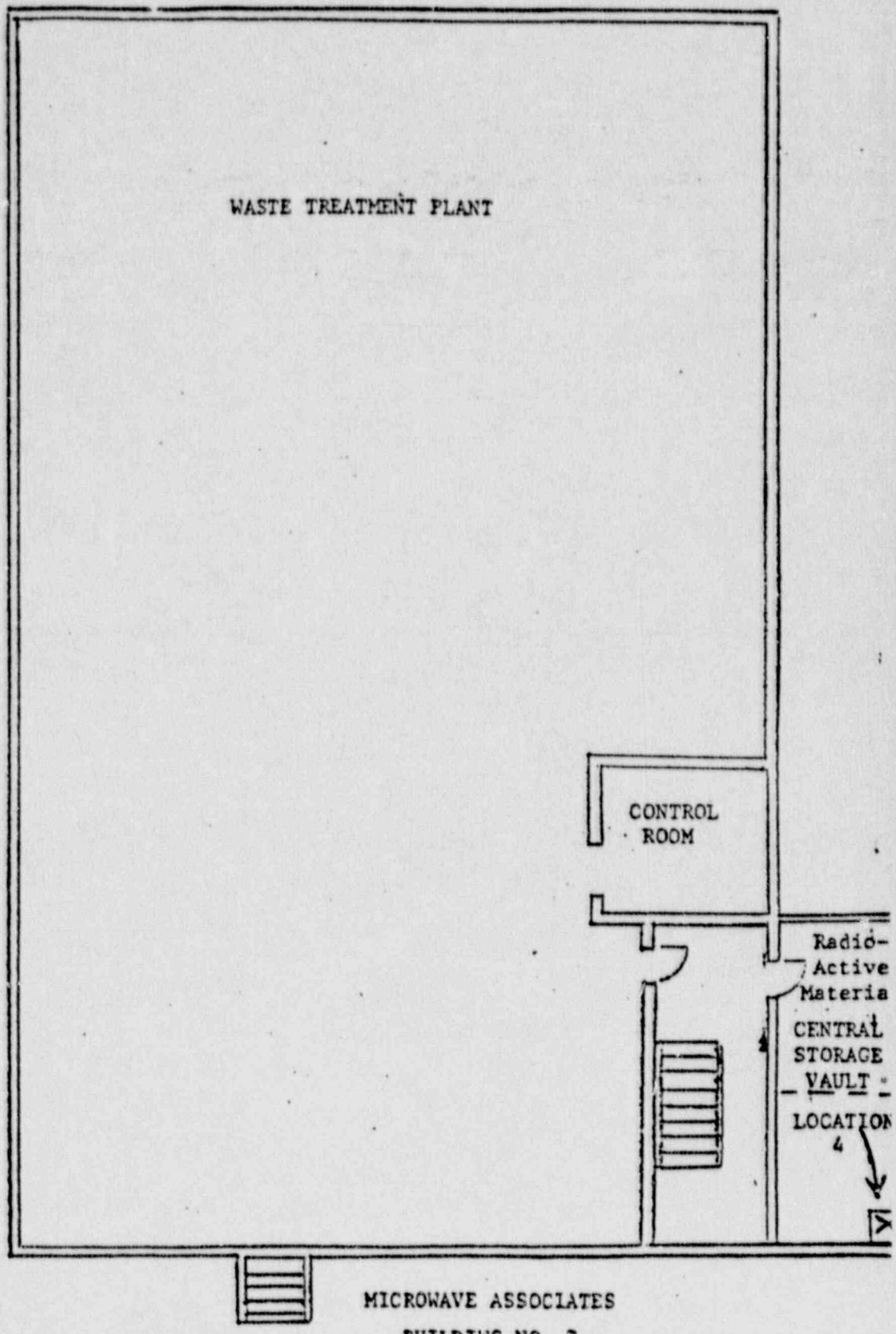
ITEM 2 FACILITIES AND EQUIPMENT



SUPPLEMENTAL SHEET NO. 4.C TO NRC FORM-313

ITEM 9 FACILITIES AND EQUIPMENT

FIG. 3



MICROWAVE ASSOCIATES

BUILDING NO. 7

BASEMENT FLOOR

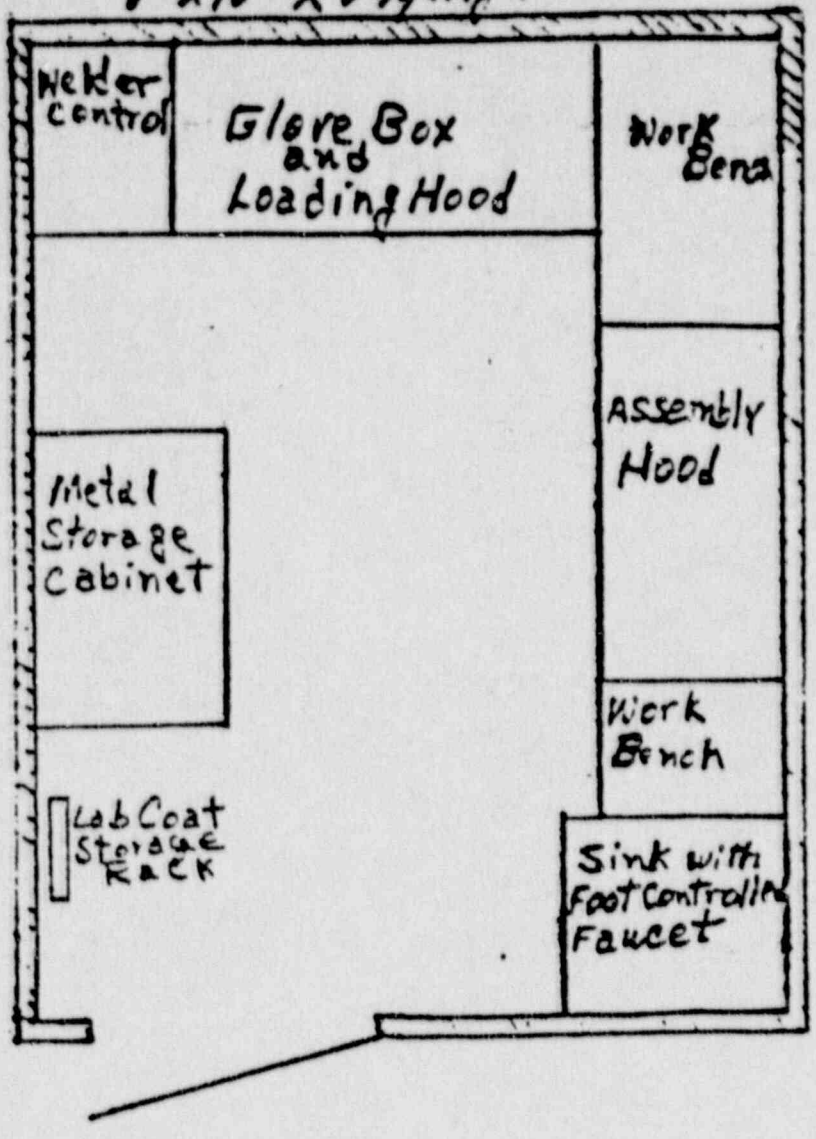
SUPPLEMENTAL SHEET NO. 4.D TO NRC FORM-313

ITEM 2 FACILITIES AND EQUIPMENT

Figure 4

[Fig. 4]

Tritium Lab Bldg 7
8' x 10' x 8 3/4 high



Approximate Scale 1/2" = 1'

REVISIONS

TOLERANCES UNLESS SPECIFIED XXXX = ± .0005 XXX = .005 XX = ± .02 ANG. ± 1/2°

ORIGINATOR M.V.R. DATE

MATERIAL

Microwave Laboratories

TITLE Tritium Lab

SUPPLEMENTAL SHEET NO. 4.E TO NRC FORM-313

ITEM 2 FACILITIES AND EQUIPMENT

Figure 5

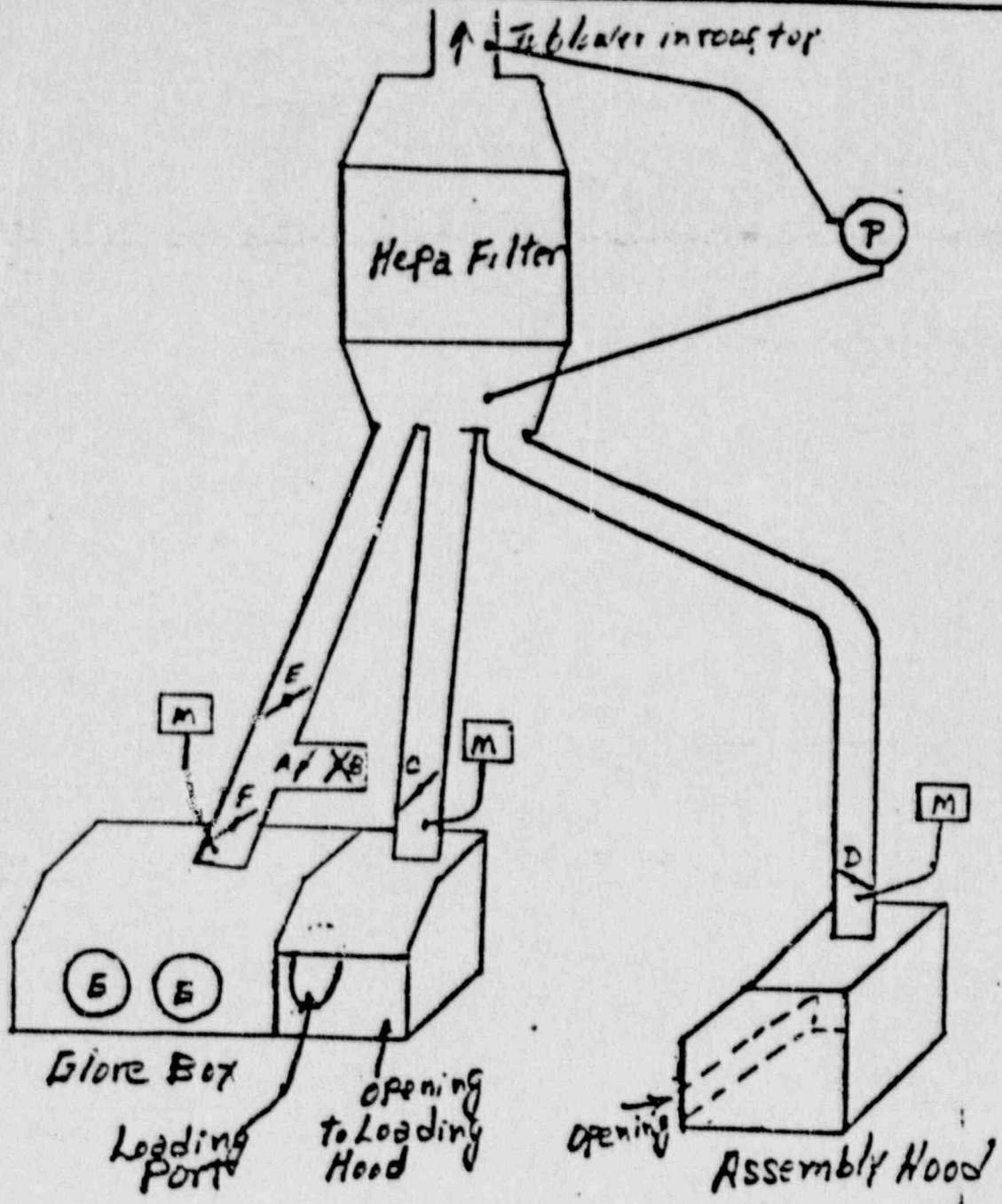


Fig. 5

Not to scale.

A, C, D, E and F = Adjustable Dampers

B = Open and Shut Damper at Bleed Opening.

E: Glove Holes with Gloves attached.

M = Dwyer Manometers.

P = Magnehelic Pressure Gage

REVISIONS	TOLERANCES UNLESS SPECIFIED XXXX = ± .XXX XXX = ± .XX XX = ± .X ANG. = ½°
ORIGINATOR WYB	DATE
MATERIAL	
Microwave Laboratory	TITLE Exhaust Ventilation System in Testing Lab

SUPPLEMENTAL SHEET NO. 5.A TO NRC FORM-313

ITEM 10 RADIATION PROTECTION PROGRAM

I. BIOASSAY

A. Urinalyses (both pre and post operational) are performed on all individuals who work in restricted areas where tritium is being used. If the average concentration of tritium in urine for any individual during a calendar quarter is less than 10 microcuries per liter, urinalyses are performed on that individual at monthly intervals as long as the average concentration in the calendar quarter remains below 10 microcuries per liter.

B. Urine samples are collected on the same day of the week in so far as possible.

C. Urine sample evaluations (by liquid scintillation counting) are performed by a qualified consultant or company.

D. Investigatory/Action Levels:
Urinalysis results which show a tritium concentration in excess of 1 microcurie per liter are investigated to determine the cause, and steps that can be taken to reduce the exposure as low as reasonably achievable.

II. PERSONNEL MONITORING FOR EXTERNAL RADIATION EXPOSURE

A. Film Badges:
Film badges, exchanged monthly, are provided to individuals who perform operations involving the incorporation of by product material (except tritium) into components.

B. Investigatory/Action Level:
Exposure in excess of 50 mrem per month are investigated to determine the cause, and steps that can be taken to reduce exposure as low as reasonably achievable.

SUPPLEMENTAL SHEET NO. 5.B TO NRC FORM-313

ITEM 10 RADIATION PROTECTION PROGRAM

III. RADIATION SURVEYS

A. TR-Production, TR - R & D and Central Storage Facility:

1. Each of these areas is surveyed monthly for radiation levels and contamination, using an end-window geiger mueller survey meter. Monthly results are recorded on M/A Form 279C Attachment V(g) and summarized progressively on M/A Form 1788 Attachment V(b).

2. Wipe samples 100 cm^2 are taken monthly to evaluate transferable contamination. The samples are measured with an end-window ($\leq$2mg/cm^2) G.M. detector. The results are recorded monthly on M/A Form No. 1854A, Attachment V(b) and summarized progressively on M/A Form No. 1821 Attachment V(c).

B. Tritium Lab:

1. Wipe samples 100 cm^2 are taken monthly in this area to evaluate transferable contamination. The samples are measured with a windowless gas proportional counter, or a liquid scintillation counter by a consulting health physicist. The results are recorded monthly on M/A Form 1821 Attachment V(c).

C. Acceptable Levels of Surface Contamination:

1. Contamination shall be kept as low as reasonably achievable.

2. Limits for removable contamination (measured by wipe tests):

See Section I in the Table shown on the following, page 2a.

3. Limits for fixed contamination:

See Section II in the Table shown on the following, page 2a.

M/A-COM LIMITS FOR SURFACE CONTAMINATION OR RADIOACTIVE MATERIALS

I. Limits for Removable Contamination	Beta or Gamma		Tritium	
	Column A	Column B	Column C	Column D
Type of Surface:	NRC*	M/A-COM**	NRC*	M/A-COM**
A. Unrestricted areas	10^{-6} μCi/cm² = 2.2 X 10^2 dpm/100 cm²	10^{-6} μCi/cm² = 2.2 X 10^2 dpm/100 cm²	10^{-6} μCi/cm² = 2.2 X 10^2 dpm/100 cm²	10^{-6} μCi/cm² = 2.2 X 10^2 dpm/100 cm²
B. Restricted areas	10^{-3} μCi/cm² = 2.2 X 10^5 dpm/100 cm²	0.05 X 10^{-3} μCi/cm² = 1.1 X 10^4 dpm/100 cm²	10^{-2} μCi/cm² = 2.2 X 10^6 dpm/100 cm²	0.05 X 10^{-2} μCi/cm² = 1.1 X 10^5 dpm/100 cm²
C. Personnel clothing worn outside restricted area	10^{-6} μCi/cm² = 2.2 X 10^2 dpm/100 cm²	10^{-6} μCi/cm² = 2.2 X 10^2 dpm/100 cm²	10^{-6} μCi/cm² = 2.2 X 10^2 dpm/100 cm²	10^{-6} μCi/cm² = 2.2 X 10^2 dpm/100 cm²
D. Protective clothing worn only inside restricted area	10^{-4} μCi/cm² = 2.2 X 10^4 dpm/100 cm²	0.05 X 10^{-4} μCi/cm² = 1.1 X 10^3 dpm/100 cm²	10^{-4} μCi/cm² = 2.2 X 10^4 dpm/100 cm²	0.05 X 10^{-4} μCi/cm² = 1.1 X 10^3 dpm/100 cm²
II. Limits for Fixed Contamination				
A. Unstricted areas	5 X 10^{-6} μCi/cm² = 1.1 X 10^3 dpm/100 cm²	5 X 10^{-6} μCi/cm² = 1.1 X 10^3 dpm/100 cm²	5 X 10^{-6} μCi/cm² = 1.1 X 10^3 dpm/100 cm²	5 X 10^{-6} μCi/cm² = 1.1 X 10^3 dpm/100 cm²
B. Restricted areas	5 X 10^{-3} μCi/cm² = 1.1 X 10^6 dpm/100 cm²	0.25 X 10^{-3} μCi/cm² = 5.5 X 10^4 dpm/100 cm²	5 X 10^{-2} μCi/cm² = 1.1 X 10^7 dpm/100 cm²	0.25 X 10^{-2} μCi/cm² = 5.5 X 10^5 dpm/100 cm²

* Values in table 2 of NRC Regulatory Guide 8.21

** M/A-COM Action Guide Limits are based on "ALARA" considerations applied to the NRC limits in Reg. Guide 8.21

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Note: For restricted areas, the contamination values listed do not apply to surfaces of work trays while in use, or to the interior surfaces of exhaust systems, and radioisotope storage containers.

ITEM 10 RADIATION PROTECTION PROGRAM

4. Readily removable plus fixed contamination (measured at 1 centimeter with a detector window-thickness $\leq 2 mg/cm^2$), as follows:

Surface	* Restricted Areas mrad/hr	Unrestricted Areas mrad/hr
Skin and Clothing	0.5	0.05
Floor	2.0	0.2
Apparatus, Equipment and Facilities	1.0	0.1

*Note: For restricted areas, the contamination values listed do not apply to surfaces of work trays while in use or to the interior surfaces of exhaust systems and radioisotope storage containers.

D. Investigatory/Action Level:

1. If any of the following values are exceeded, operations in the contaminated area shall be suspended until the area is decontaminated.

a) Any value listed in Column A or C of the Table on Page 2.a.

b) Any value listed in C.4.

2. If any of the following values are exceeded, an investigation shall be made and steps taken to reduce contamination as low as reasonably achievable.

a) Any value listed in Columns B or D of the Table on Page 2.a.

b) Any measurement exceeding 50% of any value listed in C.4.

SUPPLEMENTAL SHEET NO. 5.E TO NRC FORM-313

ITEM 10 RADIATIATION PROTECTION PROGRAM

IV. CONTROL OF EFFLUENT RELEASES

A. Equipment and Facilities:

Figure 4 and 5 on Attachment III show the Tritium Lab floor plan and a Schematic of the exhaust ventilation system. The Glove Box, Loading Hood and Assembly Hood are ventilated through a Hepa filter system into a duct that is exhausted through the roof to the outside atmosphere by a one horse power Peerless Blower. Hood face air velocities are maintained above a flow rate of 100 feet per minute. Each hood is continuously monitored by a Dwyer Instrument manometer. A Magnehelic Pressure Gage continuously monitors the pressure-drop across the Hepa filter system and is used to determine the need for a filter change.

B. Stack Monitoring:

1. Both the glove box and the assembly hood are used for operations involving the incorporation of Tritium-foil and/or Tritium-liquid into microwave tube components.

2. Effluent stack air is sampled continuously for tritium particulates using Millipore filters and for tritium non-particulates contamination, using a water reservoir collecting flask through which exhaust air is bubbled. Analysis of effluent samples are performed monthly by a consultant using liquid scintillation counting.

3. Measured discharge concentrations are well below the limits specified in Appendix B of 10CFR20. In conformity with ALARA concepts, a value of 1% of 10CFR20 concentration limits has been adopted for the investigatory action limit.

ATTACHMENT NO. 1

Following is the information required by 10CFR 32.14 and keyed to the designation of 32.14.

32.14 (b) (1)

Byproduct Material	Chemical Form and Physical Form	Maximum Activity Per Device
^{60}Co	$CoCl_2$ Solution evaporated to dryness	1 microcurie
^{147}Pm	$PmCl_3$ Solution evaporated to dryness	30 microcuries
^{3}H	Titanium tritide on foil or components	150 millicuries
^{3}H	Organic Solution evaporated to dryness	150 millicuries

32.14 (b) (2)

The basic components of a typical electron or microwave receiver protector tube are a section of waveguide (the tube body), two flanges, tuning cones, baffles, an ignitor (optional) and two special glass windows.

With the exception of the window glass, all parts are made of steel, copper, aluminum or other metals and joined into assemblies by welding, brazing or soldering to form vacuum tight, boxshape construction, referred to in the future as a tube. The completed assembly is vacuum exhausted and filled with a proprietary mixture of inert and other gases. In some designs, a quartz bulb or glass cell containing the byproduct material is incorporated inside a metal body-mount that is firmly attached to one of the flanges in the final tube assembly. In some designs the quartz bulb or glass cell is mounted inside the protector tube in a manner that facilitates replacement when necessary. Such replacements enable on-site repairs or maintenance with minimal down time of radar systems at installations of the Department of Defense and other users of our receiver protector tubes. The replacement quartz bulbs or glass cells are distributed as separate components to customers possessing M/A-COM manufactured microwave receiver protector tubes that have been designed for such replacements.

32.14 (b) (3)

An aqueous solution of byproduct material is applied in microliter quantities on one of the baffles inside the tube cavity. The sub-assemblies are placed in a drying oven held at 100 C. When the solution has dried the assemblies are sealed off and made vacuum tight.

For tube assemblies requiring a quartz bulb or glass cell the solution of byproduct material in microliter quantities is inserted inside the bulb or cell. The solution of byproduct material is dried in an oven at 100 C, then the bulb or cell hermetically sealed.

In microwave receiver protector tubes requiring tritium-foil, the byproduct material is purchased in the form of titanium tritide on stainless steel foil with a definite activity in each piece of foil. A piece of foil is welded on a metal probe under controlled conditions, then the foil and probe assembly is inserted into a tube body and welded so that the tritium source is within the gas-tight cavity of the device. After the tube is exhausted and filled with inert gas mixture, it is hermetically sealed.

32.14 (b) (4)

The qualification approval required of a supplier of electron or microwave receiver protector tubes demands meeting the mechanical and electrical specifications of customers. Mechanical tests of prototypes are appropriate to the evaluation of the permanency of attachment of the byproduct material within the cavity of the tube.

Quality control subjects prototype tubes to vibration, shock and other tests to determine the integrity of tube construction and reliability. The end point of all tests is to verify that the device remains vacuum tight and meets all mechanical and electrical specifications.

Typical conditions of vibration test performed on prototype tubes is to mount the tube undertest to the table of a vibration machine and apply a sinusoidal vibration of +/- 10 g at a frequency of 50 cycles per second for a period of 1 minute. The position of the tube is changed on the table and then vibrated again in a similar manner.

Shock test is performed on prototype tubes by mounting the tube to the table of a shock machine and subjecting the tube to 3 impact drops of 30 g for a period of 11. milliseconds. After each test the tube is rotated, and shock tested until it has been shocked tested thru the 6 directions of the tube.

The acceptance criteria of qualification tests include not only meeting electrical specifications, but also mechanical features such as the integrity of the glass windows, and internal construction. The appearance of any loose parts or particles within the tube cavity is unacceptable.

Wipe tests on prototype units for transferable radioactive contamination will be made. Wipe tests are made with filter paper by wiping the entire accessible area of prototype units using moderate finger pressure. Removable radioactive material from the tube is determined by measuring the radioactivity on the filter paper by using a calibrated appropriate detection instrument.

The filter paper samples of wipe tests from prototype tubes are not to exceed 1000 disintegrations per minute to meet acceptance requirements.

32.14 (b) (5)

In the fabrication of production lots of microwave receiver protector tubes, quality control inspections are performed from incoming component materials to the finished product. Sub-assemblies are inspected at various stages and are required to conform to drawings and specifications for each tube type. Flow cards indicating the manufacturing operation and the operator, accompany each lot of tubes to final inspection.

At inspection microscopic examination includes sorting our any assemblies with loose particles inside the tube that could cause an electrical short during testing.. Rejects for loose radioactive material in the tube cavity have not occurred.

After final assembly and electrical testing, production tubes are inspected before and after plating. A final electrical test is conducted after which the accepted tubes are etched and labeled. A final quality inspection is made for all mechanical and electrical parameters and correct labeling.

The quality control standards that the product must meet include the specifications of M/A-COM Inc., the military or that of any other customer. Specifications are available for all tube types and the Quality Control Department oversees the inspection procedures and the implementation of specification.

32.14 (b) (6)

Our system of marking and labeling finished units and their individual packaging containers conforms to the regulations of the Nuclear Regulatory Commission and Department of Transportation.

Each unit is marked by means of a rubber stamp with resistant ink capable of lasting the normal life expectancy of the unit, or an appropriate label is used. Marking includes the conventional radiation symbol, the particular isotope, the limit level as specified in 30.15 (8), the company and the company's manufacturer identification number. Small units with surfaces that are not readily marked or will not accept permanent marking will contain a tag or label with the required information inside the unit container.

Each inner container packing is labeled on an outer surface with the following identification:

M/A-COM, Inc.

Nuclide (s)*

The activity per nuclide, specified in terms of less than the maximum amount contained in the tube.

For example: $^{3}_{H}$ less than 100 millicuries

$^{60}_{Co}$ less than 1 microcuries

$^{147}_{Pm}$ less than 30 microcuries

* Note: Certain tubes may contain two nuclides.

32.14 (b) (7)

Measurements of radiation level are made using an appropriate end window Geiger Mueller survey meter. Levels of radiation do not exceed 1 millirad per hour, when measured with the Geiger Mueller probe held at contact with any exterior surface of any tube.

32.15 (a) (1) and (2)

M/A-COM, Inc. maintains a quality assurance program in manufacture of Microwave Receiver Protector Tubes. During the course of production, random samples of tubes are taken and subjected to wipe testing to determine transferable radioactivity. Random sample size is in accordance with section 32.110 and for Lot Tolerance Defective of 5 percent. The acceptance limit for each tube measured is 1000. disintegrations per minute per wipe test filter paper.

ATTACHMENT 2

M/A-COM MICROWAVE COMPONENTS, INC.

RADIOLOGICAL SAFETY RULES AND REQUIRED PROCEDURES

Revised 2/25/86

M/A-COM MICROWAVE COMPONENTS, INC

RADIOLOGICAL SAFETY RULES AND REQUIRED PROCEDURES

TABLE OF CONTENTS

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M/A-COM MICROWAVE COMPONENTS, INC.

RADIOLOGICAL SAFETY RULES

I. Purpose

The following rules and procedures for handling radioactive materials, or equipment producing ionizing radiation, are specified to assure

A. Adequate control of radiation hazards associated with the use of radioactive materials and equipment which produces ionizing radiation,

B. Compliance with applicable federal, state and local regulations.

II. General Responsibilities for Radiological Safety

A. Management's Responsibility

Management is responsible for:

1. Assigning authority for the radiological safety program,

2. Providing adequate facilities and equipment for the safe use, storage and disposal of radioactive materials,

3. Exercising appropriate disciplinary or corrective action to rectify non-compliance with Company rules or required procedures.

B. Radiological Safety Officer's Responsibility

The Radiological Safety Officer* is responsible for:

1. Organizing and supervising the Company's radiological safety program,

2. Reviewing, for radiological safety, proposed work involving the use of radioactive materials or sources of ionizing radiation,

3. Reviewing radiation exposure incidents and infractions of company rules or required procedures,

4. Providing information and training to personnel relating to radiological safety,

5. Performing periodic inspections and surveys of areas using radiation sources,

6. Supervision of the management of radiation emergencies,

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* See Appendix I

7. Providing such services as may be required for radiation protection and compliance with government regulations.

The services include the following:

a. Registration and instruction of radiation workers
b. Personnel monitoring of radiation workers
c. On site inspections, radiation surveys, and area monitoring
d. Establishing radioactive waste collection and disposal methods
e. Environmental monitoring
f. Leak testing of sealed radioactive sources
g. Monitoring radioactive materials received or shipped
h. Maintaining appropriate radiation protection instrumentation
i. Maintaining appropriate radiation protection records.

C. Supervisor

Each supervisor is responsible for:

1. Compliance, within his area of responsibility, with the Company's radiological safety rules and required procedures,

2. Training of personnel under his supervision in safe practices and procedures.

3. Establishing procedures that will insure that his area of responsibility is properly secured (i.e., radioactive sources stored properly, survey meters turned off, and radiation producing equipment left in a proper condition to prevent inadvertent or unauthorized operation).

D. Individuals

Each individual is responsible for:

1. Learning and complying with Company's radiological safety rules and required procedures.

2. Performing his/her work in a manner that will minimize radiation exposure or risk to him/herself and co-workers or the general public.

3. Reporting to his/her immediate supervisor of any known or suspected over-exposure or release of radioactive contamination.

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III. Required Procedures for Radiological Safety

A. Exemptions

The following materials and equipment are exempt from the required procedures of Section III.

1. Material that is not NRC* byproduct material, source material, or special nuclear material and material which has an equivalent specific activity of less than 0.001 microcuries per gram,

2. Self-luminous radium-dials on time pieces or on other instruments,

3. Electrical equipment that is not capable of emitting ionizing radiation in excess of 0.1 millirem per hour, at contact with the equipment, when it is energized at maximum voltage and current.

B. Compliance With Government Regulations

Procurement, use, storage, transportation and disposal of radioactive material and radiation sources, shall be done in a manner that will assure compliance with the conditions of its NRC licenses, and the radiation protection regulations of federal, state and local agencies.

C. Authorization to Use Radioactive Material and/or X-ray Machines

1. In order to qualify for authorization to use radioactive material or X-ray equipment, an individual shall:

   a. Be registered with the Radiological Safety Officer (forms are available at the Nurse's office),
   b. Read this policy and agree to comply with its provisions

2. When the individual meets the conditions set forth in C.1., authorization shall be given by the Radiological Safety Officer (or his designate) only if it is judged that the proposed work will be done safely and in compliance with the rules and procedures herein.

D. Control of Radiation Exposure

1. Exposure to ionizing radiation shall be kept at a minimum.
2. Exposure to ionizing radiation shall be controlled so that occupational exposure shall not exceed any of the following maximum-permissible-dose values:
   a. Maximum permissible doses of occupational exposure for persons over 18 years who are registered with the Radiological Safety Office.

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* Nuclear Regulatory Commission

1. rems per calendar quarter

(1) Whole-body, head and trunk, active blood-forming organs, lens of eyes, gonads.... 1.25 rems

(2) Hands and forearms, feet and ankles... 18.75 rems

(3) Skin of whole body..... 7.50 rems

b. Maximum permissible doses of occupational exposure for exposure for minors, and persons who are not registered with the Radiological Safety Officer.

One-tenth of the values listed in Section D.2a.

3. The following values should be used as guides for controlling exposures within maximum permissible values of Section D.2.

Parts of body exposed	Average weekly values	Dose Rates for 40 hours/week
(1) Whole-body,etc	100 mrem	2.5 mrem/hour
(2) Hands and forearms	1500 mrem	37.5 mrem/hour
(3) Skin of Whole-body	600 mrem	15.0 mrem/hour

E. Procurement of Radioactive Material and Sources

1. Radioactive material shall not be obtained by M/A-COM, Inc. until the following conditions have been verified by the Radiological Safety Office:

a) The NRC-licensed-material to be obtained is covered by a valid NRC license.

b) The radioactive material is included in the registration information on file with the Massachusetts Department of Labor and Industries.

2. Electrical equipment capable of emitting ionizing radiation shall not be used until the following conditions have been verified by the Radiological Safety Officer:

a) The equipment has been registered with the Massachusetts Department of Labor and Industries,

b) The Radiological Safety Officer has approved the plans for the installation and use of the equipment.

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3. Each requisition for the purchase of a radiation source (radioactive material or equipment) shall be completed to include the following words:

Attention of Radiological Safety Officer -
Radioactive Material
(or Radiation-producing equipment).

F. Use of Radioactive Material and/or X-ray Equipment

1. The Radiological Safety Officer shall authorize use of radioactive material after the following conditions are met:

   a) The proposed use, storage and disposal has been approved by the Radiological Safety Officer,

   b) The places of use have been approved by Radiological Safety Officer.

2. X-ray equipment shall not be energized until the radiation protection precautions have been approved by the Radiological Safety Officer.

G. Storage of Radioactive Material

When not being used, radioactive material shall be:

1. Stored in the labeled containers provided or approved by the Radiological Safety Officer and stored in a location that minimizes the possibility of destruction by fire.

2. Stored in a manner to prevent unauthorized removal.

3. Stored in a manner that minimizes personnel radiation exposure.

H. Transportation of Radioactive Material

1. Radioactive material or sources shall not be transported from one location to another unless the following conditions are met.

   a) The transportation method has prior approval of the Radiological Safety Officer, and complies with government regulations, and the provisions of this policy,

   b) The location to which the material source will be transported is approved to receive it by the Radiological Safety Officer.

2. Hand-carrying (in an approved container) of sources between buildings shall be done only if the source transportation has been authorized by the Radiological Safety Officer.

I. Labeling of Radioactive Material and X-ray Equipment

1. Each container for radioactive material shall bear a clearly visible label (magenta on yellow) that contains the radiation caution symbol, and the following information:

Caution - Radioactive Material

Nuclide _____

Amount of Activity _____

Activity Date _____

2. X-ray equipment shall be labeled conspicuously as follows:

CAUTION - X-RAYS

This equipment produces X-rays when energized

J. Disposal of Radioactive Waste

1. Dispose of radioactive waste only into a labelled collection container provided or approved by the Radiological Safety Officer.

2. The disposal of packaged waste shall be accomplished by utilizing the services of a NRC-licensed waste-disposal company or agency.

K. Emergency Procedures

1. In the event of known or suspected over-exposure to external radiation, the individuals involved shall report immediately to the Nurse's office.

2. In the event of an accident involving radioactive contamination, the following steps shall be taken:

   a) The Radiological Safety Officer* shall be notified immediately.

   b) Rope off or guard spill area against re-entry.

   c) Assemble potentially contaminated persons in one location and monitor them for contamination.

   d) Wait for Radiological Safety Officer * to arrive.

* If Radiological Safety Officer is not available, contact one of the alternates listed in Appendix I.

Revised 2/25/86

IV. Radiological Safety Rules

1. There shall be no smoking, eating or storage of food in any area where unsealed radioactive material is stored or used.

2. When hand or clothing contamination is possible, protective gloves and a lab coat shall be worn during operations involving the handling of radioactive material.

3. Handling tongs, or suitable remote-handling device must be used for handling a source or container which emits a dose rate, at contact, in excess of 1 rem/hour.

4. Dispose of radioactive waste only into a labelled collection container provided or approved by the Radiological Safety Officer.

5. After handling unsealed radioactive material, hands shall be washed before leaving the area.

6. Wear your assigned film badge during all times when you may receive occupational radiation exposure. When the film badge is not being used, store it in a location where it will not be exposed to radiation greater than background.

7. Notify the Radiological Safety Officer* immediately if there is known or suspected radioactive-source leakage, or radiation over-exposure. For either case, the work-operations involving the source of radiation shall be stopped immediately, and not restarted until approved by the Radiological Safety Officer.

* If Radiological Safety Officer is not available, contact one of the alternates listed in Appendix I.

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M/A-COM MICROWAVE COMPONENTS, INC.

APPENDIX I

RADIOLOGICAL SAFETY OFFICER AND PERSONS WHO SERVE AS ALTERNATES IN HIS ABSENCE

A. Name of Radiological Safety Officer	Ext.	Home Telephone No.
Hagop A. Bedrosian	3361	894-0998

B. Persons who serve as alternates
(Contact one in sequence listed)

Andrew Beaudette	1932	891-1951
Al Lavalle	2173	658-8453

NOTE: In case of an emergency, assistance can be obtained by contacting the Company's Radiological Safety Consultant, Mr. Sam Levin.

Home Phone 540-4801

*Revised 2/25/86

ATTACHEMENT 3 (a)

MICROWAVE ASSOCIATES INC.

Record of Monitoring Incoming Packages of Radioactive Material

Purchase Order No.	Ordered By	Material Received		Dose Rate *		Wipe Test $\frac{1}{2}$ dpm/100 cm^2	Package Delivery			Comments (Use other side as needed)
		Nuclide	Amount	Surface (mrem/hr)	@ 3' mrem/hr		By	Delivered to Room	Date	

* Notify the Radiological Safety Officer if: (a) wipe test results exceed 2000 dpm/100cm^2. (b) dose rate on external surface exceeds 200 mrem/hr. (c) dose rate at 3 feet exceeds 10 mrem/hr.

ORM 1788 Revised 4/9/75

ATTACHMENT 3 (b)
MICROWAVE ASSOCIATES, INC.

RECORD OF RADIATION SURVEYS

(4)

Room or
Area Location _____

Radionuclides Used:

Activity Used:

Supervisor _____

Survey Meter Used: _____

Survey Date	Survey By	Exposure dose rate in MR/hr				Contamination Measurements in mrad/hr *				Comments
		Location #1	Location #2	Location #3	Location #4	Location #1	Location #2	Location #3	Location #4	

MICROWAVE ASSOCIATES, INC. ATTACHMENT 3 (c)

LABORATORY-SURVEY WIPE-TEST RECORD

ROOM _____ DEPARTMENT _____ SUPERVISOR _____ YEAR _____

Test Location	Area Wiped (cm^2)	Counted For	Results in disintegrations per minute *											
			Jan -	Feb-	Mar -	Apr -	May -	Jun -	Jul -	Aug -	Sept -	Oct -	Nov -	Dec-

Results recorded by: (Signature) _____

* Enter absolute results or "N.D.A.", which means No Detectable Activity.

FORM 1821 Revised 4/9/75

MICROWAVE ASSOCIATES, INC. ATTACHMENT 3 (d)

Radioactive Sealed Source Wipe-Test Record

I. Source Description: Nuclide _____ Half-Life _____

a. Supplier and Source Identification _____

b. Possessed by Microwave Associates under NRC license number _____

Date source obtained by Microwave Associates, Inc. _____

c. Amount of Activity

Dates							

d. Source Description: _____

II. Measurement of emitted radiation: Type of radiation measured _____

Date of Measurement						
Distance of Measurement						
Results in mrem/hr						

III. Wipe Test Record: Required Test Interval = _____ Months

Date of Test	Results in Microcuries	Comments	Test Performed By (Signature)

ATTACHMENT 3 (e)

MICROWAVE ASSOCIATES, INC.

RADIATION SURVEY METER RECORD

Instrument Identification:

a. Type _____

b. Manufacturer _____

c. Model No. _____ Serial No. _____

Record:
(Entry to be made within six-month intervals.)

Repaired and Calibrated			Checked at M/A for Proper Operation		Assigned Location	Comments
At	By	Date	By	Date		

ATTACHMENT 3 (2)
MICROWAVE ASSOCIATES INC.

RADIATION EXPOSURE RECORD

Last Name | First Name | Initial

Employee No. | Social Security No.

Film Badge No. | Date Issued

1. Film badge results: (X-Ray or gamma ray dose to body unless otherwise indicated in comments.)

YEAR												TOTAL
REM.												

2. Other related information:

a. Date employee terminated from film badge program. _____

b. Date employee terminated Microwave Associates, Inc. _____

c. Comments relating to employee's radiation exposure. _____

Signature _____ Date _____
Radiological Safety Officer

FORM 1785 B/U Revised 4/9/75

MICROWAVE ASSOCIATES, INC.

REGISTRATION AND RADIATION MONITORING RECORD

Last Name | First Name | Initial

Employee No. | Social Security No.

This section to be completed by employee.

I have read M/A's Handbook of Radiological Safety Rules and Required Procedures, and agree to comply with its provisions.

Employee signature _____ Date _____

This section to be completed by employee's supervisor.

It is requested that the above named employee be authorized for work involving the following sources of ionizing radiation:

a. Radioactive Material ☐ b. X-Ray producing equipment ☐

Supervisor's signature _____ Date _____

This section to be completed by the Radiological Safety Officer.

Film badge issued ☐ Badge No. _____ Film badge not required _____

Comments: _____

Signature _____ Date _____

FORM 1785 B/U Revised 4/9/75

ATTACHMENT 3 (g)

MICROWAVE ASSOCIATES, INC.

Monthly Radiological Survey Report

Date_____

By_____

Meter Model_____ Serial No._____ Check Source_____ MR/HR

Area Location: TR Production

Location of Readings:

No.	Description	Dose Rate MR/HR
1	One foot from front of storage box	
2	One foot above top surface of storage box	
3	Reading in aisles at level of bench top	
4	At edge of dispensing bench	

Area Location: Storage Vault

1	At locked door	
2	Right aisle	

ATTACHMENT 3 (h)

MICROWAVE ASSOCIATES, INC.

Monthly Wipe Test Report

Date_____

By_____

Meter Model_____ Serial No._____ Check Source_____ MR/HR

Area Location: TR Production

Location of Reading

No.	Description	Wipe Area (CM^2)	DPM/100 CM^2
1	Bench top in front of storage cabinet	100	
2	Floor in front of dispensing bench	100	
3	Floor in front of sink	100	
4	Top surface of soldering bench	100	

Area Location: Storage Vault

1	Top surface of storage vault	100	
2	Floor in front of vault	100	
3	Top edge of waste barrel	100	
4	Inner surface of vault	100	

AREA LOCATION: TR R & D

1.	Top surface of soldering bench	100	

*NDA= No Detectable Activity

MICROWAVE ASSO TES, INC.

RUNNING INVENTORY OF RADIONUCLIDES WITH TOTAL POSSESSION LIMITS SET BY N.R.C. LICENSE #20-02079-01

Nuclide _____

Limit _____

ATTACHMENT 3(i)

Date Received	P. O. Number	Amount of Activity	Date of Activity	Material Shipped in Tubes		Activity Disposed via Rad. Waste		Running Total	Comments
				Activity	Date	Activity	Date		

FORM 1701 Revised 4/9/75

HQ Case

03004617
03251
4/86

BETWEEN: William O. Miller, Chief
License Fee Management Branch
Office of Administration

John E. Glenn, Chief
Nuclear Materials Section B
Division of Engineering and
Technical Programs

LICENSE FEE TRANSMITTAL

A. REGION

1. **APPLICATION ATTACHED**

Applicant/Licensee: M/A-com Microwave Components, Inc.

Application Dated: 3/4/86

Control No.: 005227

License No.: 20-02079-02E

2. **FEE ATTACHED**

Amount: $410.00

Check No.: 103725

3. **COMMENTS**

Check is also for control No's. 05228 + 05229

Renewal

H.Y.S

Signed Brenda Platchek

Date 3/24/86

B. LICENSE FEE MANAGEMENT BRANCH

1. Fee Category and Amount: 3T ($230)

2. Correct Fee Paid. Application may be processed for:

Amendment _____

Renewal ✓

License _____

Signed _____

Date _____

GION I FORM 213
ARCH 1983)

Fee Schedule:

Fee for Amendment to NRC License No. 20-02079-01	$120.00
Fee for Amendment to NRC License No. 20-02079-02E	60.00
Fee for Renewal to NRC License No. 20-02079-02E	230.00
Total Submitted on Check No. 103725	$410.00