40-8194

Regulatory File Cy.

DEPARTMENT OF THE ARMY

OFFICE OF THE DEPUTY CHIEF OF STAFF FOR LOGISTICS
WASHINGTON, D.C. 20310

DALO-MAS-I

9 NOV 1973

US Atomic Energy Commission
Directorate of Licensing
Materials Branch
Washington, DC 20545

Gentlemen:

Attached for your consideration and approval is an application for a Source Material License from the US Army Electronics Command, Fort Monmouth, New Jersey.

Additional information to supplement the application is provided as follows:

a. Air samples are taken only as deemed necessary. Source materials are used in very small quantities, ordinarily less than 25 gm, in these facilities, and continual air sampling is not considered necessary.

b. Procedure for dumping hot waste into the sanitary sewer is described in Inclosure 3.

c. The hood system in room 15C of Building S-45 uses a Kewanee Scientific Equipment filter, catalog number 854. The filter is monitored for gamma at least annually, and more often if frequency of usage dictates. The filter is changed often enough to preclude it being unduly hazardous to handle. Procedure for changing filters is included in Inclosure 2. The hoods in building 2700 do not use filters, but the small quantities of source material involved present no real hazard in this regard.

d. Because of the small quantities of source materials used at any one time, and the infrequency of use, periodic bioassays do not seem necessary. Should any event occur which would make bioassays advisable, this service will be provided by the Army Surgeon General.

Sincerely yours,

PETER M. BALDINO
for Chief, Support Division

3 Incl
as

8260
CC/1

FORM AEC-2
(3-64)
Previous editions are obsolete.

FORM APPROVED
BUREAU OF BUDGET NO. 38-R002.

UNITED STATES ATOMIC ENERGY COMMISSION

APPLICATION FOR SOURCE MATERIAL LICENSE 40-8194

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.

Regulatory File Cy.

1. (Check one)
- [X] (a) New license
- [ ] (b) Amendment to License No.
- [ ] (c) Renewal of License No.
- [ ] (d) Previous License No.

2. NAME OF APPLICANT
Dept of Army, US Army Electronics Command

3. PRINCIPAL BUSINESS ADDRESS
ATTN: AMSEL-RD-H
Fort Monmouth, New Jersey 07703

4. STATE THE ADDRESS(ES) AT WHICH SOURCE MATERIAL WILL BE POSSESSED OR USED
Will be possessed and used within the US Army military reservation of Fort Monmouth, New Jersey

5. BUSINESS OR OCCUPATION
U. S. Government

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 B

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	See Supplement A		
URANIUM DEPLETED IN THE U-235 ISOTOPE	See Supplement A		
THORIUM (ISOTOPE)	See Supplement A		

(e) MAXIMUM TOTAL QUANTITY OF SOURCE MATERIAL YOU WILL HAVE ON HAND AT ANY TIME (in pounds)
622.5 lb.

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

DOCKETED USAEC NOV 13 1973 MAIL SECTION DOCKET CLERK

RECEIVED NOV 13 1973 U.S. ATOMIC ENERGY COMMISSION Regulatory Mail Section

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).

8260

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.

See Supplement D

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 F

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

See Supplement F

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.

(*b*) Detailed procedures for waste disposal. ~~None~~ AR 755-15

14. IF 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 DISASSOCIATED 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.*

Dept of Army, US Army Electronics Command
(Applicant named in Item 2)

Dated 21 AUG 1973

BY: Walter S. McAfee
(Print or type name under signature)
WALTER S. McAFEE
Commander's Representative
(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.

U.S. GOVERNMENT PRINTING OFFICE: 1964—O-706-977 817—427—2

SUPPLEMENT LISTING

Supplement A

Types, chemical forms and quantities of Source material.

Supplement B

Purposes of source material and processes involved.

Supplement C

Users of source material and qualifications.

Supplement D

Facilities and equipment.

Supplement E

Instrument calibration.

Supplement F

Radiation Protection Program.

Supplement A

Types, Chemical Forms and Quantities of Source Material

Supplement A

item 8

The following types, chemical forms, and quantities of source material will be received, possessed, used and transferred under the license:

Natural Uranium:

a. Uranium acetate	a. powder	a. less than 0.5 lb.
b. Uranyl zinc sodium acetate	b. powder	b. less than 0.5 lb.
c. Uranium Tetrachloride	c. powder	c. less than 0.2 lb.
d. Uranium nitrate	d. powder	d. less than 4 lb.
e. Uranium oxide	e. powder	e. less than 3 lb.
f. Uranium potassium sulfate	f. powder	f. less than 0.5 lb.
g. natural uranium	g. metal	g. less than 0.3 lb.
h. any compound	h. any solid or liquid	h. less than 5 lb.

Uranium depleted in the U-235 isotope:

i. Metal	i. 99% U (Commercial grade)	i. less than 600 lb.

Thorium - 232:

j. Metal	j. 99.9% Th	j. less than 2 lb.
k. Thorium Oxide	k. powder	k. less than .5 lb.
l. Thorium containing glass	l. Solid, 30% Th	l. less than 1 lb.
m. any compound	m. any solid or liquid	m. less than 5 lb.

Supplement B

Purposes of Source Material and Processes Involved.

Supplement B

item 9

Source material a, b, c, d, e, f, g, h, j, k, and l is used for calibration of dosimeters and for obtaining standard alpha, beta and gamma spectra in spectral investigation.

Source material g is used in very thin layers in neutron sensitive semirad dosimeters that utilize the fission products triggered by the neutrons. Less than 0.01 lb is used in these devices.

Source material i is used as shielding and filter material on three radiological instrument calibrators manufactured by EON Corp model MRC-894. Less than two hundred pounds is used in each calibrator.

Source material j will be reacted with 3d transition metals to form magnetic intermetallic compounds (5-25 gms). The reaction will consist of melting the compounds in a crucible inductively. This will be done in confinement under argon and vented through a hood. Samples employed for physical measurement will be sealed in epoxy, or other suitable plastic or sealable container.

Source material h and m will be used for various aspects of research and development by the laboratories.

Supplement C

Users of Source Material and Qualifications

SUPPLEMENT C

SUBJECT: Individual Users

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

2. Users of radioactive material. The use of radioactive material covered by this license shall be limited to:

a. The RD&E RPO, Alternate RPO, and Technical Staff of RPO.

b. Individuals approved by the Committee who are:

(1) RD&E employees stationed at Fort Monmouth.

(2) Non-RD&E employees working at Fort Monmouth on RD&E research, development or test programs.

c. An individual(s) working under the direct supervision of an RD&E employee approved by the Committee to directly supervise the individual's work with the radioactive material involved. The individual performing the work need not be an RD&E employee. The primary duty station of the employee performing the direct supervision will be Fort Monmouth, New Jersey.

Note that direct supervision means that the supervisor is in a physical location where he can see the individual(s) being supervised or he is in a nearby area where he can hear a call or signal from said individual(s) and be able to reach the location where the individual(s) is working within a few moments.

3. Qualifications of Users and "Radiation Supervisors" approved by the Committee. The Committee evaluates an applicant's (a) experience with radiation and radioactive material, (b) training in the principles and practices of radiation protection, radioactivity measurement standardization and monitoring techniques and instruments, mathematics and calculations basic to the use and measurement of radioactivity, and the biological effects of radiation, and (c) his familiarity with pertinent regulations and procedures, to insure they are commensurate with the hazard and activity of the radioisotopes requested in his application.

4. See Inclosure 1 for:

a. List of individuals who serve as:

(1) Members of the Committee.

(2) RPO, Alternate RPO, and Technical Staff of RPO.

b. Training and Experience of individuals who serve in the above-mentioned capacities.

INCLOSURE 1 TO SUPPLEMENT C

SUBJECT: Training and Experience

2. <u>RD&E RPO, Alternate RPO, and Technical Staff of RPO:</u> appl. dated 2/28/74

a. ~~Mr. James M. Garner, Jr.~~ STANLEY B. POTTER, RPO for RD&E — C-1-6

b. ~~Dr. Wolfgang J. Ramm~~ CHARLES F. PULLEN, Alternate RPO for RD&E — C-1-3

c. Mr. Bartholomew F. Savignac, HP Technician, Radiological Protection Office, RD&E — C-1-24

TRAINING & EXPERIENCE WITH RADIATION & RADIOACTIVE MATERIAL
OF

Dr. Wolfgang J. Ramm W.J.R.

TITLE: Supv. Research Scientist

POSITION: Principal Research Scientist, Chairman of the Ionizing Radiation Control Committee and Alternate RD&E RPO

EDUCATION: PhD (Physics) University of Leipzig, Germany

VOCATIONAL EXPERIENCE WITH RADIATION:

a. Research Associate, Kaiser Wilhelm Institute for Physics, Berlin, Germany, 1936-1947.

b. Worked in fields of radiation physics and nuclear physics, active in radiation dosimetry from 1937 to present time.

c. Physicist at USAEL from 1948 to present time. Theoretical and experimental work in radiation dosimetry during all this time.

d. Wrote chapter 6 "Scintillation Detectors" in Hine and Brownell "Radiation Dosimetry" published by Academic Press 1956.

e. USAEL Radiological Protection Officer 1957 to 1961 and again in 1961 to present.

FORMAL TRAINING IN RADIATION - Univ of Leipzig, Germany, 1926-36

a. Principles and Practices of Radiation Protection
b. Radioactivity Measurement Standardization and Monitoring Techniques and Instruments
c. Mathematics and Calculations Basic to the Use and Measurement of Radioactivity
d. Biological Effects of Radiation

ON THE JOB TRAINING: Kaiser Wilhelm Institute, Berlin, Germany, 1936-47; US Army Electronic Laboratories, 1948 to present.

a. Principles and Practices of Radiation Protection
b. Radioactivity Measurement Standardization and Monitoring Techniques and Instruments
c. Mathematics and Calculations Basic to the Use and Measurement of Radioactivity
d. Biological Effects of Radiation

ACTUAL USE OF RADIOISOTOPES: (See chart on following page)

ACTUAL USE OF RADIOISOTOPES:

ISOTOPE	MAX AMT	WHERE GAINED	DURATION	TYPE OF USE
Radium	2 curies	Kaiser Wilhelm Inst	1937-47	open,research
1.5 Mev Cockroft-Walton Accelerator bombarded elements	u curies	"	"	"
2.5 Mev Van De Graaff	u curies	USAECOM	1951-Pres	"
Co	3200 curies	"	1956-Pres	sealed irradiation
Sr	1 curie	"	1950-Pres	open & encapsulated
Cs	120 curies	"	1958-Pres	sealed
Mixed fission products	1 curie	"	1956-Pres	neutron irradiation materials

TRAINING & EXPERIENCE WITH RADIATION & RADIOACTIVE MATERIAL
OF

James M. Garner, Jr. *JMG Jr.*
RD&E Health Physicist and RPO

A. EDUCATION:

BS Degree, Daniel Baker College (1940).
Graduate work in Electronics, Atomic Physics and Nuclear Physics, University of Delaware (1945-1947).

B. SPECIAL HEALTH PHYSICS AND RELATED TRAINING:

1. Formal training:

   a. Health Physics, Oak Ridge National Laboratory (ORNL) 1949.

   b. Radiation Safety and Control, ORNL (1960-61).

   c. Field Training in Applied Health Physics, ORNL (1961).

   d. AEC Orientation Course on Licensing and Regulations, Bethesda, MD (1964).

   e. Safe Handling of Radioisotopes in Industry, sponsored by the Oak Ridge Society for Nondestructive Testing, (4 week course) 1964.

   f. Health Physics Training Course (11 wks) sponsored by the East Tennessee Chapter of the Health Physics Society, 1964.

   g. Several short courses and training conferences sponsored by Health Physics Societies, US Public Health Services, etc.

   h. During 1963 and 1964 attended the lectures and part of the laboratories for the following courses given by the Oak Ridge Institute for Nuclear Studies: Basic Research Course (8 wks), Medical Qualification (3 wks), Health Physics (10 wks), Advanced Health Physics (3 wks), Activation Analysis (2 wks), Radioisotope Applications to Highway Engineering (3 wks).

2. On the job training:

   a. Average of two hours per week special instruction by Senior Physicists and 20 hours per week special reading during first two years at the Biochemical Research Foundation (1942 & 1943).

b. Health Physics Division, ORNL, Seminars (1949-1961).

C. EXPERIENCE WITH RADIATION:

1. Types of Uses: Production and processing of radioisotopes; research and development involving medical application in man, studies with animals and plants; environmental studies and measurements; water cooled reactor core changes; effects of radiation on materials; design, evaluation and testing of radiation detection and measuring instruments; instrument calibration; design and fabrication of sources and irradiators; waste disposal; fallout studies; teaching; applied health physics; consultant on a number of studies and projects.

2. Where Experience was Obtained: Worked with radiation and radioactive material from November 1942 to present at the Biochemical Research Foundation, Oak Ridge National Laboratory, Army Nuclear Power Field Office, Oak Ridge Institute of Nuclear Studies, American Nuclear Corp., Auburn University, US Army Electronics Command (USAECOM) and RD&E of USAECOM. During employment with the above -- worked on special assignment for NS Savanna, and at Dougway Proving Grounds, Tennessee River System, Carswell Air Force Base and a special study of training programs at several universities and of several "Agreement State" programs.

D. ACTUAL USE OF RADIOISOTOPES:

Radioisotope	Unencapsulated	Sealed Sources
Co-60	100,000 Ci	25,000 Ci
Co-57	2 uCi	
Co-137	5 Ci	120 Ci
Ra & Ra-Be	uCi	10 Ci
Pu-238 & Pu-Be	MCi	12 Ci
Pu-239	2 uCi	
Po-210 & Po-Be	3 Ci	10 Ci
Sr-90	2 Ci	2 Ci
P-32	200 mCi	
I-129	1 uCi	
I-131	50 mCi	
C-14	mCi	
H-3	mCi's	25 Ci (targets)
S-35	uCi's	
Cl-36	uCi's	
Ca-45	uCi's	
Fe-59	50 uCi	
Zn-65	uCi	
Y-90	uCi's	
Au-198	60 mCi	
Nat Th	kg	
Nat U	10's of kg	
U-235	uCi	
Am-241	uCi	
Ir-192		10's of mCi
Mixed Fission and Activation Products	40 Ci	Spent Reactor Fuel Elements

TRAINING & EXPERIENCE WITH RADIATION & RADIOACTIVE MATERIAL
OF

Louis Leo Kaplan

POSITION: Deputy Director, R&D Technical Support Activity
Research, Development & Engineering Directorate
US Army Electronics Command
Fort Monmouth, NJ

EDUCATION: BA in Physics, Brooklyn College, Brooklyn, NY (1937)
Executive Technical Development Program, 160 hrs, Polytechnic Institute of Brooklyn (1967)

SPECIAL COURSES AND/OR TRAINING FOR RADIATION:

Nuclear Engineering Course, 40 hours, Stevens Institute of Technology (1958)

Nuclear Physics - one course at Brooklyn College (1936)

ACTUAL USE OF ISOTOPES:

(a) Supervised hardening program for electron tubes 1959 - 1962 at USAECOM. Tests conducted at pulsed nuclear reactors and at linear accelerators. 8 - 10 personnel involved plus contract supervision of 3 - 5 contracts.

(b) USAECOM representative on DASA TREE subcommittee to establish and supervise DASA sponsored projects for nuclear hardening and weapons effects on all types of electronic parts 1958 - 1963.

(c) Acted as a consultant to DOD during the successful justification of the pulsed nuclear reactor now located at Aberdeen with appearances before Congressional Military Committee.

(d) Deputy Surety Officer USAECOM appointed 22 Jul 66 - to date.

TRAINING & EXPERIENCE WITH RADIATION & RADIOACTIVE MATERIAL
OF

Dr. Horst H. Kedesdy *Ked*

POSITION: Leader, Luminescence Phenomena Research Team

TITLE: Senior Research Scientist

EDUCATION:	B.S. in Physics, Technical Univ of Berlin, Germany		1935
	M.S. " " "		1937
	PhD " " "		1943

1937 - 1937 - Research Assistant, Technical University of Berlin, Germany, electron optics and microscopy

1939 - 1947 - Max Planck Institute, Berlin, Germany, solid state, X-ray and electron diffractions

1947 - 1960 - US Army Electronics Laboratories, Fort Monmouth, NJ X-ray and electron diffraction semi-conductors, ferromagnetic materials

1960 - 1971 - Director, Institute for Exploratory Research Division E, Solid State Physics

1971 - Pres - Leader, Luminescence Phenomena Research Team, Beam & Plasma Technical Area, Electronic Technology and Devices Laboratory, USAECOM

TRAINING & EXPERIENCE WITH RADIATION & RADIOACTIVE MATERIAL
OF

Dr. Stanley Kronenberg

TITLE: Supv. Research Physicist

POSITION: Chief, Nuclear Hardening Technical Area
Electronics Technology & Devices Laboratory
USAECOM

EDUCATION: PhD in Physics, University of Vienna, 1952
Dr. Kronenberg did his doctorate in theoretical nuclear physics but participated actively during his study in the experimental work performed at the Institute for Radium Research in Vienna. After graduation he was employed by the General Hospital in Vienna to study radioisotopes in connection with medicine, therapeutic and diagnostic applications of X-rays and corpuscular rays.

Since 1953 he has been employed by the US Army Electronics Command and worked since that time with the nuclear physics group in Fort Monmouth, NJ. Research has been mainly in radiation dosimetry, nuclear effects testing, and basic research in nuclear and radiation physics.

He has published numerous papers in the above fields and holds several US patents in his area of interest. He has also participated in numerous nuclear weapon tests as project officer.

ACTUAL USE OF RADIOISOTOPES:

Isotope	Max Amt	Place	Duration	Type of Use
^{3}H	100 C	ECOM	1960	source assembly
^{22}Na	several mCi	"	1962	research
^{32}P	traces	"	1953-Pres	dosimetry
^{60}Co	3500 Ci	" & Vienna	1960-Pres	research
Kr	1 Ci	"	1963	research
Ag	traces	"	1955-Pres	dosimetry
^{90}Sr	1 Ci	ECOM & Vienna	1950,1958	source assembly
^{198}At	traces	" "	1955-Pres	dosimetry
^{137}Cs	150 Ci	" "	1958-Pres	research
Th All isotopes of the chain	several Kg	"	1970-Pres	research
^{235}U	several Kg	"	1958-Pres	Use of burst reactors in research
Pu	several Kg	"	1958-Pres	Use of burst reactors in atom bombs

TRAINING & EXPERIENCE WITH RADIATION & RADIOACTIVE MATERIAL OF

William Martin

POSITION & TITLE: Environmental Engineer
Radiation Protection Officer
Fort Monmouth, MEDDAC

EDUCATION: B.S. degree, Civil Engineering, Northeastern University, Boston, Mass, 1969

FORMAL TRAINING IN RADIATION: Three month Radiological Health Course part of M.S. degree; Basic Radiological Health Course, Oct 1970 (2 wks), Public Health Service, Rockville, MD

ACTUAL USE OF RADIOISOTOPES: None.

TRAINING & EXPERIENCE WITH RADIATION & RADIOACTIVE MATERIAL
OF

Dr. Walter S. McAfee W.S. McAfee

POSITION: ECOM Commander's designated committee representative
and
Scientific Adviser to the Director of Research, Development & Engineering and of Laboratories
US Army Electronics Command, Ft Monmouth, NJ

EDUCATION:

B.S.	Mathematics	Wiley College, 1934
M.S.	Physics	The Ohio State Univ, 1937
Ph.D.	Physics	Cornell Univ, 1949

Radio Astronomy, Harvard Univ, 1957-58

RADIATION TRAINING AND EXPERIENCE:

a. Dosimetry in X-ray Lab, including measurement of the roentgen by use of a free-air chamber. Also Nuclear Physics Lab. Training in safe handling of radioactive materials, evaluation of dose and dose rate, etc.

b. Worked in the nucleonics program of this Command from August 1948 into October 1953. Also planned initial radiation and calibration facilities.

TRAINING & EXPERIENCE WITH RADIATION & RADIOACTIVE MATERIAL

OF

BRUCE LINCOLN MC CLENNAN, M. D.

MC

TITLE: Chief of Radiology, U. S. Patterson Army Hospital, Fort Monmouth, New Jersey 07703

EDUCATION:

College - Union College, Schenectady, N. Y.
B.S. in Biology - 1963

Upstate Medical Center, Syracuse, N. Y.
M.D. Degree - 1967

Internship - Mary Imogene Bassett Hospital, Cooperstown, N. Y. Rotating Type 1967-1968

Residency - N.I.H. Fellowship in Diagnostic Radiology
Fellow in Radiology, Presbyterian Hospital
Columbia-Presbyterian Medical Center,
New York City, N. Y.

Certification - Diplomat National Board of Medical Examiners - 1968
New York State License - 1968
New Jersey License - 1972
American Board of Radiology - June 1972

SCIENTIFIC PAPERS

1. The Roentgenographic Pathologic Correlation of Kerley's Lines, E. Robert Heitzman, M.D., B. Markarian, M.D., F. Zeiter, M.D., B.L. McClennan, M.D., & H. Sherry, M.D., Amer. J. Roentgen., July 1967.

2. Maligant Giant Cell Tumor of the Sphenoid, G. Potter, M.D., & B.L. McClennan, M.D., Cancer, January 1970.

3. Excretory Urography - Choice of Contrast Material, Experimental, B.L. McClennan, M.D., J.A. Becker, M.D., W. Berdon, Radiology 100:1971.

4. Excretory Urography - Choice of Contrast Material, Clinical, B.L. McClennan, M.D., & J.A. Becker, M.D., Radiology 100:1971.

5. Cerebrospinal Fluid Contrast Levels at Intravenous Urography, B.L. McClennan, M.D., & J.A. Becker, M.D., Amer. J. Roentgen., December 1971.

6. Venous Extravasation at Retrograde Urethrography: Precaution, B.L. McClennan, M.D., J.A. Becker, M.D., & T. Robinson, M.D., J. Urol. 106, September 1971.

7. Optimal Evaluation at Intravenous Urography, B.L. McClennan, M.D., Critical Reviews in Radiological Sciences, September 1971.

8. Overdose at Intravenous Urography - Toxic Cause of Death, B.L. McClennan, M.D., J.A. Becker, M.D., & E.G. Kassner, M.D., Radiology 105: November 1972.

9. Vascular Reactivity, Renal Excretion and Cerebrospinal Fluid Concentration of Polymeric Derivitives of Iothalamate, S. Hilal, M.D., B.L. McClennan, M.D., & H. Morgan, M.D., Investigative Radiology, (In press).

10. Splenic Hump vs Cyst - A Plea for Routine Tomography, B. Pressman, M.D., W. Green, M.D., & B.L. McClennan, M.D., (To be published).

11. Column of Bertin - Diagnosis by Nephrotomography, W. Green, M.D., B. Pressman, M.D., B.L. McClennan, M.D., & W. Casarella, M.D., Amer. J. Roentgen., December 1972.

12. Echinococcus Cyst of the Pelvis - Urologic Complications and Treatment, J. Birkhof, M.D., & B.L. McClennan, M.D., J. Urology, (In press).

13. Methylglucamine Iothalamate - Hyperosmolality. CLIN-ALERT, December 28, 1972 No. 243. McClennan, B.L., et. al.

14. Column of Bertin - B.L. McClennan, Winthrop Laboratories, Radiology Rounds, C.P.C. Vol 1. No 1. 1973 (In press).

TRAINING & EXPERIENCE WITH RADIATION & RADIOACTIVE MATERIAL OF

Charles F. Pullen

TITLE: Research Physicist

POSITION: Supervisor, Radiation Facilities and Secretary of the Ionizing Radiation Committee

EDUCATION: BS Physics, Monmouth College, 1960

Courses in Basic Radiological Health and Occupational Radiation Protection given by US Dept of Health, Education & Welfare.

EXPERIENCE: Worked on design, fabrication and encapsulation of isotopes for calibration systems to the 200 curie level. He participated in the research, design and development of radiation detection instruments AN/PRD39 ionization chamber survey meter, Im71/pd, IM70 and Im108 radiacmeter. Designed and fabricated an airplane landing device involving the use of a rotating source producing a vertical columated beam. Actively participated in weapon tests at Nevada Test Site. Operations: Upshot Knothole, Buster Jangle, Plumbob, Smallboy. Radiation measurements, monitoring, and recovery of test equipment from fallout areas. He has had experience in monitoring calibration of radiation detection instruments, wipe tests, and surveying. Since 1967 has acted as health physicist for R&D Laboratories at Fort Monmouth; in charge of radiation facilities and personnel monitoring in USAECOM since 1968.

ACTUAL USE OF RADIOISOTOPES:

Isotopes	Max Amt	Place	Duration	Type of User
C_s^{137}	220 Ci	ECOM	1960-Pres	research
Co^{60}	3500 Ci	"	1960-Pres	"
Si^{90}	1 Ci	"	1955 "	detectors
H^{3}	90 Ci	"	1965 "	replenisher
Po^{210}	10 Ci	"	1968 "	research
Am^{241}	100 uc	"	1965 "	"
RA^{226}	10.3 mc	"	1965 "	"
RaB	20 mc	"	1960 "	Calibration
Pu^{239}	2 uc	"	1963 "	research
Pm^{147}	300 mc	"	1965 "	"
Kr^{85}	50 mc	"	1965 "	"

TRAINING & EXPERIENCE WITH RADIATION & RADIOACTIVE MATERIAL
OF

Mr. Richard Rast

RR

EDUCATION: BS Degree in Chemistry, Seton Hall University, 1949.

EXPERIENCE: Biological and Clinical Chemistry, Serology and Hematology (2 yrs), Monmouth Medical Center and Patterson Army Hospital, Ft Monmouth, NJ, 1950-52.

Health Physics, Research & Development and Calibration of radiation sensitive systems; design, fabrication and encapsulation of isotopes for calibration systems up to 200 curies level, 1952-62.

During past ten years in the Radiac R&D Group he has applied his knowledge of physics, health physics, mathematics, and electronics to the solution of engineering problems and equipment design relating to the radiac development program. Specifically, he has worked on field calibration devices, design of new portable radiac equipment, a Remote Large Area Radiac Training Set and a Recording Radiation Monitor and Automatic Radiation Alarm System, 1962-72.

Actively participated in Nuclear Weapons tests at Nevada Test Site (NTS); operations "Upshot Knothole," "Teapot," and "Small Boy." Also operations "Castle," "Redwing," and "Hardtack" at Pacific Proving Ground, Eniwetok, M.I.

ACTUAL USE OF RADIOISOTOPES:

Isotope	Quantity	Place	Duration	Type of Use
Co^{60}	200 curies	Nevada	6 mos total	Equipment Calibration-Hi-range-
Co^{60}	200 curies	Eniwetok	8 mos total	-Dosimetry
Co^{60}	UDM-1(1-9 curies)	Evans	18 yrs(on an as needed basis	Calibration-Dosimetry R&D
Cs^{137}	UDM-1A(120 curies)	Evans	16 yrs(on an as needed basis	Calibration-Dosimetry R&D
Cs^{137}	Mrc 794(220 curies)	Evans	3 yrs	Calibratior Development
$Sr^{90}y^{90}$	Up to 2 curies	Evans	12 yrs	Calibratior Development
Co^{60}	3500 curies	Evans	5 yrs	Equipment Calibration-Hi-range Dosimetry R&D

TRAINING & EXPERIENCE WITH RADIATION & RADIOACTIVE MATERIAL
OF

J. A. Robertson

POSITION & TITLE: Chief of Logistics, R&D

EDUCATION: Civilian: Graduate of commercial college (2 yrs)

Military: Army Administration, Depot Operation Signal Supply, Army Logistics Mgmt

SPECIAL COURSES AND/OR TRAINING IN RADIATION: None

FORMAL TRAINING IN RADIATION: None

ACTUAL USE OF RADIOISOTOPES: None

B11.5

TRAINING & EXPERIENCE WITH RADIATION & RADIOACTIVE MATERIAL
OF

Bernard M. Savaiko BMS

TITLE: Safety Director, USAECOM

EDUCATION: B.S. in Industrial Engineering
Columbia University, 1957

VOCATIONAL EXPERIENCE: 20 years of safety experience, 4 years as an Air Force Safety Officer; 4 years with U. S. Steel, and 12 years at Fort Monmouth.

ON THE JOB TRAINING AND EXPERIENCE: Received on-the-job training and experience in radiation safety and measurements by supervising the work of radiation specialists for 4 years.

Training and Experience with Radiation and Radioactive Material

Of

Mr. Edward C. Thomas E.C.T.

TITLE: & POSITION: Safety Specialist and Radiological Portection Officer for Headquarters and Installation Support Activity (ECOM)

EDUCATION: High School/Special Courses:

Industrial and General Psychology and Math Refresher Classes/Blue Mt. College, Pendleton, Oregon

FORMAL TRAINING IN RADIATION: Radiological Monitoring Course Sponsored by Industrial Hygiene Sec. State Ind. Acc Comm., Pendleton, Oregon 1961

ON JOB TRAINING IN RADIATION: None

ACTUAL USE OF RADIOISOTOPE: Millicure Quantities Gamma Emitting Radio Isotopes -- Iso-Dose Plotting, Millicure Quantities of Gamma Emitting Radio Isotopes -- Instrument Operational Checks and Calibration.

TRAINING & EXPERIENCE WITH RADIATION & RADIOACTIVE MATERIEL

OF

RONALD J. VERBA

POSITION OR TITLE: Radiological Protection Officer for Maintenance Directorate.

Technical Manuals Writer & Editor.

EDUCATION: 2 years Business Management at Brookdale College.

TRAINING & EXPERIENCE IN RADIATION: Seven years writing manuals on the use, handling, and maintenance of Radiation Detection Equipment and Calibration Equipment.

On several task forces for radiation equipment.

Originator of TB 750-237, Identification of Radioactive Items in the Army Supply System. Active in this publication from 1966 to the present.

Worked directly with ECOM Safety Officer on letters, documents, and vehicles to assure safe handling, marking, and identification of ECOM items in the field.

ACTUAL USE OF RADIO-ISOTOPES: Experience with the following instrument calibrators and check sources (sealed sources):

TYPE NUMBER	RADIOISOTOPE	MAXIMUM AMOUNT	LOCATION
TS-784/PD	Sr-90	100 mCi	ECOM
AN/UDM-2	Sr-90	120 mCi	ECOM
AN/UDM-1	Co-60	10 Ci	ECOM
AN/UDM-1A	Cs-137	120 Ci	ECOM
MX-1083	Co-60	7 μ Ci's	ECOM
MX-7338/PDR-27R	Kr-85	5 mCi	ECOM

TRAINING & EXPERIENCE WITH RADIATION & RADIOACTIVE MATERIAL
OF

BARTHOLOMEW F. SAVIGNAC *BFS*

POSITION: Radiological Protection Surveyor

TITLE: Health Physics Technician
RD&E Radiological Protection Office

EDUCATION:

a. St. John's Preparatory School, DAnvers, Mass, graduated 1932; Massachusetts College of Pharmacy, 1 year, 1932-33; Rutgers University College and University of Idaho, courses in General Chemistry, General Physics, College Algebra.

b. 1971 - Formal training in Health Physics at Oak Ridge Associated Universities. Completed 10 weeks course, certificate, April 1971.

c. Some Introduction to the use of counters for radioactive sources at Rutgers University College, 1950. Also, part of a course in Health Physics at the State University of New York at Buffalo, 1970.

EXPERIENCE:

1946 to 1953 US Army Engineers, Manhattan Project as Health and SAfety Inspector at US Government Sampling Plant, Middlesex, NJ., included training in Radiation Control at University of Rochester, New York and at Clinton Laboratories, Oak Ridge, Tennessee; Correspondence with Massachusetts Institute of Technology regarding radium residues and sources, also initiated some personnel dosimetry records and procured instruments until the Atomic Energy Commission, New York Operations Office Laboratories was established. Served as radiation protection officer of the National Bureau of Standards, New Brunswick, NJ Laboratory upon request on several occasions.

1953 to 1967. National Reactor Testing Station. Shift Health Physicist at the Chemical Processing Plant, and the Materials Testing Reactors. Later, Health Physicist for the SPERT Reactors, and for several other reactors in moth balls, i.e., Gas Cooled Reactor, MIL-1, SL-1, AMP, on loan at Experimental Breeder Reactors. On the job training.

Later, 1960, US National Reactor Testing Station Central Facilities, Health Physics Foreman, for a Chemical Engineering Laboratory, metallurgy laboratory, multicurie hot cells, burial grounds, warehouses, radioactive material shipping areas, a radioactive laundry, liquid wastes disposal plants, and other radioactive areas such as large burial grounds.

1969-71 As "Senior Radiophysicist" for the Industrial Hygiene Division, Radiological Health Unit, New York State Dept of Labor. Inspected licensed industrial Installations for compliance throughout the state including fuel processing areas, reactors, firms using sources and devices.

1972-73 to present. As ECOM Health Physics Technician, received verbal and written instructions in Army Administration Procedures, Army Radiation Control Procedures, terminology; assisted by collecting data for AEC licenses, Dept of the Army Authorizations, and ECOM reports. Some surveys of devices and sources. Assisting in the preparation of applications for Dept of the Army Radioactive Material Authorization or Permit and AEC License.

ACTUAL USE OF RADIOISOTOPES:

Isotopes	Max Amt	Where Experience Gained	Duration	Type of Use
Radium	4-10 microcuries	National Bureau of Standards, New Brunswick,NJ	2 yrs	4-10 uCi calibration sources
Radium & daughters	(300 milligrams per ton) 100 tons	US Government Sampling Plant, Middlesex,NJ	7 yrs	Residues from high grade uranium ore process. Also some 0.1 mCi sources
Natural Uranium	10 Curies or more	US Government Sampling Plant, Middlesex,NJ	7 yrs	High grade ore (60% uranium for process after sampling for assays.
Natural Thorium	1 Curie	" " "	7 yrs	
Plutonium	10 Curies or more	Idaho National Reactor Testing Station	5 yrs	1. Contaminated waste burial 2. Reactor fuel.
Mixed Fission Products	10^6 Curies	Idaho National Reactor Testing Station, Idaho Chemical Processing Plant and Reactor	16 yrs	Fission products stored in tanks or calcined for storage-wastes: material testing reactors. Spent fuel assemblies.
^{235}U ^{233}U	Criticality Amounts	National Reactor Testing Sta-Processing Plant and Reactors	10 yrs	Waste burials, expended reactor cores

^{131}I	10 Curies	National Reactor Testing Station - Chemical Processing Plants & Reactors	2 yrs	Iodine release during nuclear reactor fission breaks. Medical purposes.
^{85}KE	10 Curies	" "	1 yr	Samples from reactor experiments for analysis.
.40 Ba	Unknown	National Reactor Testing Station - Chemical Processing Plants & Reactors	2 yr	Classified-1955
.40 La	Millicurie amounts			
^{3}H	10 Curies	National Reactor Testing Station, also NY State watch dials manufacturers	6 yrs	Radioactive waste inspected, use in plastic seals and in watch dials.
^{60}Co	.01 to 100 Curies	National Reactor Testing Station and NY State Industrial Hygiene	2 yrs	Use for instruments calibration and industrial radiography
^{57}Co	15 mCi	ECOM, ET&DL	1 mo	Radiation Surveys
Ra D+E	10^{-4} uCi	Idaho Reactor Testing Station	16 yrs	Counter calibration sources
Nearly all types of licensee sources	uCi to Ci	Through most Industrial Areas, NY State	1 3/4 yrs	Variable; Lists too long for this report (from reactors, accelerators produced)

TRAINING AND EXPERIENCE WITH RADIATION & RADIOACTIVE MATERIAL OF

Joseph H. Crotchfelt JC

TITLE: Engineering Tech

POSITION: Radiation Tech

EDUCATION: Courses in Basic Radiological Health and Occupational Radiation Protection given by US Dept of Health, Education & Welfare. On the job training at the Pacific Proving Ground and the Nevada Test Site.

EXPERIENCE: Mr. Crotchfelt has been working in the field of radiation measurement, handling and decontamination since 1956. He originally received instruction on the principles and practices of radiation protection, radioactivity measurement and monitoring techniques and instruments, calculations basic to the use and measurement of radiation at the Pacific Proving Ground in 1956. Since then he has had additional instruction and experience on-the-job in these laboratories in radiation measurement, instrument calibration, wipe tests, and decontamination. His experience in PPG & NTS include recovery, radiation measurement, decontamination and instrument calibration. He was responsible for the fabrication and mechanical design changes of the Biosel IM/111, a radiac meter designed to plug into Aircraft or be self-contained with batteries. Designed source holders and loaded same. Maintains, operates and assists in experiments on two (2) million volt Van de Graaff particle accelerator that has a dual capability of electrons or positive ions. Maintains, operates and takes part in experiments on the 3500 Ci Cobalt 60 Facility. Maintains, operates and conducts experiments on the Kaman Model A-1001 Neutron Generator. Is responsible for the quarterly calibration of all Radiac instruments in ET&DL.

ACTUAL USE OF RADIOISOTOPES:

ISOTOPES	MAX AMT	TYPE OF USE
Cs 137	220 Ci	research
Co 60	3500 Ci	research
Si 90	1 Ci	detectors
H3	90 Ci	replenisher
Po 210	10 Ci	research
Am 241	100 uCi	research
Ra 226	10.3 mCi	research
RaBe	20 mCi	calibration
Pu 239	2 uCi	research
Pm 147	300 mCi	research
Kr 85	50 mCi	research

SUPPLEMENT D

Facilities and Equipment

SUPPLEMENT D

SUBJECT: Facilities and Equipment

1. Reference: Form AEC-2, Item 11

2. The following facilities, within the Evans area of Fort Monmouth, where source material might be used or stored, are described.

   a. Building 401

      (1) Irradiation Room

      (2) Van De Graaff

      (3) Neutron Generator

   b. Building T-383 -- Radioactive Material Storage Vault

   c. Building S-45 -- Decontamination and Processing Rooms

3. Evans Area. The Evans Area is the southern most sub-post of the Fort Monmouth complex. The area covers approximately 230 acres. About half of the area is surrounded by a twelve foot high security fence. The unfenced area has a very low population density, even during working hours. Most of the work, involving source material at the Evans Area takes place in Buildings 401, S-45 and T-383. These buildings are within the security area.

4. Evans Area - Building 401. With the exception of the heater room, vestibule and two offices, the inside of the building is a "restricted area". The building has three levels (See Fig. D-1).

a. Irradiation Room. The irradiation room (see Fig. D-2) has thick concrete walls. The wall between the irradiation room and the "Work Areas" contains three multilayered, round, high density glass windows. A low, wooden picket fence divides the room into areas referred to as the High Radiation Area and the Radiation Area. Near the fence on the High Radiation Area side are two Radiac Calibrator Sets, AN/UDM-1 and AN/UDM-1A. One is located on each side of the room. Narrow gates, for personnel, are located on each side of the room. A large portion of the center part of the fence (referred to as the equipment gate) can be removed so that large equipment may be moved in or out. The gates and the calibrators are equipped with switches that are so arranged and wired that an audio alarm will automatically sound if a gate is opened when either of the calibrators are in use. In addition, a light near a calibrator and one at the door to the room comes on when a calibrator is put into operation.

b. Van de Graaff Accelerator. A 2 MeV Van de Graaff type accelerator, made by High Voltage Engineering, is located on the second floor (See Fig. D-1). The accelerator target is located on the ground floor. Both areas have shielding walls. Entry into the target room

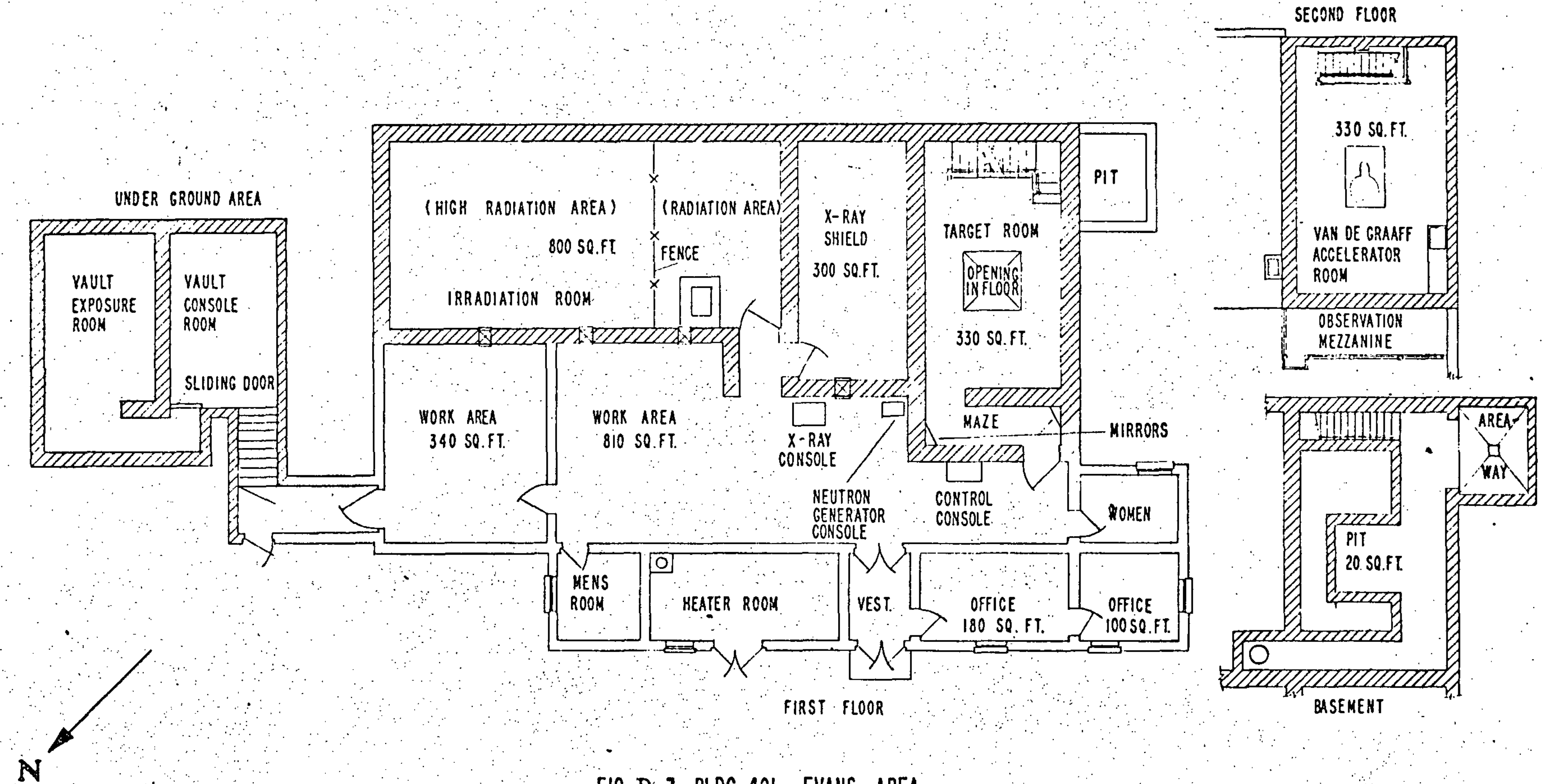


FIG. D-1 BLDG 401, EVANS AREA

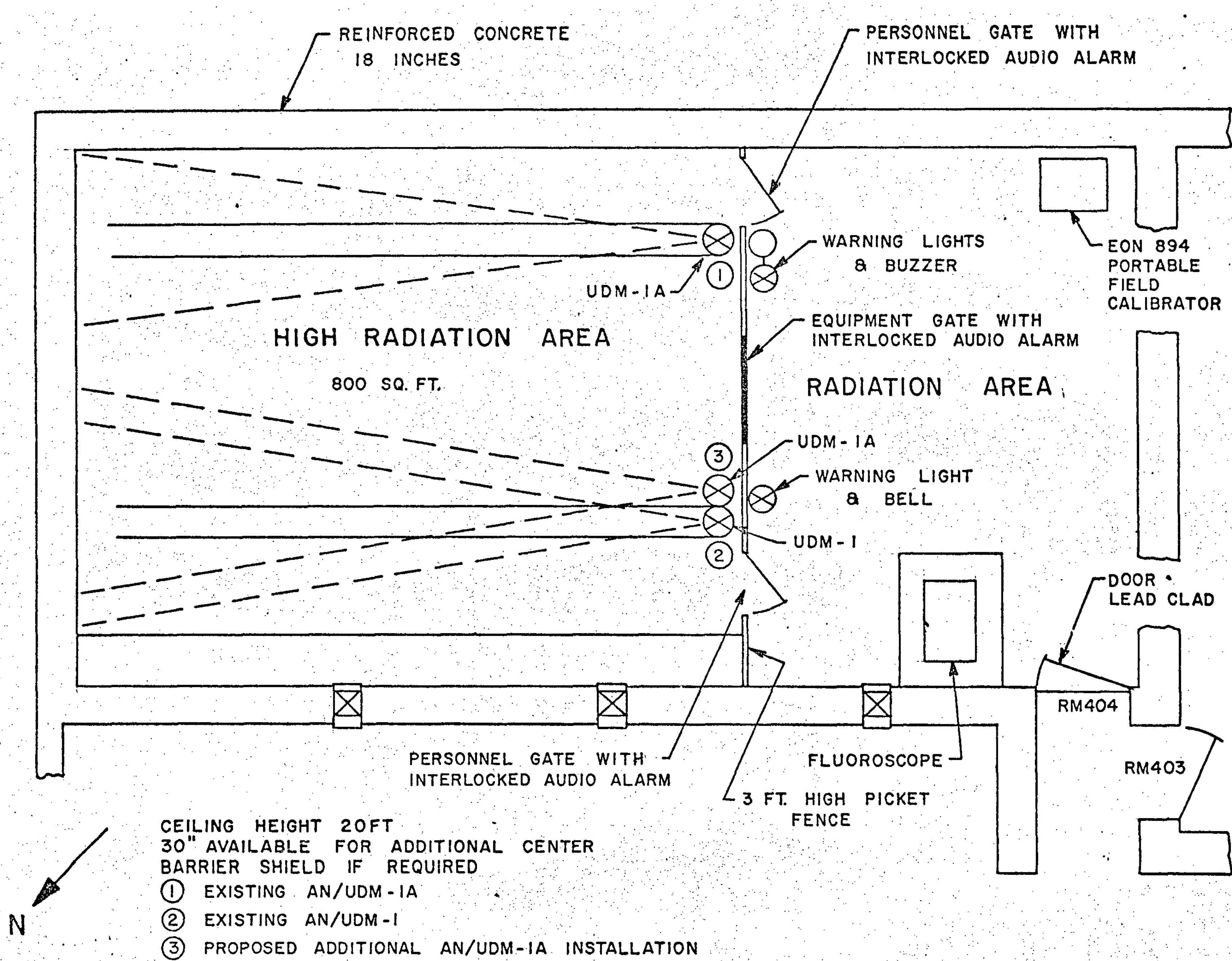


FIG. D-2 IRRADIATION ROOM, BLDG 401, EVANS AREA is through a maze with a lead covered door at its entrance. Entrance to the second floor room where the Van de Graaff is located and to the basement area below the target room is through the maze and target room. Two mirrors are located in the maze, such that a person standing just outside the open maze door has a fairly good view of the target room. The door to the maze is equipped with a safety interlock that normally makes it impossible to operate the accelerator with the door open. When it is necessary to make target room observations from just outside the entrance to the maze, the interlock may be bypassed when an individual, approved by the Committee for this operation, is at the maze door and the RPO has been informed in advance and has approved of the operation. The control console is on the face of the maze.

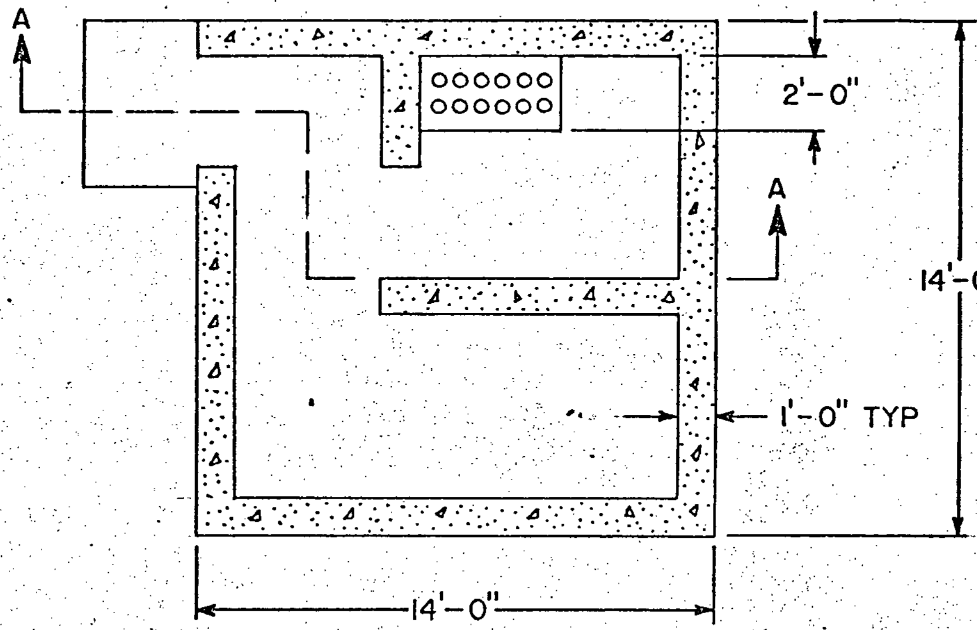
The Van de Graaff may be used to accelerate either positive ions or electrons at energies up to two MeV. The electrons are used to produce X-rays. Accelerated protons or deuterons are used to produce neutrons, radioactive material or used to study nuclear reactions.

c. Neutron Generator. The console for an Atomic Accessories Neutron Generator Model GN 312 is located in the main Work Area. This generator uses a Phillips Neutron Generator Tube 18600. The generator tube is located in the tunnel of the basement (See Fig. D-1). Interlocks are located at the pit entrance to the basement, at the Van de Graaff maze entrance and at the X-ray Shield entrance. The Neutron Generator cannot be operated unless these doors are closed. The Phillips Tube 18600 contains a 9.5 curie tritiated target that is in a hermetically sealed vacuum tube (not pumped).

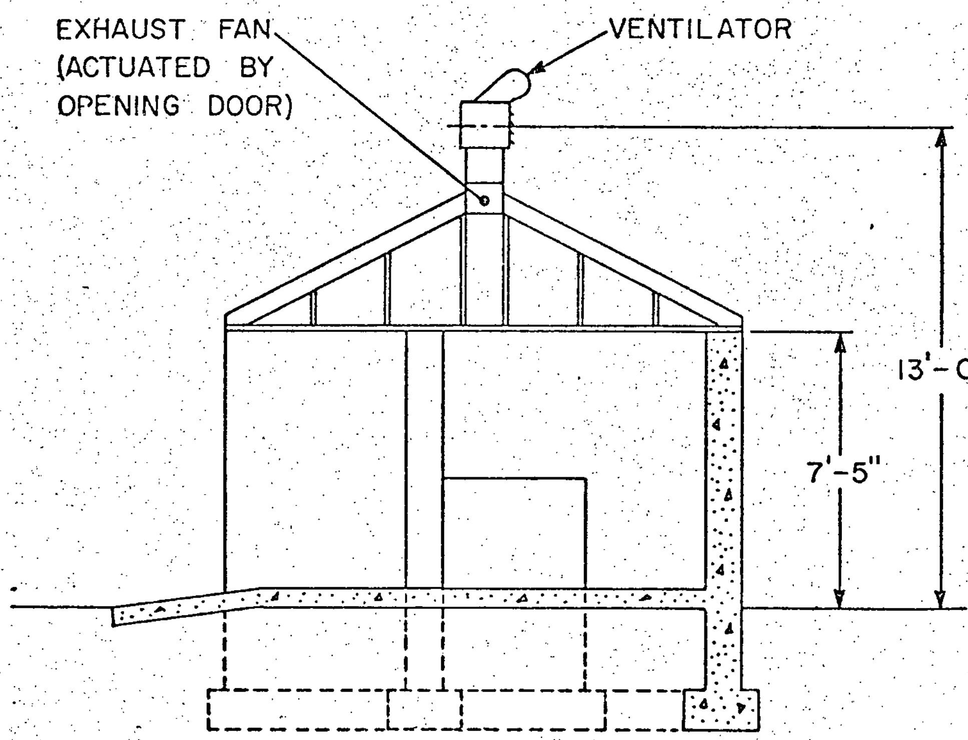
The fast neutron intensity, when the Neutron Generator is operating, at maximum output, is less than two millirem per hour at the console. A portable neutron survey instrument does not indicate a reading above background in the unrestricted areas around Building 401.

When all facilities are in use the radiation intensity in the work and office areas of the building is approximately 0.05 mR/hr from gamma and X-rays while the levels of other types of radiation is too low to detect with portable ratemeters.

5. Evans Area - Building T-383 -- Radioactive Material Storage Vault. Fig. D-3 shows the Radioactive Materials Storage Vault. One portion of the building is used to store radioactive waste for decay or until a waste disposal shipment is made. The remainder of the building is used to store radioactive material that will be used at a later date. The building is equipped with an exhaust fan that exhausts a volume of air approximately $2\frac{1}{2}$ times the volume of the building every minute. The fan comes on whenever the door is opened. The building is normally locked and access to the key is controlled. The building is not used for any purpose other than the storage of radioactive material.



FLOOR PLAN



SECTION A-A

FIG. D-3 BUILDING T-383 RADIOACTIVE STORAGE VAULT, EVANS AREA

6. Evans Area - Building S-45 -- Decontamination and Radioisotope Processing Rooms. Fig. D-4 shows the Decontamination Room and the Processing Room that are in Building S-45. Sample counting equipment and a Scott Air Pack, for emergency use, are located in other areas of the same floor of this building.

a. Room 15B -- Decontamination Room. The Decontamination Room, Rm. 15b, is equipped with a shower, a hand sink, and a floor drain. The three drains are connected to a 550 gallon "hot" waste storage tank that is buried NNE of the Radioisotope Processing Room (See Fig. D-4). The room is equipped with a toilet. In addition, coveralls, surgical caps, shoe covers, booties, gloves, etc., are stored in a cabinet in the room and lockers are provided for storage of an individual's personal clothing and belongings.

b. Room 15 - C -- Radioisotope Processing Room. The Radioisotope Processing Room is equipped with remote handling tools, a ventilated hood (100 linear feet per minute across opening when half open) and a glove box, and a "hot" stainless steel sink. (1) The hood and the glove box are both equipped with air filters. Air ducts from the filters lead to a tall stack. (2) The drains from the hood cup sink and the "hot" sink are connected to the "hot" storage tank mentioned in Para 6a above. In addition a second 550 gallon "hot" storage tank is also located NNE of the Radioisotope Processing Room. Liquid in the "hot" storage tank that the various "hot" drains are connected to can be pumped into the second "hot" storage tank. Tap water can be added to this second tank for dilution purposes. The tap water line is not directly connected to the tank -- water from the tank cannot siphon into the tap water line. Liquid from this second "hot" storage tank can be pumped into the sanitary sewer. The two "hot" liquid waste pumps are located under a removable steel plate in the floor of the room. Gauges to measure the volume of liquid in the two tanks and switches for controlling the pumps are located on the NNE wall of the room. (3) Lead brick are available for constructing temporary work and storage shields.

7. Rooms OA502, OA415, building 2700, Charles Wood area. Rooms OA502 and OA415 are equipped with ventilated hoods (100 linear feet per minute across opening when fully opened). Air ducts from the hood lead outside to a water scrubber and then to the atmosphere. All operations which produce dust fumes, mists or gases will be conducted in ventilated hoods. Equipment is periodically inspected to insure that adequate air flow rates are maintained.

8. Table D-1 lists radiation dection instruments available.

9. In addition to the instruments listed in the table, the following laboratory instruments are available:

a. Scalers with shielded GM tube and scintillating type detectors

b. Single channel pulse height analyzers

c. Victoreen R meters with reader

d. 400 channel analyzer

e. Baird Atomic Spectrometer Model 530

f. Sweep pulse height analyzer

g. "Long Counter" for neutrons

h. AN/PDR 39's for laboratory use.

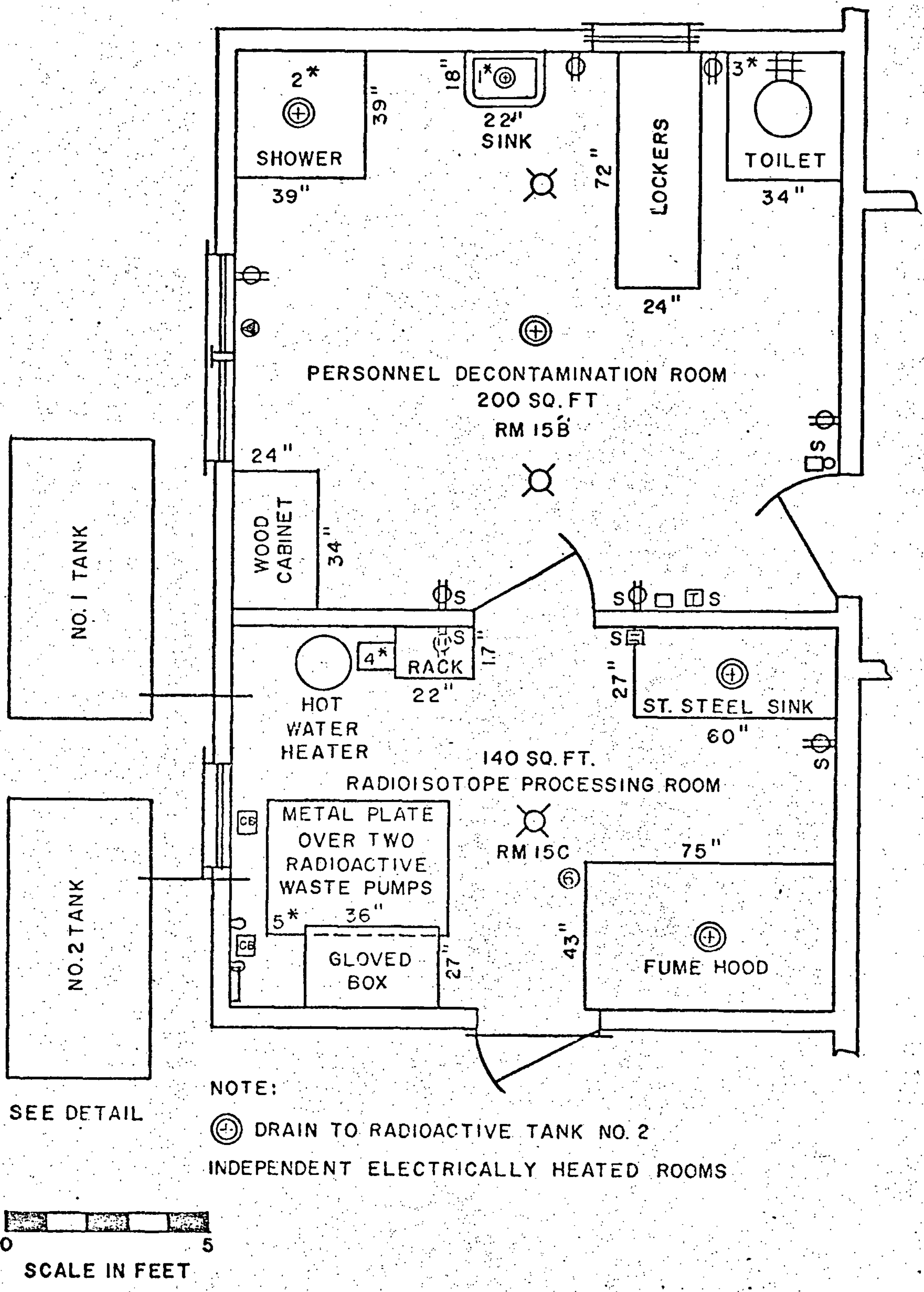


FIG. D-4 DECONTAMINATION AND PROCESSING ROOMS, BLDG S-45, EVANS AREA

TABLE D-1. Radiation Detection Instruments

Type of Instrument	Number Available	Radiation Detected	Sensitivity Range (mr/hr)	Window Thickness (mg/cm^2)	USE
Bendix #862	2 ea.	Gamma	200 mR	NA	Monitoring
Landsverk IM9EPD	5 ea.	Gamma	200 mR	NA	Measuring
JAN IM147	5 ea.	Gamma	0-50R	NA	Measuring
Bendix #884 Tissue Equivalent	4 ea.	Fast Neutron & Gamma	0-200 mrad	NA	Measuring
Bendix #609	4 ea.	Thermal Neutron	2 x daily toler. (120 mrem full scale)	NA	Measuring
Victoreen Model 440RF	1 ea.	Gamma	0-300 mR/h	1 mg/cm^2 mylar & 0.005 magnesium	Measuring
Victoreen Model 740 Cutie Pie Survey Meter	1 ea.	Alpha, Beta, Gamma	0-2500 mR/h	0.005 mylar	Measuring
Radiac Set AN/PDR-39 S.N. 1020,329	2 ea.	Gamma	0-50,000 mR/h	Thick walled ion chamber	Measuring
Nuclear Chicago Neutron Survey Meter Model 2671	2 ea.	Fast & Thermal Neutron	0-25,000 $n/cm^2/s$ 7 scales	BF_3 Proportional counter/removable moderator	Surveying Measuring
Radiac Meter Bendix #611	2 ea.	Gamma	5 R/h	NA	Monitoring
Radiac Set IM-141/PDR-27J S.N. 4846-E005	2 ea.	Beta Gamma	.5-500 mR/h	Jan 5980) type Jan 5979) Mil-E-1 GN tubes	Surveying Measuring

TABLE D.1. Radiation Detection Instruments, Cont.

Type of Instrument	Number Available	Radiation Detected	Sensitivity Range (mr/hr)	Window Thickness (mg/cm^2)	USE
Survey Meters Nuclear-Chicago Corp Model - 2610-A-P.15 S.N. 955-954	2 ea.	Beta Gamma	0-20 mR/h	Thin Walled GM Tube D50 (c K 1020)	Surveying
Survey Meters Nuclear-Chicago Corp Model-2612-P.16	2 ea.	Alpha, Beta, Gamma	.2-20 mR/h	GM Tube D-35(only) 1.4 mg/cm^2	Surveying M
Radiac Sets AN/PDR 46A IM-113/PDR S.N. 36;14;47	2 ea.	Beta Gamma	0-20 mR/h	Beta Window GM Tube	Surveying
Baird-Atomic 420E	2 ea.	Alpha, Beta, Gamma	0-12½ mR/h	End Window GM Tube	Surveying
Nuclear Chicago Alpha Survey Meter Model 2670	1 ea.	Alpha	0-150,000 cpm 7 scales (0-1875 alpha/ cm^2/s)	Proportional Counter	Contamination Surveying
Chirpee Personal Radiation Monitor-Baird Atomic Model 904517	3 ea.	Gamma	1 chirp/ 0.1 mR	GM Tube	Warning
Chirpees Personal Radiation Monitor, Atomic Accessories Model PRM-253	5 ea.	Gamma	1 chirp/ 0.1 mR	GM Tube	Warning
Tritium Monitor Atomic Accessories Model TSM-91-C	1 ea.	Alpha, Beta, Gamma	0-30000 μCi in 4 decade scales	Air Conductivity 0 Window Thickness	Alarm and Continuous Air Monitoring

TABLE D-1. Radiation Detection Instruments, Cont.

Type of Instrument	Number Available	Radiation Detected	Sensitivity Range (mr/hr)	Window Thickness (mg/cm^2)	USE
Mighty Mite Air Sampler Model MS-343	2 ea.	Alpha, Beta, Gamma	Down to Background	0 or 2 mg/cm^2	Air Sampling

Supplement E

Instrument Calibration

SUPPLEMENT E

SUBJECT: Instrument Calibration

1. Reference: Form AEC-2, item 11b.

2a. Survey instruments that respond to

(1) gamma radiation,

(2) beta and gamma,

(3) alpha, beta and gamma,

are calibrated in a standard gamma flux obtained from an AN/UDM-1(Co 60) or an AN/UDM-1A(Cs 137) calibrator. The calibrators were calibrated with Victoreen R-meters. The R-meters were in turn calibrated by the NBS and certified to 3%. The source intensities are corrected each month for decay.

b. The Nuclear Chicago Model 2670 Alpha Survey Meter was calibrated originally at the factory with a RaD+E standard. A secondary standard U_3O_8 is incorporated in the instrument and may be used to calibrate it to ±5%.

c. An Army Radiac Calibrator, AN/UDM-6, containing four standard plutonium 239 sources is also available for calibrating alpha instruments.

3. Counting systems for determining the amount of radioactive material in samples are calibrated with sources accurate to ± 7% or less. These are obtained from various commercial firms, such as, US Nuclear Corporation, Tracerlab Incorporated, Atomic Accessories, Baird Atomic, etc.

4. An NBS calibrated 2.92 mCi Ra 226-B_e neutron source (± 3%) is used to calibrate neutron instruments.

5. Calibrations are made after maintenance procedures that may result in a calibration change and at three month intervals.

6. The Atomic Accessories Model TSM-91-D Tritium Monitor is calibrated with a special source, Atomic Accessories Model TCS-179B, supplied with the monitor. The calibration procedure that came with the equipment is used.

Supplement F

Radiation Protection Program

Supplement F

SUBJECT: Radiation Protection Program

1. Reference: Form 2, Item 12.

2. The radiation protection program is described in ECOM Regulation 385-9. This regulation is being revised, and a copy of the revised edition, publication of which is imminent, is attached.

3. All activities during which source material may be released to spread or contaminate the surroundings will be conducted in a radiation control hood such as that described in para 6 of Supplement D, or under conditions and using procedures specifically approved by the Ionizing Radiation Control Committee.

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

ECOM REGULATION
No. 385-9

Safety

IONIZING RADIATION CONTROL

1. Purpose. This regulation defines policies, responsibilities, and procedures for control of ionizing radiation health hazards on Fort Monmouth. It establishes criteria for the operation of all ionizing radiation producing equipment and for all production, transportation, handling, storage, possession, and disposal of radioactive materials on Fort Monmouth, or licensed by US Army Electronics Command (ECOM) organizations headquartered at Fort Monmouth, except those involved in disaster control operations.

2. Scope. This regulation applies to all who possess, use, or handle sources of ionizing radiation within the confines of Fort Monmouth or under provisions of Atomic Energy Commission (AEC) licenses administered by ECOM organizations headquartered at Fort Monmouth. It is distributed to all ECOM and tenant activities located at Fort Monmouth for information and guidance.

3. Definitions. Definitions of terms used herein are those appearing in Title 10, Code of Federal Regulations (10CFR), chapter 1, "Atomic Energy". In addition, the following definitions pertain:

a. Ionizing Radiation: Electromagnetic or particulate radiation capable of producing ions, directly or indirectly in its passage through matter. For purposes of this regulation, alpha and beta particles, gamma rays, X-rays, and neutrons are examples of ionizing radiation. This type of radiation does not include sound or radio waves, visible, infrared, or ultraviolet light or LASERS.

b. Ionizing Radiation Control Program: Encompasses the measures established by management to insure safety of operations, training, identification of hazards, conformance with procedures and standards for users of ionizing radiation sources, to effect ECOM assignments.

*This regulation supersedes ECOMR 385-9, 15 Nov 66, and ECOM Suppl 1 to AMCR 385-25, 18 Sep 72, including all changes.

c. ECOM Ionizing Radiation Control Committee (IRCC): A group of knowledgeable individuals appointed by the Commanding General who are competent to review the total radiation program from all safety and health aspects and to advise the Commanding General on policy and required actions.

d. Radiological Protection Officer (RPO): An individual designated by the commander to provide consultation and advice on the degree of hazards associated with ionizing radiation and the effectiveness of measures to control these hazards. This individual shall be technically qualified by virtue of education, military training, and/or professional experience to associated capability commensurate with the assignment. The term "radiological protection officer" is a functional title, and is not intended to denote a commission status or job classification within the armed forces.

4. Policy. It is ECOM policy that:

a. Use of ionizing radiation will be controlled so that the radiation exposure for individuals within ECOM is no greater than limits prescribed in appendix A.

b. Safety of operations will guide transactions concerning handling, storing, disposing, and repairing items which contain radioactive material or produce ionizing radiation and which are to be stored or used at Fort Monmouth.

c. Control and approval of applications for AEC licenses, Department of the Army (DA) authorizations and permits, and procurement of ionizing radiation sources is assigned to the IRCC.

5. Exemptions. The following materials, equipment, and conditions of exposure are exempt from the controls established by this regulation.

a. Natural radioactive materials of an equivalent specific radioactivity not exceeding that of natural potassium (i.e., 0.0001 microcuries per gram) and by-product radioactive materials in quantities or concentrations not greater than those specified in the schedules of applicable AEC and DA regulations, provided they are not used in such a combined quantity that any person might receive a radiation dose exceeding one-tenth the applicable Radiation Protection Guide (RPG) in appendix A.

b. Electrical equipment such as high voltage units (e.g., klystron tubes) that is not intended primarily to produce ionizing radiation and which operates in such a manner that no person can receive a radiation dose exceeding one-tenth the applicable RPG.

6. Responsibilities. a. The Chief, Safety Office, ECOM, exercises staff supervision over the ECOM Ionizing Radiation Control Program.

b. The IRCC functions in accordance with 10CFR 33, AR 700-52, AMCR 385-25, and AMCR 385-30. The member assigned as the Commanding General's representative will authenticate AEC licenses and DA authorizations and permits.

c. Commanders and directors of activities (e.g., Research, Development, and Engineering (RD&E) and Maintenance Directorates, and Headquarters and Installation Support Activity (HISA) and US Army Medical Department Activities (MEDDAC), etc.) requiring use of ionizing radiation are responsible for implementing the Ionizing Radiation Control Program within their purview and will:

(1) Provide surveillance of all radiological health controls, maintain an inventory of all radiation sources within their activity, and confirm adherence to applicable license criteria.

(2) Provide enforcement of radiological controls at all their areas.

(3) Review all construction, siting, and operational plans involving the storage or use of radiation sources or equipment for compliance with radiation protection regulations and good health practices, and advise the Chief, Safety Office, ECOM, and the ECOM IRCC of potential personnel hazards.

(4) Maintain liaison with the Fort Monmouth Fire Department and Internal Security Division, HISA, on locations of radioactive material and where hazards to personnel may be created as a result of fire involving radioactive material.

(5) Perform radiation surveys in compliance with AR 700-52 at least once every 30 days.

(6) Maintain records in accordance with 10CFR 30, AR 700-52, and TM 38-750.

(7) Report to Chief, Safety Office, ECOM, any probable overexposure received when personnel monitoring equipment was not utilized. The Chief, Safety Office, ECOM, will in turn notify Commanding Officer, MEDDAC, or his representative.

(8) Appoint a Radiological Protection Officer.

d. All supervisors of users of radiation sources (e.g., Laboratory directors, technical area chiefs, team leaders, etc.,) will:

(1) Insure compliance with the requirements of this regulation.

(2) Insure control and posting of radiation areas in accordance with appendix A to this regulation.

(3) Provide appropriate exposure measuring devices (dosimeter, film badges, etc.) protective clothing and respirators for personnel working in radiation areas.

(4) Insure that proper storage facilities and arrangements for handling all radioactive materials are provided according to criteria and procedures set forth in appendix B to this regulation.

(5) Notify, through the organization RPO, the Chief, Safety Office, ECOM:

(a) When a radioactive source or ionizing radiation producing device is being moved onto or from Fort Monmouth if the source is 5 curies or stronger, or in the case of special nuclear material if it is more than 5 pounds.

(b) When deviation from approved procedure or planned schedules could involve radiation safety. If in the judgment of the organization RPO it is not likely that overexposure or contamination spread will occur, the Chief, Safety Office, ECOM, need not be notified.

(c) Immediately, in the event of any accident/incident involving a potential overexposure of personnel or release of radioactive contamination that might result in overexposure of personnel.

e. All personnel who possess, use, or handle sources of ionizing radiation will be responsible for:

(1) Knowing and following standing operating procedures, rules, and special instructions.

(2) Using safety equipment properly.

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

f. The Commanding Officer, US Army Medical Department Activities (MEDDAC), will be responsible for providing medical assistance and advice as established by AR 40-4 and 40-5, and in addition will be responsible for the following:

(1) Insuring safe condition and safe operation of X-ray machines used for dental and medical diagnostic and treatment purposes.

(2) Posting personnel radiation exposure records as prescribed in AR 40-14, and paragraph 1a(1) of appendix A.

(3) Making reasonable effort to obtain prior radiation exposure records of new personnel.

g. Chief, Transportation Division, HISA, is responsible for insuring that shipping procedures (as delineated in para 8 of app B) are followed.

7. References. a. Title 49, Code of Federal Regulations - Transportation

b. AR 55-55,

c. TM 55-315

STANDA S FOR RADIATION EXPOSURES AND NTAMINATION

The following guides are based on the recommendations of the Federal Radiation Council, the National Committee on Radiation Protection, the International Commission on Radiological Protection, and the regulations of the AEC and the US Army.

a. Radiation Protection Guides (RPG) for External Exposure

(1) Occupation

(a) When any person accepts employment in radiation work, it shall be assumed that he has received his age-prorated dose up to that time unless satisfactory records show to the contrary, or it can be satisfactorily demonstrated that he has not been employed in radiation work. The assumed exposure for calendar quarters prior to 1 January 1961, shall be 3750 millirem (mrem) and 1250 mrem after 1 January 1961. A reasonable effort will be made to obtain reports of previously accumulated occupational dose. This is not to imply that such an individual should be expected to routinely accept exposures at radiation levels approaching the quarterly maximum of 1250 mrem up to the time he receives his age-prorated limit.

(b) The exposure limit to the whole body, head and trunk, active blood forming organs, lens of eyes, or gonads is 1250 mrem per calendar quarter. With the approval of Commanding General, ECOM, the weekly, quarterly, and yearly exposure limits for these critical body parts may be increased to 3000 mrem per quarter if the individuals total exposure does not exceed 5000 (N-18) mrem where N is the age at last birthday and is greater than 18 years. The following guides for external exposure are applicable.

RADIATION EXPOSURE GUIDE

EXPOSURE PERIOD	CRITICAL BODY PARTS	SKIN	HANDS AND FOREARMS FEET OR ANKLES
Weekly	100 mrem	600 mrem	1500 mrem
Quarterly	1250 mrem	7500 mrem	18750 mrem
Yearly	5000 mrem	30000 mrem	75000 mrem
Accumulated	5000 (N-18) mrem		

(2) General Population. Ionizing radiation exposure limits to individuals of the general population shall be 500 mrem per year.

(3) Medical Dose. Radiation exposure resulting from necessary diagnostic and therapeutic medical and dental procedures need not be included in the determination of the radiation exposure status of the individual concerned.

b. RPG for Airborne Activity

(1) Restricted Area. Concentration above natural background of radioactive material in breathing air in restricted areas shall not exceed levels listed in 10CFR 20, appendix B, table 2.

(2) Unrestricted Area. Concentration above natural background of radioactive materials in air in unrestricted areas shall not exceed levels listed in 10CFR 20, appendix B, table 2.

c. Radiation Protection Guide (RPG) for Waterborne Activity. Concentration of waterborne radioactive materials above natural background released to unrestricted areas shall not exceed the limits listed in 10CFR 20, appendix B.

d. Radiation Surface Contamination Guide. The surface contamination limits as specified in AMCR 385-25 apply to items and areas to be released for unrestricted use without prior approval of Chief, Safety Office, ECOM.

e. Respiratory Protection Equipment Guides. The following respiratory protection will be used by personnel in an atmosphere with the indicated particulate radioactive contamination:

Alpha	10^{-12}	µCi/cc	None
	10^{-8} to 10^{-12}	µCi/cc	Military Mask M9A/or equiv
	10^{-8} or higher	µCi/cc	Supplied Air Mask
Beta-gamma	10^{-10}	µCi/cc	None
	10^{-6} to 10^{-10}	µCi/cc	Military Mask M9A/or equiv
	10^{-6} or higher	µCi/cc	Supplied Air Mask

f. Area Delineation and Posting

(1) Radioactive Material Storage Containers and Areas. Areas and containers that require posting in accordance with 10CFR 20 will be posted with a magenta and yellow sign bearing the radiation symbol and the words "CAUTION-RADIOACTIVE MATERIALS."

(2) Radiation Area. A radiation area is any area accessible to personnel with a radiation level such that a major portion of the body could receive in any one hour a dose in excess of 5 mrem, or in any 5 consecutive days a dose in excess of 100 mrem. It will be posted with a magenta and yellow sign(s) bearing the radiation symbol and the words "CAUTION-RADIATION AREA."

(3) High Radiation Area. A high radiation area is any area accessible to personnel in which there exists radiation of such level that a major portion of the body may receive in any one hour a dose in excess of 100 mrem. It will be conspicuously posted with a magenta and yellow sign(s) bearing the radiation symbol and the words "CAUTION-HIGH RADIATION AREA."

(4) Airborne Radioactivity Area. An airborne radioactivity area is any area in which airborne radioactive material is present in concentrations in excess of the amounts specified in appendix B, table 1, column 1 of 10CFR 20, or any area where airborne radioactive material is present in concentrations which, if averaged over the number of hours in any week during which individuals are in an area, exceed 25 percent of the amount specified in 10CFR 20, appendix B, table 1, column 1. These areas will be conspicuously posted with a magenta and yellow sign bearing the radiation symbol and the words "CAUTION-AIRBORNE RADIOACTIVITY AREA."

(5) Contaminated Area or Item. A contaminated area or item is any area or item where contamination levels exceed those referred to in paragraph d above, they shall be posted with appropriate signs or tags.

(6) Temporary Area Identification. Radiation roping or ribbon (yellow and magenta) will be used with warning signs whenever possible for the temporary delineation of radiation, contamination, or airborne radioactivity areas. Where noncolored or different colored rope or barrier are substituted, sufficient signs will be used with the barrier so there will be a clear understanding of the nature of the hazard existing beyond the barrier.

Appendix B

PROCEDURES FOR CONFORMANCE WITH RADIATION STANDARDS

1. General. To conform with the radiation standards as established by this regulation, contractors and users involved in operations dealing with ionizing radiation sources will comply with the following requirements:

a. A copy of documents and required information listed below will be submitted through the organization RPO to Chief, Safety Office, ECOM, at least 2 weeks prior to arrival at Fort Monmouth of radioactive materials and/or machines or devices producing ionizing radiation.

(1) Legal documents authorizing the contractor or agency to own, maintain, and use such materials, sources, devices and assemblies. Examples of such documents are AEC by-product material licenses, AEC source material licenses, and DA authorizations or permits.

Appendix B--Continued

(2) Information concerning radioactive materials and radiation producing machines or devices to include the type, description, and quantity of radioactive materials and the location for storage and use. The detailed description should include the following as applicable:

(a) Manufacturer of the source.

(b) Date of initial source activity determination.

(c) Source identification number.

(d) Cross-sectional sketch showing dimensions.

(e) Source holder material of construction.

(f) Source form (powder, plated, foil, etc.)

(g) Chemical form (metal, oxide, titanate, etc.)

(h) Strength in curies or millicuries as of date of initial source activity determination.

(i) Type of protective cover material or film (if any) over the source.

(j) Date and result of last leak test.

(k) Method of sealing against leakage.

(3) Location and name of responsible individual (or custodian) and licensed organization assigned to supervise handling of radioactive material.

(4) Intended use and operating procedures. Operating procedures will delineate radiological hazard controls in accordance with applicable sections of this regulation. Changes to procedures must be submitted to the Chief, Safety Office, ECOM.

b. Unattended radioactive material will be secured against unauthorized access and handling at all times.

c. Radiation workers who enter a radiation area must wear a film badge. An exposure record must be maintained for each individual.

d. Protective clothing, where required, must be donned prior to entering the radiation area.

e. Radiation areas will be posted and controlled.

f. Subordinate organization's radiological safety programs for the use of sources of radiation must conform to the minimum standards described herein.

Appendix B--Continued

g. All supervisors involved in operations where ionizing radiation is present will, as soon as practicable, notify the Chief, Safety Office, ECOM, if any of the following incidents occur on Fort Monmouth.

(1) Damage to, or malfunction of equipment or exhaust systems, during operations, in areas where these items are required by approved operating procedures.

(2) Doisemeter readings in excess of 100 mrem in any one day or self-reading dosimeters.

(3) Spilled, or unintentionally released, radioactive material that might result in overexposure of personnel.

(4) Wounds resulting in a break of the skin or other incidents where radioactive material may have entered a person's body. Such incidents will also be reported to Commanding Officer, MEDDAC, or his representative.

(5) Fire, disaster, or other emergency in areas where radioactive material is being stored or used.

(6) Except RD&E Directorate, loss of personnel monitoring device or exposure while not utilizing device.

h. Supervisors of individuals will insure that the individuals working in a radiation area will perform their assigned tasks in a manner to minimize their internal and external exposures.

i. Users will clean up any radioactive contamination resulting from their work.

2. <u>Radiation Area Identification and Access Control</u>. a. <u>Posting of Radiation Areas</u>

(1) Storage, radiation, high radiation, airborne radioactivity and contaminated areas as defined in paragraph f, appendix A, will be posted with appropriate signs, tags, and labels bearing the standard radiation warning symbol.

(2) Control instructions will be conspicuously posted at the entrances to a restricted area. Persons entering a restricted area will be briefed, as required by area operation plans, concerning any limited worktime, contamination control techniques, protective clothing needs, and personnel monitoring devices.

b. Personnel entering a radiation area on a nonroutine basis will obtain personnel monitoring device(s) and protective clothing from the responsible organization as required.

3. Radiological Contamination Control. a. Routine and continuous operations will not be conducted in areas where contamination levels exceed the values listed in paragraph d, appendix A, without approval of Chief, Safety Office, ECOM, except as conducted by RD&E Directorate RPO.

b. At any time allowed contamination levels are exceeded the following action will be taken by the user:

(1) Terminate activity within the area; advise security guards.

(2) Control access to the area until released by the RD&E Directorate RPO or the Chief, Safety Office, ECOM.

4. Waste Disposal. Radioactive wastes include unusable or unwanted radioactive items or material and items contaminated with radioactive materials. Waste material will be disposed of by methods consistent with all applicable regulations (i.e., AR 755-15, 10CFR 20) and accepted radiation protection practices.

5. Radiation Exposure Control. a. The amount of exposure to ionizing radiation that a worker is allowed to receive in any period of time is limited. For licensed materials, these limits are set by the licensing authority. For unlicensed sources of radiation, the recommendations of the National Committee on Radiation Protection and the Federal Radiation Council will be followed. Exposure guides are specified in appendix A.

b. Exposure Records. Radiation exposure records will be completed and maintained for each individual required to work in a radiation area.

c. Exposure Monitoring. Film badges will be used as the primary device for personnel exposure monitoring.

(1) Radiation workers who enter a radiation area must wear a film badge.

(2) Radiation monitoring will be assured for all nonradiation workers entering a radiation area.

(3) Pocket dosimeters in addition to film badges will normally be worn in areas where the anticipated dose will exceed 20 mrem per shift and by personnel engaged in radiographic operations. Pocket dosimeters issued will be recorded on a pocket dosimeter record.

(4) Personnel monitoring devices shall never be tampered with, or falsely exposed to radiation.

6. Emergency Procedures. a. General. The emergency phase begins when any accidental release, escape, or spill of radioactive materials occur in such an amount that a health hazard, or possibility of damage to valuable property exists. This phase extends through the completion of efforts to save life, prevent serious injury, or prevent further damage to valuable property. If a release of radioactive material occurs, the following basic emergency plan should be carried out:

(1) Shut down all operations which would be hazardous if unattended.

(2) Evacuate personnel from the emergency area to an assembly area where minimum radiation exposure is possible.

(3) Make an accounting of all personnel from the emergency area at the assembly area to insure complete evacuation.

(4) Notify the Chief, Safety Office, ECOM, as soon as possible.

(5) Provide for communications, transportation, power, portable radiation detection equipment, first-aid supplies, and decontamination apparatus at the assembly area, as required.

(6) Check all personnel involved for possible contamination and segregate personnel who are contaminated.

(7) Decontaminate personnel, equipment, and the emergency area.

(8) Prepare a complete written history of the incident.

b. In the event of emergency, specific actions as prescribed in chapter 10, TM 3-261, will be followed. Prescribed reports will be forwarded through the Chief, Safety Office, ECOM, ATTN: AMSEL-SF-H.

7. Storage. An area designated for the storage of radioactive material will conform to the following minimum standards:

a. It will be kept clean.

b. Fire protection devices or equipment will be readily available.

c. It will be capable of being secured against unauthorized entry.

d. Appropriate standard radiation sign will be posted.

e. When the area is left unattended, sources of radiation will be secured against unauthorized handling and/or individual exposure to penetrating radiation.

Appendix B--Continued

f. The names and telephone numbers of responsible individuals will be posted in a conspicuous location when the area is unattended.

g. At least one container enclosing the radioactive material should be fire resistant, preferably metallic.

8. Shipments. a. Incoming

(1) Immediately upon receipt of radioactive material, the activity Supply Officer, before opening the container, will notify the RPO.

(2) The shipment will be promptly monitored and logged in by a trained monitor.

(3) The radioactive material will then be delivered to the user or stored in a radioisotope storage vault, as circumstances warrant.

b. Outgoing

(1) Radioactive material to be shipped out will be monitored and logged in by the RPO before and after packaging.

(2) The outgoing shipment will be packaged and labeled to conform with Interstate Commerce Commission regulations and Department of Transportation regulations as well as those of the Surgeon General, AEC, Navy Ships Systems Command, and Army regulations.

(3) Shipments will be cleared with the Accountable Property Officer.

(AMSEL-SF)

FOR THE COMMANDER:

OFFICIAL:

FRANK G. STILO
Colonel, GS
Chief of Staff

W. I. RYERSON
Chief, HQ Spt Br

DISTRIBUTION:
M, P, O, and T plus

Chief, Safety Ofc 50

Regulatory File Cy. 40-8194

Rec'd w/ltr. dtd. 11/9/73

PROCEDURE FOR CHANGING FILTER

Regulatory File Cy.

1. Remove cover plate.

2. Place the mouth of a large plastic bag(large enough to hold the filter and for the mouth of the bag to adequately cover the opening) over the opening and tape it tightly to the housing.

3. Pull the filter out into the bag.

4. Remove the tape from the bag-housing seal, put it in the bag and seal the bag.

5. Put the bag containing the filter into another plastic bag.

6. Dispose of as radioactive waste.

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Incl 2

OPERATING PROCEDURE FOR DISPOSAL AND DILUTION OF RADIOACTIVE MATERIAL FROM STORAGE TANK IN DECONTAMINATION ROOM

After determining amount of dilution necessary to dispose of radioactive waste into the sewer system proceed as follows:

1. Pump up gauges to determine number of gallons in each tank (capacity 550 gals.).

2. Close knife switch on right, activating pump which pumps liquids from tank # 1 into tank # 2. Check both gauges to make sure correct number of gallons are placed in tank # 2 for dilution.

3. When correct number of gallons have been pumped into tank # 2, turn off pump. Dilute mixture in tank # 2 by opening water valve near floor, this allows tap water to flow into tank # 2 mixing and diluting solution. When solution has been diluted to safe disposal value (determined previously in accordance with CFR 10 - 20, read gauges for gallons added) turn off water.

4. Close knife switch on left which activates pump on tank # 2 which pumps diluted waste into the sewer for disposal. Pump until gauge on tank reads 100 gals.

5. Repeat above steps until gauge on tank # 1 reads 100 gallons.

CAUTION

Leave at least 100 gallons in each tank. If tank is allowed to empty, pump must be primed again.

6. Check tank # 1 periodically to prevent over flow.

7. Whenever tanks are emptied, record results in log book.

Incl 3