NRC FORM 313
(9-85)
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 HAMPSHIRE, NEW JERSEY, NEW YORK, PENNEYLVANIA, 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 78011

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 37-02006-09
  Program Code 03520

2. NAME AND MAILING ADDRESS OF APPLICANT *(Include Zip Code)*
General Electric Company
Spacecraft Operation, Valley Forge
P.O. Box 8555, Philadelphia, Pa 19101
Attn: Alfred W. Kobylinski

3. ADDRESS(ES) WHERE LICENSED MATERIAL WILL BE USED OR POSSESSED.
General Electric Company
Spacecraft Operation, Valley Forge
780 Third Avenue, Building #8
King of Prussia, Pa 19406

4. NAME OF PERSON TO BE CONTACTED ABOUT THIS APPLICATION
Alfred W. Kobylinski

TELEPHONE NUMBER
(215) 354-1085

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

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

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

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

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

9. FACILITIES AND EQUIPMENT.

10. RADIATION SAFETY PROGRAM.

"OFFICIAL RECORD COPY"

11. WASTE MANAGEMENT.

12. LICENSEE FEES *(See 10 CFR 170 and Section 170.31)*
FEE CATEGORY 3 E
AMOUNT ENCLOSED $ 170.00

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
Alfred W. Kobylinski	Alfred W. Kobylinski	Radiation Safety Officer	

14. VOLUNTARY ECONOMIC DATA

a. ANNUAL RECEIPTS

	<$250K		$1M–3.5M
	$250K–500K		$3.5M–7M
	$500K–750K		$7M–10M
	$750K–1M	X	>$10M

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

c. NUMBER OF BEDS
N/A

d. WOULD YOU BE WILLING TO FURNISH COST INFORMATION *(Dollar and/or staff ...)* 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

E-3

107774

FOR NRC USE ONLY

TYPE OF FEE	FEE LOG	FEE CATEGORY	COMMENTS	APPROVED BY
PEN	Sep. 10	3E	8901100228 871127 REG1 LIC30 37-02006-09 PNU 101174	A. Kimlich
AMOUNT RECEIVED	**CHECK NUMBER**			**DATE**
$170	R35513			9/22/87

PRIVACY ACT STATEMENT ON THE REVERSE

31 AUG 1987 M11

ITEM 5

RADIOACTIVE MATERIAL TO BE POSSESSED

A. Isotope:

Cobalt-60

B. Type of Sources:

Two AECL C166 or C167 sealed sources

C. Amount of Radioactive Material At Any One Time:

(b)(2)High curies maximum for each at any one time
(Current total inventory is less than (b)(2)High curies)

D. Type and Model Number of Irradiators:

Serial Number 157
AECL Gammacell 220 Irradiator
(Storage and Use)

Serial Number 186
AECL Gammacell 220 Irradiator
(Storage and Use)

Sunsi

ITEM 6

PURPOSE(S) FOR WHICH LICENSED MATERIAL WILL BE USED

Both Irradiators are used for research and development studies on the response of various electronic components and materials to radiation exposure.

ITEM 7

Individuals Responsible For Radiation Safety Program, Their Training And Experience

Prior to the start of any work with radioactive materials, all operations involving radioactive materials must be reviewed and approved by the Ionizing Radiation Advisory Group (IRAG) according to mandatory safety procedure M-6.0 (copy attached).

The current members of IRAG are as follows:

Chairman:	S. J. Mucha, M.D.	Medical Director
Member:	C. B. Chilton	Mgr., Industrial Safety & Hygiene
Member:	D. M. Sternberg	Mgr., Electrical Systems Engineering
Member:	Position Open	
Secretary:	A. W. Kobylinski	Senior Industrial Hygienist, Radiation Safety Officer

Resumes detailing training and experience with radioactive materials for each of the above individuals are attached. (Attachments 1 through 5).

The individual assigned immediate responsibility for the daily operation of the Gammacells is Mr. J. L. Andrews, Senior Survivability Project Engineer. Mr. Andrews has 20 years experience with irradiators at this and other General Electric facilities. A copy of Mr. Andrews' resume of training and experience with radioactive materials is attached. (Attachment 6).

ITEM 7

ATTACHMENT 1

RESUME:

STEPHEN J. MUCHA, M.D., F.A.C.S.
MEDICAL DIRECTOR

A. Education:

(b)(6) B.S. Degree in Biology from Franklin & Marshall College
Lancaster, Pa.

1956 - M.D. Degree from the University of Pennsylvania, School of Medicine, Philadelphia, Pa.

Ex 6

B. Post Graduate Training:

1956-1957	Internship rotating at U.S. Naval Hospital, Philadelphia, Pa.
1957-1961	General Surgical Residency, U.S. Naval Hospital, Philadelphia, Pa.
1961-1964	Assistant Chief of Surgery, U.S. Naval Hospital, Camp Lejeune, N.C.
1964-1967	Chief of Surgery, U.S. Naval Hospital, Roosevelt Roads, Puerto Rico.
1967-1971	Assistant Chief of Surgery, U.S. Naval Hospital, Philadelphia, Pa.
1971-1978	Chairman, Department of Surgery, Naval Regional Medical Center, Philadelphia, Pa.
1978-	Medical Director, General Electric Company, FESD, Philadelphia, Pa. Private Practice.

C. Memberships:

1971-1978	Chairman, Disaster Committee, Naval Regional Medical Center, Philadelphia, Pa.
1971-1978	Member, Radiation Committee, Naval Regional Medical Center, Philadelphia, Pa.
1978-1986	Member, Ionizing Radiation Advisory Group, General Electric Company, Philadelphia, Pa.
1987-	Chairman, Ionizing Radiation Advisory Group, General Electric Co., Philadelphia, Pa.

ITEM 7

ATTACHMENT 2

RESUME:

CHARLES B. CHILTON, MANAGER
INDUSTRIAL SAFETY & HYGIENE

A. Education:

B.S. - Virginia Polytechnic Institute, Blacksburg, Va. - Agricultural Eng.
M.S. - Temple University, Philadelphia, Pa. - Industrial Hygiene

Certified Safety Professional - #1410
Registered Professional Engineer in Safety Engineering, State of Calif. - #676

B. Work Experience:

U. S. Army - 6 months active duty, 28 years active reserve, rank of Colonel. Taught/attended numerous chemical, biological, radiological (CBR) courses.

Factory Insurance Association - Fire Protection Engineer - 5 years

Celanese Corporation - Safety Supervisor - 5 years

Borg-Warner Corporation - Safety Manager - 1 year

General Electric Company - Safety Manager - 17 years

C. Member:

ASSE

NFPA

AIHA

Supervised HP activities 17 years.

Attended numerous HP short courses (U.S. Army, AIHA).

Completed 2 graduate level HP courses (Temple University).

ITEM 7

ATTACHMENT 3

RESUME:

ALFRED W. KOBYLINSKI
SENIOR INDUSTRIAL HYGIENIST
RADIATION SAFETY OFFICER

A. Education:

M.S. - Occupational Health (Industrial Hygiene)
Drexel University, Philadelphia, Pa. - 1980
B.S. - Biology, Pennsylvania State University
University Park, Pa. - (b)(6)

Ex 6

- Occupational & Environmental Radiation Protection, August 1985, Harvard School of Public Health, Boston, MA
- Short courses in Radiation Science, January 1987, Rutgers University, New Brunswick, N.J.
- Several additional professional development courses dealing with radiation safety presented by the American Industrial Hygiene Association and other professional organizations.

B. Work Experience:

1974-1976 Toxicology Technician
Ayerst Laboratories, Animal Health Division
Chazy, N.Y. 12921

Assisted in the operation of diagnostic x-ray equipment used for the examination of laboratory animals.

1976-1978 Research Technician
Physiology Department, Thomas Jefferson University
Philadelphia, Pa. 19107

Performed cardiovascular physiology studies utilizing radioactive tracer microspheres labelled with SR^{85}, Ce^{147} and I^{125}. Responsible for: safe handling and use of microspheres, conducting surveys to determine radiation levels in lab area, and for the determination of and safe disposal of all contaminated materials.

12/79-present Industrial Hygienist
General Electric Company, FESD
King of Prussia, Pa 19406

Under the direction of the Space Systems Division Ionizing Radiation Advisory Group, I have functioned as Radiation Safety Officer for the divisions 3 NRC licenses.

ITEM 7

ATTACHMENT 3 (cont.)

SOTOPE	MAXIMUM AMOUNT	LOCATION	DURATION	TYPE OF USE
erium-147	4 millicuries	Thomas Jefferson Univ.	1.5 years	Medical Research
trontium-85	4 millicuries	Thomas Jefferson Univ.	1.5 years	Medical Research
odine-125	4 millicuries	Thomas Jefferson Univ.	1.5 years	Medical Research
obalt-60	16,000 curies	General Electric Co.	1980-present	Gamma Irradiation
rypton-85	20 curies	General Electric Co.	1980-present	Leak Tests
trontium-90	10 curies	General Electric Co.	1980-present	Irradiation Source
lutonium-238	90 millicuries	General Electric Co.	1980-present	Calibration
lutonium-239	microcuries	General Electric Co.	1980-present	Calibration
esium-137	100 millicuries	General Electric Co.	1980-present	Calibration Source
mericium-241	millicuries	General Electric Co.	1980-present	Research
ranium-235	microcuries	General Electric Co.	1980-present	Research
ranium-238	microcuries	General Electric Co.	1980-present	Research
latural Thorium	100 kilograms	General Electric Co.	1980-present	Structural Material
ny Neutron ctivated radio-uclide with atomic o. 3-83 inclusive	0.1 Ci	General Electric Co.	1980-present	Electronic Component Research

ITEM 7

ATTACHMENT 4

Resume for: Daniel M. Sternberg

Professional Experience:

1983 - Present: Manager, Electronic Systems Engineering
Manager of a group of 17 very senior electrical systems engineers involved with all electronic aspects of strategic missile re-entry systems. Typical areas of responsibility include telemetry and tracking, electrical power and distribution, command and control, nuclear weapons safety, radar signal processing, test equipment and flight data analysis.

In addition to managerial responsibilities, I have served on a number of "Tiger Teams" charged with correcting a program experiencing technical, cost or schedule difficulties. I am also called upon to participate in the preparation and review of vital proposals responding to government RFPs.

1981 - 1983: Chief, Reactor Projects Branch
United States Nuclear Regulatory Commission
Region, V Walnut Creek, California

Responsibility for management of inspection program at operational and construction activities, West Coast nuclear power plants. Included was overall branch budgeting, supervision of 2 supervisory, 20 senior technical and 5 administrative personnel, and long-range planning in Reactor Projects. Regional Telecommunications Coordinator and member, ADP Users Group.

1979 - 1981: Chief, Reactor Operations Section, USNRC - Region V

Management of inspection program at operating and pre-operational nuclear plants. Immediate supervisor for 10 Senior Reactor Inspectors and 3 clerical personnel. Position included recommending program changes, recruiting staff, providing oral and written testimony before government and professional bodies.

1974 - 1979: Reactor Inspector, USNRC - Region I,
King of Prussia, PA

Project Inspector for Boiling Water Reactors, planning program, conducting on-site inspections, and coordinating work of various specialists.

ITEM 7

ATTACHMENT 4 (cont.)

1969 - 1974: Electrical Project Engineer

General Electric Re-Entry and Environmental Division Philadelphia, Pennsylvania

Instrumentation and Communications Subsystem Engineer on Minuteman III Mk 12 Re-entry Vehicle program, responsible for design change support, telemetry data reduction, troubleshooting, and flight test support.

1964 - 1969: Officer, United States Navy

Completed Navy Nuclear Power School, Reactor Prototype - EOOW Qualification, and Officers Submarine School. Served aboard Polaris submarine as Communications, Sonar, Electrical, and Reactor Controls Officer during four patrols and an 18-month refueling overhaul.

Education: BSEE - (b)(6) University of Pennsylvania, Moore School of Electrical Engineering, Philadelphia, PA. Class Standing: 10 of 42. Ex 6

ITEM 7

ATTACHMENT 5

- SCO Engineering Representative To Be Determined

ITEM 7

ATTACHMENT 6

RESUME:

JOHN L. ANDREWS
SENIOR SURVIVABILITY PROJECT ENGINEER

A. Education:

(b)(6) - B. S. Degree in Physics-Massachusetts Institute of Technology

Ex 6

1966 - M. S. Degree in Nuclear Science and Engineering from Rensselaer Polytechnic Institute

1962 - Comprehensive Radiological Safety Course
A.E.C. Nevada Test Site

B. Experience:

1959-1961 General Electric Company, Aircraft Nuclear Propulsion Department, Evendale, OH

- Nuclear Engineer

Development and application of neutron fluence detectors for reactor critical assemblies. Also assisted in reactor experiments and operated test reactors.

1961-1966 General Electric Company, Radiation Effects Laboratory, Syracuse, N.Y.

- Experimental Physicist

Responsible for Radiation Effects tests on electronic parts and assemblies at numerous nuclear test facilities, development and application of nuclear instruments, radiation environment definition, technical direction of large Co-60 facility. Field operations at Nevada Test Site.

1966-1967 General Electric Company, Advanced Nuclear Systems Operation, King of Prussia, PA.

- Nuclear Systems Engineer

Responsible for nuclear safety aspects of RTG's and reports on nuclear safety. Conducted blast-fireball test on SNAP-27 mock-up at USAF Rocket Propulsion Lab.

ITEM 7

ATTACHMENT 6 (cont.)

1967-1968 General Electric Company, Spacecraft Department, King of Prussia, PA.

- Radiation Effects Engineer

  Responsible for design, implementation and operation of Radiation Effects Lab. (CCF #8), radiation dosimetry, radiation effects tests on electronic devices and materials. Supervised 2 technicians.

1968-1974 General Electric Company, Space Division, King of Prussia, PA.

- Supervising Physicist

  Increased utilization of Radiation Effects Lab, both intra-GE and on DOD contracts. Improved electron beam simulation test capabilities and usage of 2 MeV flash x-ray machine. Directed 3 technicians. Planned and prepared Survivability Test Plan for FLEETSAT COMM proposal and performed pre-proposal radiation effects work on TIROS-N.

1974-1983 General Electric Company, Space Systems Division, King of Prussia, PA.

- System Development Engineer

  Lead team responsible for advanced radiation effects tests and analysis programs on major DOD and NASA Space programs. Also engineered Radiation Effects Laboratory upgrade to include Cobalt-60 irradiator.

1983-present General Electric Company, Spacecraft Operation, Valley Forge, King of Prussia, PA.

- Senior Survivability Engineer

  Manage technology programs in radiation effects. Consults on radiation environments and radiation source/facilities.

Twenty years experience in project supervision performing nuclear survivability studies principally on semiconductor electronics and shielding for various Aerospace programs. Twenty-eight years experience in radiation measurement, damage analysis and shielding for a wide variety of nuclear environments. Eleven years experience in operation of AECL Gammacell Model 220 Irradiators.

ITEM 8

TRAINING FOR INDIVIDUALS WORKING IN OR FREQUENTING RESTRICTED AREAS

Gammacell operators and their supervisors are required to have knowledge of radiation commensurate with the radiological health problems involved in the use of the irradiators. No one other than approved operators or escorts are permitted to enter the Gammacell Room unless specifically authorized by the Radiation Effects Supervisor and escorted.

The original Gammacell operators received detailed instruction in the safe use of this equipment from the manufacturers (AECL) when the first unit was installed in 1976. This information has been passed on in the form of on-the-job training to new operators. The manufacturers' instructions were repeated in 1986 when the second unit was installed.

All individuals required to frequent the Radiation Effects Lab are provided with formal radiation safety training conducted by the Radiation Safety Officer. (Item 7, Attachment 3). This training is designed to cover all requirements of 10 CFR 19.12. Radiation safety training sessions are typically about one and one-half hours long. However, the length of the training can be shortened or extended depending on the previous training and/or experience of the trainees.

Participative lecture, completion of assigned readings, and on-the-job instruction in combination are used to provide radiation safety training.

The competency of an authorized operator is verified by various methods. The most common method is observed operation under the supervision of an authorized and certified user. The supervising user then certifies to the IRAG that the new user has demonstrated the capability to perform the required work safely. Observation by the Radiation Safety Officer is also used as a means of verifying operator competency.

A current list of authorized Gammacell operators and escorts is maintained by the Radiation Effects Laboratory Supervisor. The number of operators is approximately ten, geared to the current utilization of the Gammacells; some escorts are not operators, all operators are escorts.

ITEM 9

13. FACILITIES AND EQUIPMENT

The irradiator facility is located within the CCF8 building of the Valley Forge Space Center. This building is located on Third Avenue in King of Prussia, Pennsylvania.

Figure 1 shows a plan view of CCF8 with the radiation laboratory indicated by the shaded section. A guard at door No. 1 controls access to the building, for purposes unrelated to the use of radioactive material. All doors except door No. 1 are alarmed at all times. Door No. 1 is alarmed when the building is unmanned.

Figure 2 shows a plan view of the Radiation Laboratory. The irradiators are located in Room 8128 A. Normal access is controlled to the general laboratory area by Cypherlock "A" at point 2 on the plan. Access to the irradiator is controlled by Cypherlock "B" at point 3 on the plan. The double door from Room 8410 into the corridor may be used infrequently to move large equipment.

An access list is maintained of personnel authorized to possess the combination to Cypherlock "B". Personnel on this list shall have the prior approval of the Ionizing Radiation Advisory Group (IRAG). Certain personnel (escorts), as approved by the IRAG, shall have authority to admit visitors to the irradiator room. A visitors log is maintained.

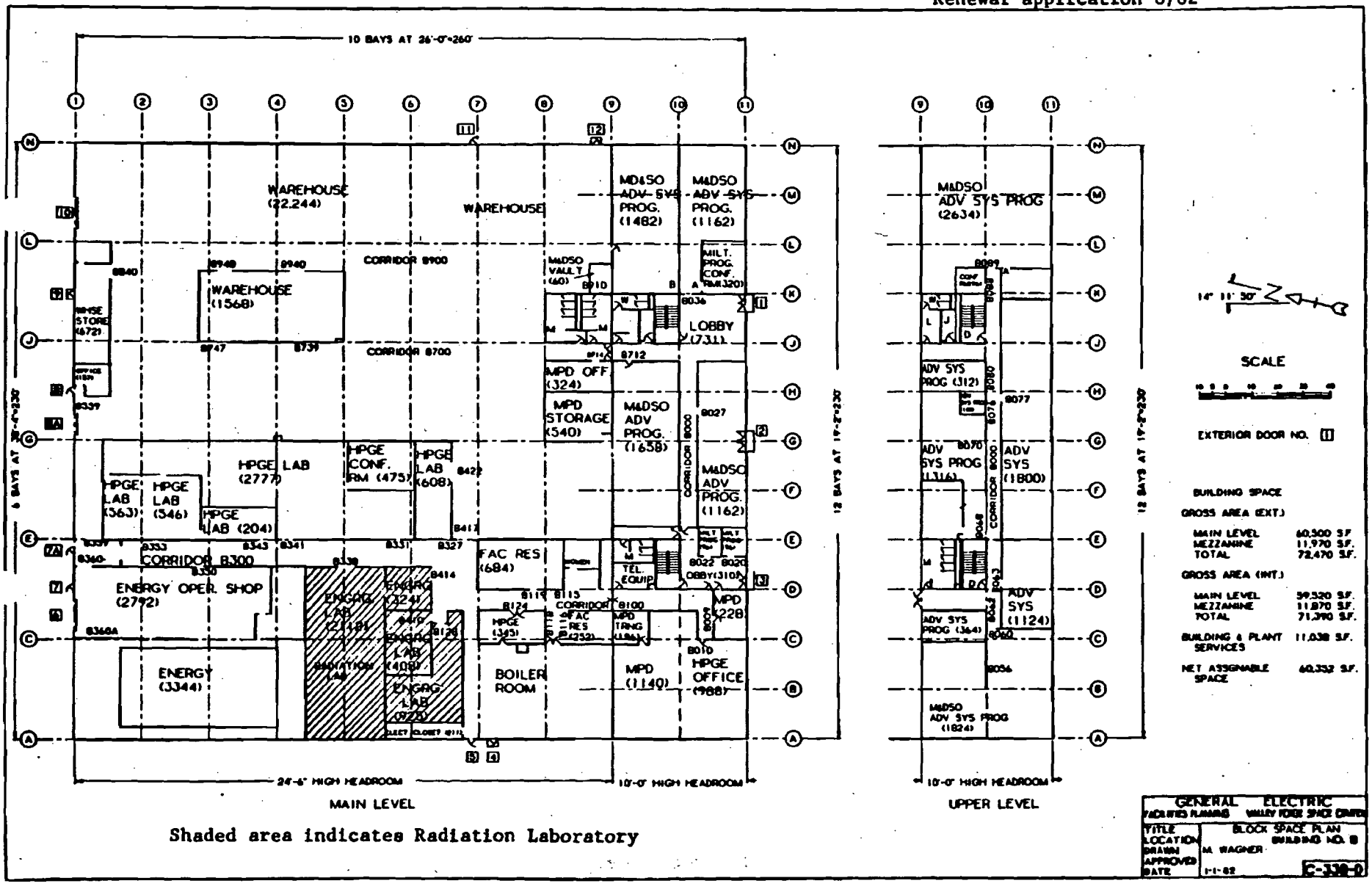
When an individual is removed from the list, the Cypherlock combination shall be changed.

The irradiator console keys shall be kept under combination lock when not in use. Knowledge of the combination shall be limited to currently approved operators.

Item 9

Figure 1

General Electric Co.-SSD
37-02006-09
Renewal application 8/82



Shaded area indicates Radiation Laboratory

FIGURE 1. CC&F 8 BUILDING LAYOUT

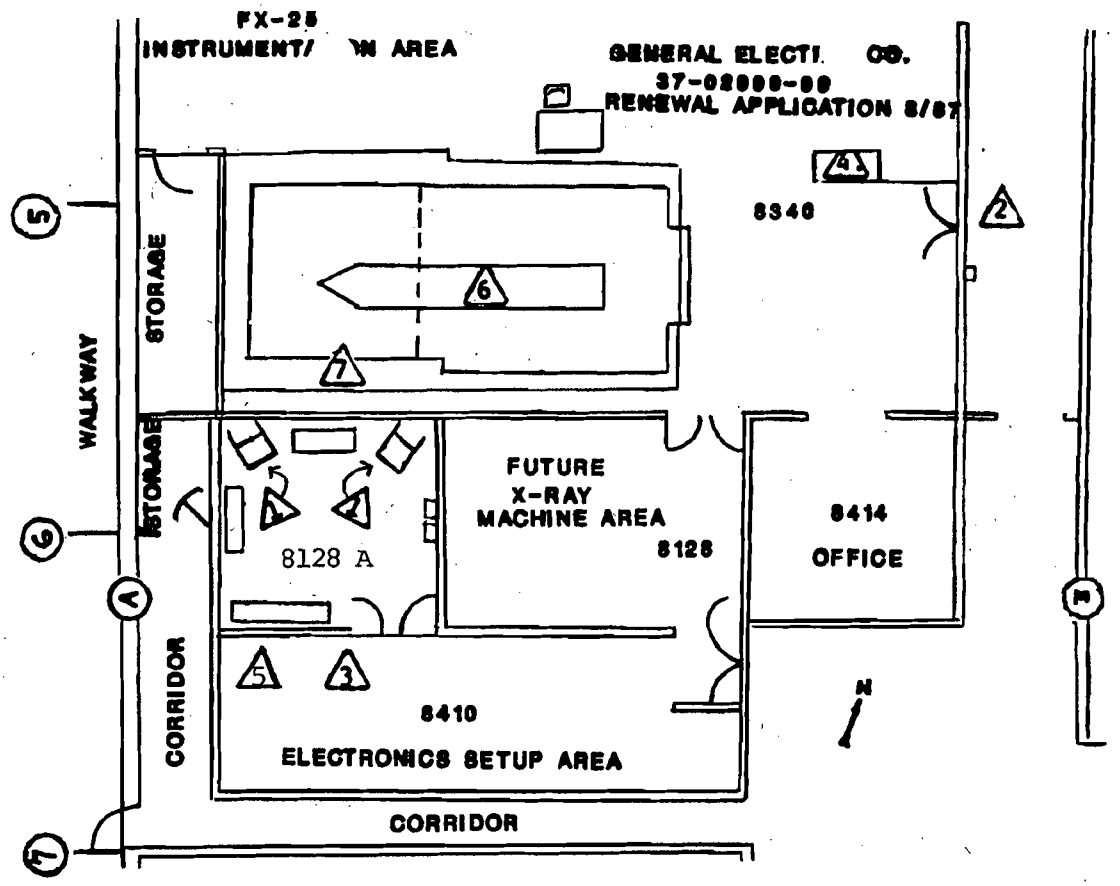


FIGURE 2 RADIATION LABORATORY FLOORPLAN
(SEE KEYED NOTES BELOW)

Item 9

Figure 2

NOTES TO FIGURE 2

GENERAL

1. Doors shown in usual positions.
2. Furniture and setups outside Room 8128 not shown.
3. 8340, etc. are room numbers.
4. Drawn to scale.
5. Usual access to the Gammacell 220 Unit is from Room 8340, through Rooms 8128 and 8410 to Room 8128A.

SPECIFIC

1. Gammacell 220 units.
2. Door entry by cipher lock "A" during normal shift if laboratory is attended. Door entry by cipher lock "A" and key outside time of laboratory work shift(s).
3. Door entry by cipher lock "B."
4. Personnel dosimetry station.
5. Survey meter.
6. Ion Physics FX-25 Flash X-Ray Machine.
7. FX-25 Concrete Vault.

ITEM 9

RADIATION DETECTION INSTRUMENTS

Type of Instruments Make & Model Name	Number Available	Radiation Detected	Sensitivity Ranges	Window Thickness (mg/cm^2)	Use Monitoring Surveying Measuring
Nuclear Measurements Corp. PC-55	1	Alpha Beta Gamma	0 to 99,000 K counts	Windowless Gas Flow Counter	Measuring
Victoren Model 470A	1	Alpha Beta Gamma	0 to 3, 10 30, 100, 300 1000 mR/hr and R/hr	17 mg/cm^2 & 500 mg/cm^2	Surveying
Victoren Model 471	1	Alpha Beta Gamma	0 to 1, 3 10, 30, 100 300 mR/hr and R/hr	0.6 mg/cm^2 & 500 mg/cm^2	Surveying

ITEM 9

Calibration Of Instruments Listed In Item 10

Radiation monitoring equipment (gamma dose rate meters) is calibrated every three months at four different distances from one of the following sources: Cobalt-60, 15 millicuries on 2/19/70, in Radiation Products Division's Model 571 meter calibration kit, SN 108, and/or CS-137, 42.5 mR/hr (± 5%) at 30 inches on 12/8/77, in ECN Corp./Nuclear Associates' Gamma Calibrator Model 64-764, Sn 224.

Radiation counting equipment is calibrated on each day that counting operations are performed. The following calibrated sources are available:

Am-241	6.1	microcuries	on	07/06/77
Ba-133	1.19	"	"	10/07/77
C-14	0.046	"	"	06/18/76
Cd-109	11.0	"	"	05/12/77
Co-57	1.17	"	"	08/09/77
Co-60	0.01	"	"	09/18/69
Co-60	1.25	"	"	08/11/77
Cs-137	1.08	"	"	08/18/77
I-129	0.099	"	"	01/ /77
Na-22	8.36	"	"	04/01/69
Ni-63	0.0345	"	"	12/06/76
Pu-239	0.005	"	"	12/10/74
Sr-90	0.01	"	"	02/26/69

Calibrations are normally performed by, or under the direction of, the Radiation Safety Officer. When an instrument is returned to the manufacturer or sent to a facility which specializes in radiation protection instrumentation repair, calibration is normally requested as part of the repair service.

ITEM 9

DOSIMETRY

Just inside door 2 on Figure 2 is the radiation dosimeter badge station. No one is permitted beyond that point unless they are wearing a dosimeter badge. This requirement is strictly enforced.

Currently we are utilizing thermo-luminescent dosimeters supplied by R. S. Landauer, Jr. and Company, 2 Science Road, Glenwood, Illinois. The dosimeters are exchanged quarterly.

ITEM 10

Radiation Protection Program For Gammacell 220

1. RPP Administration

Administrative control has been achieved through the use of procedure M-6, "Ionizing Radiation Control", and the Ionizing Radiation Advisory Groups' (IRAG) review and approval of the radiation safety policy for the Gammacell 220 facility. A copy of M-6 is attached, and this mandatory safety procedure document describes the responsibilities of the IRAG, the Radiation Safety Officer, and the supervisors and users of ionizing radiation. Attached is an organization chart showing the reporting sequence for the personnel involved.

2. Duties of the Radiation Safety Officer

The Radiation Safety Officer is responsible for:

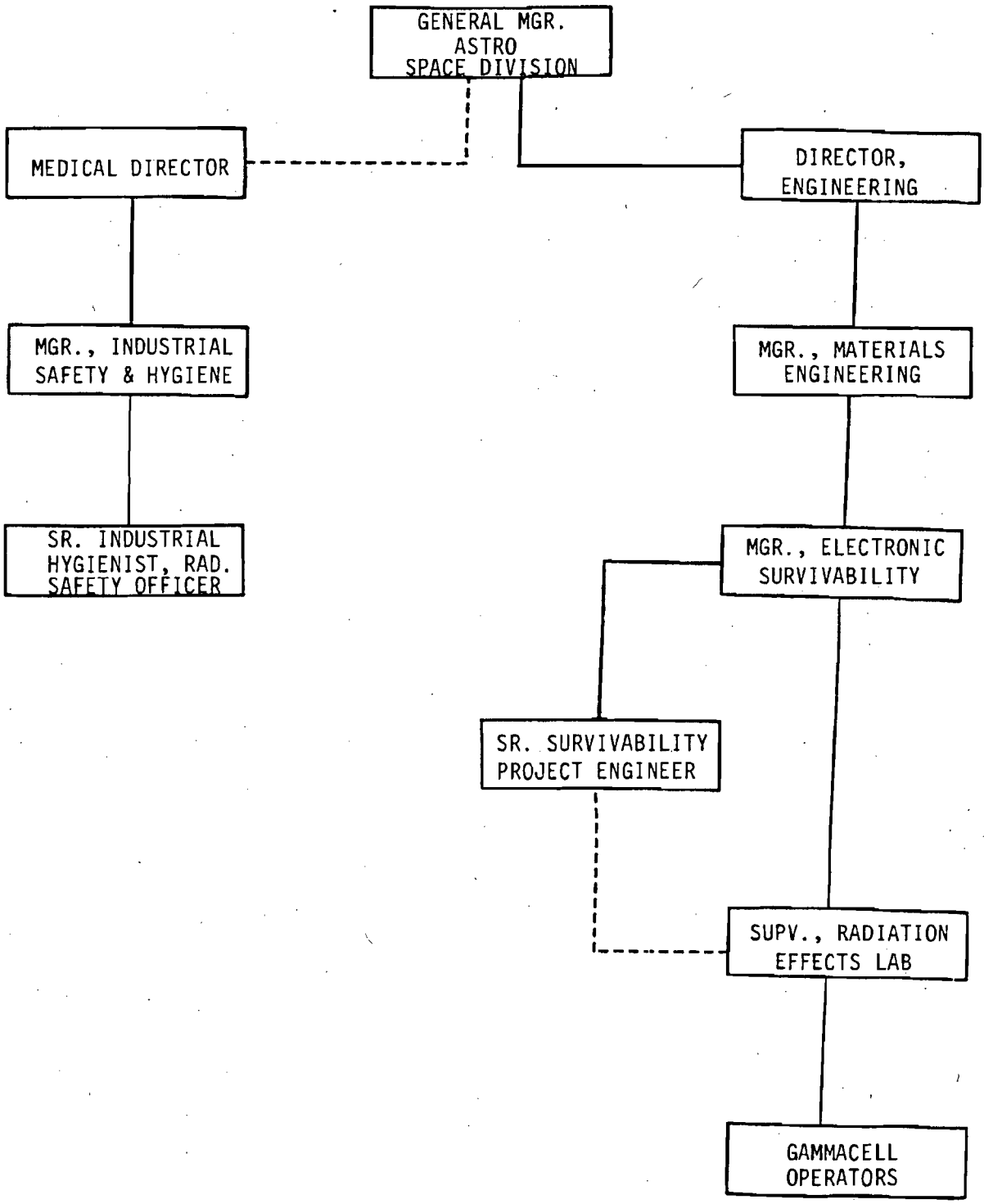
1. Serving as Secretary of the Ionizing Radiation Advisory Group.
2. Keeping records of IRAG activities and such other information as required by regulatory agencies.
3. Assisting supervisory personnel in the writing of all ionizing radiation safety requirements, and development of such information and training programs as may be required to assure proper handling of these materials.
4. Conducting such surveys, leakage tests, and environmental studies as may be required to insure the integrity of the program.
5. Insuring that suitable warning signs and devices are in place and operating as required in accordance with appropriate regulations.
6. Developing and maintaining emergency procedures.
7. Investigating and preparing reports of all actual or suspected excessive or unauthoized exposure to ionizing radiation.

3. Duties of Operators

Each operator is responsible for:

1. Wearing the prescribed monitoring equipment (i.e., TLD badge, etc.) whenever working with radiation.
2. Using the recommended contamination control equipment and following contamination control procedures as required.

ITEM 10


GENERAL MGR.
ASTRO
SPACE DIVISION
MEDICAL DIRECTOR
DIRECTOR,
ENGINEERING
MGR., INDUSTRIAL
SAFETY & HYGIENE
MGR., MATERIALS
ENGINEERING
SR. INDUSTRIAL
HYGIENIST, RAD.
SAFETY OFFICER
MGR., ELECTRONIC
SURVIVABILITY
SR. SURVIVABILITY
PROJECT ENGINEER
SUPV., RADIATION
EFFECTS LAB
GAMMACELL
OPERATORS

ITEM 10

Radiation Protection Program For Gammacell 220 (cont.)

3. Keeping his exposure as low as possible by recommending improved procedures, etc., when applicable.

4. Observing and obeying all signs, tags, etc., posted by the Radiation Safety Officer.

5. Reporting conditions that are considered hazardous or may result in over-exposure.

6. Not deviating from the approved program without the prior approval of the IRAG.

4. Control Measures

A. Access Control

The details of the physical security system for the Radiation Effects Laboratory (which contains the Gammacell Room) is contained in Item 9. No unauthorized personnel are permitted inside the Radiation Effects Laboratory at anytime. Authorization to enter this area is controlled by Radiation Effects Management and/or the Radiation Safety Officer.

B. Operating Procedure

The basic operating procedure for the Gammacell 220 is that supplied by AECL. This basic operating procedure forms a part of the overall operating procedure to be used for the irradiator. A copy is attached.

C. Routine Safety Precautions

Provisions for limiting physical access to the irradiator and for key control have already been mentioned in Item 9.

A personnel dosimetry station provisioned with radiation badges is located in Room 8340. A radiation survey meter is located in the irradiator room.

Use of the Gammacell unit is restricted to Authorized Operators. The doors to Room 8340 and 8128 A are marked Radiation Areas.

A copy of AECL's instruction manual for the Gammacell 220 is kept in Room 8128 A.

ITEM 10

Radiation Protection Program For Gammacell 220 (cont.)

Electronic parts and assemblies, semiconductor and dielectric materials are authorized to be exposed in the facility. Other items may be exposed upon approval of a written request to the IRAG. Explosive materials are explicitly prohibited for exposure. Care is to be taken with all samples to avoid excessive corrosion of the sample drawer.

Operators are required to maintain an exposure log for each day of use, and recordable items in the log include: date of test, description of sample, start and stop times, name of authorized operator, and reading of survey meter.

Only AECL is authorized to perform maintenance, repair or modification of the irradiator which would involve removal of shielding or interlocks or access to the sealed sources.

D. Leak Test Procedures

Radioactive leak tests are performed every six months. The alcohol-moistened paper discs are usually used. The leak test sample is taken from appropriate accessible surfaces of the irradiator. After drying, the sample smear is counted by using a windowless proportional counter or a thin end-window GM counter.

E. Emergency Procedures

The basic instruction for all employees to report any emergency is to telephone the Plant Protection Center by dialing the emergency number (FIRE, 3473). Personnel in the Protection Center are given standing orders for contacting various personnel according to the type of emergency.

1) FIRE

For fires in Room 8128 A electric power should be turned off, Patrol notified, fire extinguishers used if practical. If the fire is not readily containable, personnel should exit the room, taking the radiation survey meter and await firemen. Fires in adjacent areas, or fires discovered in Room 8128 A in the absence of Authorized Operators, one Authorized Operator and the Radiation Safety Officer are to be notified. Firemen are to be appraised of the location of the Gammacell.

ITEM 10

Radiation Protection Program For Gammacell 220 (cont.)

2) POWER FAILURE

In the event of a power failure the timer will stop and it will be necessary to raise the sample drawer manually in accordance with the AECL procedures.

Test operations are not to be initiated during a power failure. Cipher lock operation is not affected by commercial power failures because it is powered by an on-site generator.

3) RADIATION EMERGENCY

If readings on the radiator survey meter exceed 25 mR/hr, a radiation emergency exists and the room is to be evacuated and the Radiation Safety Officer notified.

ITEM 10

AECL Standard Operating Procedures

The Gammacell 220 has been designed to enable operation with minimum exposure to radiation. To ensure protection, operators should adhere to the following procedures.

AUTOMATIC OPERATION

1. Raise the drawer by first inserting the key in the key switch and turning it 90° clockwise, then press the UP rocker switch.

2. Open the collar doors by grasping the handles and pulling on the lever behind the right handle.

3. Slide the sample chamber locking ring to the right, remove the door by lifting it up and outwards.

4. Place the sample in the chamber. The access tube in the drawer top accommodates accessory tubes and electrical leads, which should be fitted in accordance with the instructions provided in the Gammacell 220 Accessories Manual.

   NOTE: Materials expected to change state during irradiation should be placed in suitable containers.

   Liquids expected to expand or boil should be provided with secondary containers for overflow, or vented to one of the access tubes .

   The sample chamber and source cage will not withstand repeated spills of corrosive materials.

5. Replace the sample chamber door with a forward and downward motion. Move the locking ring to the left until it snaps into position. If difficulties are experienced check that the door is correctly positioned in the port.

6. Close the collar doors, the left one first; ensure that the latch locks the door in place.

7. Set the required irradiation time on the digital timer in the following manner. (Refer to Figure 8.)

   a) Push the timer reset knob, turn it clockwise 90°, and release; the white line on the knob should be horizontal.

   b) Open the hinged cover which protects the predetermining drums; turn the knurled wheels either direction until the desired number sequence appears in the windows.

   c) Rotate the selector switch to hours, minutes or seconds. Close the hinged cover and turn the timer reset knob counterclockwise; the white line on the knob should be vertical, press the reset knob to set the timer.

8. Push the DOWN switch. The drawer will lower to the irradiating position, activate the timer, and remain there until the preset time interval has elapsed, when it will automatically raise.

9. To remove the sample repeat steps 2 and 3.

ITEM 10

AECL Standard Operating Procedures

MANUAL OPERATION

1. For initial set-up read the preceding steps 2 to 6.
2. Rotate the selector switch to MANUAL.
3. Press the DOWN switch. The drawer will lower and remain there indefinitely until the UP switch is operated.

POWER FAILURE

In the event of a power failure the timer will stop and it will be necessary to raise the drawer manually.

1. Turn the key switch to the OFF position.
2. Spring out the large round button near the lower right corner of the back cover.
3. Push the crank (Figure 2, item 14) through the hole until it snaps into the extension on the input shaft of the reducer.
4. Crank in a clockwise direction to raise the drawer.

NOTE:

1. If it is necessary to change an operation time do not alter the digit settings while the drawer is down and the timer is operating. Raise the drawer and set the timer as described in AUTOMATIC OPERATION, step 7.
2. On completion of a timed operation the timer can be reset to the same operation time by depressing the reset knob.
3. If it is required that the drawer be raised during an operation the timer will store the remaining portion of the preset time until the operation is resumed.

6.1 PURPOSE

To state the requirements that shall apply in the use of all ionizing radiation, ionizing radiation machines, and radioactive materials to insure the maximum safety to all persons in the Valley Forge Space Center. These requirements are intended to be consistent with the regulations of the Nuclear Regulatory Commission, Pennsylvania Department of Environmental Resources, U. S. Department of Labor, and recommended practices of the General Electric Company.

6.2 DEFINITIONS

6.2.1 Ionizing Radiation

Gamma rays and x-rays, alpha and beta particles, high-speed electrons, neutrons, protons, and other nuclear particles; but not sound or radio waves, or visible, infrared or ultraviolet light.

6.2.2 Ionizing Radiation Machine

Any device which produces ionizing radiation when the associated control devices are energized.

6.2.3 Radioactive Materials

Any material (solid, liquid, gas) which emits ionizing radiation spontaneously, for example: carbon-14, cesium-137, cobalt-60, radium, thorium, etc. Note: all compounds of uranium, thorium and radium and all general-licensed sources are included, whether labeled radioactive or not by the vendor.

6.2.4 Occupational Dose

Includes exposure of an individual to ionizing radiation, (1) in a restricted area; or (2) in the course of employment in which the individual's duties involve exposure to ionizing radiation. Occupational dose shall not include any exposure of an individual to ionizing radiation for the purpose of medical therapy or diagnosis.

6.2.5 Rem

The quantity of any type of ionizing radiation which causes the same biological effect as one roentgen of X or gamma radiation.

6.2.6 Permissible Doses

1. Every reasonable effort shall be made to maintain all radiation exposures as low as reasonably achievable and within applicable limits. (ALARA)

2. Personnel who are occupationally exposed to radioactive materials licensed by the U. S. Nuclear Regulatory Commission or who are working under DOE contracts shall adhere to the provisions found in U.S. Code of Federal Regulations, Title 10, Part 20, "Standards for Protection Against Radiation". Copies of the regulations, licenses, and operating procedures are available for examination in the Industrial Safety and Hygiene Office.

3. Personnel who are occupationally exposed to other radioactive materials or to ionizing radiation machines shall be governed by the regulations found in 29 CFR 1910.96, "Occupational Safety and Health Standards - Ionizing Radiation", and in Pennsylvania Title 25, Part I, Subpart D, Article V, Chapter 227, "Standards for Control of Radiation Exposure".

4. Permissible Limits for External Exposure

PART OF BODY	REMS PER CALENDAR QUARTER
Whole body, head and trunk, active blood-forming organs, lens of eyes, gonads	1.25
Hands and forearms, feet and ankles	18.75
Skin of whole body	7.5

5. Exposure to airborne radioactivity shall not exceed the concentrations listed in the applicable regulations.

6. Individuals have the rights to request a report of their occupational radiation exposure data. Contact the Industrial Safety and Hygiene Office for further information.

6.2.7 Contamination

The unintentional spread of radioactive material to places where is may harm personnel or interfere with experiments.

6.3 POLICY

6.3.1 It is the policy of ASTRO Space Division - Valley Forge to keep the ionizing radiation exposure of all personnel as low as practicable and, in particular, below all existing federal, state and Company regulations.

6.3.2 All Proposed uses of radioactive material or ionizing radiation-producing devices shall be reviewed and prior written approval for use secured from the Ionizing Radiation Advisory Group (IRAG) consisting of:

Chairman:	Medical Director
Member:	Manager, Industrial Safety & Hygiene
Member:	RSD Engineering
Member:	SCO Engineering
Secretary:	Sr. Industrial Hygienist Radiation Safety Officer (RSO)

6.3.3 All ionizing radiation producing machines and radioactive materials shall be used, stored, handled, transported, or disposed of in accordance with existing regulations and approvals (i.e., Nuclear Regulatory Commission, Commonwealth of Pennsylvania, General Electric Company and the IRAG).

6.3.4 All ionizing radiation machines and radioactive materials shall be used only in the manner approved by the IRAG; the IRAG may revoke any approval it has issued when an investigation shows justification for such action. In such event, the radiation user shall immediately relinquish all radioactive materials or ionizing radiation producing devices to the RSO.

6.3.5 Accidents involving radioactive materials in which there is a possibility of ingestion or inhalation or radioactive material or severe body contamination shall be reported immediately to the members of the IRAG. Accidental exposures (actual or suspected) in excess of the quarterly limits stated above shall be immediately reported to the IRAG.

6.3.6 Where the aforementioned rules or regulations may not necessarily apply, the Ionizing Radiation Advisory Group's activity will be guided by recommendations of organizations such as the National Committee on Radiation Protection and Measurement and also by Company recommendations, particularly where recommendations establishing lower levels of exposure are concerned.

6.4 RESPONSIBILITIES AND PROCEDURES

6.4.1 It is the responsibility of all personnel working with ionizing radiation to acquaint themselves with the regulations bearing on their duties and their responsibility with regard to ionizing radiation safety. In particular, each individual is responsible for:

1. Wearing the prescribed monitoring equipment (i.e., TLD badge, etc.) whenever working with radiation.

2. Using the recommended contamination control equipment and following contamination control procedures as required.

3. Keeping his or her exposure as low as possible by recommending improvement procedures, etc., when applicable.

4. Observing and obeying all signs, tags, etc., posted by the RSO.

5. Reporting conditions that are considered hazardous or may result in overexposure, a violation of procedures or regulations, or unnecessary exposure.

6. Adhering to the approved program unless prior approval of the IRAG has been obtained for any deviations there from.

6.4.2 Supervisors are responsible for the ionizing radiation safety of all personnel reporting to them. In particular, each supervisor is responsible for:

1. Assuring that each individual understands and follows all regulations regarding ionizing radiation safety.

2. Assuring that each individual is aware of the location of the NRC or state Notice to Employees posed in the area.

3. Coordinating with the RSO to obtain in all necessary radiation safety advice and assistance.

4. Disposal of radioactive material in accordance with NRC, EPA, and State of Pennsylvania regulations as set forth by the RSO.

6.4.3 The manager of a component requiring radioactive material or ionizing radiation-producing devices shall:

1. Submit a written request to the Chairman of the IRAG prior to performing any work on the requested program. The request shall include as a minimum, the following information:

   a. Quantity, type and form of any radionuclides to be used and a description of any ionizing radiation-producing equipment.

   b. Name, title and radiation or radioactive materials experience of the individual responsible for the work to be performed.

   c. Names, title and radiation or radioactive materials experience of individuals who will work with the materials or equipment.

   d. A description of the work to be performed and facilities to be used.

   e. A specific description of the safety precautions to be taken and procedures to be followed. (Assistance in preparing this section may be obtained from the RSO.)

2. Provide such information to the IRAG as it may require for periodic audits of the approved ionizing radiation program.

3. Assure that personnel under his or her direction shall not deviate from the approved program without the prior approval of the IRAG.

4. Follow all Safe Work Practices in this Manual, specifically those applicable to ionizing radiation.

5. Post the safety requirements provided by IRAG.

6. Obtain the approval of the RSO prior to performing any operation involving machining, melting, welding, heating, or otherwise altering any source of radiation.

7. Deliver radioactive materials for disposal to the RSO.

6.4.4 The IRAG will:

1. Accept or reject any proposed use of radionuclides or ionizing radiation-producing equipment which in the Group's opinion does or does not adequately meet safety requirements set forth by the NRC, State of Pennsylvania (or other states as they may apply), General Electric Company and Division instructions. The Group's authority is limited to ionizing radiation safety criteria only.

2. Notify the requesting component manager of its decision, and supplement the safety requirements submitted when it feels the need to do so.

3. Perform such periodic audits and inspections as it deems necessary.

6.4.5 The Medical Director is responsible for:

1. Serving as Chairman of the Ionizing Radiation Advisory Group.

2. Determining the medical program to be followed by all employees involved in working with ionizing radiation.

6.4.6 The Manager, Industrial Safety and Hygiene is responsible for:

1. Serving as a member of the IRAG.

2. Providing the overall administration or an effective ionizing radiation control program and the health physics function; insuring compliance with applicable regulations; and reviewing and approving, prior to procurement or use, radioactive materials and equipment specifically designed to produce ionizing radiation.

3. Obtaining from the Nuclear Regulatory Commission, the Department of Transportation, and other authorized government agencies those licenses required to obtain, possess, use and ship radioactive materials and register the licenses with Commonwealth of Pennsylvania (Note: NRC licenses will only be secured by the Chairman, IRAG as needed. In order to avoid unnecessary delays, advise him or her of needs well in advance of critical dates).

6.4.7 The Senior Industrial Hygienist is responsible for:

1. Serving as Secretary of the Ionizing Radiation Advisory Group.

2. Serving as Radiation Safety Officer.

3. Keeping records of IRAG activities and such other information as required by regulatory agencies.

3. Assisting supervisory personnel in the writing of all ionizing radiation safety requirements, and development of such information and training programs as may be required to assure proper handling of these materials.

4. Conducting such surveys, leakage tests, and environmental studies as may be required to insure the integrity of the program.

5. Insuring that suitable warning signs and devices are in place and operating as required in accordance with the regulations of the Department of Health, Commonwealth of Pennsylvania and the Nuclear Regulatory Commission.

6. Developing and maintaining emergency procedures.

7. Investigating and preparing reports of all actual or suspected excessive or unauthorized exposure to ionizing radiation.

6.4.8 RSD/SCO Engineering Representative

1. Serving as a Member of the IRAG.

2. Providing engineering advice regarding safe and proper use of radioactive material and ionizing radiation producing devices.

6.4.9 All responsible supervisory personnel shall submit for review to the Radiation Safety Officer all Planning Sheets, MSI's, STP's or other applicable documents which set forth a program, process or procedure for working with or otherwise involving ionizing radiation.

6.4.10 The initiating manager shall secure the written approval of the IRAG prior to the purchase or other means of obtaining any ionizing radiation producing machine or radioactive material. The Purchasing component shall not complete a Purchase Order for these items unless it has been properly approved by the IRAG. (Also see Section 6.5.)

6.4.11 Each operation using radioactive materials shall maintain detailed records of all radioactive materials on hand. These records shall be readily available for inspection by the RSO. All radioactive materials not in use shall be relinquished to the RSO for storage or disposal.

6.4.12 Receiving and Shipping shall:

1. Not release any radioactive materials or ionizing radiation-producing devices without the written approval of the Radiation Safety Officer. Procedures specified in Section 6.5.3 shall be followed.

2. Ship or transport radioactive materials only in accordance with Section 6.5.4 and applicable NRC, DOT and state regulations.

6.4.13 The Accountant - Taxes, Insurance and Royalties will ascertain that adequate insurance coverage exists for possession and use of radioactive materials at Division locations.

6.4.14 Facilities Engineering/Drafting shall obtain the approval of the RSO on all drawings of ionizing radiation-producing devices, radio-active materials or facilities or devices to house or contain radiation devices or radioactive materials. All such drawings shall be labeled RADIATION DEVICE OR RADIOACTIVE MATERIALS in prominent lettering.

6.4.15 Property management, or the manager responsible for the use of an ionizing-radiation-producing machine, shall notify the Industrial Safety and Hygiene Office in advance of any plans to transfer/sell/terminate any machine which produces ionizing radiation (e.g., cabinet x-ray machines, x-ray diffraction apparatus, etc.) so that federal and state regulations concerning the transfer/sale/termination of each device can be addressed.

6.5 PROCURING, RECEIVING AND TRANSPORTING OR RADIOACTIVE MATERIALS

6.5.1 Licensees for radioactive materials are required to conform to several sets of regulations related to obtaining, receiving and transporting radioactive materials. Adherence to the procedures and requirements listed below is required to achieve compliance with the regulations. Where applicable, these procedures and requirements are amended to all VFSC IRAG approvals.

6.5.2 Purchasing or otherwise Obtaining Radioactive Materials

1. Each Material Request for radioactive materials shall bear the note: RADIOACTIVE.

2. All Purchase Orders for radioactive materials shall be forwarded to the Radiation Safety Officer for approval before any order, including by telephone or TWX, is placed.

3. In all other circumstances where radioactive materials are transferred into VFSC facilities, e.g., a loaned source, return of a source from a customer, etc., the transferee shall obtain the approval of the Radiation Safety Officer before the transfer is initiated.

4. The Radiation Safety Officer shall complete the certification to receive radioactive materials (Figure 1) when necessary. The original shall accompany the Purchase Order when applicable, or be sent to the transferee in nonpurchase transfers.

5. All radioactive materials shall be shipped to the attention of the Radiation Safety Officer.

6.5.3 Receiving Radioactive Materials

1. Receiving shall notify the Safety Office (x2777 CH ST., x1085 VFSC) immediately upon receipt of radioactive materials. Receiving shall not open any shipping container before the RSO has completed the acceptance surveys.

2. The Radiation Safety Officer shall promptly survey the shipment, utilizing the following general procedure:

   a. Radiation and contamination survey of outer container.

   b. Radiation and contamination survey of inner container, if applicable.

   c. Leak test or radiation and contamination survey of the source or container, whichever is applicable, except unsealed sources.

3. In the event a leaking container is found, the carrier and the Nuclear regulatory Commission Inspection and Enforcement Regional Office I, shall be notified immediately. The Radiation Safety Officer shall immediately take action to determine the extent of contamination in VFSC facilities and decontaminate as needed.

6.5.4 Shipping or Transport of Radioactive Materials

1. Any person who plans to ship radioactive materials shall contact the Radiation Safety Officer at least three working days prior to the date of the shipment. The transferor shall supply to the Radiation Safety Officer the type, quantity and form of the material, the name and telephone number of the receiver, the type of container and the mode of transport. The Radiation Safety Officer shall contact the receiver to obtain his or her certification to receive radioactive materials.

2. Immediately prior to shipment, the Radiation Safety representative shall survey and leak test the container(s), attach shipping labels and complete the shipping certification (Figure 2).

3. The Radiation Safety Officer shall be notified prior to any interplant transfers of radioactive material. NRC or DOT approved shipping containers shall be used where applicable.

6.6 EMERGENCY PROCEDURES

Procedures for radiological emergencies are established as appropriate to each application. These procedures supplement the general emergency plan in effect for the Space Center. See A-3, A-4.0 and F-1.0 in the Safety Manual for procedures for reporting general emergencies, accident emergencies, and fire emergencies, respectively.

The basic instruction for all employees to report any emergency is to telephone the Plant Protection Center by dialing the emergency number (FIRE, 3473). Personnel in the Protection Center are given standing orders for contacting various personnel according to the type of emergency.

Personnel who work with radioactive materials are instructed in specific actions to be taken in the event of an emergency involving radioactive materials. This would include such situations as fires, spills, monitor alarms, and mission sources.

In addition, the plant Fire Brigade receives general instruction regarding fighting fires involving radioactive or other toxic materials.

On the following page, there are examples of emergency procedures for operations involving radioactive material.

SAMPLE EMERGENCY PROCEDURES

Minor Spills - Unsealed Radioactive Material

1. NOTIFY: Notify persons in the area that a spill has occurred.

2. PREVENT SPREAD: Cover the spill (with absorbent paper if spill is liquid).

3. CLEANUP: Use disposable gloves and remote handling tongs. Carefully fold the absorbent paper containing the spill. Insert into a plastic bag and dispose of in the radioactive waste container. Also insert into the plastic bag all other contaminated materials such as disposable gloves. Non-liquid spills are to be cleaned up in a manner which minimize the possibility of any of the spill becoming airborne and inhaled.

4. SURVEY: With a low-range, thin-window G-M survey meter, check the area around the spill, hands, and clothing for contamination.

5. REPORT: Report incident to the Industrial Safety and Hygiene Office.

Major Spills - Unsealed Radioactive Material

1. CLEAR AREA: Notify all persons not involved in the spill to hold their breaths and to vacate the room.

2. PREVENT SPREAD OF SPILL: Personnel involved in the spill should: cover the spill (with absorbent paper if spill is liquid), close all windows, shut off fans and air conditioners, and leave the room. No immediate attempt should be made to clean up the spill.

3. SHIELD SOURCE: If possible, the spill should be shielded (if penetrating radiation is involved), but only if it can be done without further contamination or without significantly increasing your radiation exposure.

4. CLOSE ROOM: Leave the room and lock the door(s) to prevent entry.

5. CALL FOR HELP: Notify the Industrial Safety and Hygiene Office.

6. PREVENT SPREAD OF CONTAMINATION: All involved personnel should remain in one confined area to limit spread of contamination (every person who might have been in the immediate area of the spill should be considered contaminated until checked by the RSO); if the spilled material was powdered, the door(s) and other openings leading into the room should be sealed with wide masking tape or adhesive tape and heavy wrapping paper in order to limit spill to the room.

7. PROHIBIT ENTRY: Entry into the contaminated area should be prohibited and the RSO will direct all subsequent operations, such as: surveying the area and evaluating the extent of the emergency, surveying all personnel involved, supervising decontamination of all personnel, if necessary, and supervising decontamination of the room.

8. PERSONNEL DECONTAMINATION: Contaminated clothing should be removed and stored for further evaluation; if the spill is on the skin, flush thoroughly and then wash with mild soap and lukewarm water.

Missing Source - Sealed Radioactive Material

1. CLEAR AREA: Notify all persons not involved in the search to vacate the area.
2. CALL FOR HELP: Notify the Industrial Safety and Hygiene Office.
3. SURVEY: Survey and cordon off the radiation hazard area.
4. PROHIBIT ENTRY: Prohibit entry into the radiation hazard area and await assistance from the Industrial Safety & Hygiene Office.

RADIOACTIVE MATERIALS: SHIPMENT RECEIPT

TO:

FROM:

SHIPMENT NUMBER: SCO 00000-86

SECURITY CLASSIFICATION :

MODE OF SHIPMENT:

NUMBER OF CONTAINERS:

NUMBER OF ITEMS:

DESCRIPTION:

HAZARD CLASS:

NAME; ID NO:

WEIGHT (KGM) :

VOLUME (LITERS) :

ISOTYPE:

FORM:

MR/HR AT SURFACE:

MR/HR AT ONE METER:

ACTIVITIES (CURIES):

A1/A2:

LABEL:

SMEAR NUMBER:

FROM:

TO:

THE ABOVE DESCRIBED ARTICLES ARE PROPERLY CLASSIFIED, PACKAGED, MARKED, AND LABELED. THE ARTICLES ARE IN PROPER CONDITION FOR TRANSPORTATION, AND THE SPREADABLE ACTIVITY AND DOSE RATES ARE WITHIN THE SPECIFIED LIMITS, AS PRESCRIBED BY DOT REGULATIONS.

THIS PACKAGE CONFORMS TO THE CONDITION AND LIMITATIONS SPECIFIED IN 49CFR173, 421 FOR EXCEPTED RADIOACTIVE MATERIAL, LIMITED QUANTITY, N.O.S., UN2910.

SPECIAL PRECAUTIONS;

REMOVABLE ACTIVITY (DPM/SMEAR) :

RADIATION PROTECTION OFFICER:

DATE:

87055D Rev 03-11-87/lak

RADIOACTIVE MATERIALS: SHIPMENT/RECEIPT

TO:

FROM:

SHIPMENT NUMBER: SCO 00000-86

SECURITY CLASSIFICATION :

MODE OF SHIPMENT:

NUMBER OF CONTAINERS:

NUMBER OF ITEMS:

DESCRIPTION:

HAZARD CLASS:

NAME; ID NO:

WEIGHT (KGM) :

VOLUME (LITERS) :

ISOTYPE:

FORM:

MR/HR AT SURFACE:

MR/HR AT ONE METER:

ACTIVITIES (CURIES):

A1/A2:

LABEL:

SMEAR NUMBER:

FROM:

TO:

THE ABOVE DESCRIBED ARTICLES ARE PROPERLY CLASSIFIED, PACKAGED, MARKED, AND LABELED. THE ARTICLES ARE IN PROPER CONDITION FOR TRANSPORTATION, AND THE SPREADABLE ACTIVITY AND DOSE RATES ARE WITHIN THE SPECIFIED LIMITS, AS PRESCRIBED BY DOT REGULATIONS.

SPECIAL PRECAUTIONS;

REMOVABLE ACTIVITY (DPM/SMEAR) :

RADIATION PROTECTION OFFICER:

DATE:

870550 Rev 3/11/87,lak

ITEM 11

WASTE DISPOSAL

Due to the nature of the intended use of the Gammacell 220's, the generation of radiological waste is not expected on a routine basis. In the event of leaking source(s), AECL will provide for repair/disposal. Contaminated smears, etc. will be disposed of via Teledyne Isotopes, 50 Van Buren Avenue, Westwood, New Jersey 07675.

(12) 9/23
030-12894
03520
9/F7

BETWEEN: C. James Holloway, Chief
License Fee Management Branch
Office of Resource Management

John E. Glenn, Chief
Nuclear Materials Safety & Safeguards Section B
Division of Radiation Safety and Safeguards

LICENSE FEE TRANSMITTAL

A. REGION 1

1. APPLICATION ATTACHED

Applicant/Licensee: General Electric Co.

Application Dated: Rec'd. 8/31/87

Control No.: 107774

License No.: 37-02006-09

2. FEE ATTACHED

Amount: $170.00

Check No.: 359513

3. COMMENTS

Ren

Signed [illegible]

Date 9/16/87

B. LICENSE FEE MANAGEMENT BRANCH

1. Fee Category and Amount: 3E $170

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

Amendment

Renewal ✓

License

Signed S. Kimberly

Date 9/22/87