NRC FORM 374	<u> </u>	PAGE 1 OF 2 PAGE
U.S.	NUCLEAR REGULATORY COMMISSION	PAGES
	MATERIALS LICENSE	Amendment No. 18
Pursuant to the Atomic Energy Act of 1954, as a Code of Federal Regulations, Chapter I, Parts 30, 31, made by the licensee, a license is hereby issued authon nuclear material designated below; to use such materia to persons authorized to receive it in accordance with the specified in Section 183 of the Atomic Energy Act of 1 Regulatory Commission now or hereafter in effect and	mended, the Energy Reorganization Act of 32, 33, 34, 35, 39, 40 and 70, and in reliance rizing the licensee to receive, acquire, possess, 1 for the purpose(s) and at the place(s) designate regulations of the applicable Part(s). This lice 954, as amended, and is subject to all applicable d to any conditions specified below.	f 1974 (Public Law 93-438), and Title 10, on statements and representations heretofore and transfer byproduct, source, and special ed below; to deliver or transfer such material inse shall be deemed to contain the conditions e rules, regulations and orders of the Nuclear
Licensee	1	
 General Electric Company Aerospace 	In accordance w April 26, 1989, 3. License number SU its entirety to	ith application dated B-831 is amended in read as follows:
^{2.} P. O. Box 8555 Philadelphia, Pennsylvania 191	OF AR R. Excinition date Oc	tober 31, 1995
· · · · · · · · · · · · · · · · · · ·	5. Docket or Reference No. 704	Q-07344
6. Byproduct, source, and/or special nuclear material	7. Chemical and/or physical form	Maximum amount that licensee may possess at any one time hander this license
A. Uranium (Natural or 1) depleted in the isotope Uranium-235) B. Thorium B	A Zim B	. 200 kilograms . 200 Pilograms
9. Authorized use A. and B. Research and development manufacturing pelated 10	as defined in Section 30.4 o missile and smale programs.	f 10 CFR Part 30 and
 Licensed material may be used and 401 E. Hunting Park Ayeau Astrospace Division facilitie Road, and 720 Vandenburg Road sites of the licensee anywher tory Commission maintains jur 	CONDITIONS at the licensee's facilities e in Philadelphia, Pennsylvan s on 230 Goddard Boulevard, B if King of Prussia, Pennsylv e in the United States where isdiction for regulating the	at 3198 Chestnut Street, at 3198 Chestnut Street, a; Building 100 and uilding 21, 970 Pulaski ania; and at temporary job the U.S. Nuclear Regula- use of licensed material.
11. A. Licensed material shall designated by the Ionizi	be used by, or under the supe ng Radiation Advisory Group,	rvision of, individuals Dr. S. J. Mucha, Chairman.
B. The Radiation Safety Off	icer for this license is Char	ries B. Chilton.
12. Licensed material shall not b	e used in or on human beings.	
13. The licensee may transport li 10 CFR Part 71, "Packaging an	censed material in accordance d Transportation of Radioacti	e with the provisions of ve Material."
REGILIGED Information And the Freedom of Information Act.		r.40
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SEP 2 7 1990

License No. SUB-831 Docket No. 040-07344 Control No. 110630

General Electric Company Aerospace Division ATTN: Charles B. Chilton Manager, Industrial Safety and Hygiene P. O. Box 8555 Philadelphia, Pennsylvania 19101

Gentlemen:

Please find enclosed the renewal of your NRC Material License.

Please review the enclosed document carefully and be sure that you understand all conditions. If there are any errors or questions, please notify the Region I Material Licensing Section, (215) 337-5093, so that we can provide appropriate corrections and answers.

Please be advised that you must conduct your program involving licensed radioactive materials in accordance with the conditions of your NRC license, representations made in your license application, and NRC regulations. In particular, please note the items in the enclosed, "Requirements for Materials Licensees."

Since serious consequences to employees and the public can result from failure to comply with NRC requirements, the NRC expects licensees to pay meticulous attention to detail and to achieve the high standard of compliance which the NRC expects of its licensees.

You will be periodically inspected by NRC. A fee may be charged for inspections in accordance with 10 CFR Part 170. Failure to conduct your program safely and in accordance with NRC regulations, license conditions, and representations made in your license application and supplemental correspondence with NRC will result in prompt and vigorous enforcement action against you. This could include issuance of a notice of violation, or in case of serious violations, an imposition of a civil penalty or an order suspending, modifying or revoking your license as specified in the General Policy and Procedures for NRC Enforcement Actions, 10 CFR Part 2, Appendix C.

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ML SUB-831/LTR - 0001.0.0 07/17/90 General Electric Company

We wish you success in operating a safe and effective licensed program.

Sincerely,

Original Signed By: Francis M. Costello

John D. Kinneman, Chief Nuclear Materials Safety Section B Division of Radiation Safety and Safeguards

Enclosures:

- 1. Amendment No. 18
- Requirements for Materials Licensees
   NRC Forms 3 and 313
   10 CFR Parts 2, 19, 20, 40, and 170

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DRSS:RI Kinneman 07/37/90

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ML SUB-831/LTR - 0002.0.0 .07/17/90

TIME DATE CONVERSATION RECORD 5/90 10:25 7 TYPE ROUTING CONFERENCE X TELEPHONE NAME/SYMBOL INT X OUTGOING Location of Visit/Conference: NAME OF PERSON(S) CONTACTED OR IN CONTACT WITH YOU ORGANIZATION (Office, dept., bureau, TELEPHONE NO: etc.) Charles Chilton Gene L'électric (215) 354-4570 SUBJECT 5 ß 831 SUMMARY the Win 1:00 PM plate M that only 12:55 pm Streets locility nya 508-831 4 Te sl 12 -224 9:45 AM Blio Ed The swing rigar stimle 236 G 100 a 120 burg al :'o/ 741 be 16 70 a ACTION REQUIRED σ NAME OF PERSON DOCUMENTING CONVERSATION SIGNATURE DATE 7/5/90 miter , les , Steven Courtemanche te. ACTION TAKEN SIGNATURE TITLE DATE 50271-101

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**CONVERSATION RECORD** 

OPTIONAL FORM 271 (12-76) DEPARTMENT OF DEFENSE



GE Aerospace KY

General Electric Company P.O. Box 8555, Philadelphia, PA 19101 215 354-1000

June 28, 1990

U.S. Nuclear Regulatory Commission Region I Nuclear Materials Safety Section B 475 Allendale Road King of Prussia, PA 19406

Attn: John D. Kinneman, Chief

RE: Mail Control No. 110630

Dear Mr. Kinneman:

Attached are two copies of the response to your request for additional information relative to the renewal application for License # SUB-831.

If there are any questions concerning this response, please contact the undersigned at (215) 354-4570.

Sincerely,

CB Chilton

Charles B. Chilton Manager, Industrial Safety and Hygiene

CBC/jed

Attachments

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JUL 02 1990

#### ATTACHMENT I

License No. SUB-831 Control No. 110630

1. Your application contained a change in the name of the licensee from "General Electric Company, Space Systems Division" to "General Electric Company, Aerospace." Please confirm that the parent organization has not changed. If it has changed, please confirm tha the parent organization agrees to abide by all commitments and representations previously made to the NRC.

General Electric Company, Aerospace is the correct name of the present operating organization responsible for License No. SUB-831. The parent organization has not changed.

2. Please confirm that you want facilities at D & Luzerne Streets, Philadelphia, Pennsylvania and Space Division, Allendale Road and Third Avenue, King of Prussia, Pennsylvania, removed as places of use. If so, then please submit close-out surveys for these facilities.

Both facilities should be removed from License No. SUB-831. A close-out survey for the Third Avenue facility is enclosed as Attachment II. The facility at D & Luzerne Streets has not been used for source material/activities for about 10 years and the pertinent close-out survey can not be located in our records. However, both locations are still on byproduct material License No. 37-02006-05 and therefore a formal close-out survey should not be required, at this time, to remove the location from License No. SUB-831.

3. Please confirm that proonnel will be reinstructed whenever there is a significant change in duties, regulations, or the terms of the license.

Affected personnel are/will be routinely reinstructed whenever there are any significant changes in duties, regulations, or the terms of the license. (See Item 8, XV, Item 10, I-IV and M-6.0, 6.4)

4. Ancillary personnel (clerical, housekeeping, security, etc.) whose duties may require them to work in the vicinity of radioactive material (whether escorted or not) need to be informed about radiation hazards and appropriate precautions. Outline your method to assure that these employees receive the necessary instruction. Confirm that this instruction will be given both initially and annually thereafter on a refresher basis.

All new personnel receive basic instruction on radiation safety as part of their orientation/general safety training. All support personnel attend safety courses at least once every year. These courses contain refresher aspects on radiation safety (i.e., restricted access, labels, signs, etc.).

#### ATTACHMENT I (continued)

License No. SUB-831 Control No. 110630

- 5. Please submit a copy of your revised procedures for calibration of radiation survey and monitoring instruments to include the following:
  - a. The accuracy of the sources(s). Traceability of the source to primary standard should be provided.
  - b. The step-by-step procedures, including associated radiation safety procedures. These procedures should include a two-point calibration of each scale of each instrument with the points separated by at least 50% of the scale.

All calibrations are performed by or under the direct supervision of the RSO (IRAG). Therefore, no specific procedure has been developed other than to generally follow the procedure contained in the manufacturer's manual. Some survey instruments are calibrated by commercial vendors licensed by NRC to perform calibrations as a service to others. (See Item 10, VII).

6. Please specify the frequency at which you plan to perform routine surveys.

Survey frequency is determined by IRAG at the time of approval of use. This is at least quarterly and can be as frequent as daily. (See 7 below).

7. Please define what is meant by a "low," "medium." or "high risk area." Please submit frequencies for routine surveys for these areas.

These are subjective categories that depend upon isotopes, activities used, user, faciltities and frequency of operations. <u>General Categorization</u>:

- "Low" less than 10 microcuries and minimal potential for removable contamination, infrequent use survey quarterly or after each operation if less than quarterly.
- "Medium" 10 microcuries to 10 millicuries and small potential for removable contamination, use weekly to quarterly - survey monthly.
- "High" greater than 100 microcuries and potential for removable contamination, routine use - survey daily to monthly dependent upon incidence of removable contamination.

#### ATTACHMENT I (continued)

License No. SUB-831 Control No. 110630

- 8. Please submit a revised copy of your opening package procedures. The procedures should include the following as well as what was submitted:
  - Put on disposable plastic gloves before performing the procedure.
  - b. Monitor the package surface for safe radiation levels.
  - c. Compare package slip with contents to determine that the proper radioactive material has been delivered.

All packages are received by or under the direct supervision of the RSO (IRAG), therefore, no specific procedure has been developed other than to follow Reg. Guide 7.3.

- a. Disposable gloves are used when surveying packaging (shipment/receipt).
- b. See M-6-13.
- c. RSO compares to P.0./M-6-12 before release to user.
- Please revise your laboratory instructions to include the following:
  - a. Do not eat, drink, smoke or apply cosmetics in any area where radioactive material is stored or used.
  - b. Do not store food, drink, or personnel effects in areas where radioactive material is stored or used.
  - a/b. Eating, drinking and smoking are not permitted in any laboratories at GE. These activites are restricted to designated areas.

9.

ATTACHMENT II License No. SUB-831 Control No. 110630

# **Oesterling Consulting Service**

717 South Park Avenue Audubon, Pennsylvania 19407 215-666-6048

8 January 1982

Ms. Veronica Konrad General Electric Co. Advanced Energy Dept., Bldg 7 King of Prussia, PA

Dear Ms. Konrad:

The work on purchase order J19000DE5227, Amd. 1 has been completed with the delivery of the enclosed survey report. The invoice for services was submitted previously through Mr. S. Dadd.

As the report indicates, the facility can be decommissioned.

Thank you for the opportunity to be of service.

Sincerely yours.

Richard G. Oesterlöng, Certified Health Physicist (70-17)

cc: S. Dadd w/ report

A. Kobylinski w/ report

ATTACHMENT II (cont.) License No. SUB-831 Control No. 110630

# Oesterling Consulting Service

717 South Park Avenue Audubon, Pennsylvania 19407 215-666-6048

8 January 1982

# DECONTAMINATION AND SURVEY REPORT PROJECT GEAED 81-2

Facility: Impact test room operated by the General Electric Advanced Energy Department in bldg. 8, Third Ave., King of Prussia, PA.

Radioactive Material: As stated by the General Electric Co. representatives, the radioactive material was natural thorium as the oxide.

Guidelines for Surface Decontamination for Decommissioning Facilities: The US Nuclear Regulatory Commission has the following guidelines for residual contamination by natural thorium:

Direct measurement -- 1000 dpm/100 cm² averaged over one square meter -- 3000 dpm/100 cm² maximum in any 100 cm² area

Removable by wipe sample -- 200 dpm/100 cm² maximum

Instrumentation and Calibration: For both direct and wipe sample measurements, the detector was a thin window Geiger-Müller tube sensitive to both alpha and beta radiations. The detector was connected to a count ratemeter for direct measurements and to a scaler for wipe sample measurements. Calibration was performed on 28 December 1981. The release survey was performed from 28 December 1981 through 31 December 1981.

A natural thorium standard of suitable quality was unavailable. Consequently, counting efficiencies were determined for two beta spectra with different maximum energies and for one alpha emitter. The results were as follows:

Counting Efficiency
0.29
0.35
0.12

The three counting efficiencies were combined with the observation that alpha and beta emissions from natural thorium are about equal in a thin sample. The resulting composite counting efficiency = 0.21.

The detector sensitive area is 65 cm². The background count rate was nearly constant at an average value of 80 cpm. The yielded minimum detectable activities at the 95% confidence level of 60 dpm with a 30 second count on a wipe and 150 dpm/100 cm² direct.

ATTACHMENT II (cont.) License No. SUB-831 Control No. 110630

#### GEAED 81-2, p. 2

Wipe samples were taken with hard surface paper as recommended by the USNRC. Areas of 1000  $\rm cm^2$  were wiped. If detectable activity was observed in that area, then areas of 100  $\rm cm^2$  were wiped in the suspect area.

Decontamination Method: Virtually all decontamination was performed by disassembly of structures followed by wiping with detergent solutions. Porous materials, such as wood and floor tile, with a high probabilility of contamination were disposed directly to contaminated waste. Most small items of low value were disposed to radioactive waste.

<u>Survey Results</u>: A comprehensive survey was performed after completion of decontamination to confirm the status of the facility. The results are tabulated in Table I.

<u>Conclusions and Recommendations</u>: The survey results indicate that the facility can be released and decommissioned. The only item with any significant contamination is the granite block. The radiation level from the granite appears to be intrinsic, since the same levels were observed in an area where the surface had been chipped away to accomplish decontamination.

Richard G. Oesterling, Certified Health Physicist (70-17)

## ATTACHMENT II (cont.) License No. SUB-831 Control No. 110630

#### TABLE I

#### SURVEY RESULTS

		Direct (dpm/100cm ² )		Removable	$(dpm/100cm^2)$	
	Location	average	maximum	average	maximum	
.1.	Floor area under and east from framework	<b>&lt;</b> 150	290	<20	~60	
2.	Floor area west from framework	<150	600	<20	<60	
3.	Frame support rails	<b>~1</b> 50	200	<20	<60	
4.	Catch box door	≺150	290	< 20	<60	
5.	Catch box side plate	<150	<b>&lt;</b> 1 50	<20	<60	
6.	Catch box top plate	<150	210	<20	<60	
7.	Granite block flange	<150	500	<60	< 60	
8.	Granite block support plate	<150	<150	<20	<60	
9.	Muzzle support structure	< 150	<150	<20	< 60	
10.	Gun muzzle & barrel	<150	<150	<20	< 60	
11.	Projectile carrier	<1.50	<150	<b>&lt;</b> 60	< 60	
12.	Granite block from room	880	880	<20	<b>&lt;</b> 60	
13.	Catch box tray	<150	<150 .	<20	<60	
14.	Camera	<150	<150	<60	< 60	
15.	Camera stand & floor plate	<150	<150	< 60	<60	
16.	Room walls	<150	<150	<20	<60	
17.	Room ceiling & light fixture	<150	<150	<20	<b>~60</b>	
18.	Crane standards, wheels, casters	< 150	<150	<20	<60	
19.	Crane bridge rail	<150	290	<20	<60	
20.	Exhaust fan inner surfaces	<150	<150	<60	<60	
21.	Exhaust ductwork	<150	< 150	<20	<60	
22.	Assorted metal and plastic plate	<150	<150	<20	<60	

# OFFICIAL RECORD COPY ML 10

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MAY 31 1990

License No. SUB-831 Docket No. 040-07344 Control No. 110630

General Electric Company Aerospace Division P. O. Box 8555 Philadelphia, Pennsylvania 19101

SUBJECT: APPLICATION FOR MATERIAL LICENSE RENEWAL DATED April 26, 1989, AND OUR REQUEST FOR ADDITIONAL INFORMATION DATED January 23, 1990

Gentlemen:

This refers to your request for renewal of your license. A check of our files indicates that we have not received a response from you to date. If we do not receive a reply within 30 days, it may be necessary to deny your application and terminate your license. Such action would require that you divest yourself of all licensed material.

Sincerely,

# Original Signed By: Steven R. Courtemanche

Steven R. Courtemanche Nuclear Materials Safety Section A Division of Radiation Safety and Safeguards

Enclosure: Letter dated January 23, 1990

RI:DRSS Courtemanch/pmb 4/20 /90

nneman

9/90 OFFICIAL RECORD COPY

ML 269 COURTEMANCHE - 0001.0.0 04/19/90

# JAN 23 1990

License No. SUB-831 Docket No. 040-07344 Control No. 110630

General Electric Company Aerospace Division ATTN: A. W. Kobylinski, RSO P.O. Box 8555 Philadelphia, Pennsylvania 19101

Gentlemen:

This is in reference to your application dated April 26, 1989, to renew License No. SUB-831. In order to continue our review, we need the following additional information:

- 1. Your application contained a change in the name of the licensee from "General Electric Company, Space Systems Division" to "General Electric Company, Aerospace." Please confirm that the parent organization has not changed. If it has changed, please confirm that the parent organization agrees to abide by all commitments and representations previously made to the NRC.
- 2. Please confirm that you want the facilities at D & Luzerne Streets, Philadelphia, Pennsylvania and Space Division, Allendale Road and Third Avenue, King of Prussia, Pennsylvania removed as places of use. If so, then please submit close-out surveys for these facilities.
- 3. Please confirm that personnel will be reinstructed whenever there is a significant change in duties, regulations, or the terms of the license.
- 4. Ancillary personnel (clerical, housekeeping, security, etc.) whose duties may require them to work in the vicinity of radioactive material (whether escorted or not) need to be informed about radiation hazards and appropriate precautions. Outline your method to assure that these employees receive the necessary instruction. Confirm that this instruction will be given both initially and annually thereafter on a refresher basis.
- 5. Please submit a copy of your revised procedures for calibration of radiation survey and monitoring instruments to include the following:

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a. The accuracy of the source(s). Traceability of the source to a primary standard should be provided.

ML 082 COURTEMANCHE - 0001.0.0

01/18/90

- b. The step-by-step procedures, including associated radiation safety procedures. These procedures should include a two-point calibration of each scale of each instrument with the points separated by at least 50% of the scale.
- 6. Please specify the frequency at which you plan to perform routine surveys.
- 7. Please define what is meant by a "low," "medium," or "high risk area." Please submit frequencies for routine surveys for these areas.
- 8. Please submit a revised copy of your opening package procedures. The procedures should include the following as well as what was submitted:
  - a. Put on disposable plastic gloves before performing the procedure.
  - b. Monitor the package surface for safe radiation levels.
  - c. Compare package slip with contents to determine that the proper radioactive material has been delivered.
- 9. Please revise your laboratory instructions to include the following:
  - a) Do not eat, drink, smoke or apply cosmetics in any area where radioactive material is stored or used.
  - b) Do not store food, drink, or personnel effects in areas where radioactive material is stored or used.

We will continue our review upon receipt of this information. Please reply <u>in</u> <u>duplicate</u> to my attention at the Region I office and refer to Mail Cortrol No. 110630.

#### OFFICIAL RECORD COPY

ML 082 COURTEMANCHE - 0002.0.0 01/18/90 General Electric Company

In order to continue prompt review of your application, we request that you submit your response to this letter within 30 calendar days from the date of this letter.

Sincerely,

Original Signed By: , Francis M. Costello. John D. Kinneman, Chief

Nuclear Materials Safety Section B Division of Radiation Safety and Safeguards

RI: DRSS DRSS Courtema _Kinneman 01/27 /90 01/22/90

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ML 082 COURTEMANCHE - 0003.0.0 01/18/90



UNITED STATES NUCLEAR REGULATORY COMMISSION **REGION I** 475 ALLENDALE ROAD KING OF PRUSSIA, PENNSYLVANIA 19408

MAY 1 6 1989

General Electric Company Aerospace ATTN: Alfred W. Kobylinski Radiation Safety Officer P.O. Box 8555

040-07344
SUB_221

Philadelphia, PA 19101

CONTROL NO. 110630

SUBJECT: LICENSE RENEWAL APPLICATION

Gentlemen:

This is to acknowledge receipt of your application for renewal of material(s) license identified above. Your application is deemed timely filed, and accordingly, the license will not expire until final action has been taken by this office.

Any correspondence regarding the renewal application should reference the control number specified and your license number.

Sincerely,

Original Signed By: Doris J. Foster

Doris J. Foster, Chief Licensing Assistant Section Division of Radiation Safety and Safeguards

OFFICIAL RECORD COPY ML 10





General Electric Company P.O. Box 8555, Philadelphia, PA 19101

April 26, 1989

U. S. Nuclear Regulatory Commission Region 1 Nuclear Material Section B 475 Allendale Road King of Prussia, PA 19406

Re: Source Material License SUB-831 Renewal Application (Program Code 11300)

Dear Sir/Madam:

Attached are two copies of the renewal application for the above-referenced source material license. Also attached is a check for \$230.00 to cover the fee for this application.

If there are any questions or comments concerning this application, please contact the undersigned at (215) 354-1085.

Sincerely,

Alfred W. Kobyliński Senior Industrial Hygienist Radiation Safety Officer

cc: S. J. Mucha, M.D. C. B. Chilton D. M. Sternberg



License Fee Information ON

**11**06**30** 

# OFFICIAL RECORD COPY ML 10

APR 27 1989

PRC FORE 313 10.871 10 CFR 30, 32, 33, 34, 35 and 40 APPLICATION FOR	U.S. NUCLEAR REGULATORY COMMISSION APPROVED BY OME 3160-0120 Expires: 6-30-90
INSTRUCTIONS: SEE THE APPROPRIATE LICENSE APPLICATION GUIDE FOR DE OF THE ENTIRE COMPLETED APPLICATION TO THE NRC OFFICE SPECIFIED BE	ETAILED INSTRUCTIONS FOR COMPLETING APPLICATION, SEND TWO COPIES
APPLICATIONS FOR DISTRIBUTION OF EXEMPT PRODUCTS FILE APPLICATIONS WITH	IF YOU ARE LOCATED IN:
U.S. NUCLEAR REGULATORY COMMISSION	ILLINDIS, INDIANA, IOWA, MICHIGAN, MINNESOTA, MISSOURI, OHIO, DR
WASHINGTON, DC 20666	US NUCLEAR REGULATORY COMMISSION, REGION III
LL OTHER PERSONS FILE APPLICATIONS AS FOLLOWS, IF YOU ARE CATED IN:	MATERIALS LICENSING SECTION 799 ROOSEVELT ROAD
ONNECTICUT, DELAWARE, DISTRICT OF COLUMBIA, MAINE, MARYLAND, IASSACHUSETTS, NEW HAMPSHIRE, NEW JERSEY, NEW YORK, PENNSYLVANIA, HODE ISLAND, OR VERMONT, SEND APPLICATIONS TO:	GLEN ELLYN, IL 80137 ARKANSAS, COLORADO, IDAHO, KANSAS, LOUISIANA, MONTANA, NEBRASKA, NEW MEXICO, NORTH DAKOTA, OKLAHOMA, SOUTH DAKOTA, TEXAS, UTAH, DR WYCOMING, SENDA ADDI CASILONE TA.
U.S. NUCLEAR REGULATORY COMMISSION, REGION I NUCLEAR MATERIALS SAFETY SECTION B 475 ALLENDALE ROAD KING OF PRUSSIA. PA 19406	U.S. NUCLEAR REGULATORY COMMISSION, REGION IV MATERIAL RADIATION PROTECTION SECTION 611 RVAN PLAZA ORIVE SUITE 1000
ILABAMA, FLORIDA, GEORGIA, KENTUCKY, MISSISSIPPI, NORTH CAROLINA, UERTO RICO, SOUTH CAROLINA, TENNESSEE, VIRGINIA, VIRGIN ISLANDS, OR VEST VIRGINIA, SEND APPLICATIONS TO:	ARLINGTON, TX 78011 ALASKA, ARIZONA, CALIFORNIA, HAWAII, NEVADA, OREGON, WASHINGTON, AND U.S. TERRITORIES AND POSSESSIONS IN THE PACIFIC. SEND APPLICATIONS
U.S. NUCLEAR REGULATORY COMMISSION, REGION II	TO:
AUCEAN MATCHIALS SAFET SECTION 101 MARIETA STREET, SUITE 2900 ATLANTA, GA 30323	U.S. NUCLEAR REGULATORY COMMISSION, REGION V NUCLEAR MATERIALS SAFETY SECTION 1460 MARIA LANE, SUITE 210 WALNUT CREEK, CA 34696
ERSONS LOCATED IN AGREEMENT STATES SEND APPLICATIONS TO THE U.S. NUCLEAR F	REGULATORY COMMISSION ONLY IF THEY WISH TO POSSESS AND USE LICENSED MATERIA
THIS IS AN APPLICATION FOR (Check appropriate item)	2. NAME AND MAILING ADDRESS OF APPLICANT (Include Zin Code)
	General Electric Co.
B. AMENDMENT TO LICENSE NUMBER	Aerospace
C. RENEWAL OF LICENSE NUMBER	P. O. Box 8555 /0/
	Philadelphia, PA 19 <del>460</del>
See Allachment I.	
NAME OF PERSON TO BE CONTACTED ABOUT THIS APPLICATION Alfred W. Kobylinski	TELEPHONE NUMBER (215) 354-1085
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#### ATTACHMENT 1

1. Street addresses where licensed source material may be used:

- a. Valley Forge Space Center, 230 Goddard Blvd., King of Prussia, PA 19406, and ancillary facilities in King of Prussia. The ancillary facility include, but are not limited to:
  - 1. Building B, 720 Vandenberg Road

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- 2. Building 16, 741 First Avenue (storage only)
- 3. Building 21, 970 Pulaski Road (storage only)
- b. 3198 Chestnut St., Phila., PA 19101
- c. 401 E. Hunting Park Ave., Phila., PA 19140

## ITEM 5

### Material To Be Possessed

Mat	terial	Che phy	mical and/or sical form	Max lic at	cimum amount that censee may possess any one time
Α.	Uranium	Α.	Any form (natural or depleted in the U-235 isotope	A.	200 kilograms
Β.	Thorium	Β.	Any	Β.	200 kilograms
The	e specific	sourc	e radioactive materi	als d	currently possessed are as follows:
1) (Mo	Natural ost is 2%	thoriu thoriu	m alloyed with magne m.)	sium	, (Alloy HM21A) less than 4% thorium.
2)	Natural	thoriu	m alloyed with tungs	ten.	
3)	Natural ·	thoriu	m oxide, solid spher	es.	
4)	Natural	uraniu	m, solid granules.		

5) Depleted uranium, solid granules.

#### ITEM 6

#### Purposes for which Licensed Material Will Be Used

The materials listed in Item 5, A and B are used for research, development and manufacturing operations relative to missile and space craft programs.

Currently active processes involving specific source materials are, but are not limited to, the following:

- Magnesium thorium alloy (less than 4% thorium) is used for structural material on communication satellites. Major machining operations involving this alloy are currently not performed at the GE Aerospace facilities. However, periodic touch-up or small scale drilling of the finished parts is performed under controlled conditions. An inventory of raw stock and finished parts is maintained.
- 2) Tungsten thorium alloy (less than 4% thorium) is used as a structural material and for counterbalancing for missile components. Periodically parts manufactured of this material are non-destructively and destructively tested in a controlled environment.
- 3) Natural thorium oxide, storage only, no current use.

4) Natural uranium, storage only, no current use.

5) Depleted uranium, storage only, no current use.

#### ITEM 7

#### Individuals Who Will Use or Directly Supervise the Use of Licensed Material

Prior to the start of any work with radioactive materials, all operations involving radioactive materials must be approved by the Ionizing Radiation Advisory Group (IRAG) according to mandatory safety procedure M-6.

A copy of M-6 is enclosed. This document includes: policy statement and responsibilities and procedures (for all personnel working with ionizing radiation, for their supervisors, for their managers, for the IRAG, and for each member of the IRAG). Also included in M-6 are the responsibilities and procedures for procuring, receiving, using, transporting, and disposing radioactive materials.

Current members of the IRAG are as follows (resumes enclosed):

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

# ITEM 7

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#### Resume

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

)(6) B.S.	Degree in Biology from Franklin & Marshall College
1956 - M.D. Medi	caster, Pa. Degree from the University of Pennsylvania, School of cine, Philadelphia, Pa.
Post Gradua	ite 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 <b>-</b> 1971	Assistant Chief of Surgery, U.S. Naval Hospital, Philadelphia, Pa.
1 <b>971-</b> 1978	Chairman, Department of Surgery, Naval Regional Medica 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
	Co., Philadelphia, Pa.
1987-	Chairman, Ionizing Radiation Advisory Group, General
	Electric Co., Philadelphia, Pa.

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#### ITEM 7

#### 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

#### Work Experience:

U. S. Army - 6 months active duty, 30 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 - 19 years

Member:

ASSE NFPA AIHA AIA

Supervised HP activities 19 years. Attended numerous HP short courses (U.S. Army, AIHA). Completed 2 graduate level HP courses (Temple University).

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#### ITEM 7

#### Resume

#### DANIEL M. STERNBERG MANAGER, ELECTRONIC SYSTEMS ENGINEERING

#### Professional Experience:

1983 - Present: <u>Manager, Electronic Systems Engineering</u> 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:

<u>Chief, Reactor Projects Branch</u> 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: <u>Chief, Reactor Operations Section, USNRC</u> -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.

#### ITEM 7

#### Resume (cont.)

#### DANIEL M. STERNBERG MANAGER, ELECTRONIC SYSTEMS ENGINEERING

1974 - 1979: <u>Reactor Inspector, USNRC - Region I</u>, King of Prussia, PA

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

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 University of Pennsylvania, Moore School of Electrical Engineering, Philadelphia, PA. Class Standing: 10 of 42.

#### ITEM 7

#### Resume

#### ALFRED W. KOBYLINSKI SENIOR INDUSTRIAL HYGIENIST RADIATION SAFETY OFFICER

#### . Education:

- M.S. Occupational Health (Industrial Hygiene)
  - Drexel University, Philadelphia, PA 1980
- B.S. Biology, Pennsylvania <u>State</u> University University Park, PA - (^{(b)(6)}
  - Occupation & Environmental Radiation Protection, August 1985, Harvard School of Public Health, Boston, MA
  - Short courses in Radiation Science, January 1987, Rutgers University, New Brunswick, NJ
  - 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, NY 2921 Assisted in the operation of diagnostic x-ray equipment used for the examination of laboratory animals. Research Technician Physiology Department, Thomas Jefferson University

1976-1978

Philadelphia, PA 19107 Performed cardiovascular physiology studies utilizing radioactive tracer microspheres labelled with SR⁸⁵, Ce¹⁴⁷ and I¹²⁵. Responsible for: safe handling and use microspheres, conducting surveys to determine radiation levels in lab area, and for the determination of and safe disposal of all contaminated materials. Industrial Hygienist

12/79present

General Electric Company, RESD King of Prussia, PA 19406 Under the direction of the Ionizing Radiation Advisory group, I have functioned as Radiation Safety Officer for all activities covered by 3 U.S. NRC and 1 Pennsylvania license.

# ITEM 7

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# Resume (cont.)

## ALFRED W. KOBYLINSKI SENIOR INDUSTRIAL HYGIENIST RADIATION SAFETY OFFICER

ISOTOPE	MAXIMUM AMOUNT	LOCATION	DURATION	TYPE OF USE
Cerium-147	4 millicuries	Thomas Jefferson University	1.5 years	Medical Research
Strontium-85	4 millicuries	Thomas Jefferson University	1.5 years	Medical Research
Iodine-125	4 millicuries	Thomas Jefferson University	1.5 years	Medical Research
Cobalt-60	(b)(4)	General Electric Company	1980- present	Gamma Irradiation Calibration
Krypton-85	20 curies	General Electric Company	1980- present	Leak Tests
Strontium-90	10 curies	General Electric Company	1980- present	Irradiation Source
Plutoniúm-238	90 millicuries	General Electric Company	1980- present	Calibration
Plutonium-239	microcuries	General Electric Company	1980- present	Calibration
Cesium-137	100 millicuries	General Electric Company	1980- present	Calibration Source
Americium-241	millicuries	General Electric Company	1980- present	Research
Uranium-235	microcuries	General Electric Company	1980- present	Research
Uranium-238	microcuries	General Electric Company	1980 present	Research
Natural Thorium	100 kilograms	General Electric Company	1980- present	Structural Material

## ITEM 7

# Resume (cont.)

## ALFRED W. KOBYLINSKI SENIOR INDUSTRIAL HYGIENIST RADIATION SAFETY OFFICER

ISOTOPE	MAXIMUM AMOUNT	LOCATION	DURATION	TYPE OF USE
Depleted Uranium	100 kilograms	General Electric Company	1980 present	Shielding & Counter Weights
Radium-226 1,0	000 millicuries	General Electric Company	1980- present	Vacuum Measurement
Any Neutron activated radi nuclide with atomic No. 3-8 inclusive	0.1 Ci 33	General Electric Company	1980- present	Electronic Component Research

#### ITEM 8

#### Training for Individuals Working In or Frequenting Restricted Areas

Areas currently designated as restricted because of the presence of source radioactive materials are limited to the Health Physics Storage Vaults at Building 100 and 3198 Chestnut Street, the MgTh storage area in Building B and the air-borne radioactivity control room in Building 100. Diagrams of each of the above areas are provided in Item 9.

Access to the above areas is limited to a small number of individuals. For example, only the radiation safety officer and his staff have access to the Health Physics Storage Vaults.

Training for the individual employees required to work in restricted areas is accomplished through a combination of on the job instructions and formal classroom training.

The classroom training is conducted by the radiation safety officer or an authorized member of his staff. A brief outline of the general topics covered is as follows:

- I. Introduction and definitions of terms
- II. Basic atomic structure
- III. Ionizing versus non-ionizing radiation
- IV. Review of the electromagnetic forms of ionizing radiation
- V. Review of the particulate forms of ionizing radiation
- VI. Relative penetrating abilities of EM and particulate radiation
- VII. Units of measure

Curie Roentgen, RAD, REM Calculations involving the above units

VIII.Measurements and dosimetry

IX. Standards for exposure ALARA NRC Parts 19 & 20 Pennsylvania DER regulations GE company policy

#### ITEM 8

# Training for Individuals Working In or Frequenting Restricted Areas (cont.)

X. Internal versus external exposure

Review of the hazards of loose radioactive materials

XI. Health effects /

Chronic vs. acute exposure Theories on low level exposures

XII. Background radiation

XIII.Personnel protection

Shielding Distance Time

XIV. Emergency procedures

XV. Signs, forms, labels, etc.

The above outline is modified to fit the needs of employees working in various areas involving different processes and equipment. Typically the formal training session can last for one and a half hours to several hours depending on the background and experience of the individuals being trained. At the time of the formal training employees are provided with copies of 10 CFR Parts 19 & 20, the GE Aerospace policy on ionizing radiation and a short reference text on ionizing radiation.

Following the classroom instructions, supervisory personnel are required to provide detailed on the job instruction to individuals under their direction. The on the job instruction includes radiation safety awareness. Supervisors are required to observe new personnel as they perform their designated tasks and to report training deficiencies to the Ionizing Radiation Advisory Group.

During routine inspections the radiation safety officer, his staff and the members of the IRAG observe employees conducting tasks involving radioactive material. Deficiencies in training are noted and corrective actions implemented.

#### ITEM 9

#### Facilities and Equipment

GE Aerospace has shielding, shielded source containers, shielded rooms, handling equipment (tongs, forceps, etc.), fume hoods, gloveboxes, high-efficiency filtration systems, and other equipment utilized for the control of radioactive materials. The IRAG may require new facilities and equipment, and may require modification of existing facilities and equipment, in order to maintain personnel exposure levels as low as reasonably achievable. The IRAG utilizes the criteria found in various recommendations of national and international groups and regulatory guides to determine the facility and equipment requirements for a particular use.

#### ITEM 9

#### I. Specific Facilities

#### A. Health Physics Storage Vault

Room T596 at Chestnut Street is used as the health physics storage area. A sketch of the room is attached. Pertinent dimensions are as follows:

North wall: 12" solid concrete block 16" South wall: н .... 12" B 11 u West wall: 11 ш н 16" East wall: plus 8" cinder block 5" concrete Ceiling: Floor: room is on level; earth beneath floor. Room elevation: 14'

This room is secured by a combination lock and hasp on the door.

#### B. Airborne Radioactivity Control Room

As mentioned before, it is occasionally necessary to perform dust producing operations on radioactive material (usually low specific activity specimens). These operations are performed in Room U8604 of Building 100 King of Prussia. A sketch of the room is attached.

In this room, two hoods and one glovebox are connected to an absolute filter unit. When both doors to the two hoods are two-thirds closed, the face velocity is greater than 100 fpm at each opening.

Entry into this room is controlled by a cypherlock.

#### C. Radioactive Material Use Lab

Attached is a plan view of Room U8614 of Building 100 in King of Prussia. The glovebox and HEPA-filtered hood are shown; also, the location of lockable storage cabinet where small quantities of radioactive material are stored is indicated.

(b)(4)

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Bldg. 100

D. Health Physics Storage Vault

Attached is a sketch of the health physics storage vault, room (b)(4) Bldg. 100, King of Prussia. The inside dimensions of the room are 6.5 feet in length, 6 feet in width, and 8.25 feet in height. The walls are constructed of double-reinforced poured concrete with the following thicknesses: north, west, and east walls (10 inches) and south wall (13 inches). The steel door in the east wall has an equivalent thickness of approximately 0.125 inch of steel. The poured concrete floor is over earth. The roof,

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ITEM 9 (b)(4) Bldg. 100 (cont.)

#### D. Health Physics Storage Vault

a six-inch-thick poured concrete slab, is covered by a 1.75 feet-thick layer of earth.

The steel door has a keylock.

#### E. Raw Stock Storage Room - Building B

Attached is a sketch of the raw stock metal storage room in Building B, 720 Vandenberg Road, King of Prussia. This room is used for storage only of raw stock magnesium thorium alloy (2% thorium). All walls for this room are concrete block to the roof deck and the two doors are padlocked. Access to this room is limited to authorized employees.

#### II. Air Sampling Equipment

UNICO Model 300, 6.7 cfm thru 4-inch diameter Whatman 41 filter, equipped with rotameter, one unit available.

Gelman Little Giant, 14 lpm (0.49 cfm) at vacuum load of 10 inches of mercury (from manufacturer's pressure-volume characteristic curve), one unit available.

DuPont Personnal Air Sampler, 2 pm (0.07 cfm), three units available.

Bendix Model 4-16003, 15 cfm thru 4-inch diameter Whatman 41 filter, equipped with gauge reading directly in cfm based on calibrated orifice principle.



# HEALTH PHYSICS STORAGE VAULT BLDG 100 - VALLEY FORGE







# AIR-BORNE RADIOACTIVITY CONTROL ROOM ROOM U8604 – KING OF PRUSSIA

MEDICAL SERVICES CSSD





# RADIOACTIVE MATERIAL USE LAB ROOM U8614 – KING OF PRUSSIA







HEALTH PHYSICS STORAGE AREA ROOM T596 - CHESTNUT STREET







#### ITEM 10

#### **Radiation Protection Plan**

Uses of radioactive material under this license will extend to those uses permitted by NRC regulations and the NRC license and approved by the Ionizing Radiation Advisory Group (IRAG) which was established to meet the requirements for a broad scope license. Administrative control is achieved through use of mandatory procedure M-6, "Ionizing Radiation Control," of the Safety Manual.

The Safety Manual is established by Division Policies. Mandatory Procedure M-6, "Ionizing Radiation Control, " establishes policy for use of ionizing radiation and authorities of the Ionizing Radiation Advisory Group.

#### Policies and Authorities

It is the policy of all components to keep the ionizing radiation exposure of all personnel as low as reasonably achievable (ALARA) and, in particular, below all existing federal, state, and company regulations.

All proposed uses of ionizing radiation shall be reviewed and prior written approval for use secured from the Ionizing Radiation Advisory Group consisting of:

Chairman: Medical Director Member: Manager, Industrial Safety and Hygiene Member: Manager, Systems & Subsystems Performance Evaluation Secretary: Radiation Safety Officer

The composition of the IRAG currently is: S.J. Mucha M.D., Chairman; C.B. Chilton, Member; D.M. Steinberg, Member; A.W. Kobylinski, Secretary. Their resumes are attached.

IRAG approval of a proposed use of ionizing radiation is contingent upon a satisfactory completion of a safety evaluation of the proposed use which takes into consideration such matters as the adequacy of facilities and equipment, training and experience of the user, and the operating or handling procedures.

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

. The IRAG may revoke any approval which it has issued when an investigation shows justification for such action. In such an event, the radiation user shall immediately relinquish all radioactive materials and ionizing radiation machines to the Radiation Safety Officer.

Accidents involving radioactive materials in which there is a possibility of ingestion or inhalation of radioactive material or body contamination

#### ITEM 10

#### Policies and Authorities (cont.)

shall be reported immediately to the members of the IRAG. Accidental exposures (actual or suspected) in excess of the quarterly limits stated in M-6 shall be immediately reported to the IRAG.

Control of potential radiation hazards will be achieved through the application of criteria in the NRC regulations and guidelines and supplemented by criteria in standards and guides of organizations such as ICRP, NCRP, ANSI, ACGIH, etc.

The specific control measures adopted will be commensurate with the potential hazard and will be based on the safety evaluation of the proposed use. The adequacy of these control measures will be monitored by a specific radiation survey program.

The IRAG does not contemplate approving any proposed use which would require (a) a respiratory protection program, (b) a routine bioassay program, (c) the generation of airborne radioactivity which could cause concentration levels in restricted areas greater than those specified in 10 CFR 20.103 (b) (1), or (d) the generation of airborne radioactivity which could cause concentration levels in unrestricted areas greater than a few percent of levels specified in 10 CFR 20.106 (a).

#### Responsibilities of the Radiation Safety Officer (RSO)

1. Providing radiation safety evaluation and assistance before, during, and at termination of proposed/approved uses.

2. Radiation safety orientation and training.

3. Ongoing evaluation of radiation hazards incident to receipt, use, storage, handling, transport, and disposal of radioactive materials by approved users (radiation survey program).

4. Ongoing evaluation of radiation safety procedures incident to procurement, receipt, use, storage, handling, transport, transfer, and disposal of radioactive materials by approved users (radiation inspection program).

5. Management of radiation safety records (surveys, inspections, material inventories, personnel exposures, and receipt, use, and disposal of materials).

6. Radioactive waste disposal.

#### ITEM 10

#### General Radiation Protection Plan

#### I. Radiation Safety Evaluations

As mentioned previously, a safety evaluation is performed before approval of any use. Control measures are imposed on the approved use and are based on the preoperational evaluation. The appropriateness and adequacy of these control measures are operationally evaluated by the radiation survey and radiation inspection programs described later. A further safety evaluation is conducted at termination of an approved use which considers such matters as transfer or disposal of the balance of radioactive material and the contamination levels of material and the contamination levels of facilities and equipment.

#### II. Radiation Safety Orientation and Training

Personnel whose work involves potential exposure to ionizing radiation and their supervisors are expected to have <u>knowledge</u> of radiation safety commensurate with the potential radiological health problems involved in the proposed use. The requirements for <u>instruction</u> of individuals very with the proposed use and with the experience of the individual. Personnel with prior similar experience are normally considered qualified by the IRAG. Personnel without the required prior experience receive instruction commensurate with the potential radiological health problems involved in the proposed use and in accordance with the requirements of 10 CFR 19.12.

The instructor normally is the radiation safety officer. However, with IRAG approval, other qualified persons have provided this training.

Participative lecture, completion of assigned readings, and on-the-job instruction, separately and in combination, have been used to provide radiation safety training, and the choice is based again on the proposed use and on the experience of the individuals. An orientation session can take anywhere from one to several hours. The competency of an authorized user is verified by various methods. The most common method is observed use 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 has also been used as a means of verifying user competency. Oral or written tests are seldom used.

#### III. Radiation Survey Program

This involves measurements of levels of radiation or concentrations of materials present and the evaluation of the consequent radiation hazards incident to receipt, production, use, release, shipping, handling, transport, disposal, or presence of radioactive materials under the specific set of conditions of approved use.

#### ITEM 10

#### C. Surface Contamination Standards

Acceptable average surface contamination levels for unrestricted use of premises and equipment  $(dpm/100 \text{ cm}^2)$  are as follows:

	Fixed	Removable
Transurancies, Ra-226	100	20
Th-nat, Th-232, Sr-90, U-232, I-131	1000	200
U-nat, & U-238 (and associated decay products)	5000	1000
Other <b>By</b> emitters	5000	1000

#### D. Exposure/Radiation Rate Surveys

<u>External radiation levels</u> from concentrated radioactive sources and fixed surface contamination must be checked by direct radiation surveys at a frequency based on the external radiation hazard and quantity of the radioactive material involved, work activity, and type of work activity. Low and medium risk areas must be surveyed at least monthly, and high risk area, daily or weekly, by the material users as directed by the IRAG approved procedures.

#### E. Effluent Monitoring

Effluent monitoring for releases to unrestricted areas: for airborne effluents, calculational evaluations, calculational evaluations supplemented by stack monitoring, or other environmental monitoring is required as appropriate for any planned and potential releases; for liquid effluents, calculational evaluations, calculational evaluations supplemented by waste stream monitoring/water sampling, or other environmental monitoring as required as appropriate for any planned and potential releases.

As stated previously, the IRAG does not as a policy permit "airborne radioactivity areas" in restricted areas. In almost all cases, this policy results in the use of HEPA-filtered contaminated-air-control equipment for filtering air before release to unrestricted areas. At present, there is no generation of contaminated liquid waste. When such waste was generated, it was disposed through a licensed disposal company. Using the method cited in 10 CFR 20.303 would only be considered for small and infrequent amounts of liquid radioactive waste.

#### ITEM 10

#### F. Personnel Dose Monitoring

<u>Personnel radiation badges</u> must be worn by all personnel engaged in operations which have been designated as requiring badges by IRAG. Each individuals who enters a restricted area under such circumstances that he receives, or is likely to receive, a dose in any calendar quarter in excess of 25 percent of the applicable value specified in paragraph (a) of 10 CFR 20.101 must wear a personnel radiation badge. Badges may be required by the RSO/IRAG even if one could not or would not likely receive 25 percent of the values referenced previously.

The vendor may be the one listed or any other supplier with high quality and accuracy of service. The normal badge exchange frequency is quarterly. More frequent exchanges would be used if warranted. For example, highly variable dose rates to personnel or dose rates above three rems per year would warrant a monthly or more frequent exchange. Currently, there is no need for badge exchanges more frequent than quarterly.

#### F. Personnel Dose Monitoring (cont.)

Self-reading pocket dosimeters are used only to supplement the badge. The need for pocket dosimeters is very rare for licensed activities. Pocket dosimeter readings are not used for record purposes under licensed activities.

#### **G.** Sealed Source Leak Tests

The radiation safety officer performs a leak test on each sealed source at the frequency indicated by the appropriate license. The tests normally consist of wipes of the source with moistened filter paper followed, after drying, by counting in a windowless flow counter. Tongs, etc., are used as required. Leaking sources are normally disposed to radioactive waste. Arrangements may be made with the original supplier to return a source when required.

#### H. Bioassay Program

The IRAG does not contemplate approving programs which would require routine use of bioassay. Control of exposure to unsealed radioactive materials is achieved through engineered controls. The need for bioassay is therefore limited to accident or emergency situations. Bioassay would, for example, be required in the event an emergency entry is made to clean up a contamination spill outside a hood or glove box. Another example is the situation in which an employee is found to be contaminated on the face or head.

## ITEM 10

#### H. Bioassay Program (cont.)

Bioassay, when needed, is performed by commercial vendors. Vendors which may be used include Eberline Co., Teledyne Isotopes, Radiation Management Corp., Helgeson Nuclear Services or others depending on the specific isotope to be assayed and the vendor's detection capabilities.

#### **IV.** Radiation Inspection Program

#### A. IRAG-approved Radiation Safety Conditions and Procedures

Conditions and procedures, based on the safety evaluation of the proposed use, specific to the proposed use, and documented for the approved use, are used as a baseline for periodic tailored inspections. Documented changes to the IRAG approval, which are a result of operational experience, become part of the baseline inspection.

#### B. Postings, Signs, Labels, and Tags

Areas and containers in which radioactive material is present must be approved and properly posted and labeled. The radioactive material itself must be tagged or labeled if feasible.

#### C. Materials Control Provisions for Procurement, Receipt, Use, Shipping, and Disposal through the Radiation Safety Organization

Written procedures require the RSO's written approval (i) before purchase of any source of ionizing radiation, (ii) before its release to user (after receipt), and (iii) before its shipment. Incoming shipments are surveyed per 10 CFR 20.205 and for dose rate levels release to user.

Outgoing shipments receive a dose rate and removable contamination (when appropriate) survey of the unpackaged material to assure that radiological shipping regulations are met.

#### D. Engineering Controls for Exposure Rate Reduction

Shielding and remote manipulation are used as much as possible to keep exposures as low as reasonably achievable.

#### E. Engineering Controls for Control of Airborne Radioactivity

Operations producing significant airborne radioactive contamination in a restricted area must provide engineering controls for <u>contaminated</u> air control (complete enclosure, booth/hood-type enclosure or,

#### ITEM 10

#### E. Engineering Controls for Control of Airborne Radioactivity (cont.)

only as a last resort, local exhaust) approved by the RSO. Airborne contamination is considered significant either when concentrations, equal to or in excess of the amounts specified in Appendix B, Table I, column I of 10 CFR 20, exist (for no matter how short a duration) or when concentrations, which, averaged over the number of hours in any week during which individuals are in the area, exceed 25 percent of the amounts specified in the prior reference. Operations producing any airborne radioactive contamination should provide contaminated air control in order to keep exposures as low as reasonably achievable. All operations given approval must be resurveyed if warranted by increased work activity, new work procedures, or changes in room ventilation.

All exhaust systems are designed following specifications in the "Industrial Ventilation" manual published by the American Conference of Governmental Industrial Hygienists or equivalent specifications. If air sampling indicates a need for contaminated air control, exhaust systems equipped with HEPA filters are used; for booths, air flow is maintained at 100 to 200 cfm per square foot face; for local exhaust, air capacity and distance between exhaust line intake and point of operation are adjusted to give the recommended capture velocity at the point of operation. Ventilation equipment, if required, is checked for proper air flow at least annually using an air velocity meter. Filters are checked periodically and replaced when saturated.

#### F. Use of Respiratory Protection

The IRAG does not contemplate approving programs which would require routine respiratory protection. Control of exposure to unsealed radioactive materials is achieved through engineered controls. The need for respiratory protection is therefore limited to accident or emergency situations. Its use would, for example, be required in the event that an emergency entry is made to clean up a contamination spill outside a hood or glove box.

#### G. Use of Protective Clothing

Protective clothing must be worn by personnel as specified by IRAG approved procedures in order to prevent personnel contamination and the possible incorporation of radioactive materials.

#### H. Protective Coverings for Plant Surfaces, Equipment and Instruments

<u>Protective coverings</u> (trays, etc.) on lab benches and other working surfaces must be used to prevent their contamination when working with powdered or liquid radioactive material (unsealed radioactive material); with liquid radioactive material, the covering should be absorbent and have a leak-proof backing.

#### ITEM 10

#### I. Surface Contamination Control Areas

Where the spread of surface contamination cannot be limited to a tray or bench top area, a barricaded area may be set up; in the case where the contamination is released with high initial velocity, the barricade may have solid walls and/or ceiling. In either case, the designated surface contamination zone would have a single access/egress point and written procedures for entering or leaving at that point would address the use/disposition of protective clothing and the use of contamination survey instrumentation if required.

#### J. Storage Conditions

All <u>storage</u> containers and areas for radioactive material must be approved and properly posted by the RSO. Storage areas for large quantities of radioactive materials (especially those in liquid or powdered form) which produce gaseous radioactive decay products must be well ventilated. Periodic contamination surveys are taken of the storage areas.

#### K. Radiation Emergency Procedures

See pages 9 thru 11 of the attached mandatory safety procedure, "Ionizing Radiation Control".

#### V. Records Management

Management of radiation safety records is the responsibility of the RSO. Records maintained include, but are not limited to, the following: radiation level surveys, radiation safety inspections, radioactive material inventories, personnel exposure results, and the receipt, use, and disposal of radioactive materials.

#### VI. Waste Disposal

Radioactive waste must be kept segregated and disposed of through the Safety Office. Presently, all waste generated is in the solid form including scrap radioactive material, below specification products, contaminated tools and protective coverings, contaminated filters, and decontamination materials. All solid waste and normally all liquid waste, if liquid waste is produced, is disposed through a licensed disposal firm. Small amounts of liquid waste can be disposed through the sanitary sewer system.

#### **VIII**.Calibration of Instruments

Radiation monitoring equipment is calibrated every six months and following repair at four different distances from one of the following three sources: CoBalt-60, 15 millicuries on 2/19/70, in Radiation Products Division's

#### ITEM 10

#### VIII.Calibration of Instruments (cont.)

Model 571 meter calibration kit, SN 108; Cesium-137, 100 millicuries on 12/77, in Eon Corporation/Nuclear Associate's Model 64-764 gamma calibrator, source SN 224; Cobalt-60, 36 millicuries on 12/18/64, in Nuclear Chicago's Model RR-62 source holder, SN B7.

Radiation monitoring equipment is calibrated every six months and following repair at four different distances from the following source: Cobalt-60, 15 millicuries on 2/19/70, in Radiation Products Division's Model 571 meter calibration kit, SN 108.

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

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
Ca-137	1.08	" " 08/18/77
I-129	0.099	" " 01//77
Na-22	0.36	" " 04/01/69
Ni-63	0.0345	" " 12/06/76
Pu-239	0.005	" " 12/10/74
Sr-90	0.01	" " 02/26/69

Personnel monitoring badges (TLD-type) are supplied by and processed quarterly by R. S. Landauer, Jr. & Co., 2 Science Road, Glenwood, Illinois 60425-1586.

Air sampling equipment is calibrated once per year or before use. Low volume samplers are calibrated using a Mark III flowmeter kit from Fisher Scientific Co. (0.4 to 23,400 cc/minute), and high volume samplers are calibrated using a tubular extension (21.5 inches long and 4 inches in diameter) with Alnor Instrument Co. Series 600 Velometer (30-300 fpm).

Calibrations are normally performed by, or under the direction of the RSO.

## ITEM 10

# VII. Radiation Detection Instruments

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RADIATION DETECTION EQUIPMENT	Q	RADIATION DETECTED	RANGES	WINDOW THICKNESS	USE
Nuclear Measurements Corp. Model PC-55 Proportional Counting System	1	Alpha, Beta Gamma	0-3500 kdpm	Windowless	Counting wipe samples and air filters
Victoreen Model 470A Air Ionization Survey Meter IC #610261	2 1	Alpha, Beta Gamma, X-ray	0-3, 10, 30 100, 300 1000 mR/hr and R/hr	17 mg/cm²	Exposure rate surveys X-ray monitoring
Nuclear Measurements Corp. Model PC-4 Proportional Counting System	1	Alpha, Beta Gamma	0-3500 dpm	Windowless	Counting wipe samples and air filters
Eberline Model E-120 GM Survey	1	Beta, Gamma X-ray	0.5, 5, 50 mR/hr	30 mg/cm²	Contamination determina- tion and radiation surveys
Eberline Model E-520 GM Survey	2	Beta, Gamma	0-0.2, 2, 20, 200	30 mg/cm²	Contamination determina- tion and radiation surveys
Eberline RM-20 Radiation Monitor	1	Alpha, Beta Gamma	1-500, x1 x10, x100 or x 1K	1.4 to 2.0 mg/cm²	Contamination determina- tion and radiation surveys
Victoreen Model 440 Air Ionization Survey Meter	1	Alpha, Beta Gamma, X-ray	0-3, 10, 30 100, 300 mR/hr	3.0 mg/cm²	Exposure rate surveys

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# ITEM 10

# VII. Radiation Detection Instruments (cont.)

RADIATION DETECTION EQUIPMENT	Q	RADIATION DETECTED	RANGES	WINDOW THICKNESS	USE
Eberline Portable Lin-log Gas Proportional Counter Model PAC-4G-3	1	Low level Alpha, Beta	0-500 К срт	0.85 mg/cm ²	Alpha detection
Eberline Teletector Model 6112	1	Gamma, Beta	0.1 mR/h to 1000 R/h	30 mg/cm²	Gamma measurement, Beta detection, con- tamination determination
Victoreen Model 6870 Minometer II [Indirect-Reading Dosimeters 362 and 365]	1	X-ray, Gamma	0 40mR or 0 200 mR		Detect and measure X and Gamma radiation
R. S. Landauer Jr & Co. Tech/Ops Landauer, Inc. 2 Science Road Glenwood, IL 60425-1586	350	Beta, Gamma X-ray	Quarterly exchanged dosimeters used for whole body, extremity and area monitoring. Minimum measurable exposure of 10m Rem/Qtr for X and gamma rays and 40 m Rem/Qtr. for energetic Beta particles		Dosimetry

TLD - Radiation Dosimetry Service

VALLEY FORGE SPACE CENTER

IONIZING RADIATION CONTROL	MANDATORY PROCEDURE	FEB 1989	M-6.0
SUBJECT	CLASSIFICATION	ISSUED	NUMBER
		1. The second	and the second secon

#### 6.1 <u>PURPOSE</u>

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 <u>Rem</u>

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 involving ionizing radiation 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.
- 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
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 right 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 it 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:	RESD 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 of radioactive material or severe body contamination shall be reported immediately to the. 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., TID 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 posted 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.

M--6-5

#### 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 of 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.

- 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 of 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.
  - 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 RESD/SCO Engineering Representative is responsible for:
  - 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 VFSC 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 mmber 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 1).
- 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 Plant 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 missing 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. <u>NOTIFY</u>: Notify persons in the area that a spill has occurred.
- 2. <u>PREVENT SPREAD</u>: Cover the spill (with absorbent paper if spill is liquid).
- 3. <u>CLEANUP</u>: 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. <u>SURVEY</u>: With a low-range, thin-window G-M survey meter, check the area around the spill, hands, and clothing for contamination.
- 5. <u>REPORT</u>: Report incident to the Industrial Safety and Hygiene Office.

#### Major Spills - Unsealed Radioactive Material

- 1. <u>CLEAR AREA</u>: Notify all persons not involved in the spill to hold their breaths and to vacate the room.
- 2. <u>PREVENT SPREAD OF SPILL</u>: 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. <u>No immediate attempt</u> should be made to clean up the spill.
- 3. <u>SHIELD SOURCE</u>: 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. <u>CLOSE ROOM</u>: Leave the room and lock the door(s) to prevent entry.
- 5. <u>CALL FOR HELP</u>: Notify the Industrial Safety and Hygiene Office.
- 6. <u>PREVENT SPREAD OF CONTAMINATION:</u> All involved <u>personnel</u> <u>should remain in one confined area</u> 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. <u>PROHIBIT ENTRY</u>: 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. <u>PERSONNEL DECONTAMINATION</u>: 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. <u>CLEAR AREA</u>: Notify all persons not involved in the search to vacate the area.
- 2. <u>CALL FOR HELP</u>: Notify the Industrial Safety and Hygiene Office.
- 3. <u>SURVEY</u>: Survey and cordon off the radiation hazard area.
- 4. <u>PROHIBIT ENTRY</u>: Prohibit entry into the radiation hazard area and await assistance from the Industrial Safety & Hygiene Office.

# GENERAL DE ELECTRIC

#### VALLEY FORGE SPACE CENTER

GENREAL ELECTRIC COMPANY PO BOX 8555 PHILADELPHIA, PENNSYLVANIA 19101 (215)962-2000

Certification of Authorization to Receive Radioactive Materials

This certifies that the Valley Forge Space Center, General Electric Company, is authorized to receive, possess and use the radioactive materials listed below according to the provisions of license number_______ which expires

#### Material

Form

Quantity

All radioactive materials are to be shipped to the attention of the undersigned at the following address:

General Electric Company Valley Forge Space Center Valley Forge Space Center 230 East Goddard Boulevard King of Prussia, PA 19406

#### Radiation Safety Officer Date

Distribution:

Original accompanies Purchase Order or sent to transferor Copy #1 Health Physicist Copy #2 RAM Requestor

Figure 1

M-6-12

LAK/87055D/REV 03-11-87

7/RECEIPT

TO:	FROM:
SHIPMENT NUMBER: SCO 00000-86	SECURITY CLASSIFICATION :
MODE OF SHIPMENT:	NUMBER OF CONTAINERS:
NUMBER OF ITEMS:	DESCRIPTION:
HAZARD CLASS:	

WEIGHT (KGM) :

NAME; ID NO:

ISOTYPE:

MR/HR AT SURFACE:

ACTIVITIES (CURIES):

LABEL:

FROM:

VOLUME (LITERS) :

FORM:

MR/HR AT ONE METER:

A1/A2:

**SMEAR NUMBER:** 

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:

M-6-13

87055D Rev 03-11-87/lak

## RADIOACTIVE MATERIALS: SHIPMENT/RECEIPT

TO:

FROM:

SHIPMENT NUMBER: SCO 00000-86

MODE OF SHIPMENT:

NUMBER OF ITEMS:

HAZARD CLASS:

NAME; ID NO:

WEIGHT (KGM):

ISOTYPE:

MR/HR AT SURFACE:

**ACTIVITIES (CURIES):** 

LABEL:

FROM:

SECURITY CLASSIFICATION : NUMBER OF CONTAINERS: DESCRIPTION:

VOLUME (LITERS) : FORM: MR/HR AT ONE METER: A1/A2: SMEAR NUMBER: 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:

M-6-14

870550 Rev 3/11/87,Ias

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#### ITEM 11

#### Waste Disposal

Normal waste disposal procedure is for the waste to be transferred to a commercial firm licensed to accept such wastes. Currently, waste is transferred to Radiological Services of Teledyne Isotopes, 50 Van Buren Avenue, Westwood, NJ 07675. However, the services of Chemical-Nuclear Systems Inc., Columbia, S.C. 29210 have been used in the past for the disposal of source materials and may be again used in the future.

Only solid wastes are anticipated and all waste material is containerized in appropriate transportation and disposal containers supplied by the licensed radiological waste vendor.

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OFFICIAL RECORD COPY ML 10

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(FOR LENS USE) INFORMATION FROM LTS ::4¥ BETWEEN: LICENSE FEE MANAGEMENT BRANCH, ARM = PROGRAM CODE: 11300 AND STATUS CODE: 2 REGIONAL LICENSING SECTIONS FEE CATEGORY: 2C 2 EXP. DATE: 19890531 FEE COMMENTS: LICENSE FEE TRANSMITTAL REGION A. 1 48 1. APPLICATION ATTACHED APPLICANT/LICENSEE: GENERAL ELECTRIC CO. 890427 RECEIVED DATE: DOCKET NO: 4007344 110630 CONTROL NO. : LICENSE NO.: SUB-831 ACTION TYPE: RENEWAL 2. FEE ATTACHED 230.00 AMOUNT: CHECK NO.: 16635 V U 3. COMMENTS SIGNED DATE B. LICENSE FEE MANAGEMENT BRANCH (CHECK WHEN MILESTONE 03 IS ENTERED 14-17 FEE CATEGORY AND AMOUNT: 20 1 230 1. APPLICATION MAY BE PROCESSED FOR: 2. CORRECT FEE PAID. **AMENDNENT** 33 RENEWAL LICENSE OTHER 3. SIGNED DATE