

APPLICATION FOR MATERIAL LICENSE

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

FEDERAL AGENCIES FILE APPLICATIONS WITH:

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

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

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

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

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

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

IF YOU ARE LOCATED IN:

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

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

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

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

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

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

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

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

- ☐ A. NEW LICENSE
☐ B. AMENDMENT TO LICENSE NUMBER _____
☒ C. RENEWAL OF LICENSE NUMBER 19-17250-01

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

Harry Diamond Laboratories
ATTN: SLCIS-SO
2800 Powder Mill Road
Adelphi, MD 20783-1197

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

Harry Diamond Laboratories
2800 Powder Mill Road
Adelphi, MD 20783-1197

8802030100 871217
REG 1 LIC 30
19-17250-01 PDR

4. NAME OF PERSON TO BE CONTACTED ABOUT THIS APPLICATION:

Michael Borisky (Radiation Protection Officer)

TELEPHONE NUMBER:

(202) 394-2218

SUBMIT ITEMS 5 THROUGH 11 ON 8 1/2 x 11" PAPER. THE TYPE AND SCOPE OF INFORMATION TO BE PROVIDED IS DESCRIBED IN THE LICENSE APPLICATION GUIDE.

5. RADIOACTIVE MATERIAL See Supplement #1

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

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

See Supplement #1

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

See Supplement #2

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

See Supplement #3

9. FACILITIES AND EQUIPMENT:

See Supplement #4

10. RADIATION SAFETY PROGRAM:

See Supplement #5

11. WASTE MANAGEMENT:

See Supplement #6

12. LICENSEE FEES (See 10 CFR 170 and Section 170.31):

FEE CATEGORY: AMOUNT ENCLOSED \$

13. CERTIFICATION (Must be completed by applicant): THE APPLICANT UNDERSTANDS THAT ALL STATEMENTS AND REPRESENTATIONS MADE IN THIS APPLICATION ARE BINDING UPON THE APPLICANT. THE APPLICANT AND ANY OFFICIAL EXECUTING THIS CERTIFICATION ON BEHALF OF THE APPLICANT, NAMED IN ITEM 2, CERTIFY THAT THIS APPLICATION IS PREPARED IN CONFORMITY WITH TITLE 10, CODE OF FEDERAL REGULATIONS PARTS 30, 32, 33, 34, 35, AND 40 AND THAT ALL INFORMATION CONTAINED HEREIN IS TRUE AND CORRECT TO THE BEST OF THEIR KNOWLEDGE AND BELIEF.

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

SIGNATURE—CERTIFYING OFFICER:

TYPED, PRINTED NAME:

STUART M. MARCUS

TITLE:

Director, Harry Diamond Labs
Installation Support Activity

14. VOLUNTARY ECONOMIC DATA:

ANNUAL GROSS PAY		5. NUMBER OF EMPLOYEES (Total for entire facility excluding outside contractors)	6. NUMBER OF BEDS
<\$250K	\$1M-\$3M		
\$250K-\$500K	\$3.5M-\$7M		
\$500K-\$750K	\$7M-\$10M		
\$750K-\$1M	>\$10M		

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

☐ YES ☒ NO

FOR NRC USE ONLY

TYPE OF FEE	FEE LOG	FEE CATEGORY	COMMENTS	APPROVED BY
AMOUNT RECEIVED	CHECK NUMBER	FEE EXEMPT		DATE

107972 26 OCT 1987

PRIVACY ACT STATEMENT

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

1. **AUTHORITY:** Sections 81 and 161(b) of the Atomic Energy Act of 1954, as amended (42 U.S.C. 2111 and 2201(b)).
2. **PRINCIPAL PURPOSE(S):** The information is evaluated by the NRC staff pursuant to the criteria set forth in 10 CFR Parts 30, 32, 33, 34, 35 and 40 to determine whether the application meets the requirements of the Atomic Energy Act of 1954, as amended, and the Commission's regulations, for the issuance of a radioactive material license or amendment thereof.
3. **ROUTINE USES:** The information may be (a) provided to State health departments for their information and use; and (b) provided to Federal, State, and local health officials and other persons in the event of incident or exposure, for their information, investigation, and protection of the public health and safety. The information may also be disclosed to appropriate Federal, State, and local agencies in the event that the information indicates a violation or potential violation of law and in the course of an administrative or judicial proceeding. In addition, this information may be transferred to an appropriate Federal, State, or local agency to the extent relevant and necessary for an NRC decision or to an appropriate Federal agency to the extent relevant and necessary for that agency's decision about you.
4. **WHETHER DISCLOSURE IS MANDATORY OR VOLUNTARY AND EFFECT ON INDIVIDUAL OF NOT PROVIDING INFORMATION:** Disclosure of the requested information is voluntary. If the requested information is not furnished, however, the application for radioactive material license, or amendment thereof, will not be processed. A request that information be held from public inspection must be in accordance with the provisions of 10 CFR 2.790. Withholding from public inspection shall not affect the right, if any, of persons properly and directly concerned need to inspect the document.
5. **SYSTEM MANAGER(S) AND ADDRESS:** U.S. Nuclear Regulatory Commission
Director, Division of Fuel Cycle and Material Safety
Office of Nuclear Material Safety and Safeguards
Washington, D.C. 20555

Supplement #1

Item 5, NRC Form 313, Radioactive Material

<u>Element and Mass Number</u>	<u>Chemical and/or Physical Form</u>	<u>Manufacturer and Model #</u>	<u>Max Activity and Max Activity per Source At Any One Time</u>
Cobalt-60	Sealed Sources		Max 245 mCi Total
	3 each	Tracerlab	12 mCi each
	1 each	Tracerlab	15 mCi each
	1 each	Tracerlab	1 mCi each
Cobalt-60	Sealed Source	Nuclear Chicago	2.0 each
	1 each	Style 850213	
Cesium-137	Sealed Source	Tracerlab	15 mCi each
	1 each		
Cesium-137	Sealed Source	Nuclear Chicago	1.0 Ci each
	1 each		

Item 6, Form NRC 313, Purpose For Which Material Will Be Used.

The sources will be used for constancy, calibration, and response checks of radiation detecting instruments. Sources will be stored as stated in Item 9. The source will only be used by the radiation protection officer, alternate radiation protection officer, or the Co-60 facility supervisor and operators named in Items 7 and 8 of this application.

As there are remote area monitors permanently located within the Harry Diamond Laboratories Co ⁶⁰ Irradiator Facility (NRC Lic 19-17250-05), 3 sources are stored and used within this facility to conduct calibration and constancy checks on these monitors (see Item 9).

Supplement #2

Item 7, NRC Form 313, Individuals Responsible For Radiation Safety Program and Their Training and Experience

MICHAEL BORISKY (Radiation Protection Officer)

M.H.S., Radiation Health, Johns Hopkins School of Public Health and Hygiene, 1985

B.A., Biological Sciences, University of Md at Baltimore County, 1977

<u>TYPE OF TRAINING</u>	<u>WHERE TRAINED</u>	<u>DATE</u>	<u>DURATION</u>	<u>ON THE JOB</u>	<u>FORMAL COURSE</u>
a. Principles	Johns Hopkins (graduate)				
	Intro to Rad Health 18A67(70%)*	Sep 82	28 hrs	No	Yes
	Radiation Safety 18A70(70%)	Nov 83	11 hrs	No	Yes
	Occupational Saf. and Health 18A23(50%)	Jan 84	12 hrs	No	Yes
	Environ. Health Admin & Policy 18A19(50%)	Mar 84	8 hrs	No	Yes
	University of Maryland (undergraduate)				
	Baltimore, MD				
	Physics 100 (10%)*	Feb 74	4 hrs	No	Yes
	Physics 111 (10%)	Sep 75	6 hrs	No	Yes
	Physics 112 (10%)	Feb 76	6 hrs	No	Yes
	USA Chemical School				
	Ft McClellan, Alabama				
	Rad Safety Course 7K-F3	Jan 81	34 hrs	No	Yes
b. Mathematics	Johns Hopkins (graduate)				
	Intro to Rad Health 18A67(10%)	Sep 82	4 hrs	No	Yes
	Biostatistics 14M01(20%)	Sep 83	8 hrs	No	Yes
	Radiochemistry 18A65(10%)	Nov 83	5 hrs	No	Yes
	Radiation Safety 18A70(10%)	Nov 83	2 hrs	No	Yes
	Radiation Dosimetry 18A73(40%)	Nov 83	6 hrs	No	Yes
	University of Maryland (undergraduate)				
	Baltimore, MD				
	Precalculus 130	Feb 74	42 hrs	No	Yes
	Calculus and Anal Geom 151	Sep 74	56 hrs	No	Yes
	Statistics 160	Sep 75	42 hrs	No	Yes
	USA Chemical School				
	Ft McClellan, Alabama				
	Rad Safety Course 7K-F3	Jan 81	36 hrs	No	Yes

*percentage of course applicable to category of training

Supplement #2 continued.

<u>TYPE OF TRAINING</u>	<u>WHERE TRAINED</u>	<u>DATE</u>	<u>DURATION</u>	<u>ON THE JOB</u>	<u>FORMAL COURSE</u>
c. Measurement	<u>Johns Hopkins (graduate)</u>				
	<u>Intro to Rad Health</u>				
	18A67(10%)	Sep 82	4 hrs	No	Yes
	<u>Radiotracer Techniques</u>				
	18A61(50%)	Sep 82	8 hrs	No	Yes
	<u>Nuclear Instrumentation</u>				
	18A64(100%)	Nov 82	43 hrs	No	Yes
	<u>Radiotracer Techniques</u>				
	18B61(50%)	Nov 82	4 hrs	No	Yes
	<u>Advanced Nuc Inst</u>				
	(100%)	Jan 83	43 hrs	No	Yes
	<u>Radiochemistry 18A65</u>				
	(50%)	Nov 83	25 hrs	No	Yes
	<u>Radiation Safety 18A70</u>				
	(10%)	Nov 83	2 hrs	No	Yes
	<u>Radiation Dosimetry</u>				
	18A73(40%)	Nov 83	6 hrs	No	Yes
	<u>USA Chemical School</u>				
	<u>Ft McClellan, Alabama</u>				
	<u>Rad Safety Course 7K-F3</u>	Jan 81	34 hrs	No	Yes
d. Biological	<u>Johns Hopkins (graduate)</u>				
	<u>Intro to Rad Health</u>				
	18A67(10%)	Sep 82	4 hrs	No	Yes
	<u>Radiobiology 18A71</u>				
	(100%)	Jan 83	24 hrs	No	Yes
	<u>Radiochemistry 18A65</u>				
	(20%)	Nov 83	10 hrs	No	Yes
	<u>Radiation Safety</u>				
	18A70(10%)	Nov 83	2 hrs	No	Yes
	<u>Radiation Dosimetry</u>				
	18A73(10%)	Nov 83	1.5 hrs	No	Yes
	<u>University of Maryland</u>				
	<u>Baltimore, MD</u>				
	<u>Concepts of Biology</u>				
	100 (10%)	Sep 74	4 hrs	No	Yes
	<u>Genetics 310(20%)</u>	Sep 75	12 hrs	No	Yes
	<u>Cell Biology 320(10%)</u>	Feb 76	6 hrs	No	Yes
	<u>Developmental Biology</u>				
	340(10%)	Sep 76	6 hrs	No	Yes

Organismic Biology 350 (10%)	Feb 77	6 hrs	No	Yes
<u>USA Chemical School</u>				
<u>Ft McClellan, Alabama</u>				
Rad Safety Course 7K-F3	Jan 81	3 hrs	No	Yes
<u>Johns Hopkins University</u>				
<u>Baltimore, MD</u>				
Biochemistry (10%)	Feb 78	3 hrs	No	Yes

Supplement #2 continued

MICHAEL J. BORISKY

<u>ISOTOPE</u>	<u>MAXIMUM AMOUNT</u>	<u>WHERE EXPERIENCE GAINED</u>	<u>DURATION OF EXPERIENCE</u>	<u>TYPE OF USE</u>
Co-60	15,020 Ci	Harry Diamond Labs	6 years	Routine Health Physics
Cs-137	721 mCi	Harry Diamond Labs	6 years	Routine Health Physics and Instrument Checks
Atomic Nos 3 thru 83	250 mCi	Harry Diamond Labs	6 years	Routine Health Physics
Pu ²³⁹	67 gms	Harry Diamond Labs	6 years	" " "
U ²³⁵	22 gms	Harry Diamond Labs	6 years	" " "
Np ²³⁷	12 gms	Harry Diamond Labs	6 years	" " "
Sr-Y ⁹⁰	400 mCi	Ft Meade, MD	1 year	Routine Health Physics
Pu ²³⁹	40 uCi	Ft Meade, MD	1 year	Calibration, Routine Health Physics
Cs ¹³⁷	10 mCi	Ft Meade, MD	1 year	Routine Health Physics
Am ²⁴¹	60 mCi	Ft Meade, MD	1 year	" " "
H-3	10 Ci	Ft Meade, MD	1 year	" " "
Ra ²²⁶	microcuries	Ft Meade, MD	1 year	" " "

In addition, while at Harry Diamond Labs, Mr. Borisky has been performing routine health physics functions for the 11 MeV Aurora Facility, 3 MeV HIFX Facility, and three industrial X-ray units, ranging from 110 kVp to 300 kVp. Health Physics duties have included the evaluation and monitoring of facility modifications.

See attached resume.

MICHAEL BORISKY (Radiation Protection Officer)

EDUCATION

- 1988 * Master of Health Science, Radiation Health Science, Johns Hopkins School of Hygiene and Public Health, Baltimore, MD. GPA 3.3.
- 1977 Bachelor of Science, Biological Sciences, University of Maryland at Baltimore County, Baltimore, MD. Cum Laude

PROFESSIONAL EXPERIENCE

- December 1981 to present Health Physicist, U.S. Army Harry Diamond Laboratories, Adelphi, MD. Responsible for the management of the Radiation Protection Program. Sources at Harry Diamond include an NRC licensed 40,000 Curie Co-60 facility, a 14 MV flash X-ray facility, a 5 MV flash X-ray facility, MW to GW pulse microwave facilities, over 100 lasers, and various unique electronic sources of both ionizing and nonionizing radiation. Duties and responsibilities include: chairing the Radiation Control Committee; planning and design of new sources and facilities and modifications to existing sources and facilities, usually requiring detailed hazard analysis and shielding calculations; formulating procedures for the safe use of new or modified radiation sources; evaluating and revising local standards, procedures, and controls to assure compliance with Federal law, Army regulations, and accepted practices; performing periodic surveys of sources and procedures; conducting training for personnel using radiation sources; maintaining NRC licenses and DA authorizations for the use of radioactive materials; directing and reviewing personnel monitoring; and periodically reviewing radiation protection literature. As the only Health Physicist at Harry Diamond, works independently without any technical supervision.
- December 1980 to December 1981 Health Physicist, U.S. Army Fort George G. Meade, Ft. Meade, MD. Developed and managed Fort Meade's first Radiation Protection Program. Radiation sources were Army commodities containing radioactive materials. Developed program to ensure the proper handling, leak testing, storage, use, inventory, disposal, and transport of radioactive commodities. As the only Health Physicist at Fort Meade, worked independently without any technical supervision.
- December 1978 to December 1980 Research Technician, Johns Hopkins School of Hygiene and Public Health, Baltimore, MD. Participated in research to investigate how to better treat public water and sewage systems to protect the public from microbiological contamination of water supplies. Duties included participation in study design, conducting experiments, fabrication and design of special apparatus, and interpretation of results.

MICHAEL JOHN BORISKY

RESUME

page two

PROFESSIONAL
ORGANIZATIONS

Health Physics Society

ADDITIONAL
EDUCATION

Biochemistry

Johns Hopkins University

Aquatic Chemistry (grad)

Johns Hopkins University

Information Management Systems (grad)

Johns Hopkins University

AWARDS

Harry Diamond Laboratories Fellowship, 1982-1984, Johns Hopkins School of Hygiene and Public Health.

Harry Diamond Laboratories, Special Service Award, 1985.

University of Maryland, 1977, Cum Laude.

COURSE
WORK

Academic coursework included:

University of Maryland

Physics

Biological Sciences

Chemistry

Calculus

Statistics

Johns Hopkins School of Hygiene and Public Health

Nuclear Instrumentation

Radiobiology

Radiation Dosimetry

Radiochemistry

Radiation Physics

Radiation Safety

Biostatistics

Epidemiology

Supplement #2 continued

DR. HARVEY EISEN (Alternate Radiation Protection Officer)

TYPE OF TRAINING	WHERE TRAINED	DATE	HOURS**	ON THE JOB	FORMAL COURSE
a. Principles	Univ of Md (undergraduate)				
	General Physics (10%)*	Sep 57	7	no	yes
	General Physics (10%)	Feb 58	7	no	yes
	Intro to Nuc Tech (20%)	Sep 58	8	no	yes
	Heat Power-Nuc and Chem (10%)	Feb 60	6	no	yes
	Univ of Md. (graduate)				
	Modern Physics (10%)	Sep 60	4	no	yes
	Nuc Tech Lab (50%)	Sep 60	21	no	yes
	Nuc Eng Sem (20%)	Feb 61	3	no	yes
	Spec Prob Nuc Eng (20%)	Feb 61	6	no	yes
	Nuc Pow Use Nuc Rad (50%)	Feb 61	15	no	yes
	Nuc Reactor Eng (50%)	Sep 61		no	yes
	Nuc Reactor Eng (50%)	Feb 62	21	no	yes
	Nuc Pow Use Nuc Rad (50%)	Sep 62	21	no	yes
	Nuc Eng Res (20%)	Sep 62	3	no	yes
	Sem in Nuc Energy (20%)	Feb 63	3	no	yes
	Nuc Eng Research (20%)	Feb 63	3	no	yes
	Nuc Eng Research (20%)	Sep 63	3	no	yes
	Nuc Eng Research (20%)	Sep 64	3	no	yes
	Sem in Nuc Eng (20%)	Sep 64	3	no	yes
	Nuc Eng Research (20%)	Feb 65	3	no	yes
	Sem in Nuc Eng (20%)	Feb 65	3	no	yes
	Radiation Shielding (50%)	Sep 66	21	no	yes
	Nuc Reactor Dynamics (10%)	Feb 67	4	no	yes
	Nuc Eng Research (20%)	Feb 67	3	no	yes
	National Bureau of Standards(NBS)/Harry Diamond Labs(HDL)				
	Radiation Safety Course	1960	6	yes	yes
	Medical Self Help Course	1965	4	yes	yes
	Safety Aspects of Ionizing Radiation Source Use	1977	4	yes	yes
b. Mathematics	Univ of Md. (undergraduate)				
	General Physics (20%)	Sep 57	14	no	yes
	Diff Equations	Sep 57	42	no	yes
	Basic Elect Eng (20%)	Feb 58	8	no	yes
	Intro to Nuc Tech (20%)	Sep 58	8	no	yes
	Univ of Md. (graduate)				
	Heat Power-Nuc and Chem (20%)	Apr 60	12	no	yes
	Rad Shield Energy Dep (50%)	Sep 66	21	no	yes
	Nuc Reactor Dynamics (50%)	Feb 67	21	no	yes
	George Washington University				
	Math for Sci and Eng	1959	42	no	yes
	NBS/HDL				
	Radiation Safety Course	1960	6	yes	yes
	Saf Asp of Ion Rad Use	1977	1	yes	yes

* percentage of course applicable to category of training

** hours of the course applicable to category of training

DR. HARVEY EISEN (Alternate Radiation Protection Officer)

<u>TYPE OF TRAINING</u>	<u>WHERE TRAINED</u>	<u>DATE</u>	<u>HOURS**</u>	<u>ON THE JOB</u>	<u>FORMAL COURSE</u>
c. Measurement	<u>Univ of Md. (undergraduate)</u>				
	General Physics (5%)*	Sep 57	4	no	yes
	General Physics (5%)	Feb 58	4	no	yes
	Basic Elect Eng (20%)	Feb 58	14	no	yes
	Alt Current Circuits (10%)	Sep 58	6	no	yes
	Elect and Magn (20%)	Sep 58	8	no	yes
	Intro to Nuc Tech (20%)	Sep 58	8	no	yes
	Eng Elect (20%)	Feb 59	11	no	yes
	Applied Elect (20%)	Feb 60	3	no	yes
	Heat Power-Nuc and Chem (10%)	Feb 60	6	no	yes
	<u>Univ of Md. (graduate)</u>				
	Nuc Tech Lab (50%)	Sep 60	28	no	yes
	Nuc Pow Use of Nuc Rad (20%)	Sep 60	6	no	yes
	Nuc Pow Use of Nuc Rad (20%)	Sep 62	6	no	yes
	Rad Shield Energy Dep (10%)	Sep 66	4	no	yes
	Nuc Reactor Dynamics (20%)	Feb 67	8	no	yes
	<u>NBS/HDL</u>				
	Radiation Safety Course	1960	6	yes	yes
	Saf Asp Ion Rad Use	1977	1	yes	yes
d. Biology	<u>Univ of Md. (graduate)</u>				
	Nuc Tech Lab (10%)	Sep 66	6	no	yes
	Rad Shield Energy Dep (10%)	Sep 66	4	no	yes
	<u>NBS/HDL</u>				
	Radiation Saf Course	1960	6	yes	yes
	Medical Self Help Course	1965	12	yes	yes
	Saf Asp of Ion Rad Use	1977	1	yes	yes

* percentage of course applicable to category of training

** hours of the course applicable to category of training

Supplement #2

DR. HARVEY EISEN (Alternate Radiation Protection Officer)

PhD Nuclear Engineering
BS Electrical Engineering

<u>ISOTOPE</u>	<u>MAXIMUM AMOUNT</u>	<u>WHERE EXPERIENCE GAINED</u>	<u>DURATION</u>	<u>USE</u>
Co-60	40,000 Curies	Harry Diamond Labs	20 years	Radiation Effects Stud.
Triga Reactor	250 kW	General Atomic	3 years	Radiation Effects Stud.
Triga Reactor	250 kW	Harry Diamond Labs DORF Facility	7 years	Radiation Effects Stud.

In addition to the above experience, Dr. Eisen also served for 5 years as an active member of the Diamond Ordnance Reactor Facility (DORF) Triga Reactor Safeguards Committee. Dr. Eisen is currently serving as a member of the HDL Radiation Control Committee.

Dr. Eisen has also gained radiation worker experience from his occasional use of particle accelerators over the years. Dr. Eisen's occasional use of particle accelerators includes the following: 12 years with HDL's 10 MV AURORA flash X-ray facility; 17 years with HDL's 4 MV HIFX flash X-ray facility; 12 years with NRL's 10-40 MV LINAC linear accelerator; and 2 years with the NBS/AFRRI 2 MV Van de Graff facility.

PROFESSIONAL EXPERIENCE

May 1973 to present
Harry Diamond Laboratories, Adelphi, MD

Supervises a section studying nuclear radiation effects on electronics. Studies include both experimental and analytical work, ranging from component studies to systems analyses, including radiation effects field testing. These studies require a knowledge of radiation transport, use of reactors and other ionizing radiation sources, radiation dosimetry, modern electronic components and circuitry, and radiation effects mechanisms. Responsibilities include both technical and administrative supervision of the research group, including new program development, funding, and research. Currently manages a DOD-wide radiation effects information center, and acts as a consultant to other Army project offices and agencies.

Nov 1971 to May 1973
Harry Diamond Laboratories, Adelphi, MD

Senior member of research groups studying radiation effects on semiconductor devices. Co-author of a major survey on the status of knowledge of radiation effects on MOS technology devices. Served as a member of several advisory panels and working groups and committees to other Government agencies. Contributed to thermonuclear shock studies and was a Project Officer on a Nevada Test Site underground test.

DR HARVEY EISEN (Alternate Radiation Protection Officer)

Sept 1970 to Nov 1971

National Bureau of Standards, Wash., DC

Developed a technique for using radiochromic dye films for making absolute, high precision measurements of energy deposited by radiation. Measured electron energy deposition profiles in a variety of targets and made comparisons to theoretical calculations. These measurements were the first of their kind, and qualified for Dr. Eisen's PhD thesis. Results were presented at an IAEA Symposium in Vienna.

June 1965 to Sept 1970

Harry Diamond Laboratories, Adelphi, MD

Responsible for the laboratory and field testing in an investigation of transient radiation susceptibility and hardening of transistors. Obtained and used several complex computer radiation energy deposition codes. Served as technical monitor for large development contracts. Developed the first method of measuring the free surface motion of pulse-radiation excited materials.

June 1960 to June 1965

Harry Diamond Laboratories, Adelphi, MD

Served as an instrumentation engineer for radiation effects experiments. Responsible for planning, executing, and reporting on original experiments, consulting on new instrumentation requirements for others, and planning and choosing new instrumentation equipment.

Supplement #3

Item 8, NRC Form 313, Training For Individuals Working In Or Frequenting Restricted Areas

<u>TYPE OF TRAINING</u>	<u>WHERE TRAINED</u>	<u>DURATION OF TRAINING</u>	<u>ON THE JOB</u>	<u>FORMAL COURSE</u>
<u>Klaus G. Kerris (Facility Supervisor)</u>				
a. Principles	UCLA	3 years	Yes	Yes
	Hughes Aircraft Co	11 years	Yes	No
	Harry Diamond Labs	16 years	Yes	No
b. Measurements	UCLA	3 years	Yes	Yes
	Hughes Aircraft Co	11 years	Yes	No
	Harry Diamond Labs	16 years	Yes	No
c. Mathematics	Ohio State University	2 years	No	Yes
	UCLA	4 years	Yes	Yes
	Hughes Aircraft Co	11 years	Yes	No
	Harry Diamond Labs	16 years	Yes	No
d. Biological	Harry Diamond Labs	16 years	Yes	No

Klaus G. Kerris (Facility Supervisor)

<u>ISOTOPE</u>	<u>MAXIMUM AMOUNT</u>	<u>WHERE EXPERIENCE WAS GAINED</u>	<u>DURATION OF EXPERIENCE</u>	<u>TYPE OF USE</u>
Cobalt-60	40,000 Ci	Harry Diamond Labs	13 years	Facility Supervisor of a Co-60 Water-Well Irradiator
Sodium-22	Microcuries	UCLA	3 years	Spectrometry
Cobalt-60	7,000 Ci	Hughes Aircraft Co.	11 years	Radiation Effects Study
Zinc-63	Microcuries	UCLA	3 years	Spectrometry
Strontium-90	Microcuries	Hughes Aircraft Co	11 years	Instrument Calibration
Cesium-137	Microcuries	UCLA	3 years	Spectrometry

Mr. Kerris was employed by UCLA as a Research Assistant for 3 years. During that time, he assisted in the development and construction of a 50 MeV proton cyclotron. He was also involved in the operation of the 18 MeV proton cyclotron and used various small sources for beta and gamma spectrometry and instrument calibration.

At Hughes Aircraft Company, he participated in the design of several linear electron accelerators. He was extensively involved in experiments using a 10 MeV linear electron accelerator, a 1 MeV Electron Beam Generator, and a 7 kCi Cobalt-60 source.

At Harry Diamond Laboratories, he has been in charge of dosimetry measurements at Aurora, a 10 MeV pulsed bremsstrahlung generator. In addition, he has functioned as Facility Supervisor of the HDL Cobalt-60 Water-Well Irradiator for the past 13 years.

Supplement #3 continued

Item 8, Training For Individuals Working In Or Frequenting Restricted Areas

Charles C. Casaer (Chief Operator, Cobalt-60 Irradiator)

<u>TYPE OF TRAINING</u>	<u>WHERE TRAINED</u>	<u>DURATION OF TRAINING</u>	<u>ON THE JOB</u>	<u>FORMAL COURSE</u>
a. Principles	Harry Diamond Labs	18 years	Yes	No
b. Measurements	Harry Diamond Labs	18 years	Yes	No
c. Mathematics	Harry Diamond Labs	18 years	Yes	No
d. Biological	Harry Diamond Labs	15 years	Yes	No

Charles C. Casaer (Chief Operator, Cobalt-60 Irradiator)

<u>ISOTOPE</u>	<u>MAXIMUM AMOUNT</u>	<u>WHERE EXPERIENCE WAS GAINED</u>	<u>DURATION OF EXPERIENCE</u>	<u>TYPE OF USE</u>
Cobalt-60	1 Ci	Harry Diamond Labs	15 years	In-Air Instrument Calibration
Cobalt-60	40,000 Ci	Harry Diamond Labs	8 years	In-Air Radiation Effects Testing

In addition, Mr. Casaer has been Chief Operator of the Pulsed X-ray Generator (HIFX) at HDL for the past 18 years. His duties in this position involved the use of GM, Scintillation, and T.L.D. instrumentation for general radiation surveys, remote area monitors, and radiation effects dosimetry. He has also completed a 48-hour course of instruction and training in operation of the HDL Cobalt-60 Facility for in-air irradiations. Instruction and supervision was provided by Mr. Klaus Kerris, Supervisor of the Cobalt-60 Facility.

Perry Sarigianis (Alternate Operator, Cobalt-60 Irradiator)

<u>TYPE OF TRAINING</u>	<u>WHERE TRAINED</u>	<u>DURATION OF TRAINING</u>	<u>ON THE JOB</u>	<u>FORMAL COURSE</u>
a. Principles	Harry Diamond Labs	6 years	Yes	No
	The Martin Co.	3 months	Yes	No
	Allis Chalmers Co	2 months	Yes	No
b. Measurements	Harry Diamond Labs	6 years	Yes	No
	The Martin Co	3 months	Yes	No
	Allis Chalmers Co	2 months	Yes	No
c. Mathematics	The Martin Co	3 months	Yes	No
	Allis Chalmers Co	2 months	Yes	No
	Harry Diamond Labs	6 years	Yes	No

Supplement #3 continued

Item 8, NRC Form 313, Training For Individuals Working In Or Frequenting Restricted Areas

Perry Sarigianis (Alternate Operator, Cobalt-60 Irradiator) continued

<u>TYPE OF TRAINING</u>	<u>WHERE TRAINED</u>	<u>DURATION OF TRAINING</u>	<u>ON THE JOB</u>	<u>FORMAL COURSE</u>
d. Biological	Harry Diamond Labs	6 years	Yes	No
	The Martin Co	3 months	Yes	No
	Allis Chalmers Co	2 months	Yes	No

Perry Sarigianis (Alternate Operator, Cobalt-60 Irradiator)

<u>ISOTOPE</u>	<u>MAXIMUM AMOUNT</u>	<u>WHERE EXPERIENCE WAS GAINED</u>	<u>DURATION OF EXPERIENCE</u>	<u>TYPE OF USE</u>
Cobalt-60	40,000 Ci	Harry Diamond Labs	6 years	Irradiator
Cf252	90 ug	USGS	10 months	Activation Analysis
PuBe		Allis Chalmers Co	3 years	Detector Calibration
Cs137		Allis Chalmers Co	3 years	Detector Calibration
Cs137		USGA	1 year	Detector Calibration
Cobalt-60	10 Ci	Allis Chalmers Co	4 years	Detector Calibration

Furthermore, Mr. Sarigianis has been Senior Technician for the 10 MeV, pulsed bremsstrahlung generator (Aurora) at Harry Diamond Labs for 15 years. His duties included instrumentation control and electromechanics. He has also completed a two day course of instruction and training at the HDL Cobalt-60 Facility for in-air irradiation. Instruction and supervision was provided by Mr. Klaus Kerris, Supervisor of the Cobalt-60 Facility and approved by the Ionizing Radiation Committee at Harry Diamond Laboratories.

SUPPLEMENT #4

Item 9, NRC Form 313, Facilities and Equipment

<u>HDL Control Number</u>	<u>Container or Device In Which Sealed Source Will be Stored or Used</u>	<u>Manufacturer</u>	<u>Model #</u>
A, 12 mCi Co ⁶⁰	Lead Pig, 6" high by 4" diameter	Not Indicated	Not Indicated
B, 1 mCi Co ⁶⁰	Lead pig, as E, below	Tracerlab	Not Indicated
C, 12 mCi Co ⁶⁰	Lead pig, 6½" high by 4" diameter	Not Indicated	Not Indicated
D, 12 mCi Co ⁶⁰	Lead pig, 6½" high by 4" diameter	Not Indicated	Not Indicated
E, 15 mCi Co ⁶⁰	Lead pig, 4½" high by 4" diameter inside box, 9½" x 7" x 7"	Tracerlab	Not Indicated
F, 2 Ci Co ⁶⁰	Lead pig, See Figures 1 and 2	Harry Diamond Laboratories	N/A
G, 15 mCi Cs ¹³⁷	Lead pig, 6" x 6" x 6"	Not Indicated	Not Indicated
H, 1 Ci Co ⁶⁰	Lead pig, See Figures 1 and 2	Harry Diamond Laboratories	N/A

1. Sealed sources will be stored in Radioactive Materials Storage area or Cobalt-60 exposure room as illustrated in Figures 3 and 4. Both areas are specifically designed to ensure that radioactive material contained therein do not create "restricted areas" at points exterior to their walls, floor, or ceiling. The doors to both the areas are kept locked. Access to the Rad Storage Area will be limited to the Radiation Protection Officers. Access to the sources in the Co⁶⁰ Facility will be limited to K. Kerris, P. Sarigianis, C. Casaer, and RPO's. Both storage areas are within Building S04, on HDL property which is surrounded by a guarded chainlink fence.

2. When necessary, a special area will be set up for the purpose of using the sources to calibrate radiation detection instrumentation. The area will have limited access and will be posted with the required radiation warning signs. Persons conducting calibration procedures will be equipped with survey instruments and will wear film badges. Forceps, tongs, and special remote handling tools are available when needed, varying in length from 12 inches to 48 inches.

Item 9. NRC Form 313, Facilities and Equipment

Portable Instruments

<u>TYPE</u>	<u>MANUFACTURER</u>	<u>MODEL #</u>	<u>NO. AVAIL.</u>	<u>RADIATION DETECTED</u>	<u>SENSITIVITY RANGE</u>
Proportional	Nuclear Measurements Corp.	PC-4	1	Alpha, beta	$0-3.5 \times 10^6$ cpm
G-M	Ludlum Measurements Inc.	Model 2	2	Beta, gamma	0.1-50 mR/hr
G-M	Victoreen	Thyac III, Model 490	1	Beta, gamma	0.05 - 200 mR/hr
Ion Chamber	Victoreen	Model 440-RF	1	Gamma	1 - 300 mR/hr
Scintillation	Eberline Instrument	Gadora-1B	1	Gamma	1 - 1000 R/hr
Ion Chamber	Keithley Instrument Co.	Model 3615	1	Gamma, beta	0-20 R/hr, 0-20 mR
G-M	Eberline Instrument	Teletector 6112B	2	Gamma, beta	$0.01 - 10^6$ mR/hr
G-M	Ludlum Measurements Inc.	Model 3	1	Beta, gamma, alpha	0-200 mR/hr 0-5,000 cpm

Supplement #4 continued

Portable radiation detection instruments are calibrated quarterly by Radiation Services Organization, P.O. Box 419, Laurel, MD 20707, State of Maryland license 33-021-01. A certification of calibration is provided by Radiation Services Organization, and is kept on file in the HDL Installation Safety Office.

The Nuclear Measurements Corporation Model PC-4 internal proportional counter is used to evaluate wipe tests and source leak tests, and is calibrated quarterly by the Radiation Protection Officer using NBS traceable calibration sources. Reference license 19-17250-05 for a complete description of the PC-4 calibration procedure.

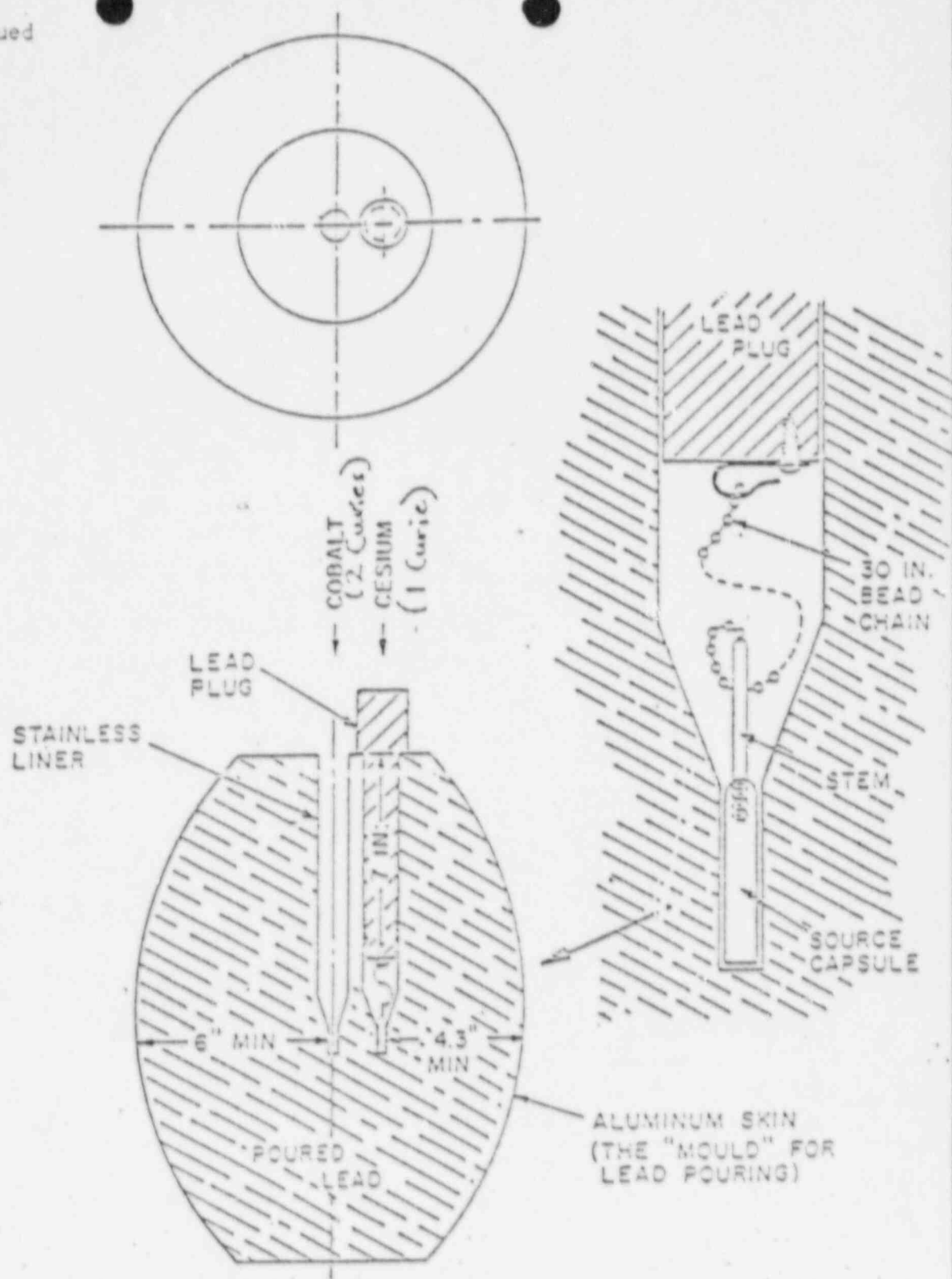


Figure 1. Storage container.

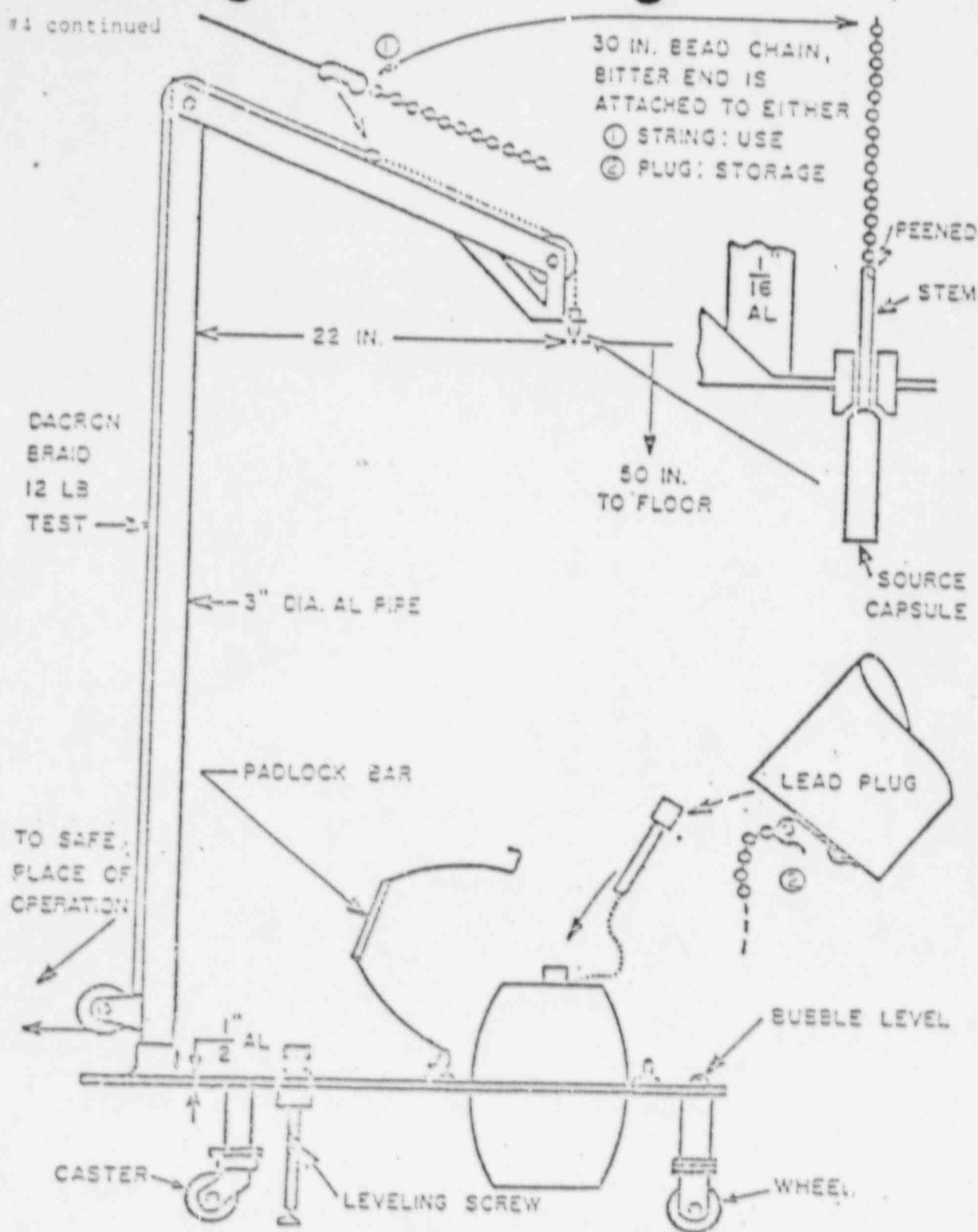
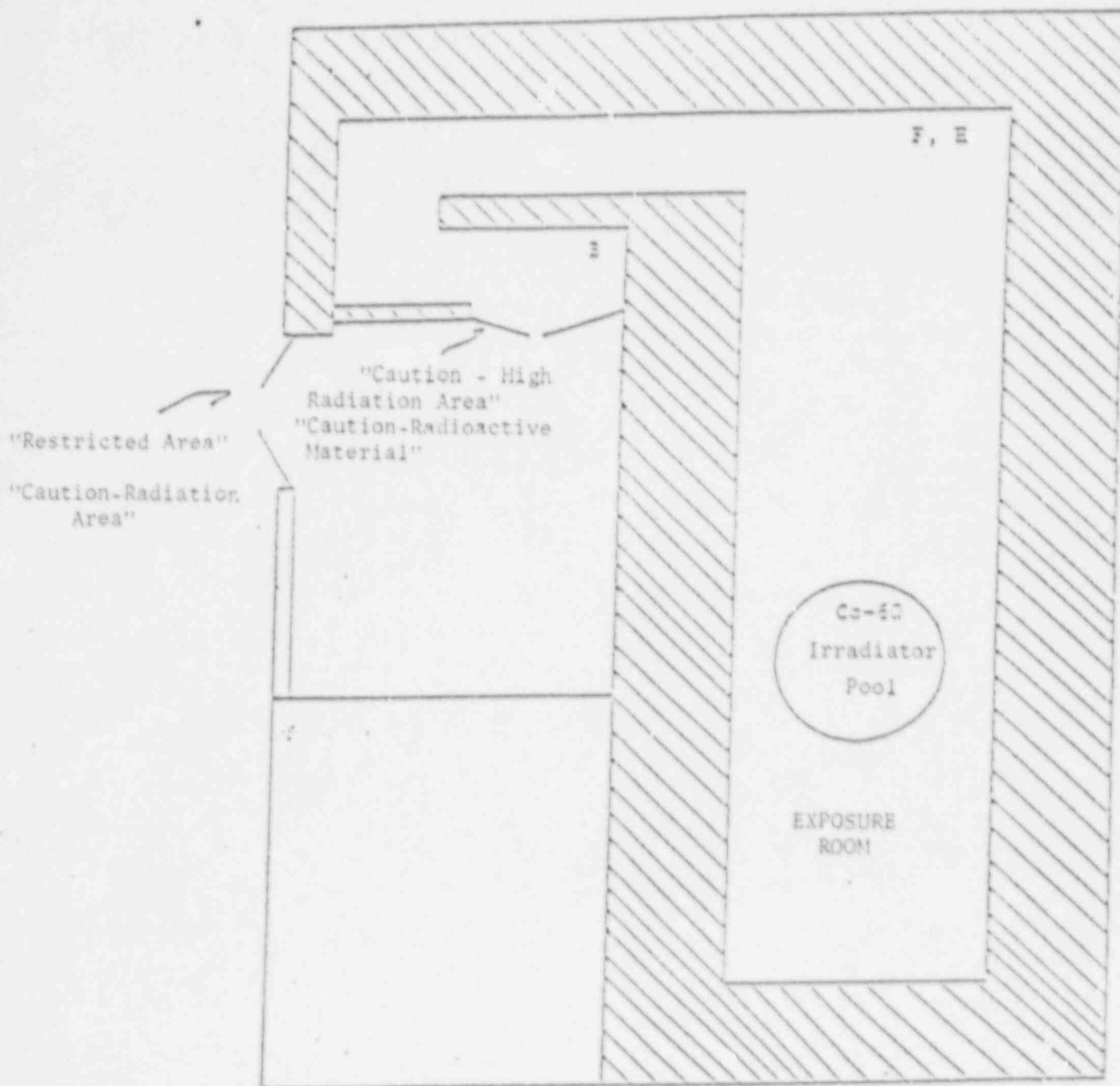


Figure 2. Diagram showing storage-exposure assembly.

HDL Cobalt-60 Irradiator Facility
(NRC Lic 19-17250-05)



EDL Control

1a

1b

1c

Sealed Sources

1 BaCl_2 , Co^{60}

2 Cl , Co^{60}

1 Ca , Cs^{137}

Manufacturer

Tracerlab

Nuclear Chicago

Nuclear Chicago

Radioactive Material Storage Facility

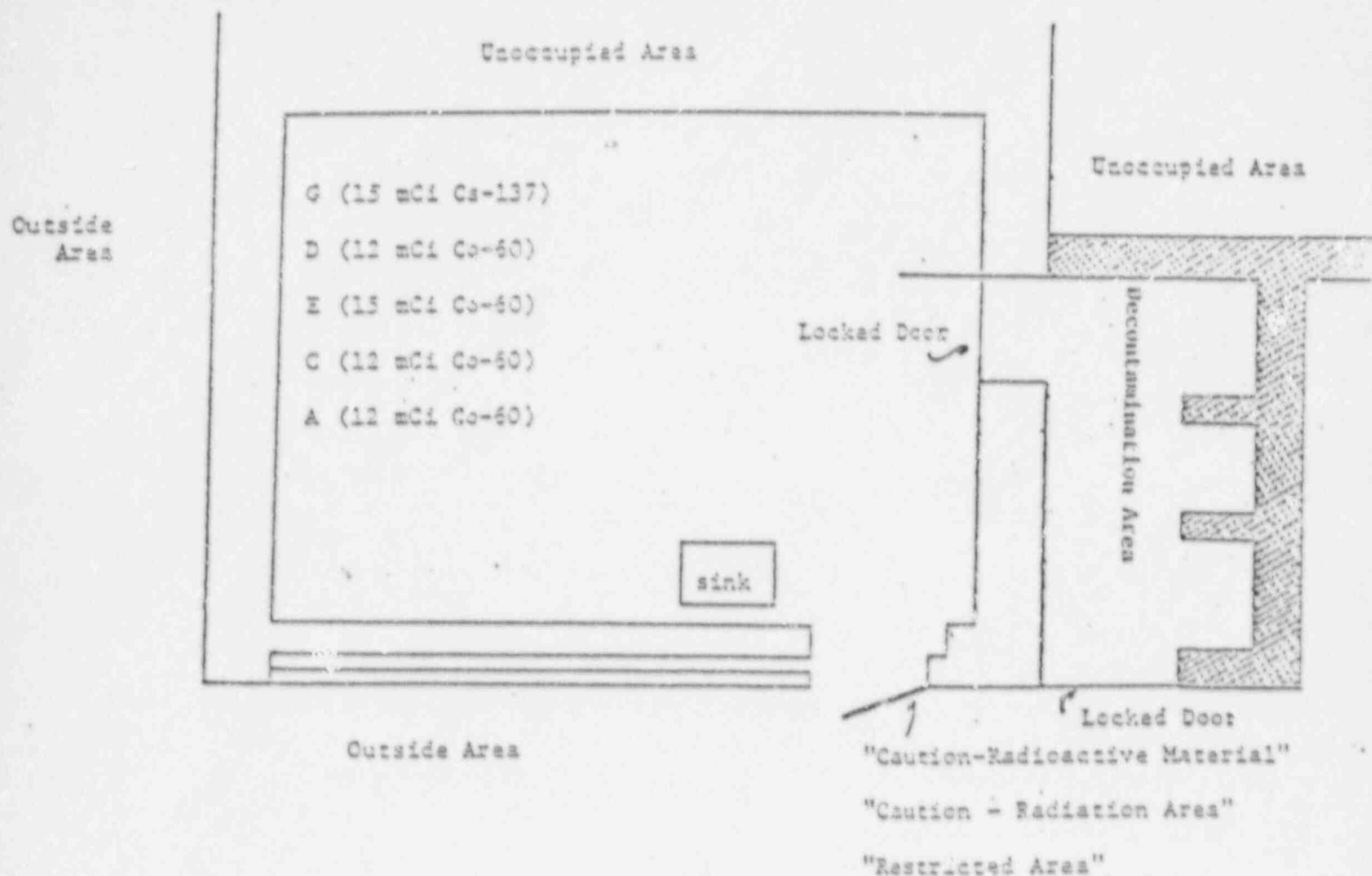


Figure 4

SUPPLEMENT #5

Item 10, NRC Form 313, Radiation Safety Program

The use of subject material will be conducted IAW the provisions of HDL Memorandum 385-20, Ionizing Radiation Protection Program, 24 March 1980. HDLM 385-20 provides for the safe procurement, use, storage, transport, and disposal of ionizing radiation sources at Harry Diamond Laboratories. HDLM 385-20 is equal to or more restrictive than applicable NRC and Army regulations.

IAW HDLM 385-20, there is in HDL a Radiation Control Committee composed of the Radiation Protection Officer, Chief of the Safety Office, a representative of the administrative office, and several technical members trained and experienced in the use of radioactive materials. The use of subject material will be under the cognizance of this Committee.

The sources will be leak tested at intervals not to exceed 6 months under the direction of the HDL Radiation Protection Officer. The leak test will be conducted in one of the following ways:

- a. The source will be wiped with a filter paper (or the filter paper will be wiped with the source) and the filter paper will be counted in an internal gas-flow proportional counter.
- b. The source will be swabbed with a piece of cotton, perhaps with a suitable solvent, and the cotton swab will be counted in an internal gas-flow proportional counter.
- c. A piece of masking tape may be folded, sticky surface out, around a dowel or paddle. The surface will be swabbed, the tape cut away from the dowel and attached to the inside bottom of a planchet for counting in an internal gas-flow proportional counter.

If a source should need service, maintenance or repair, it will be returned to the manufacturer or transferred to a vendor authorized to repair these sources IAW applicable NRC and Army regulations. Disposal of sources will be conducted as stated in Item 11.

Responsibility of the Radiation Protection Officer includes administration of the HDL Radiation Protection Program, ensuring that operations and facilities incorporate NRC and Army standards, conducting periodic radiation protection surveys at HDL facilities and operation where ionizing radiation is produced, ensuring that radiation detection equipment is maintained in good condition and calibrated at periods not to exceed 90 days, monitoring the shipment and transfer of radiation sources and personally supervising preparation and shipment, coordinating with laboratory employees and their supervisors to ensure that radiation workers are sufficiently trained to perform safely, ensuring that monthly film badge service is provided, and reviewing and recording employee exposures on a monthly basis.

Supplement #5 continued

The type of personnel monitoring device used at Harry Diamond Laboratories is the film badge. Both whole body and wrist beta gamma badges are available. The badges are supplied and evaluated on a monthly basis by the U.S. Army Ionizing Radiation Dosimetry Center, ATTN: AMXTM-CB-DCR, Lexington, KY 40511-S102. Personnel exposure results are recorded on a monthly basis, and reviewed by the Radiation Protection Officer on a quarterly basis.

Supplement #6

Item 11, NRC Form 313, Waste Disposal

Waste disposal will be handled through the U.S. Army Armament Material Readiness Command, Rock Island, IL, in accordance with the procedures delineated in Army Regulation 385-11, "Ionizing Radiation Protection".

26 OCT 1987

BETWEEN:

LICENSE FEE MANAGEMENT BRANCH, ARM
AND
REGIONAL LICENSING SECTIONS

(FOR LFMS USE)
INFORMATION FROM LMS

PROGRAM CODE: 03124
STATUS CODE: 2
FEE CATEGORY: EX 3P
EXP. DATE: 19871231
FEE COMMENTS:

LICENSE FEE TRANSMITTAL

4. REGION

1. APPLICATION ATTACHED

APPLICANT/LICENSEE: ARMY, DEPARTMENT OF THE
RECEIVED DATE: 871026
DOCKET NO: 3012438
CONTROL NO.: 107972
LICENSE NO.: 19-17250-01
ACTION TYPE: RENEWAL

2. FEE ATTACHED

AMOUNT: \$
CHECK NO.: -----

3. COMMENTS

SIGNED
DATE

[Signature]
10/29/87

5. LICENSE FEE MANAGEMENT BRANCH (CHECK WHEN MILESTONE 03 IS ENTERED /_/_/)

1. FEE CATEGORY AND AMOUNT: -----

2. CORRECT FEE PAID. APPLICATION MAY BE PROCESSED FOR:

AMENDMENT -----
RENEWAL -----
LICENSE -----

3. OTHER -----

SIGNED
DATE

