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

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

APPLICATION FOR MATERIAL LICENSE

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

FEDERAL AGENCIES FILE APPLICATIONS WITH:

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

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

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

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

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

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

IF YOU ARE LOCATED IN:

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

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

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

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

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

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

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

1. THIS IS AN APPLICATION FOR *(Check appropriate item)*
   - [X] A. NEW LICENSE
   - [ ] B. AMENDMENT TO LICENSE NUMBER ____________
   - [ ] C. RENEWAL OF LICENSE NUMBER ____________

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

   University of Dayton
   300 College Park Avenue
   Dayton, OH 45469

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

   University of Dayton
   300 College Park Avenue
   Dayton, OH 45469

8512060373 850628
REG3 LIC30
34-07958-05 PDR

4. NAME OF PERSON TO BE CONTACTED ABOUT THIS APPLICATION: Dr. Richard S. Harmer (Radiation Safety Officer)
   TELEPHONE NUMBER: (513) 229-3527

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

5. RADIOACTIVE MATERIAL
   a. Element and mass number; b. chemical and/or physical form; and c. maximum amount which will be possessed at any one time.
6. PURPOSE(S) FOR WHICH LICENSED MATERIAL WILL BE USED.
7. INDIVIDUAL(S) RESPONSIBLE FOR RADIATION SAFETY PROGRAM AND THEIR TRAINING AND EXPERIENCE.
8. TRAINING FOR INDIVIDUALS WORKING IN OR FREQUENTING RESTRICTED AREAS.
9. FACILITIES AND EQUIPMENT.
10. RADIATION SAFETY PROGRAM.
11. WASTE MANAGEMENT.
12. LICENSEE FEES *(See 10 CFR 170 and Section 170.31)*
    FEE CATEGORY: Exempt-Category 3L
    AMOUNT ENCLOSED $ 0

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

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

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

SIGNATURE—CERTIFYING OFFICER	TYPED/PRINTED NAME	TITLE	DATE
[signature]	George B. Noland	Associate Provost	3/28/85

14. VOLUNTARY ECONOMIC DATA

a. ANNUAL RECEIPTS		
[ ] <$250K	[ ] $1M–3.5M	
[ ] $250K–500K	[ ] $3.5M–7M	
[ ] $500K–750K	[ ] $7M–10M	
[ ] $750K–1M	[ ] >$10M	

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

c. NUMBER OF BEDS

d. WOULD YOU BE WILLING TO FURNISH COST INFORMATION *(Dollar and/or staff hours)* ON THE ECONOMIC IMPACT OF CURRENT NRC REGULATIONS OR ANY FUTURE PROPOSED NRC REGULATIONS THAT MAY AFFECT YOU? *(NRC regulations permit it to protect confidential commercial or financial—proprietary—information furnished to the agency in confidence)*
[ ] YES [ ] NO

RECEIVED
APR 03 1985
REGION III

FOR NRC USE ONLY

TYPE OF FEE	FEE LOG	FEE CATEGORY	COMMENTS	APPROVED BY
appl	apr 18	3L	FEE EXEMPT	CP
AMOUNT RECEIVED	CHECK NUMBER		CONTROL NO. 78657	DATE 4/10/85

PRIVACY ACT STATEMENT ON THE REVERSE

PRIVACY ACT STATEMENT

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

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

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

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

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

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

ITEM 5. MATERIAL TO BE LICENSED

Ref. No.	(5a) Element and Mass No.	5(b) Chemical and/or Physical form	(5c) Maximum activity to be possessed
1.	Any byproduct material with Atomic Nos. 3 to 83 inclusive	Any	25 millicuries of each byproduct material with Atomic Nos. 3 to 83 inclusive, with a total of 250 millicuries except as listed specifically below.
2.	Hydrogen-3	Any	50 millicuries
3.	Carbon-14	Any	50 millicuries
4.	Calcium-45	Any	5 millicuries
5.	Iron-55	Any	5 millicuries
6.	Strontium-90	Any	1 millicurie
7.	Bismuth-207	Any	1 millicurie
8.	Americium-241	Any	2 millicuries
9.	Promethium-147	Sealed Source (Radio Chemical Centre Model No. PHX.31)	10 Curies
10.	Hydrogen-3	Foil Source (Varian Aerograph Electron Capture Detector Cell Model No. 02-1681-01)	1 Curie
11.	Nickel-63	Foil Source (Varian Associates Electron Capture Detector Cell Model No. 2020	8 millicuries

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

Materials listed under ITEM 5, Material to be licensed, reference numbers 1 through 8, will be used for biological and biochemical laboratory research and for student instruction. Materials listed under ITEM 5, reference numbers 10 and 11 are for used in gas chromatography units for sample analysis.

ITEM 7. INDIVIDUALS RESPONSIBLE FOR RADIATION SAFETY PROGRAM AND THEIR TRAINING AND EXPERIENCE

7.1 Individual Who Will Supervise Use.

Radioactive materials are to be used by or under the direct supervision of individuals designated by the radiation safety committee. The names of these individuals, their training and experience is listed under item 7.3.

7.2 Radiation Protection Officer.

The radiation protection program at the University of Dayton, presented in detail under Item 10 of this application, is directed by the Radiation Protection Officer and his technical advisor. Dr. Richard S. Harmer is the Radiation Protection Officer(RPO) and his duties encompass all the administrative recordkeeping and monitoring activities required of that office and the required enforcement activities. Dr. Donald R. Geiger of the biololgy department serves as technical advisor on matters involving radiation safety. The experience and training of these individuals is listed below.

Name: Richard S. Harmer
Education : Ph.D., Ceramic Engineering, Univeristy of Illinois, 1971.
Title: Associate Professor, Mechanical Engineering
Research Ceramist, Research Institute
Radiation Training:
Graduate level X-ray Diffraction course at the Univeristy of Illinois, 1963.
Radiation Experience:
1963-present:Use and maintenance of x-ray difffraction and x-ray spectroscopy equipment used in materials research.
1980-present: Radiation Protection Officer for the University of Dayton, NRC License 34-07958-01, Amendment 16.

Name: Donald R. Geiger
Education: Ph.D., Biology, Ohio State University, 1963.
Title: Professor, Biology.
Radiation Training:
Radiation Biology, Ohio State University, 1963.
Radiation Experience
1960-present: Research and teaching using H-3, C-14, P-32, P-33, Cr-51, Fe-59, Rb-86, I-125, I-129, I-131, and Pm-147

Teaches upper-level undergraduate course in radiation biology, BIO 410.
Radiation Protection Officer for University of Dayton until 1980, NRC License 34-07958-01, Amendment 13.

Duties and Responsibilities of the Radiation Protection Officer.

The office of the Radiation Protection Officer is responsible for the general oversight of the acquisition, use, and disposal of byproduct materials and byproduct wastes, the maintenance of all records related to the byproduct material license and as required by paragraph 30.51 of 10 CFR Part 30, and compliance with rules, regulations, and license conditions. The RPO is also chairman of the Radiation Protection Committee and oversees implementation of the use and safety policies established by that committee. Detailed responsibilities are listed below.

A. Serves as the communications link between the Univeristy of Dayton and the USNRC on all matters relating to the NRC byproduct license.

   As such, the RPO provides the NRC with information and data necessary to the license and communicates NRC rules, changes in rules, and advisory information to byproduct users at the University.

B. Oversees the acquisition, use, and disposal of byproduct materials at the University in order to assure compliance with license.

   1. Approves all purchase requests for byproduct material and checks possession inventory to assure limits not exceeded prior to issuance of purchase orders.
   2. Inspects and unpacks all byproduct material received. Records results of receiving inspection and monitoring and enters isotope into the inventory log.
   3. Maintains copies of disposal records and adjusts inventory accordingly.

C. Maintains current copy of Title 10 CFR for reference use by byproduct materials users. Maintains a supply of Parts 19, 20, and 30 for users. Maintains current NRC license and current amendment and supplies copies of the license to materials suppliers.

D. Maintains the following files of records

   1. Roster of all approved users of byproduct materials, the locations, isotopes in use, and supervisors.
   2. Records of all byproduct material in the possession of the University of Dayton.
   3. Records of disposal of all radioactive waste.
   4. Dosimeter records for all users.
   5. All bioassay records.
   6. Wipe test results for all sealed sources.
   7. Records of results of safety monitoring - survey results and wipe tests - of locations in which byproducts are in use.
   8. Calibration records of survey instruments.

E. Provides radiation exposure history of former students and employees for other radiation safety officials upon request.

F. Oversees the proper disposal of radioactive wastes.

G. Assembles and maintains a radiation safety manual which explains

the main precautions for radioisotope use, the method of managing radiation safety at the University of Dayton, the responsibilities of all persons involved, including users.

H. Provides copies of safety rules, ordering procedures, handling procedures, emergency procedures for dealing with radioactive spills, etc. to all users of byproduct materials.

I. Provides consultation and orientation services to housekeeping and security personnel regarding the hazards and safety associated with working in areas where byproduct materials are in use.

7.3 Radiation Safety Committee.

The Radiation Safety Committee is composed of the departmental radiation safety officers representing the biology, chemistry, and physics departments, the radiation protection officer, the technical advisor to the RPO, and the Associate Provost, Dean for Graduate Studies and Research. Chairman and secretary for the radiation safety committee is the RPO. The committee will meet on a quarterly schedule unless a special meeting is requested by any committee member. Item 10.5 of this application details the responsibilities and powers of the committee.

Members of the radiation safety committee, their training and experience are as follows:

Radiation Protection Officer:
Name: Richard S. Harmer
See Item 7.2 for training and experience.

Technical Advisor
Name: Donald R. Geiger
See Item 7.2 for training and experience

Departmental Radiation Safety Officer, Biology
Name: Roy M. Ventullo
Education: Ph.D., Biology, University of Georgia, 1978.
Title: Assistant Professor, Biology
Radiation Training:
Radiation Safety course, State University of New York (Bockport), 1974
Radiation Experience:
1974-present: Research using H-3, C-14, and P-32.
Present: C-14 labeled hydrocarbons, bicarbonates, and amino acids.

Departmental Radiation Safety Officer, Chemistry
Name: Sanford S. Singer
Education: Ph.D., Chemistry, University of Michigan, 1967.
Title: Associate Professor, Chemistry
Radiation Training:
No formal training. On Job Training at A. Einstein College of Medicine, New York, 1967-1969, Temple University Medical School, Pennsylvania, 1969-1972.
Radiation Experience:
1967-present: Biochemistry research using H-3, C-14, P-32, and S-35.

Departmental Radiation Safety Officer, Physics
Name: James R. Schneider
Education: Ph.D., Physics, University of Cincinnati, 1965.
Title: Professor, Physics
Radiation Training:
Radioisotope Techniques, NSF Summer Institute, Massachusettes Institute of Technology, 1961.
Radiation Experience:
1960-present: Research using x-ray diffraction and spectroscopy. Teaching advanced undergraduate course in x-ray and gamma-ray spectroscopy.

Associate Provost
Dean for Graduate Studies and Research
Name: George B. Noland
Education: Ph.D., Biology, Michigan State University, 1955.
Title: Associate Provost
Dean for Graduate Studies and Research
Director, Research Institute

7.4 List of Qualified Users of Byproduct Materials

In addition to those individuals profiled above, several other faculty members have received formal training in radiation safety and are conducting research using byproduct materials. Their biographical data follow:

Name: Praphulla K. Bajpai
Education: Ph.D., Biology, Ohio State University, 1965.
Title: Professor, Biology
Radiation Training:
Radiation Biophysics, Ohio State University, 1962
Oakridge Laboratory, summer 1972, "Radioimmunoassay"
Radiation Experience:
1968-present: Research using H-3, Na-22, P-32, Ca-45, I-125, and I-131.

Name: John J. Rowe
Education: Ph.D., Biology, University of Kansas Medical Center, 1975
Title: Associate Professor, Biology
Radiation Training:
Certified radiation safety course at University of Georgia, 1977

Radiation Experience:
1975-present: Research using H-3, and C-14.

Name: Faye Schwelitz
Education: Ph.D., Biology, Purdue University, 1971.
Title: Associate Professor, Biology
Radiation Training:
Three radiation courses, Purdue University, 1968-1969.
Radiation Experience:
1973-present: Research using H-3 and P-32.

Name: Robert J. Kearns
Education: Ph.D., Biology, Washington State University,
Title: Assistant Professor
Radiation Training:
"Radiation Biology", Washington State University, 1976.
Radiation Experience:
1976-present: Research using H-3, Cr-51, and I-125.

Name: Mary Jo Vesper
Education: Ph.D., Biology, Ohio State University, 1978
Title: Assistant Professor
Radiation Training:
"Radioisotopes in Plant and Soil Research", Ohio State University, 1976.
Radiation Experience:
1974-present: Research using H-3, C-14, and Ca-45.

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

Not Applicable. See Item 10.6

ITEM 9. FACILITIES AND EQUIPMENT

The laboratories in which byproduct materials are used in research or teaching activities and the rooms used for storage of byproduct materials or wastes are listed below, in order according to department. The pages following present a summary of activities in and isotopes used in each facility. A floor plan, identifying areas of isotope use is also included for each room.

(a) Laboratory Facilities

(i) Biology Department
- (1) Sherman Hall, Room 30, Equipment Room.
- (2) Sherman Hall, Room 33, Plant Physiology.
- (3) Sherman Hall, Room 34, Plant Physiology.
- (4) Sherman Hall, Room 37, Animal Physiology.
- (5) Sherman Hall, Room 126, Microbiology/Immunology.
- (6) Sherman Hall, Room 204, Bioinstrumentation (teaching lab).
- (7) Sherman Hall, Room 213, Cell Biology.
- (8) Sherman Hall, Room 227, Microbiology.
- (9) Sherman Hall, Room 229, Microbiology.
- (10) Sherman Hall, Room 318, Developmental Biology.

(ii) Chemistry Department
- (1) Wohlleben Hall, Rooms 416-418, Biochemistry.

(iii) Physics Department
- (1) Sherman Hall, Room 22, Research Laboratory

(iv) Research Institute
- (1) Kettering Laboratories, Room 112, Environmental Sciences

(b) Storage Facilities

(i) Biology Department
- (1) Sherman Hall, Room 33, Floor well for storage of radioisotopes.

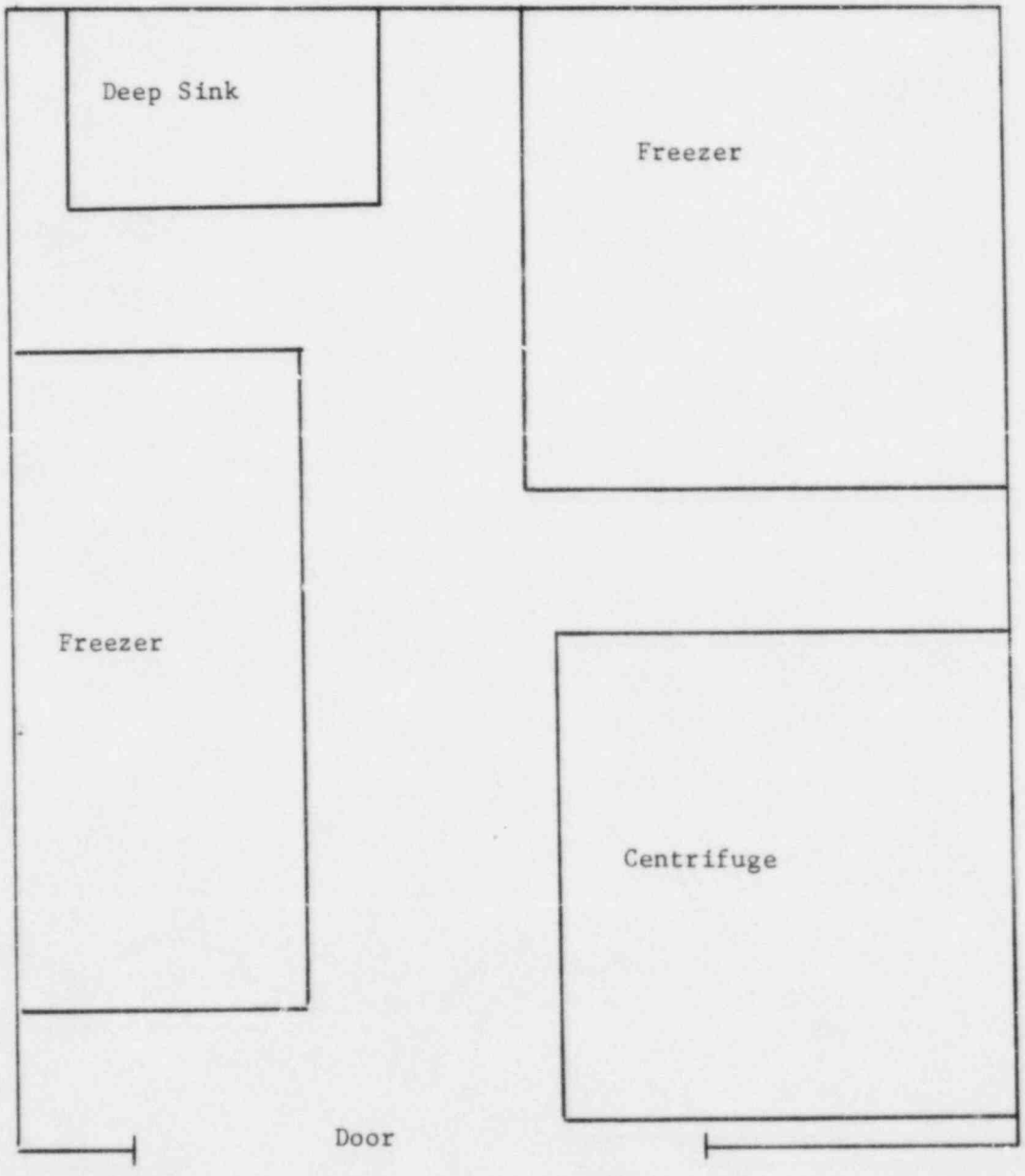
(ii) Physics Department
- (1) Sherman Hall, Room 22, Safe for storage of radioisotopes.

(iii) Chemistry Department
- (1) Wohlleben Hall, Storage Building, Radioactive waste storage.

Item 9. (continued)
Sketches of laboratories and description of laboratory use.

Room 30, Sherman Hall
Storage and Utility Room

This room contains two locked freezers for storage of material containing radioisotopes to be held for later disposal or for later processing and assay. Also labile solutions of labeled materials are stored in this room. Stored isotopes are all low level beta emitters so no measurable radiation field exists.

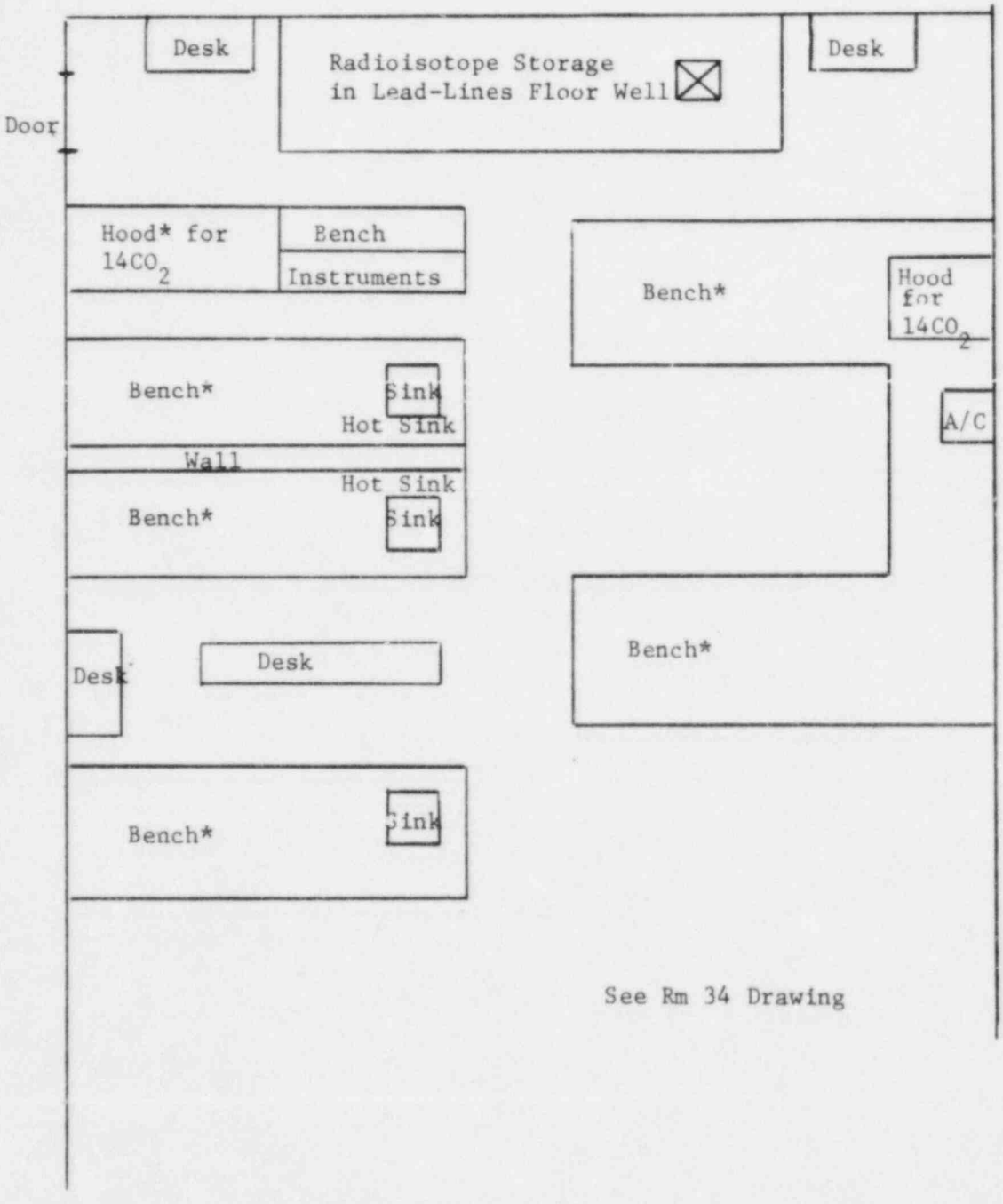


FACILITIES AND EQUIPMENT
ITEM 9.

Item 9. (continued)
Sketches of laboratories and description of laboratory use.

Room 33, Sherman Hall
Research Laboratory, Plant Physiology

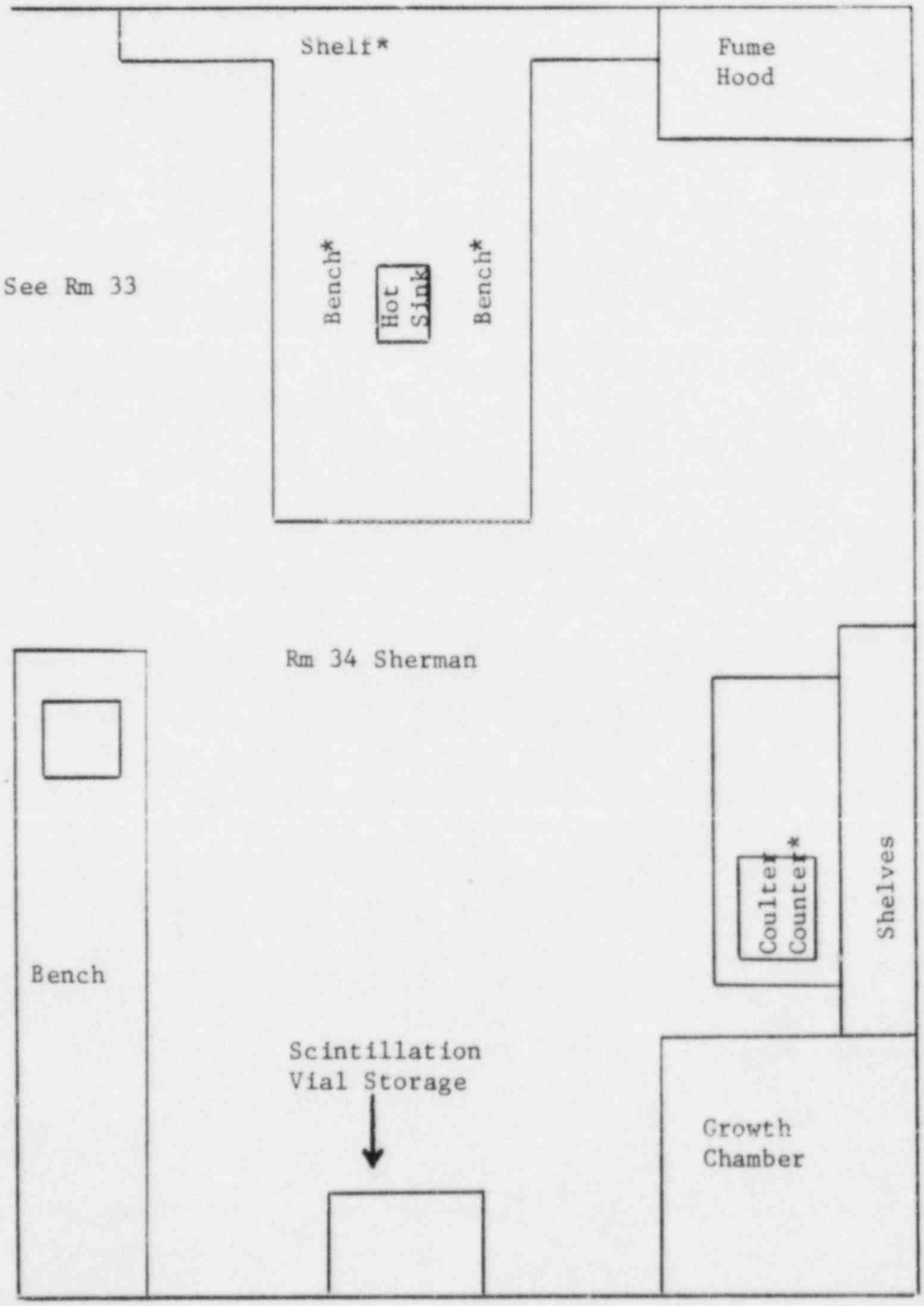
This room is used for research employing principally C-14 labeled compounds, including C-14 labeled carbon dioxide. Isotope use is limited to the counter tops and hood indicated by an asterisk. Two sinks are designated for disposal of radioisotopes. Radioisotopes which emit a significant field are stored in a locked room in Rom 33, within a lead lined floor well which is sealed with epoxy. Calibration sources are kept in this well.



Item 9. (continued)
Sketches of laboratories and description of laboratory use.

Room 34, Sherman Hall
Research Laboratory, Plant Physiology

Research in the laboratory involves use of H-3 and P-32. Isotopes are used on the counter tops and in the hood marked by asterisks. Phosphorous-32 labeled wastes are stored on top of the growth chamber for 10 half-lives prior to disposal.

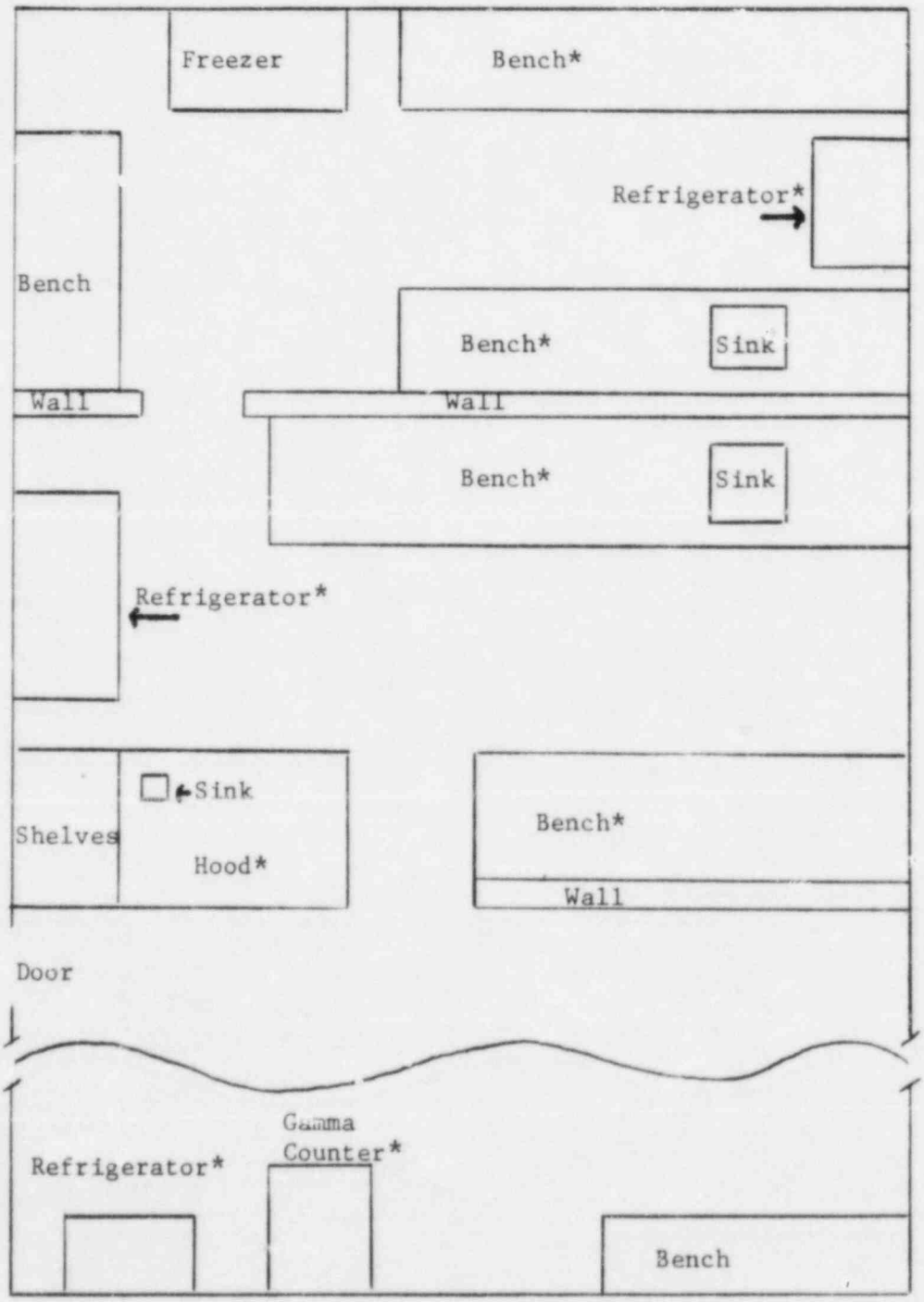


FACILITIES AND EQUIPMENT
ITEM 9.

Item 9. (continued)
Sketches of laboratories and description of laboratory use.

Room 37, Sherman Hall
Animal Physiology Laboratory

Animal physiology research is conducted in this area using I-131, I-125, P-32 and Ca-45 labeled materials. Work areas where isotopes are used are indicated by asterisks. Iodination is done in Room 213 Sherman Hall.

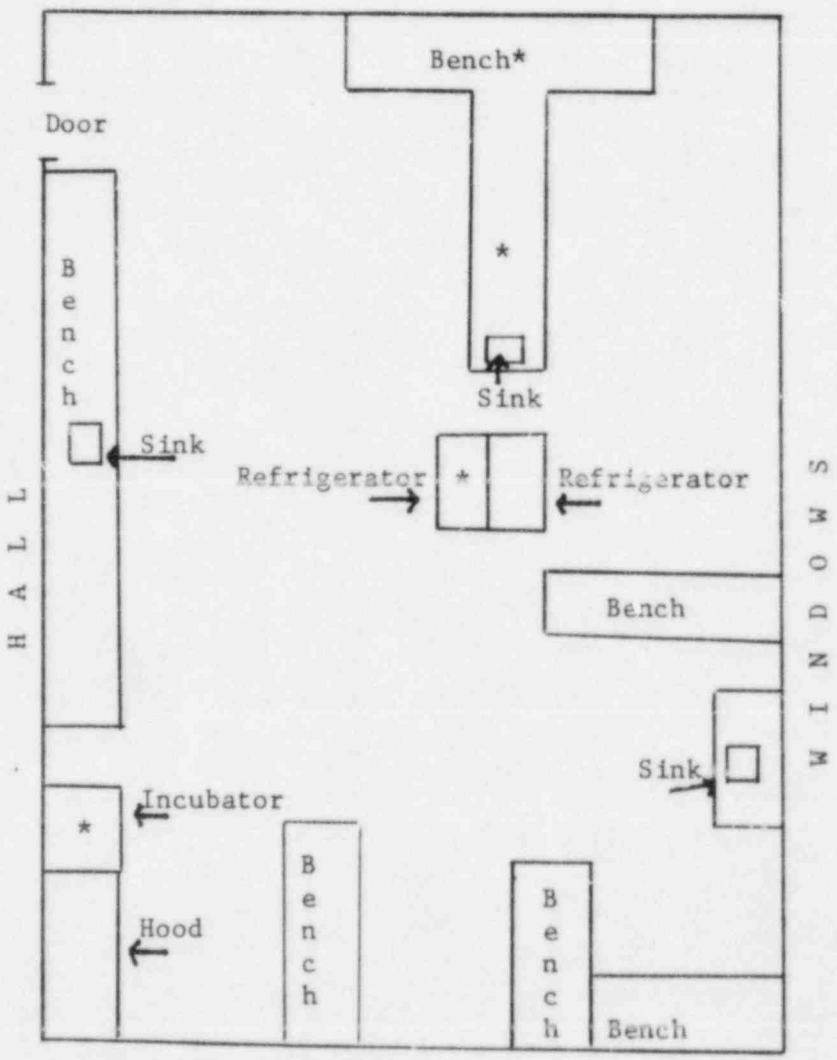


FACILITIES AND EQUIPMENT
ITEM 9.

Item 9. (continued)
Sketches of laboratories and description of laboratory use.

Room 126, Sherman Hall
Microbiology/Immunology

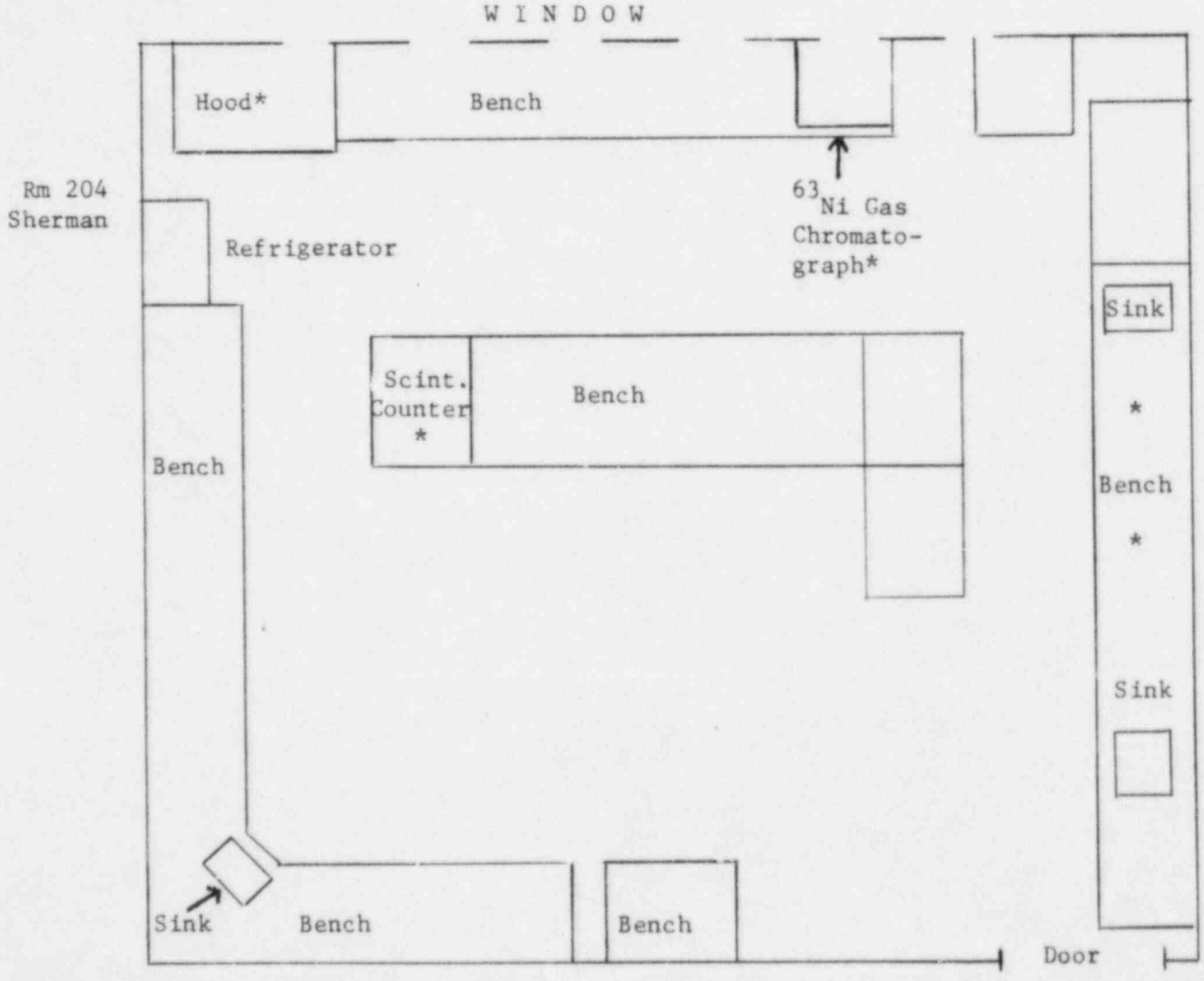
Isotopes used in this research laboratory include H-3 and Cr-51. Areas of radioisotope use are marked with an asterisk. Waste is disposed of in the marked hot sink and isotope storage is located in the marked refrigerator.



Item 9. (continued)
Sketches of laboratories and description of laboratory use.

Room 204 Sherman Hall
Bioinstrumentation Teaching Laboratory

This room is used as a countin room for liquid scintillation samples. Isotopes in use include H-3, C-14, and P-33. Carbon-14 samples are separated nd collected with the column and fraction collector and freeze-dried with the lyophlizer. Samples are stored temporarily in the refrigerator. All areas where radioisotopes are used are indicated by an asterisk. Scintillation fluor is temporarily stored in the hood until disposal.



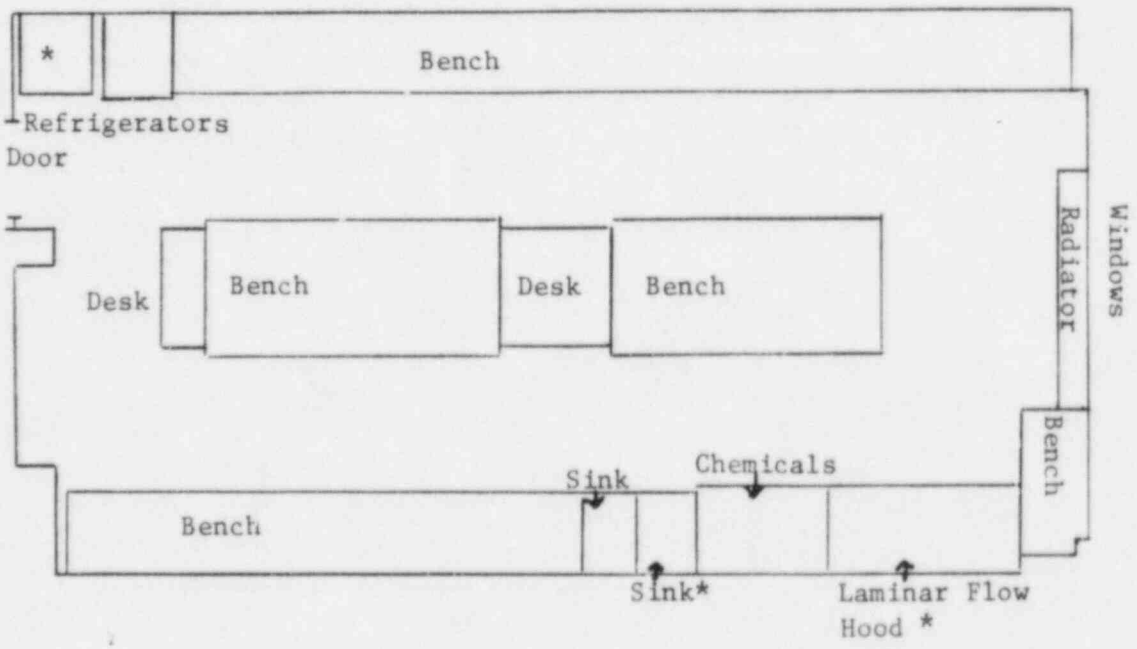
FACILITIES AND EQUIPMENT
ITEM 9.

CONTROL NO. 78657

Item 9. (continued)
Sketches of laboratories and description of laboratory use.

Room 213, Sherman Hall
Cell Biology Laboratory

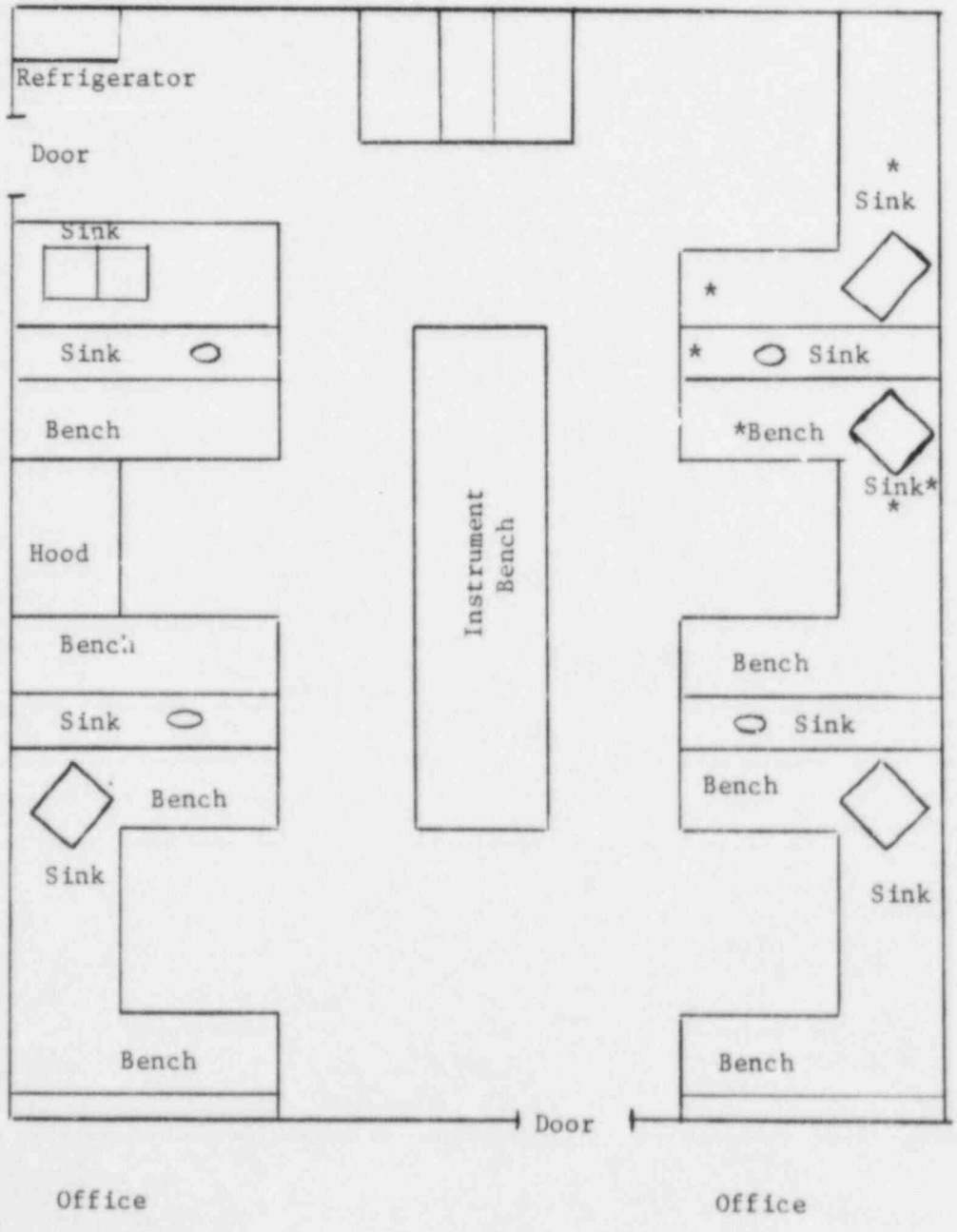
This room is a research laboratory using H-3 labeled materials. Radioisotopes are used on the bench tops and in the laminar flow hood marked with asterisks. Isotope storage is in the similarly marked refrigerator. Liquid waste is disposed of in the hot sink marked with an asterisk.



Item 9. (continued)
Sketches of laboratories and description of laboratory use.

Room 227, Sherman Hall
Microbiology Laboratory

Use of radioisotopes is restricted to bench tops and hood marked by asterisks. Liquid waste is disposed of in the hot sink similarly marked. Isotopes in use are primarily C-14 labeled materials. Radioisotope storage is in the refrigerator.

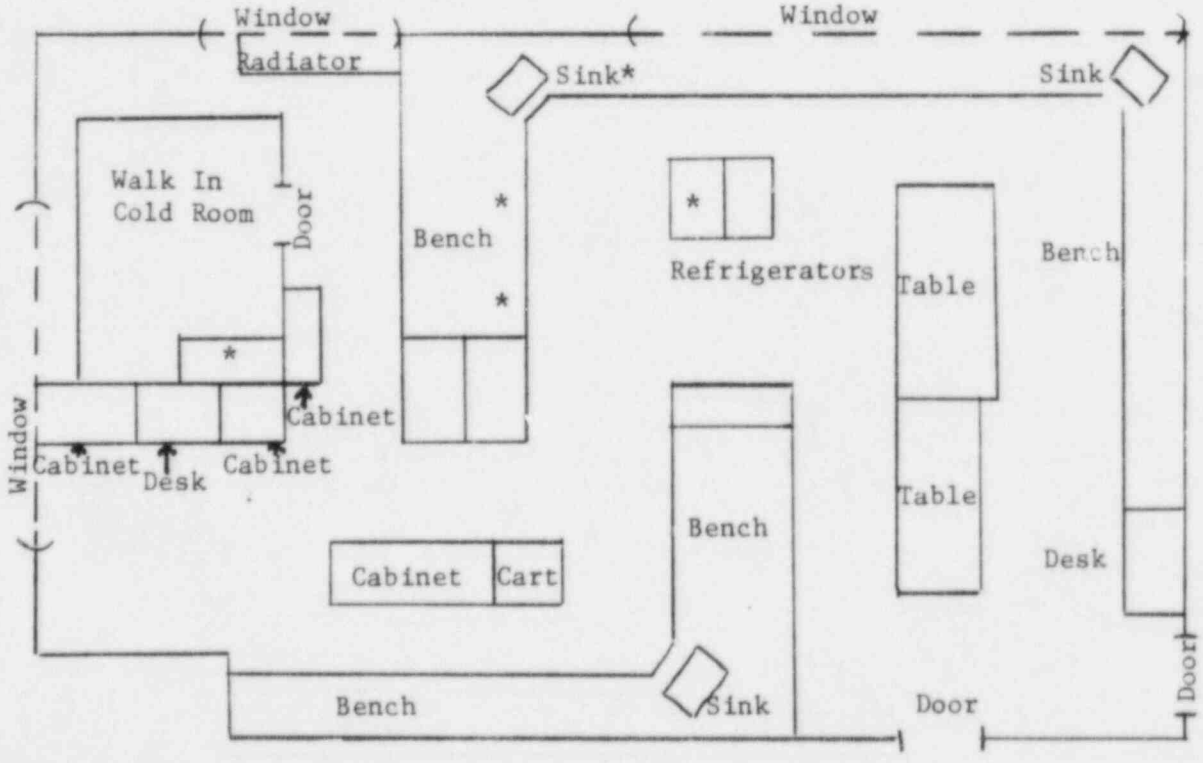


FACILITIES AND EQUIPMENT
ITEM 9.

Item 9. (continued)
Sketches of laboratories and description of laboratory use.

Room 229, Sherman Hall
Research Laboratory, Microbiology

Research in this laboratory involves the use of H-3 and C-14 labeled compounds. Radioisotopes are used on the bench tops marked by asterisks. Storage of isotopes is in the walk-in cold room. Wastes are temporarily stored on bench until disposal.

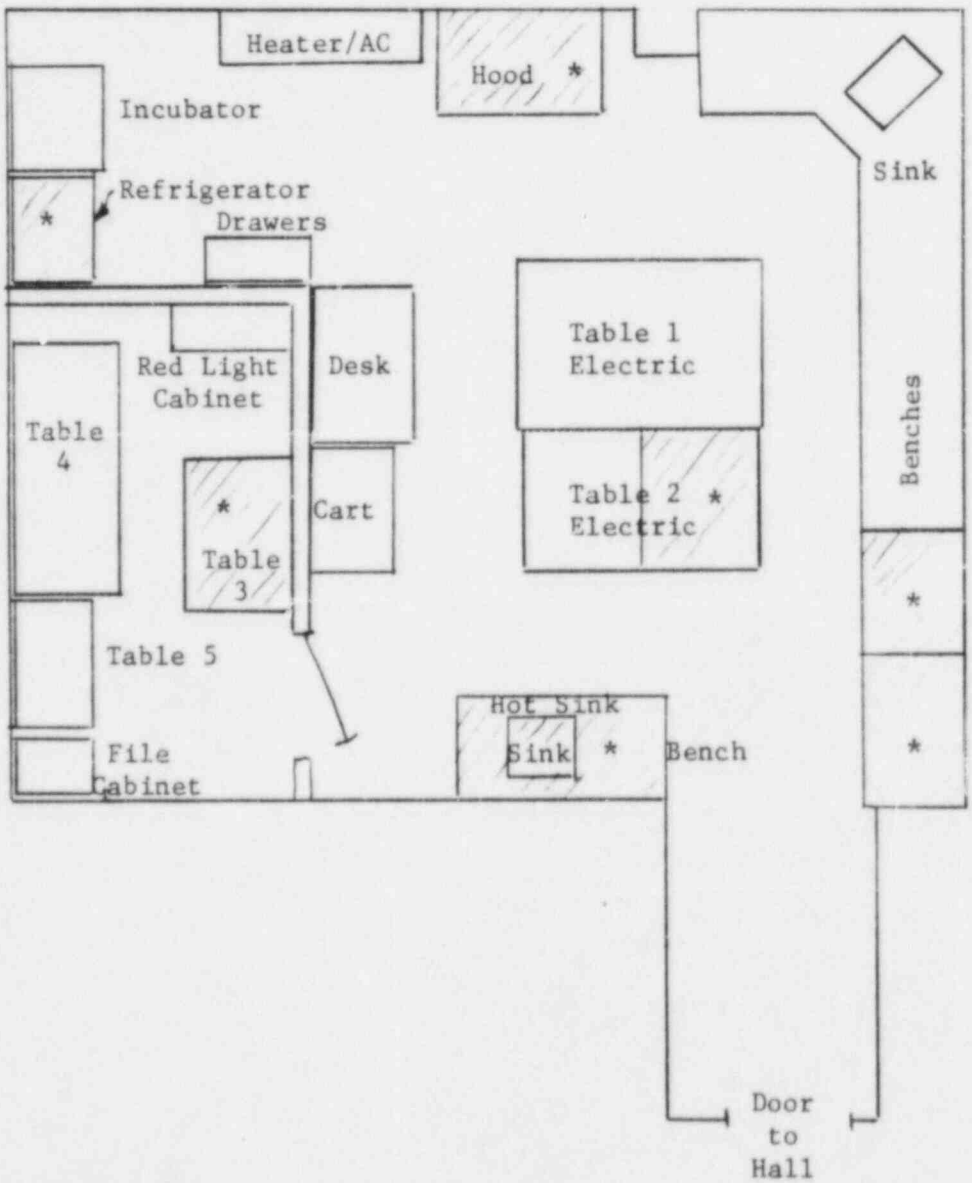


FACILITIES AND EQUIPMENT
ITEM 9.

Item 9. (continued)
Sketches of laboratories and description of laboratory use.

Room 318, Sherman Hall
Developmental Biology

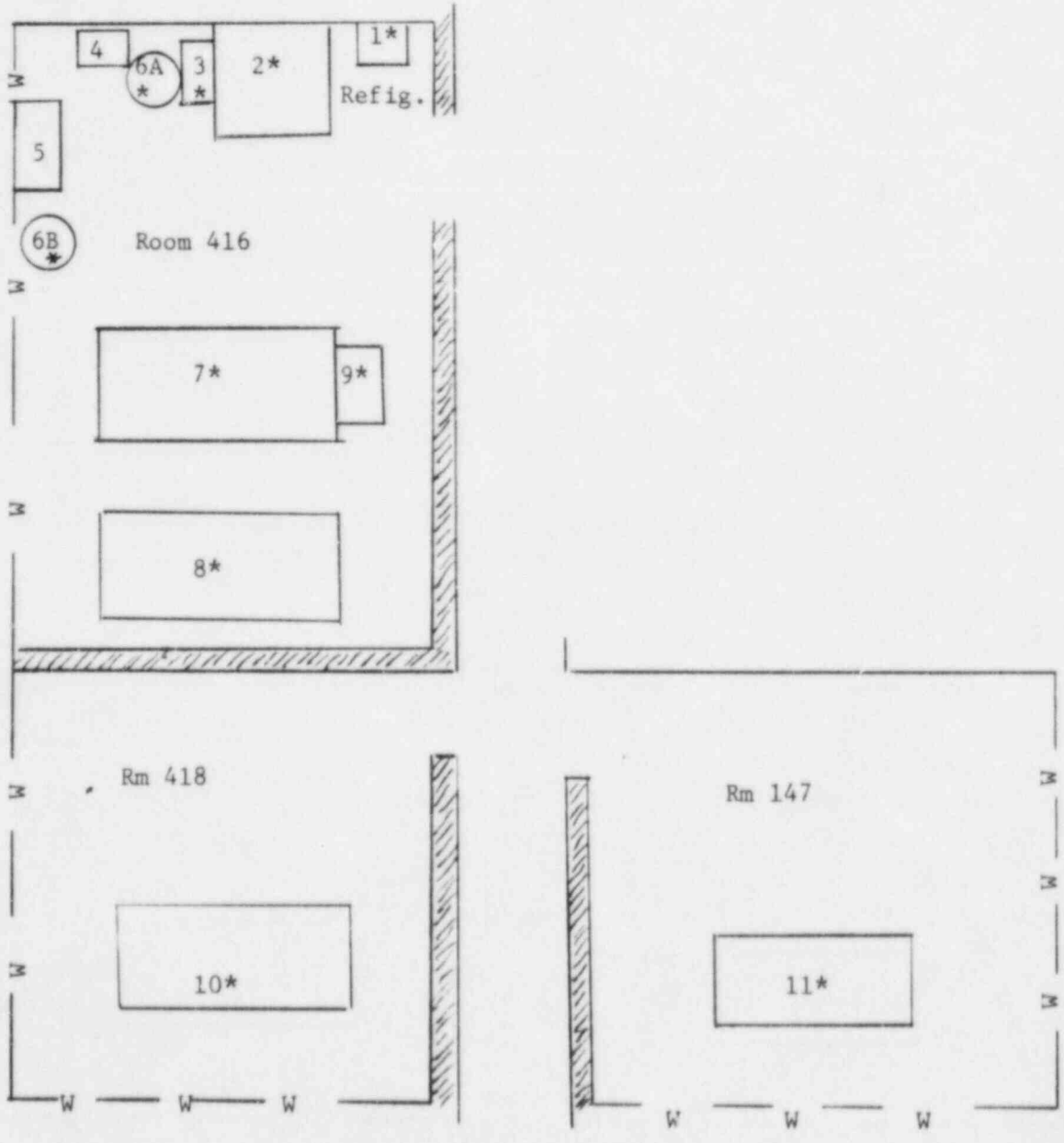
Research in this laboratory involves the use of H-3, C-14, and Ca-45. Bench tops, sink, and refrigerator, show as cross-hatched areas, are the areas radioisotopes are used. Waste is disposed of in the hot sink.



Item 9. (continued)
Sketches of laboratories and description of laboratory use.

Rooms 416, 417, 418, Wohlleben Hall
Biochemistry Laboaratory

Radioisotopes used in this laboratory are restricted to H-3, C-14, and S-35. Use of isotopes is restricted to the areas marked with an asterisk. Liquid waste is disposed of in the sink marked by an asterisk. Animal carcasses are stored in the refrigerator marked "4" and isotopes are stored cold boxes marked "1", "2", and "3".

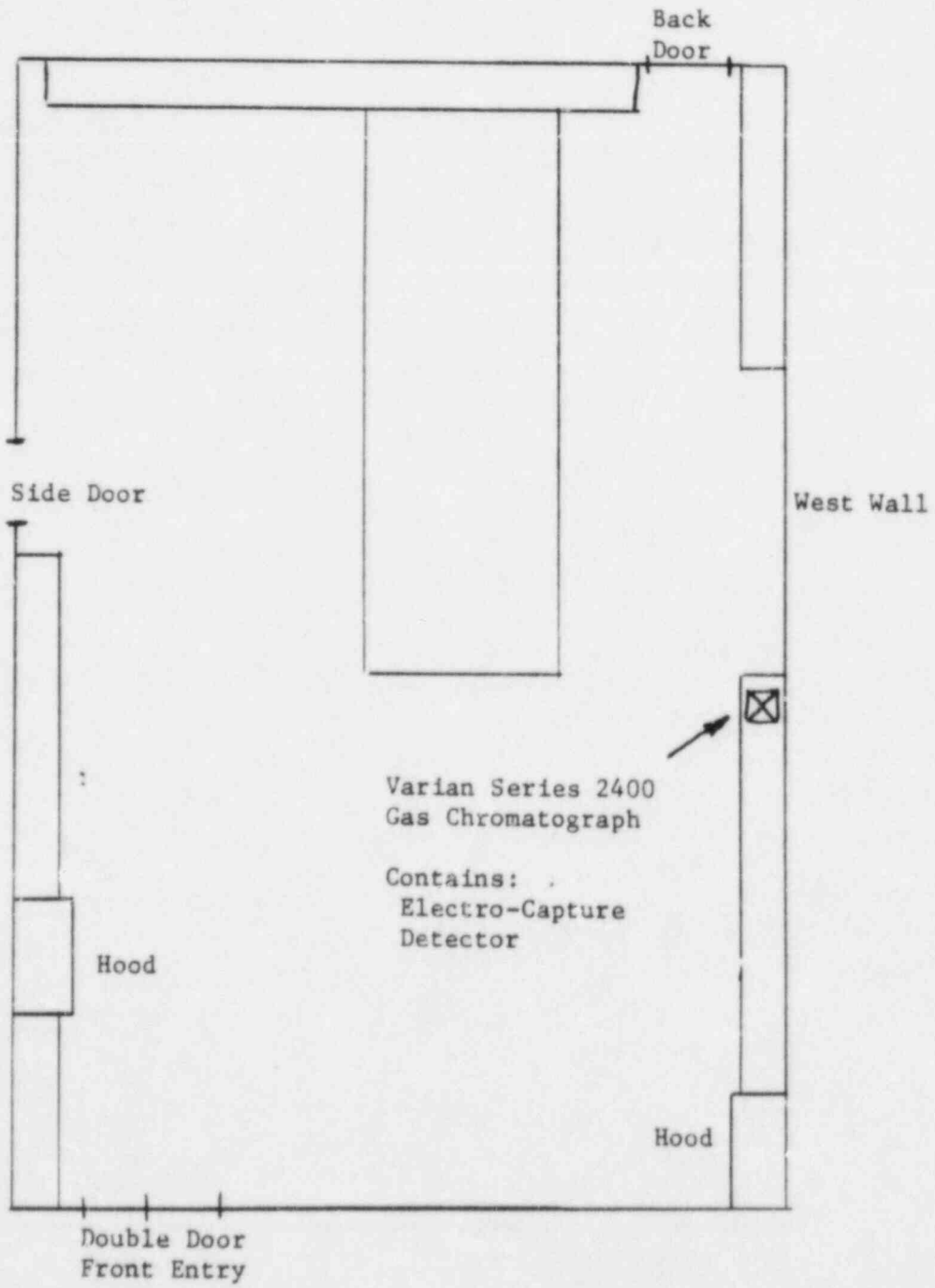


FACILITIES AND EQUIPMENT
ITEM 9.

Item 9. (continued)
Sketches of laboratories and description of laboratory use.

Room 22, Sherman Hall
Resarch Laboratory

This room is used for storage of solid radioisotope samples for use in calibration of radiation detectors. All isotopes are immobilized in metallic or plastic discs and are store in the locked safe marked with an asterisk.

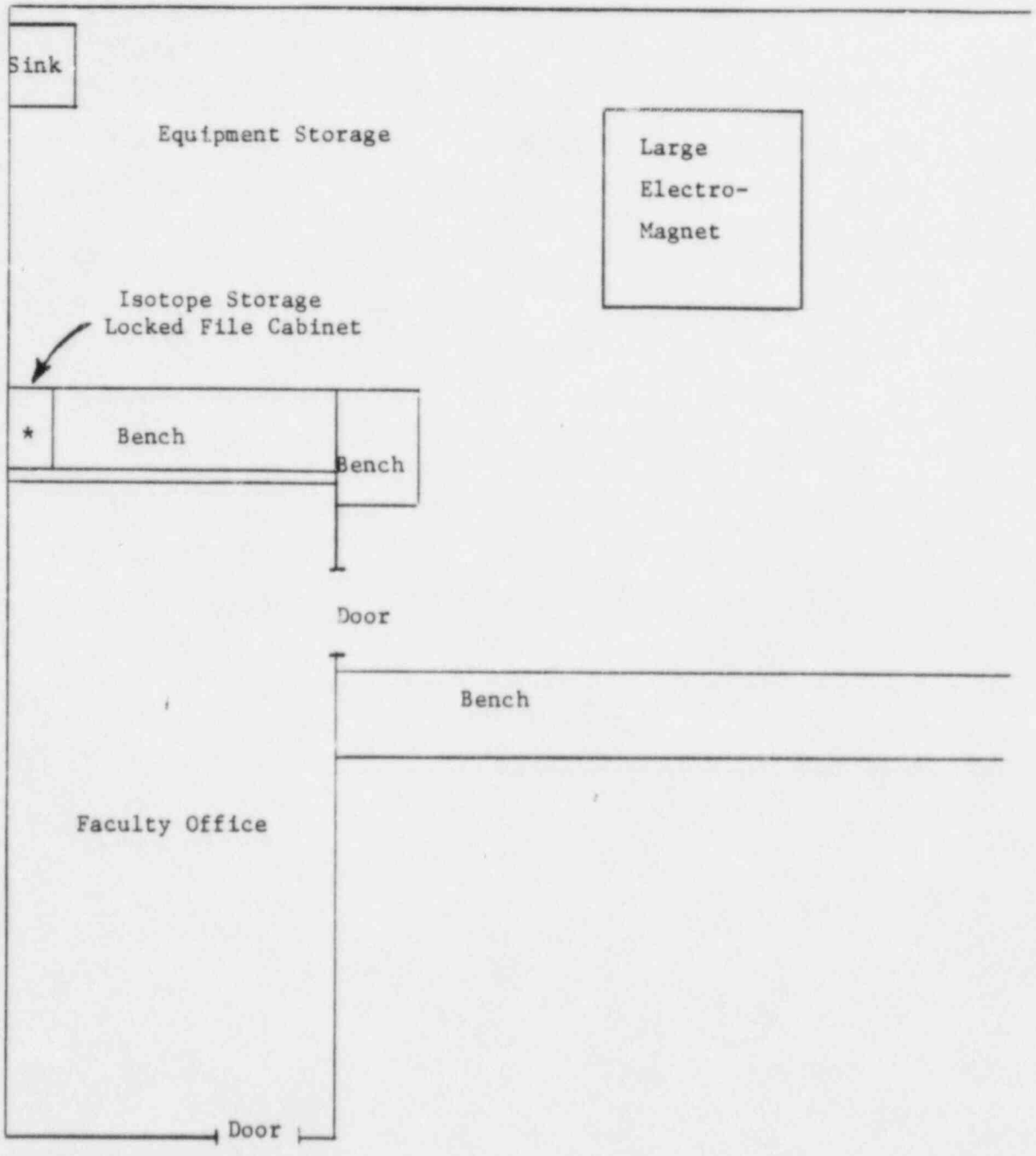


FACILITIES AND EQUIPMENT
ITEM 9.

Item 9. (continued)
Sketches of laboratories and description of laboratory use.

Room 112, Kettering Laboratories
Environmental Chemistry Laboratories

The radioisotopes used in these laboratories are sealed sources enclosed in electron capture detectors for gas chromatography. Radiation is confined within the detectors and the sources are wipe tested for leakage semi-annually.

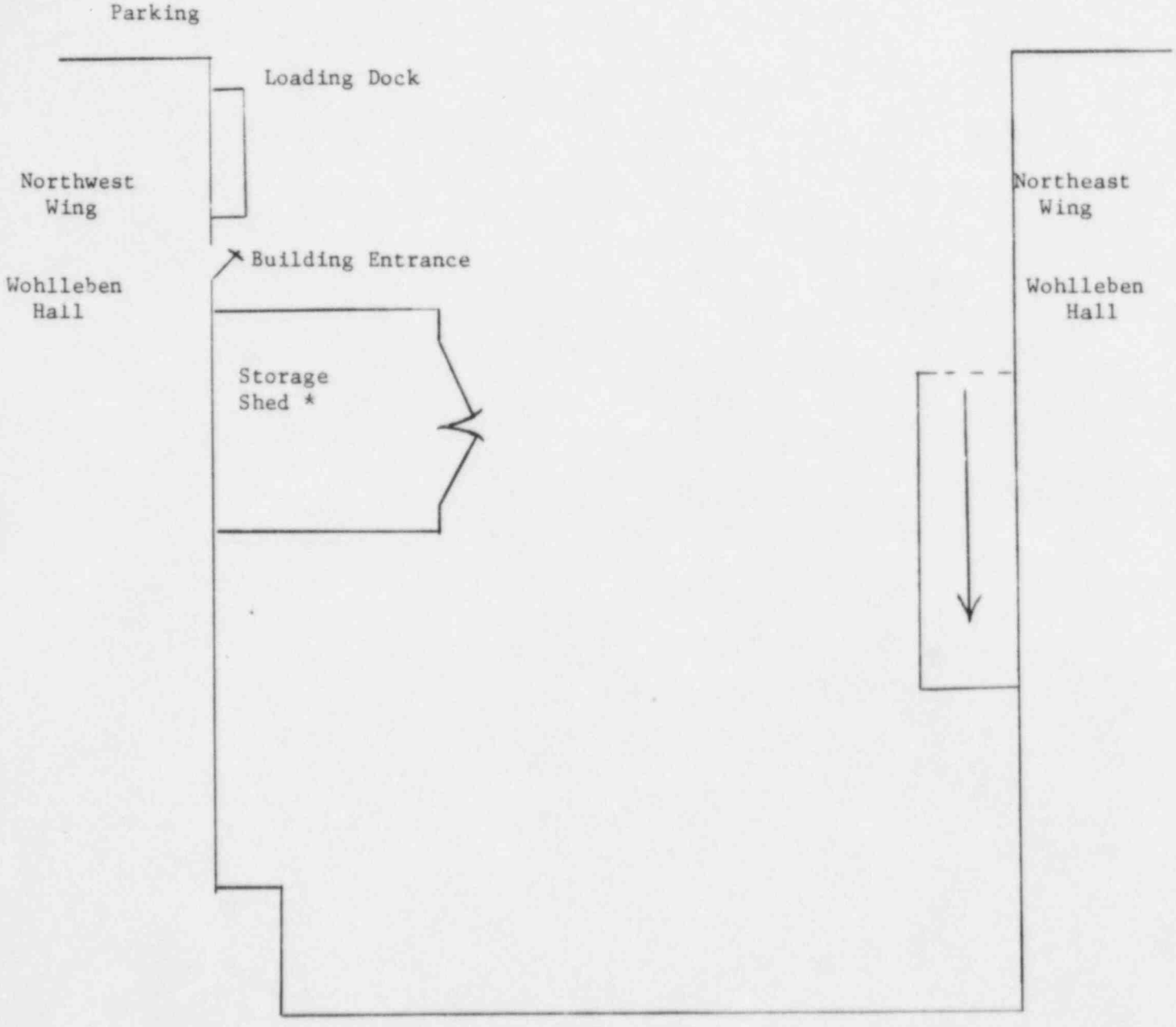


FACILITIES AND EQUIPMENT
ITEM 9.

Item 9. (continued)
Sketches of laboratories and description of laboratory use.

Storage Shed, Wohlleben Hall

This facility is used for storage of radioactive wastes until proper disposal is carried out.



FACILITIES AND EQUIPMENT
ITEM 9.

ITEM 10. RADIATION SAFETY PROGRAM

ITEM 10.1 RADIATION DETECTION INSTRUMENTS

Ref. No.	Type of Instrument	Manufacturer's Name	Model No.	No. Avail.	Radiation Detected	Sensitivity Range
Biology Department						
10-1	Liquid Scintillation Counter	Searle	Delta 300	1	Beta	>50CPM
10-2	Liquid Scintillation Counter	Nuclear	6825	1	Beta	>50CPM
10-3	Crystal Scintillation Counter	Nuclear Chicago	1085	1	Gamma	>50CPM
10-4	Hand Held G-M Monitor	Texas Nuclear	2650	2	Gamma Beta	100CPM
10-5	Dosimeter	Victoreen	570	1	X-ray Gamma	> 2r
Chemistry Department						
10-6	Liquid Scintillation Counter	Intertechnique	SL30	1	Beta	>50CPM
10-7	Hand Held G-M Monitor	Texas Nuclear	2650	1	Gamma Beta	100CPM
Research Institute						
10-8	Hand Held G-M Monitor	Jordan Electronics	AGB-50A-SR	1	Gamma Beta	0.1mr/hr.
10-9	Dosimeter	Victoreen	570	2	X-ray	> 200mr
10-10	Dosimeter	Dosimeter Corp.	002	1	X-ray	> 200mr
10-11	Dosimeter	LEC	14434	1	X-ray	> 200mr

No air monitoring or air sampling equipment is installed. Byproduct materials used at the University of Dayton are almost exclusively in solution form. The only likely airborn radioisotopes would be C-14, as plant respirated carbon dioxide, and I-125. When these conditions exist, experimental research is performed in laboratory hoods having positive drafts.

All radiation survey instruments are available to individual byproduct users for

routine survey activities within their respective laboratories. Liquid scintillation counters, Ref. No. 10-1, 10-2, and 10-6, are routinely used for wipe test surveys of laboratory areas where byproduct materials are used and for leak testing sealed sources.

ITEM 10.2 CALIBRATION OF INSTRUMENTS LISTED IN ITEM 10.1.

(1) Hand Held GM Monitors - Ref. No. 10-4, 10-7, and 10-8.

At the current time, the Radiation Protection Officer is evaluating the feasibility of establishing a calibration laboratory on site. Until this study is finished and procedures for calibration are filed and approved by the NRC, calibration will be performed by Dosimeter Corporation of America, 6106 Interstate Circle, Cincinnati, Ohio 45242. Calibration will be performed semi-annually by Dosimeter Corporation or after any repair to the instruments.

Following calibration, survey instruments will be checked against secondary standards at the University of Dayton. These data will then used to frequently check calibration and if significant deviation occurs, recalibration will be ordered..

(2) Liquid Scintillation Detectors - Ref. No. 10-1, 10-2, and 10-6.

Searle Analytic C-14 and H-3 sealed counting standards sets are used at least weekly.

(3) Crystal Scintillation Counter - Ref. No. 10-3.

Calibrated gamma sources are used to calibrate the instruments before use for monitoring purposes.

ITEM 10.3. PERSONNEL MONITORING DEVICES

Type	Supplier, Model, Sensitivity	Exchange Frequency
Biology and Chemistry		
TLD Badges	Eberline, Inc.	Monthly
Research Institute		
Film Badges	R.S. Laudauer	Monthly
Film Badges	Siemens Gammasonic	Monthly
Dosimeter (2 ea.)	Victoreen Model 541R - 200mr	Daily
Dosimeter	Dosimeter Corp. Model 002 - 200 mr	Daily
Dosimeter	LEC Model 14434 - 200 mr	Daily

10.4 BIOASSAY PROGRAM

Tritium Bioassay. The tritium used at the University of Dayton is present in two forms - organic chemicals used in the biology and chemistry departments (less than 15 millicuries in possession) and as a sealed source in gas chromatograph electron capture detector.

In reviewing the "Guidelines for Bioassay Requirements for Tritium" published by the USNRC Division of Fuel Cycle and Material Safety, October 19,1977, the conditions under which bioassay for tritium is required are not present at the University of Dayton. The amount of tritium processed at one time or the total amount processed monthly is always less than one tenth of the amount shown in Table 1 of the above cited guidelines. This conclusion is based upon the assumption that sealed sources are not intended to be covered by the quantity limitations stated in the guidelines.

Bioassay for tritium is not required and will not performed unless tritium use changes significantly. Appropriate reports will be filed with the NRC should such a change in our bioassay postion occur.

Iodine Bioassay I-125 and I-131. Radioiodine, as used in research programs at the University of Dayton, is used in the form of a bound, nonvolatile hormone or organic compound. It is contained in sealed containers and accessed by hypodermic syringe and then only in positive draft fume hoods. The total worked with at any one time is far less than 10 millicuries and, as such, is at a level well below those requiring bioassay as specified in Table 1, USNRC Regulatory Guide 8.20, Revision 1, September 1979. Therefore, bioassay for radioiodine is not required unless requested by individuals working with these materials.

All students and/or technicians working with these materials are informed of the hazards associated with working with I-125 and I-131 and are informed of the optional bioassay program.

Bicassays for tritium and for radioiodine will be required when and if the quantities and forms of these isotopes processed are such that either the "Guidelines for Bioassay Requirements for Tritium" published by the USNRC Division of Fuel Cycle and Material Safety, October 19,1977 or Table 1, USNRC Regulatory Guide 8.20, Revision 1, September 1979 or subsequently issued guidelines require bioassay.

10.5 RADIATION SAFETY COMMITTEE - DUTIES AND RESPONSIBILITIES

The Radiation Safety Committee (RSC), is officially an advisory group assisting the Associate Provost and the RPO. Being staffed by the Associate Provost, the RPO, the technical advisor to the RPO, and the departmental RSOs, the RSC is in effect, fully responsible for the establishment, operation, and enforcement of the radiation safety program at the University of Dayton. Through its meetings, it approves all policies dealing with the use and disposal of byproduct materials and wastes. Primary authority regarding enforcement of the safety program lies with the RPO. Final authority, however, lies with the Associate Provost.

Meetings of the RSC will be held on quarterly schedule unless special meetings are called for by any member of the committee. Quorum for any meeting will be a simple majority of the six members. Of the six committee members, only the RPO, Dr. Richard S. Harmer must be present. Minutes of these meetings are maintained by the RPO, who then provides the committee members with copies. The last meeting of the calendar year is used to to review the entire safety program and to review records

maintained for the NRC.

10.6 RADIATION PROTECTION PROCEDURES

Radiation protection procedures at the University of Dayton are contained in documents covering areas such as ordering byproduct materials, receiving and inspection of incomming byproduct materials, both during regular business hours and off-duty hours, secure storage of radioactive materials, surveying of unrestricted areas, instructions to students, housekeeping and security personnel, laboratory technicians and animal caretakers, general safety instructions and emergency procedures for dealing with spills of byproduct materials. In addition, each user of byproduct materials is provided with 10 CFR parts 19, 20, 21, and 30-35. Each user also receipts to the RPO that he or she has read parts 19 and 20 and that the laboratories under their direction are in compliance with the rules contained in those parts of 10 CFR.

The following pages contain the procedures extablished in the areas listed above.

PROCEDURES FOR ORDERING RADIOACTIVE MATERIALS

Procedures for ordering byproduct materials require approval of the RPO and as such, insure that possession limits specified in the NRC license are not exceeded. The procedures are as follows:

1. Purchase Request Forms are completed by the scientist using the byproduct material and approved by the appropriate supervisory personnel.

2. Completed Purchase Order Forms are then forwarded to the RPO, who after checking the current inventory of byproduct material in possession at the University and ensuring possession limits as specified in the NRC license are not exceeded, approves the request, records the request in the byproduct log, and transmits the purchase request to the Research Institute Purchasing Office.

3. Purchase orders are then issued by Research Institute Purchasing Office only if the purchase request has been initialed by the RPO indicating his approval of the purchase.

4. Upon delivery and inspection of purchased byproduct material, the RPO enters the amount of byproduct material into the inventory records of the University.

In general, telephone orders for byproduct materials, placed by non-purchasing personnel are discouraged except under unusual circumstances. When telephone purchase orders are necessary, procedures are as follows:

1. The requesting scientist telephones the RPO requesting that a purchase order be issued. The scientist provides the RPO with the radioisotope being ordered, the amount being ordered, the chemical or physical form of the isotope, and the name of the supplier.

2. The RPO checks the possession inventory to ensure that possession limits are not exceeded and issues a written request to the Research Institute Purchasing Office that a purchase order number be issued to the requesting scientist.

3. The Research Institute Purchasing Office issues a purchase order number to the scientist who then places the order with the supplier.

4. Upon delivery and inspection of the purchased byproduct material, the RPO enters the amount of material into the inventory records of the University.

RECEIVING OF RADIOACTIVE MATERIALS

During normal business hours, byproduct material deliveries are made to Central Receiving for the University, Room 141 Kettering Laboratories. Upon such a delivery, Central Receiving personnel notify the RPO of the delivery. If visual inspection indicates possible damage to the package, the carrier is requested to remain on site until the RPO can determine if the the carrier or the delivery vehicle has been contaminated. Following inspection of the shipment and monitoring for leakage, the shipment quantity is checked against the purchase order, the arrival is logged in the possession inventory and the package is delivered to the purchasing scientist. The procedural memoranda relating to receiving and inspection, first issued in 1979 and amended to reflect current practice, are presented on following pages.

Off-hour deliveries, which have not occurred within the last five years, are received by Campus Security. The senior officer on duty will receive the package and store it in a secure location, Room 141 Kettering Laboratories. Should the package appear damaged or leaking, the officer immediately notifies the RPO and requests that the carrier remain on site until the possible contamination may be evaluated. The procedural memorandum to Campus security is presented following the previously mentioned receiving and inspection memoranda.

MEMORANDUM

TO: Shipping and Receiving

FROM: R.S. Harmer, Radiation Protection Officer

DATE: March 27, 1985

SUBJECT: Receiving Delivery of Radioactive Materials

In order that the University of Dayton complies with the rules and regulations of the Nuclear Regulatory Commission regarding possession and handling of radioactive materials, the following procedures are to be followed in receiving shipments of any such material.

1. Do not handle any packages containing radioactive materials without wearing disposable gloves.

2. Upon arrival of shipment, notify the radiation protection officer (Dr. Richard S. Harmer, ext 3527).

3. Visually inspect package for any sign of damage (e.g. wetness, puncture, crushed, etc.). If damage is apparent, request carrier to remain on site until the Radiation Safety Team can determine if the carrier or the delivery vehicle has been contaminated.

4. Do not open the package. The radiation safety team will open, inspect, and survey the contents for leakage and will confirm agreement between purchase order, shipping list, and assure agreement with possession limits stated in our NRC license.

On some occasion, the University may receive delivery of radioactive materials during hours or on dates when Shipping and Receiving is closed. On those occasions, receipt of the delivery will be performed by Campus Security.

Campus Security has been instructed to deliver the shipment to Room 141A K.L. (Mail Room), place it in a designated area, and secure the area. If, on any morning, such delivery has been found to have occurred, immediately notify the Radiation Officer and Radiation Protection Team.

RSH/ln

Procedures for Opening Packages Containing Radioactive Materials

Important: Do not handle packages without wearing disposable gloves and

1. Visually inspect package for any sign of damage (e.g. wetness, puncture, crushed). If damage is apparent, notify Radiation Protection Officer immediately.

2. Measure exposure rate @ 3 feet from package surface and record on Receipt Report. If dose is greater than 10 mR/Hr, stop procedure and notify Radiation Protection Officer.

3. Measure exposure rate @ surface of package and record on Receipt Report. If dose is greater than 200 mR/Hr, stop procedure and notify Radiation Protection Officer.

4. Put on gloves.

5. Open the outer package (following manufacturer's directions, if supplied) and remove packing slip. Open inner package to verify contents (compare requisition, packing slips, and label on bottle) check integrity of final source container (inspect for breakage of seals or vials, loss of liquid, discoloration of packing material). Check also that shipment does not exceed possession limits by contacting Radiation Protection Officer.

6. Wipe external surface of final source container with moistened cotton swab or filter paper held with forcepts, assay and record.

7. Monitor the packing material and packages for contamination before discarding:

   a. if contaminated, treat as radioactive waste;

   b. if not, obliterate radiation labels before discarding in regular trash.

Radiation Protection Officer

Dr. Richard S. Harmer ext. 3527

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Radioactive Shipment Receipt Report

1. P.O. # _____ Survey Date _____ Time _____

   Survey Officer _____

2. Condition of Package

   ____ O.K. ____ Punctured ____ Wet

   ____ Crushed ____ Other _____

3. Radiation Units of Label: _____ (mR/hr) (mCi) (μCi)

4. Survey Radiation Levels:

   a. Package Surface _____ (mR/Hr)

   b. 3 Feet From Surface _____ (mR/Hr)

5. Do Packing Slip and Container Label and Contents Agree?

   a) Radionuclide ____ yes ____ no difference _____

   b) Amount ____ yes ____ no difference _____

   c) Chemical For ____ yes ____ no difference _____

6. Wipe Test Results From

   a) Outer Package _____ CPM = _____ DPM

   eff = ( )

   b) Final Source Container _____ CPM = _____ DPM

   eff = ( )

7. Survey Results of Packing Materials and Cartons _____ (mR/Hr

8. Disposition of Package After Inspection _____

9. If NRC/Carrier notification required, give time, date, and persons notified.

MEMORANDUM

TO: Campus Security

FROM: R. S. Harmer, Radiation Protection Officer

DATE: 18 June 1980

SUBJECT: Receipt of Packages Containing Radioactive Material

Any packages containing radioactive material that arrive between 5:00 p.m. and 8:00 a.m., on Saturday, Sunday, or holidays shall be signed for by the senior officer of Campus Security on duty. The package shall immediately be taken to Room 141A K.L. Unlock the door, place the package in the designated area under the counter on the right and relock the door.

Note: If the package is wet or appears damaged do not handle the package and immediately contact the Radiation Safety Officer identified below. Ask the carrier to remain at the site of delivery until it can be determined that neither the carrier nor the delivery vehicle is contaminated.

Radiation Safety Officer	Dr. Richard S. Harmer
Office Phone	229-3527
Home Phone	434-8952
Alternative Radiation Safety Officer	Dr. Donald Geiger, S.M.
Office Phone	229-2225
Home Phone	228-2442

SECURE STORAGE OF RADIOACTIVE MATERIALS

Storage of radioactive materials and the security of that storage is the responsibility of the individual approved materials users identified in Item 7.3 and 7.4 of this application. Storage areas identified in Item 9 of this application consist of safes, lock file cabinets or locked storage cabinets. During off-duty hours, the room in which storage facilities are located are locked. Access to storage is only with the consent of the departmental radiation safety officer.

Storage of material delivered during off-duty hours is secured through two locked doors preventing unauthorized entry into Room 141 Kettering Laboratories.

SURVEYING OF UNRESTRICTED AREAS

Radiation levels in unrestricted areas in which radioactive material are in use are monitored daily by the approved byproduct user supervising the areas in question. Monitoring is conducted with calibrated survey meters to insure radiation levels are less than 2 millirems/hour. Personnel monitoring devices, TLD badges, film badges, and dosimeters, monitor radiation levels over extended periods and assure dosage levels below 100 milliems/week. Reported exposure of all personnel monitoring devices is collected by the RPO so that records for all personnel are available to departmental RSOs.

INSTRUCTIONS TO PERSONNEL

Students. Both undergraduate and graduated students use radioactive materials in the course of their studies and research. All students are given a copy of the general safety instructions presented on later pages of Item 10 of this application. Undergraduate students are under the direct and immediate supervision of an approved byproduct material user at all times they are working with radioactive substances. Safety procedures, the potential health hazards of the particular substances they are working with, and proper protective measures are presented prior to the particular study being conducted.

Advanced undergraduate students, juniors and seniors, may take BIO 410, "Radiation Biology". This course trains undergraduate students in the use of ionizing radiation in the study of biological systems. Training in the safe use of byproduct materials and the use of survey equipment is covered in the laboratory portion of the course.

Graduate students are required to take BIO 552 - "Biological Instrumentation" prior to working with radioactive substances without immediate supervision of an approved byproduct user. A portion of this course is directed toword training in the proper handling of radioactive substances, safety procedures and health protection associated with using radioactive substances in reasearch. Additionally, the laboratory trains the student in use of survey meters for monitoring radiation levels. Personnel monitoring devices are also required.

Since only an introductory level of education is available through BIO 552, graduate students must get approval from their departmental radiation safety officer prior to use of radioactive substances in their research. Approval is given oly after the student has demonstrated understanding and knowledge of proper procedures for use

of the radioactive material required for their research.

Housekeeping and Security Personnel. Housekeeping and security personnel are informed of the possible encounter with radioactive materials and radiation areas in the course of performing their work through briefings conducted by the RPO. These briefings instruct in the proper interpretation of radiation warning symbols and access to areas where radioactive materials are in use. In addition, security personnel are instructed in the use of radiation survey equipment as well as personnel monitoring devices. Housekeeping personnel who must enter unrestricted areas where radioactive substances are in use are provided with dosimeters and a record of any dosage received in the course of their job. Any dosage received is reported to the RPO, who then directs the appropriate departmental RSO to locate the source of exposure and take corrective action.

Laboratory Personnel. As a general rule, the University of Dayton does not employ full-time or part-time laboratory personnel. The tasks normally associated with that personnel classification are performed by graduate research assistants under the supervision of an approved byproduct user. The training provided these students was discussed above.

Animal Caretakers. The care, handling of animals, animal waste, carcasses, and decontamination of animal cages is the responsibility of the approved byproduct material users identified in Item 7 of this application. All of these individuals have received earlier training in the safety procedures, handling procedures, and health hazards associated with use of radioactive materials.

GENERAL SAFETY INSTRUCTIONS

The following page is a copy of the general safety instruction distributed to all individuals involved with radioactive materials. In addition, copies of these instruction are also posted inall laboratories in which radioactive materials are in use.

LABORATORY RULES FOR THE USE OF
RADIOACTIVE MATERIAL

1. Wear laboratory coats, or other protective clothing at all times in the areas where radioactive materials are used.

2. Wear disposable gloves at all times while handling radioactive materials.

3. Monitor hands and clothing for contamination after each procedure or before leaving the area.

4. Use syringe shields for preparation of animal doses and administration to animals.

5. Do not eat, drink, smoke, or apply cosmetics in any area where radioactive material is stored or used.

6. Assay each patient dose in the dose calibrator prior to administration. Do not use any doses that differ from the prescribed dose by more than 10%.

7. Wear personnel monitoring devices (Film badge or TLD) at all times while in areas where radioactive materials are used or stored. These should be worn at chest or waist level.

8. Wear TLD finger badges during elution of generator and preparation, assay, and injection of radiopharmaceuticals.

9. Dispose of radioactive waste only in specially designated receptacles.

10. Never pipette by mouth.

11. Survey generator, kit preparation, and injection areas for contamination after each procedure or at the end of the day. Decontaminate if necessary.

12. Confine radioactive solutions in covered containers plainly identified and labeled with name of compound, radionuclide, date, activity, and radiation level if applicable.

13. Always transport radioactive material in shielded containers.

Date: _____

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RADIATION SAFETY PROGRAM
ITEM 10.

EMERGENCY PROCEDURES FOR SPILLS

The following page is a copy of the emergency procedures to be followed in the event of a spill of radioactive material. Copies of these procedures are posted along with the General Safety Instructions in all laboratories using radioactive materials.

EMERGENCY PROCEDURES FOR
RADIOACTIVE MATERIAL SPILLS

Minor Spills:

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

2. PREVENT THE SPREAD: Cover the spill with absorbent paper.

3. CLEAN UP: Use disposable gloves and remove handling tongs. Carefully fold the absorbent paper and pad. Insert into a plastic bag and dispose of in the radioactive waste container. Include all other contaminated materials such as disposable gloves.

4. SURVEY: With a G.M. Survey Meter, check the area around the spill, your hands and clothing for contamination.

5. REPORT: Report incident to the Radiation Safety Officer.

Major Spills:

1. CLEAR THE AREA: Notify all persons not involved in the spill to vacate the room.

2. PREVENT THE SPREAD: Cover the spill with absorbent pads, but do not attempt to clean it up. Confine the movement of all personnel potentially contaminated to prevent the spread.

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

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

5. CALL FOR HELP: Notify the Radiation Protection Officer Immediately.

6. PERSONNEL DECONTAMINATION: Contaminated clothing should be removed and stored for further evaluation by the Radiation Safety Team. If the spill is on the skin, flush thoroughly and then wash with mild soap and lukewarm water.

RADIATION PROTECTION OFFICER: Dr. Richard S. Harmer
OFFICE PHONE: 229-3527
HOME PHONE: 434-8952

Date: _____

ITEM 11. WASTE DISPOSAL

11.1 Liquid and Dispersible Wastes.

The vast majority of byproduct waste generated at the University of Dayton is water soluble or readily dispersible. Therefore, most all waste is disposed of in the sanitary sewer in accordance with 10 CFR 20.303 "Disposal by release into sanitary sewerage systems". Average daily water consumption on the main University campus is approximately 1.2 million liters. With this high water usage, allowable daily radioisotope disposal is far in excess of the possession limits for byproduct materials requested in this application.

Liquid scintillation media is prepared for disposal by mixing with water and a low sudsing detergent so as to breakdown the organic solvent present in the medium. The scintillation medium-detergent mixture is then disposed of in the sanitary system followed by continuous water flow to prevent any byproduct accumulation in pipe traps in the plumbing system. The release of approximately 4 liters of scintillation medium per week has no impact upon the city sanitary treatment plant.

11.2 Solid Wastes.

Solid wastes fall into two categories. The first category contains solid materials contaminated by hydrogen-3 or carbon-14. Solids contaminated by H-3 or C-14 are disposed of in accordance with 10 CFR 20.306 "Disposal of specific wastes".

Solid waste and solids contaminated by other radioisotopes are typically held for ten half-lives or until no measurable radiation above background is present. At the present time, the majority of this material is S-35 contaminated glassware and absorbent materials. This material is currently stored in a locked basement storage area under Wohlleben Hall (Chemistry department).

The University seeks permission to dispose of the S-35 contaminated materials in the same fashion as disposal of C-14 and H-3 contaminated materials are disposed of under 10 CFR 10.306. The rationale behind this request is that 1. The energy of the S-35 beta emission is approximately the same as that of C-14, 167.4 keV for S-35 vs. 156 keV for C-14, and 2. The half-life of S-35 is much shorter than that of either H-3 or C-14, 88 days for S-35 vs. 12.26 years for H-3 and 5730 years for C-14. We recognize that such disposal S-35 probably does not result in a major impact upon low level waste disposal facilities, but it would greatly simplify solid waste disposal at the University of Dayton.

In all cases, disposal records are maintained listing date, isotope, quantity or activity, chemical or physical form, and location of disposal. Copies of these records are filed with the RPO.