NRC FORM 313
(9-86)
10 CFR 30, 32, 33, 34, 35 and 40

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

APPLICATION FOR MATERIAL LICENSE

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

FEDERAL AGENCIES FILE APPLICATIONS WITH:

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

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

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

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

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

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

IF YOU ARE LOCATED IN:

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

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

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

U.S. NUCLEAR REGULATORY COMMISSION, REGION IV
MATERIAL RADIATION PROTECTION SECTION
611 RYAN PLAZA DRIVE, SUITE 1000
ARLINGTON, TX 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 _____
- [X] C. RENEWAL OF LICENSE NUMBER 45-09475-30

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

Virginia Polytechnic Institute & State University
Blacksburg, VA 24061

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

same as #2

4. NAME OF PERSON TO BE CONTACTED ABOUT THIS APPLICATION

Douglas C. Smiley

TELEPHONE NUMBER: (703)-961-5364

SUBMIT ITEMS 5 THROUGH 11 ON 8½ x 11" PAPE.. 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
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 OF CERTIFYING OFFICER	TYPED/PRINTED NAME	TITLE	DATE
W Robert Van Dresser	William R. Van Dresser	Vice President for Administration and Operations	5/15/87

14. VOLUNTARY ECONOMIC DATA

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

b. NUMBER OF EMPLOYEES (Total for entire facility excluding outside contractors): about 5,000

c. NUMBER OF BEDS: N/A

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)

- [XX] YES
- [ ] NO

FOR NRC USE ONLY

TYPE OF FEE	FEE LOG	FEE CATEGORY	COMMENTS	APPROVED BY
REN	May 6-11	EX 3L	FEE EXEMPT 170.11(a)(3) 251590	M. Russell

AMOUNT RECEIVED: | CHECK NUMBER: | DATE: 5/26/87

8801220120 870714
REG2 LIC30
45-09475-30 PDR

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. RADIOACTIVE MATERIAL

5a (Isotope)	5b (Form)	5c (Maximum)
1. any byproduct material with atomic numbers 3-83 except as specified below	any	250 millicuries of each radionuclide with a total possession limit of 5 curies
2. Hydrogen 3	any	16 curies
3. Carbon 14	any	1 curie
4. Uranium 235	any	100 milligrams
5. Molybdenum 99/ Technetium 99m	generators	1 curie of each isotope
6. Technetium 99m	any	1 curie
7. Cobalt 60	sealed source	30 millicuries, not to exceed 10 millicuries each
8. Americium 241	sealed source	10 curies, not to exceed 1 curie each
9. Cesium 137	sealed source	5 curies, not to exceed 500 millicuries each
10. Strontium 90	sealed source	25 millicuries, not to exceed 5 millicuries each
11. Nickel 63	sealed source	500 millicuries, not to exceed 20 millicuries each
12. Krypton 85	sealed source	25 millicuries, not to exceed 10 millicuries each
13. Uranium 235	encapsulated as fission foils	12 grams
14. Plutonium 239	encapsulated as fission foils	15 grams
15. Plutonium 239	sealed source (PuBe)	81 grams
16. Plutonium 239	plated alpha source	0.1 microcuries

Specific source information - includes manufacturer, model and activity

7a. Co 60, Tracer Lab, model G-903, 2 x 0.01 mCi

8a. Am 241, Radiation Material Corp. (RMC), model AF-3, 0.25 mCi
b. Am 241, RMC, model AF-3, 2 x 1 mCi
c. Am 241, General Nuclear, Inc., model GNI-VD, 5 mCi
d. Am 241, Gammatron, Inc., model AN-HP, 2 x 250 mCi
e. Am 241, NEN, model 1, 100 mCi
f. Am 241, Troxler, model 1255, 100 mCi
g. Am 241, CPN Corp., model Strata, 50 mCi
h. Am 241, Troxler, model 3332, 10 mCi
i. Am 241, Troxler, model 3216, 40 mCi
j. Am 241, Isotope Products Lab, source #J179 100 mCi

9a. Cs 137, Amersham/Searle, model GCT.4, 23 7 mCi
b. Cs 137, US Radium Corp., model CDV-798, 32 mCi
c. Cs 137, CPN Corp., model Strata, 10 mCi
d. Cs 137, Isotope Products Lab, source #J253, 200 mCi

10a. Sr 90, ICN, model 75125, 1 mCi

11a. Ni 63, Bendix, model 2600, 15 mCi
b. Ni 63, Bendix, model 2068, 15 mCi
c. Ni 63, Bendix, model 2500, 15 mCi
d. Ni 63, Hewlett Packard, model 18803-60520, 15 mCi
e. Ni 63, Hewlett Packard, model 19303, 15 mCi
f. Ni 63, Tracor, model 550, 15 mCi
g. Ni 63, Tracor, model 540, 4 x 15 mCi
h. Ni 63, Microtek, model 739360, 10 mCi
i. Ni 63, Microtek, model 739260, 10 mCi
j. Ni 63, Perkin Elmer, model 330-0119, 2 x 15 mCi
k. Ni 63, Perkin Elmer, model 900, 10 mCi
l. Ni 63, Varian, model 02-0965, 8 mCi
m. Ni 63, Varian, model 3700, 3 x 8 mCi

12a. Kr 85, Admiral Corp., model MX7338/PDR27, 5 mCi

13a. U 235, Reuter Stokes, model Y4316, 1.916 grams

14a. Pu 239, Parkwell Labs, model 33PL, 14.55 grams

15a. Pu 239, Monsanto, source #M179, 14.28 grams
b. Pu 239, Monsanto, source #M180, 14.38 grams
c. Pu 239, Monsanto, source #M181, 14.37 grams
d. Pu 239, Monsanto, source #M182, 14.48 grams
e. Pu 239, Monsanto, source #M183, 0.128 grams
f. Pu 239, Monsanto, source #M184, 0.134 grams
g. Pu 239, Monsanto, source #M185, 0.134 grams
h. Pu 239, Monsanto, source #M567, 14.87 grams

16a. Pu 239, Dupont, source #P107, 0.036 uCi
b. Pu 239, Dupont, source #P108, 0.00045 uCi

ITEM 6. PURPOSE FOR WHICH LICENSED MATERIAL WILL BE USED

All numbers cited are in reference to Item 5.

1,2,3	used for educational and research purposes
4	used for laboratory tracer studies in minerals and rocks
5	used for the elution of technetium 99m as pertechnetate
6	used for diagnostic nuclear medicine in animals at the Veterinary Hospital
7,8(a-c), 9(a-b),10, 16	used for instrument checks and calibration
8(e)	used in x-ray fluorescence devices
8(f-i),9(c)	used in moisture and/or density gauges
8(d),12,13, 14	for storage only in the waste storage building
8(j),9(d)	used for soil dynamics studies, fixed installation
11	used in gas chromatographs
15	used for instrument calibration, educational and research purposes

Other Uses:

Up to 10 mCi of carbon 14 at one time will be used at temporary job sites throughout the State of Virginia. Temporary job sites outside of Virginia will be used with reciprocity arrangements established with NRC agreement states. Carbon 14 will also be used at temporary job sites in Antartica. Some examples are: primary productivity studies in lakes or streams, in vitro studies of uptake by aquatic organisms, and in vivo use in trees.

Up to 1 mCi of phosphorus 32 at one time will be used at temporary job sites throughout the State of Virginia. An example would be: in vitro uptake studies.

Hydrogen 3, phosphorus 33 and sulfur 35 will be used at temporary job sites in Antartica. An example would be: in vitro primary productivity studies.

Soil moisture and soil density gauges will be used at temporary job sites throughout the State of Virginia. Temporary

job sites outside of Virginia will also be used with reciprocity arrangements established with NRC agreement states.

Chromium 51, iron 59, scandium 46, selenium 75, zinc 65, mercury 203, cadmium 109, cesium 134, tin 113, hafnium 181, niobium 95 and iodine 125 will be used at the University of Virginia Mountain Lake Biological Station in Giles County, Virginia. A map is attached showing this location (Attachment I). The total quantity of all isotopes at the station will not exceed 5 mCi. Adequate radiation safety precautions will be observed. Transport of the isotopes will be done in accordance with DOT regulations. Daily contamination surveys will be performed in the lab to ensure no spread of the isotopes. All waste and contaminated items will be returned to Va Tech for proper disposal or decontamination.

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

The Radiation Safety Committee oversees the Radiation Safety Program. The training and experience of the Radioisotope Radiation Safety Officer and all Committee members follow.

Douglas C. Smiley, Radioisotope Radiation Safety Officer

Training and Experience:

VPI & SU, B.S. in Biology, Option in Health Physics, 1975

Courses included:

Fundamentals of Radiation (Modern Physics)	3 hours
Radiation Protection and Monitoring	9 hours
Theory of Reactors	6 hours
Health Physics Laboratories	3 hours
Radiobiology (including laboratory)	5 hours

Institute for Resource Management, H.P. technician, March 1975 - November 1976. Duties included: performance of radiation level, air and surface contamination surveys and maintenance of personnel dosimetry programs.

Carolina Power & Light, H.P. technician, H.P. engineering technician, ALARA specialist, November 1976 - September 1980. Duties included: performance of radiation level, air and surface contamination surveys; survey instrument calibration, radwaste shipments, personnel training in health physics, health physics procedure writing and critiquing H.P. practices at the Brunswick plant.

VPI & SU, Radioisotope Radiation Safety Officer, September 1980 - present. Duties delineated in Radiation Safety Handbook (attached).

Dr. A. Keith Furr, Committee Chairman

Professor of Nuclear Engineering, VPI & SU
Head, Health and Safety Department, VPI & SU

Field of Research: Reactor and Nuclear Physics

Training and Experience:

A.B. - Catawba College, 1954
M.S. - Emory University (Nuclear Physics), 1955
Ph.D.- Duke University (Nuclear Physics), 1962

Research Fellow, Oak Ridge Institute of Nuclear Studies, 1958 - 59
Research Participant, Savannah River Laboratory, 1962
Conducted neutron physics research on Oak Ridge (X-10) and VPI & SU

nuclear reactors, 1959
Directed numerous research programs at VPI & SU using the VPI & SU nuclear reactor and multi-curie hot cell, 1960 - 75
Experience with monitoring high intensity sources at VPI & SU and Oak Ridge, 1960 - 75
Served as Director of the VPI & SU Research Reactor from 1970 - 75
Originated the former VPI & SU undergraduate Health Physics program in 1974

Dr. R. Michael Akers, Committee Member

Associate Professor of Dairy Science

Training and Experience:

A.S., Wytheville Community College, 1972
B.S., VPI & SU, 1974, Biology
M.S., VPI & SU, 1976, Dairy Science
Ph.D., Michigan State University, 1980, Dairy Science (Physiology)

Research Physiologist, USDA Milk Secretion and Mastitis Laboratory, Beltsville, Md., March 1980 - November 1981
Successful completion of VPI & SU radiation safety training
Authorized Principal User at VPI & SU since 1982 working with H 3 and I 125

Dr. Stephen W. Boyle, Committee Member

Associate Professor of Microbiology (In Vet Medicine)

Training and Experience:
B.S., Natural Sciences, Rutgers University, 1966
M.S., Microbiology, University of Rhode Island, 1969
Ph.D., Microbiology, University of Rhode Island, 1971

University of Rhode Island, 1966 - 1971, worked with H 3, C 14, P 32 and I 125, while there took a Biochemistry Techniques course
Memorial University of Newfoundland, 1972 - 1984, successful completion of radiation safety training, worked with H 3, C 14, P 32, I 125 and S 35
VPI & SU, 1984 - present, successful completion of radiation safety training
Authorized Principal User at VPI & SU since 1985 using P 32, S 35 and C 14

Dr. Colin B. Carrig, Committee Member

Professor, College of Veterinary Medicine

Training and Experience:

1962 - University of Sydney, Australia, B.V.Sc. (DVM equivalent)
1973 - American College of Veterinary Radiology, Board Certification
1974 - University of California at Davis, Ph.D.

Actively teaching radiology for 12 years
Successful completion of X-ray safety training at VPI & SU

John W. Cure, III, Committee Member

President, Health Physics Consultation, Lynchburg, Va.

Training and Experience:

B.S., Virginia Military Institute, 1952, Electrical Engineering
M.S., Vanderbilt University, 1955, Physics

1952 - 1953, AEC Radiological Physics Fellowship, Vanderbilt Univ. and Oak Ridge National Laboratory
1953 - 1954, Oak Ridge National Laboratory, Junior Health Physicist
1954 - 1956, U.S. Air Force, 1st Lt., research officer, participant in Nevada test site 'Operation Teapot'
1956 - 1963, Health Physicist and Experimental Physicist, Babcock and Wilcox, Critical Experiment Laboratory, implemented Health Physics program
1964 - 1970, Health Physicist, B&W, Nuclear Development Center, developed, initiated and operated the health physics program
1970 - 1986, Supervisor of Radiation and Safety, B&W, Lynchburg Research Center
1981 - present, President and founder, Health Physics Consultation, provides radiation physics services to hospitals, physicians, institutions and industry

Certified Health Physicist since 1961 by the American Board of Health Physics

Dr. Richard F. Desjardins, Committee Member

Student Health Staff Physician, 1972 - present

Training and Experience:

1947 - University of Maine, B.A.
1952 - Tufts University Medical School, M.D.

Attended Emergency Planning for Radiation Emergencies offered by

Oak Ridge National Laboratory - 1974

James E. Dunlap, Committee Member (shared with Goldsmith)

Associate Director of Purchasing

Training and Experience:

B.S., Distributive Education, VPI & SU, 1967

Virginia Beach school teacher from 1967 - 1969
VPI & SU in Purchasing from 1969 - present, past involvement in radioactive material purchases and extensive contract work

C. David Goldsmith, Committee Member (shared with Dunlap)

Assistant Purchasing Agent, VPI & SU
Board of Directors, Virginia Tech Employees Federal Credit Union
Member of Virginia Association of Governmental Purchasing
Member of National Association of Educational Buyers

Training and Experience:

B.S. (Business Administration), 1959, Fairmont State College, West Virginia
Galis Electric & Machine Co., Morgantown, West Virginia, 1 year (mining industry)
Standard Kollsman, Melrose Park, Illinois, 1.5 years (electronics and television industry)
Melpar, Inc., Alexandria, Virginia, 6 years (aerospace and electronics sub-contractor)
VPI & SU, 17 years as assistant purchasing agent and scientific and electronics buyer. Has previously purchased all radioactive supplies, chemicals, and equipment for the University. 1970

James F. Light, Committee Member

Instructor of Electronic Instrumentation in Geology

Training and Experience:

B.S., Physics, West Virginia State, 1962

X-ray laboratory at W.R. Grace from 1966 - 1970
X-ray laboratory at VPI & SU from 1970 - present, maintaining the Geology analytical x-ray equipment and performing alignments
Successful completion of VPI & SU X-ray radiation safety training
Authorized Principal User of X-ray equipment at VPI & SU since 1982

Dr. F.M. Anne McNabb, Committee Member

Associate Professor of Biology

Training and Experience:

B.Ed., Education, University of Alberta, 1960
B.S., Zoology, University of Alberta, 1961
M.A., Zoology, UCLA, 1965
Ph.D., Zoology, UCLA, 1968

Successful completion of VPI & SU radiation safety training
Authorized Principal User at VPI & SU since 1975 using I 125, P 32 and C 14
Audited VPI & SU Radiophysiology course

Thomas S. Smithwick, Committee Member

X-Ray Radiation Safety Officer

Training and Experience:

B.A., Florida Atlantic University, 1974, Chemistry
Nuclear Medicine Technology, ASCP, ARRT, Boca Raton Community Hospital, 1976
M.S., East Tennessee State University, 1981, Environmental Health

Nuclear medicine/RIA technologist at Boca Raton Community Hospital from 1974 - 1979
Graduate teaching assistant in Radiological Health at East Tennessee State University from 1980 - 1981
Nuclear medicine technologist at Clinch Valley Community Hospital in 1981
Reactor and X-ray Radiation Safety Officer, VPI & SU from 1982 - present

Dr. Brian Storrie, Committee Member

Professor of Biochemistry

Training and Experience:

B.S., Cornell University, 1968
Ph.D., California Institute of Technology, 1973

Laboratory Radiation Safety Officer at Cal. Tech, 1971 - 72
Successful completion of VPI & SU radiation safety training
Authorized Principal User at VPI & SU since 1978 working with I 125, H 3, C 14, S 35 and P 32

Worked with I 125, H 3, C 14 and P 32 at several different

institutions including Cornell, Cal. Tech and Sloan-Kettering

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

All individuals must successfully complete the VPI & SU Radiation Safety Training program prior to working with radioisotopes. The topics covered are:

Fundamentals of Radioactivity
Nuclear Reactions
Interactions of Radiation with Matter
Radiation Detection Instruments (theory)
Radiation Detection Instruments (practical)
Federal, State and Local Regulations
Laboratory Design and Operations
Biological Effects

All new salaried employees attend an orientation program within the first month of their employment. The orientation program includes basic information about radioactive material areas and radioactive waste.

ITEM 9. FACILITIES AND EQUIPMENT

Facilities:

The yellow areas on the attached building plans are the areas within the University where radioactive material may be used or stored (Attachment II).

Existing fume hoods in the laboratories are predominately unfiltered (a few have HEPA's and charcoal filters), due to the activities discharged being much less than 10 CFR 20 Appendix B limits. Future hoods will be filtered if necessary in compliance with internal University policies.

Waste Storage Facility:

The Waste Storage Building is used for the storage of waste held for decay as well as storing drums ready for shipment from the University. The building is a restricted area, equipped with a dead bolt lock. The building is locked at all times except when authorized personnel are present. Keys to the building are maintained in the Radiation Safety Office. Radiation levels inside of the building are taken whenever additional waste drums are moved into the facility. The outside of the building is continously monitored with an environmental TLD.

Nuclear Medicine Facility:

The nuclear medicine facility consists of a scanning room as well as a radiopharmacy room. The scanning room is approximately 15' by 22' with cinderblock walls. The concrete floor has a drain and the room is equipped with a wall mounted hose reel. This room contains the scintillation camera system. The radiopharmacy is approximately 5' by 15' which opens into the scanning room. This room will be equipped with counters and storage cabinets designed for work with radiopharmaceuticals. This room will also contain a storage shield for the Mo 99/Tc 99m generator, a table top work shield with a splash tray, a dose calibrator, shielded waste receptacles, vial shields and syringe shields.

Small animals will be housed in runs or cages. The runs (approximately 3' by 8') have epoxy coated floors and cinderblock walls to prevent contamination spread. Each run has a drain for excreta. The cages are designed to contain and collect all excreta. Large animals will be housed in stalls approximately 14' by 10' with concrete floors and with bedding material for collection of excreta.

To ensure security, unauthorized personnel are not allowed alone within the confines of the hospital. The radiopharmacy and scanning room will be maintained locked when not in use

by authorized individuals. Cages, runs and stalls will be locked when in use.

Approximately 125 animals will be administered Tc 99m each year. Initially this administration will be for diagnostic purposes with most of the cases restricted to domestic dogs and cats. The urine and feces of these animals will be flushed into the sanitary system after a 24 hour decay period as per 10 CFR 20.303. The total activity released into the sanitary system is estimated to be less than 100 mCi of Tc 99m per year based on potential excreta activities. This would be less than 10% of the 10 CFR 20 release limit.

Animals will be isolated for 24 hours post injection unless emergency surgery is required. Animals will not be released from the hospital prior to 24 hours post injection. Skin surface readings will not exceed 2 mr/hr at the time of the animal's release from the hospital or 100 mr in seven consecutive days.

Animals administered radioactive pharmaceuticals or their byproducts will not be used for human consumption. All nuclear medicine procedures will be approved by the Radiation Safety Committee.

Equipment:

Quarterly TLD and monthly film badges are used for personnel monitoring. These devices are currently processed by:

R.S. Landauer, Jr. & Co.
Division of Tech/Ops, Inc.
Glenwood Science Park
Glenwood, Ill. 60425

R.S. Landauer is NVLAP accredited. Future processor changes will only be to companies that have NVLAP accreditation.

All portable survey instruments are calibrated by the Radiation Safety Office, the manufacturer (new instruments) or RSO, Inc., P.O. Box 1526, Laurel, Md. 20707 (license #MD-33-021-01). They are calibrated against known Cs 137 standards and the calibrations are performed annually or after any maintenance affecting the calibration.

Each scale is calibrated at two points located at approximately 25% and 75% of full scale. Acceptable calibration is within 10% of the true exposure rate. Response factors or graphs are used if necessary to interpret meter readings to within the accepted tolerance.

Pocket dosimeters are calibrated against known Cs 137 standards by placing them around the source at a predetermined

distance. Acceptable calibration is within 10% of the true exposure rate and drift of no more than 2% of full scale in 24 hours.

A listing of the radiation detection instruments for laboratories as well as for the Radiation Safety Office follows.

INSTRUMENTS CURRENTLY PRESENT WITHIN THE LABORATORIES

INSTRUMENT TYPE	NUMBER	RADIATION DETECTED	RANGE	USE*
portable thin window GM	24	beta,gamma	0-200 mr/hr 0-50 mr/hr 0-20 mr/hr	1,2,4
portable GM	6	beta,gamma	0-2 R/hr 0-200 mr/hr 0-50 mr/hr 0-20 mr/hr	2
portable thin NaI	5	low gamma	0-500K CPM	1,2,4
liquid scint. counter	18	alpha,beta gamma	0-1M CPM	1,5
NaI scint. counter	6	gamma	0-1M CPM	1,5

*Usage is indicated by the following number codes:

1 = area and equipment loose contamination surveillance
2 = area and equipment radiation level surveillance
3 = personnel radiation monitoring
4 = personnel contamination monitoring
5 = experimental assays

RADIATION SAFETY OFFICE RADIATION DETECTION INSTRUMENTS

INSTRUMENT TYPE	MANUF.	MODEL #	NUMBER	RADIATION DETECTED	RANGE	USE*
portable thin window gas flow	Eberline	PAC4G	1	alpha,beta	0-500K CPM	1
portable thin window GM	Victoreen	490	1	alpha,beta gamma	0-80K CPM 0-20 mr/hr	1,2,4
portable thin window ion chamber	Keithley	36100	1	beta,gamma	0-20 R/hr	2
portable thin window ion chamber	Victoreen	471	1	beta,gamma	0-300 R/hr	2
portable GM	Victoreen	6A,6B	3	beta,gamma	0-50 mr/hr	2
portable thin window GM frisker	Eberline	RM14	1	alpha,beta gamma	0-500K CPM	1,4
portable neutron	Techical Assoc.	REM-PUG	1	fast and thermal	0-10 Rem/hr	2
portable NaI	Ludlum	3	1	low and high energy gamma	0-500K CPM 0-2.5K uR/hr	1,2,4
pocket dosimeter	Bendix Victoreen	n/a	12	gamma	0-200 mr	4
liquid scint. counter	Beckman	LS100C	1	alpha,beta gamma	0-1M CPM	1
NaI(Tl) thyroid monitor	Tracor Harshaw	TN7200 8SHE3M/2X	1	gamma	MDA about 0.3 nCi	3
gas flow proportional	Canberra	(system)	1	alpha,beta	n/a	1

*Usage is indicated by the following number codes:

1 = area and equipment loose contamination surveillance
2 = area and equipment radiation level surveillance
3 = personnel radiation monitoring
4 = personnel contamination monitoring

ITEM 10. RADIATION SAFETY PROGRAM

Specifics about our radiation safety program can be found in the attached Radiation Safety Handbook, revision 10/86 (Attachment III). Several additions and changes follow that have not been incorporated into the Handbook.

We would like to request a minor exception to 10CFR20.203(f), container labeling. Instead of the required 'Caution - Radioactive Material' labeling, we propose that our dry waste be labeled 'Caution - Radioactive Waste'. Convenient large labels for our containers are available with this proposed wording.

The Administration of this University is committed to the ALARA principle (Attachment V). The RSO and RSC review all new experiments ensuring that the protocol maintains exposures as low as is reasonably achievable.

Revision to Section 4.5 BIOASSAY:

Urine specimens are obtained from selected individuals on an annual basis. These individuals are selected from among the most active users. The urinalysis for gross beta is performed by a commercial laboratory.

When individuals work with tritiated (H 3) compounds, special urinalyses may be required. If quantities greater than 10 mCi/month are used outside of a hood, this special bioassay is required. If quantities greater than 100 mCi/month are used inside of a hood, the bioassay would also be required.

If the evaluation of a urine sample exceeds three times the minimum sensitivity of the commercial laboratory's counting system, the following actions will be taken:

Resample for reevaluation and identification by the commercial firm.

Perform locally either a gamma scan or a liquid scintillation measurement to identify the isotope.

After identification, follow the biological elimination until a positive result is no longer obtained.

If a body burden is approached, outside advice and assistance will be solicited, such as from the ORNL Emergency Response Group.

Investigate the laboratory operations, including air and area surveys, to determine the causes and evaluate the potential for further exposures. If the investigation indicates problems which could lead to further uptake, work in the area will be avoided until the cause is discovered and corrected. Corrective actions that will eliminate or lower the potential for further exposures will be implemented in a timely manner.

Thyroid analysis is performed on selected individuals using a thin NaI(Tl) detector system as necessary. When individuals use unbound I 125, the monitoring criteria are: 0.1 mCi in an open room and 1 mCi in a fume hood. The monitoring criteria for individuals using bound I 125 are: 1 mCi in an open room and 10 mCi in a fume hood. Monitoring is performed if any of these quantities are handled at one time or handled over a 3 month period. The time elapsed before monitoring is very critical. Thyroid analysis is performed within 72 hours of the potential exposure whenever possible. The optimum time is 24 hours.

If the thyroid burden is determined to be in excess of 120 nCi (25% of the maximum permissible thyroid burden), the following actions will be taken:

An investigation of the laboratory operations involved, including air and area surveys, to determine the causes and to evaluate the potential for further exposures.

If the investigation indicates problems in the work area which could result in further exposure to personnel, additional work in the area will be avoided until the cause is discovered and corrected.

Corrective actions that will eliminate or lower the potential for further exposures will be implemented in a timely manner.

A thyroid scan will be performed within 2 weeks of the original scan to confirm the uptake and determine the effective half-life for estimating dose commitment.

If the thyroid burden is determined to be in excess of 500 nCi (100% of the maximum permissible thyroid burden), the following steps in addition to those above will be performed:

Appropriate medical assistance will be pursued to provide therapeutic measures as necessary to accelerate the biological elimination of the I 125.

Weekly scans will be performed until the burden decreases to less than 120 nCi.

Bioassays will also be performed if there is an accident or an unusual experiment involving a known or suspected hazardous condition. Such an experiment would require prior approval of the Radiation Safety Committee.

Revision to Section 4.6 CONTAMINATION, RADIATION MONITORING AND CONTROL:

This change replaces the fifth and sixth paragraphs from the end of Section 4.6 relating to instrument calibration.

> All portable survey instruments are calibrated by the RSO or qualified commercial firms. They are calibrated against known Cs 137 standards and are performed annually or after any maintenance affecting the calibration.
>
> Each scale is calibrated at two points located at approximately 25% and 75% of full scale. Acceptable calibration is within 10% of the true exposure rate. Response factors or graphs are used as necessary to interpret meter readings to within the accepted tolerance.

Revision to Section 4.7 RADIOACTIVE WASTE DISPOSAL PROCEDURE:

The majority of these changes relate to our ability to hold S 35 waste for decay. A draft copy of this section is included (Attachment IV).

New section for RADIOISOTOPE USE IN ANIMALS:

Only authorized radioisotope users can provide care to animals containing radioactive material (e.g. feed, water and bedding changes).

Animals should be housed in areas normally unoccupied by personnel.

Rooms or areas in which animals are housed must be posted as a radioactive material area.

When x or gamma emitting radioisotopes are used, personnel exposure should be reduced by minimizing the time spent with the animals and maximizing the distance away from the animals.

Any used bedding material must be treated as radioactive waste. This biological waste must be bagged, labeled with a 'radioactive waste label', and placed into designated frozen storage areas for radioactive waste.

Any animal carcasses must be bagged, labeled with a 'radioactive waste label', and placed into designated frozen storage areas for radioactive waste.

New section for DECONTAMINATION OF ANIMAL HOUSING:

Only authorized radioisotope users can clean animal housing.

Any used bedding material must be treated as radioactive waste. This biological waste must be bagged, labeled with a 'radioactive waste label', and placed into designated frozen storage areas for radioactive waste.

After animals and bedding materials have been removed from the housing, a contamination survey must be performed. If less than 1 uCi is present, the cages and/or runs should be washed with copious amounts of water. If more than 1 uCi is present, the cages and/or runs should also be washed with copious amounts of water but the activity disposed must be recorded.

After the housing is dry, a contamination survey must be performed. If the housing is noncontaminated, the radiation labels can be removed. If the housing is still contaminated, those areas need to be scrubbed with soap and water. After the housing has been rinsed with water and is dry, another contamination survey must be performed.

When isotopes with short half-lives are used, the contaminated area can be covered with plastic and resurveyed after ten half-lives have elapsed.

When isotopes with long half-lives are used, more aggressive decontamination efforts will be necessary. These efforts will be performed under RSO supervision.

Once housing is clean, normal access can be restored.

ITEM 11. WASTE MANAGEMENT

The specifics of our waste disposal program are described in detail in Section 4.7 of the Radiation Safety Handbook. We have three primary disposal methods:

1. Removal by a waste broker
2. Decay-In-Storage
3. Release into the sanitary system

Our current waste broker is RSO, Inc., P.O. Box 1526, Laurel, Md. 20707, license #MD 33-021-01. Compactable dry solid, noncompactable dry solid, bulk liquids, biowaste and liquid scintillation fluid in vials (LSV) are removed by this company. Noncompactable dry solid and biowaste drums are shipped to Barnwell for burial. Compactable dry solid, bulk liquid and LSV drums are shipped for reprocessing to RAMP Industries, 1027 West 46th Ave., Denver, Co. 80221, license #523-01. After reprocessing is complete compacted dry solid and solidified liquids are returned to RSO, Inc. for shipment to Barnwell. This method accounts for approximately 65% of our drummed waste.

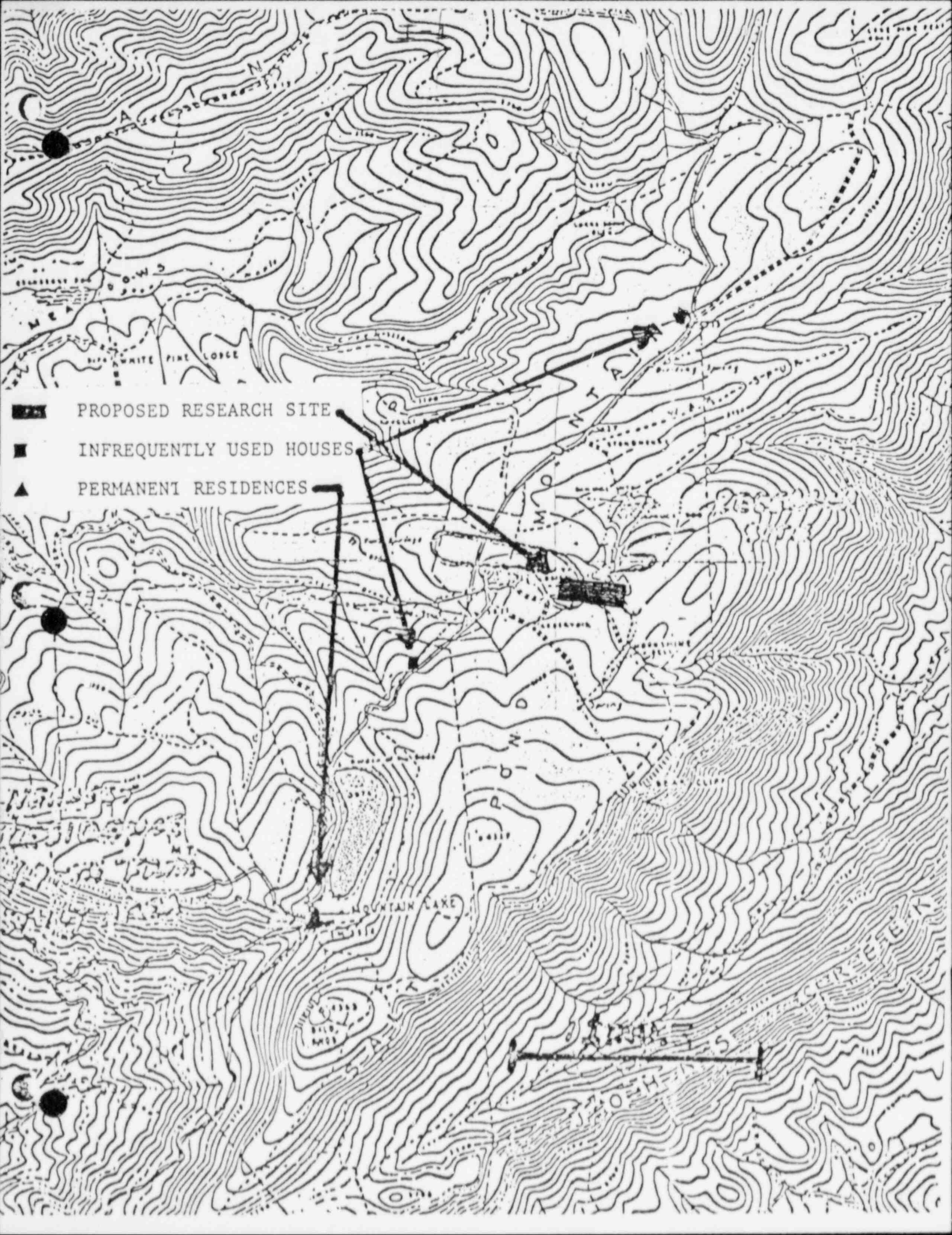
Radioactive waste with half-lives less than 90 days is held for decay. The waste is kept at our Waste Storage building for ten half-lives. After the decay period has elapsed, the waste is surveyed in a low background area to ensure it is at background. A GM pancake probe is normally used to perform this survey. The waste surveyed at background is disposed as clean trash. This method accounts for the other 35% of our drummed waste.

After each quarterly waste pickup, liquid wastes are released into the sanitary system by the RSO. These miscible liquids primarily contain H 3 and C 14. Approximately 500 - 1000 gallons of waste are disposed in this manner per year. Other minimal releases to the sanitary include liquids generated during decontamination of personnel, equipment or areas.

Small quantities of gaseous wastes are generated. These materials, primarily consisting of H 3 and C 14, are released in adherence to 10 CFR 20 unrestricted limits for air. Any volatile operations are performed in a hood to ensure rapid venting to the outside.

A T T A C H M E N T I

UVA MOUNTAIN LAKE BIOLOGICAL STATION

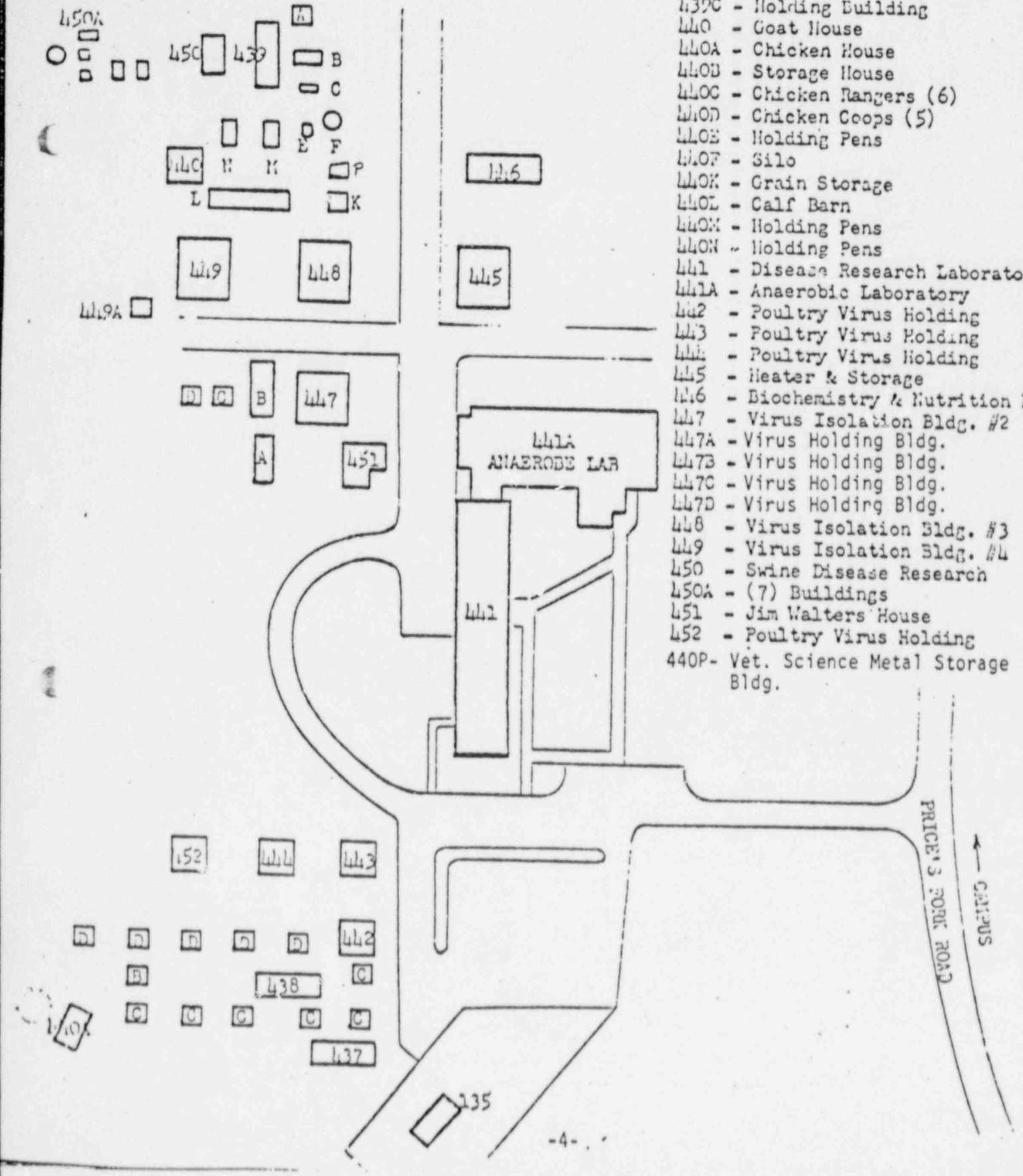

PROPOSED RESEARCH SITE
INFREQUENTLY USED HOUSES
PERMANENT RESIDENCES
WHITE PINE LODGE
MOUNTAIN LAKE

A T T A C H M E N T II

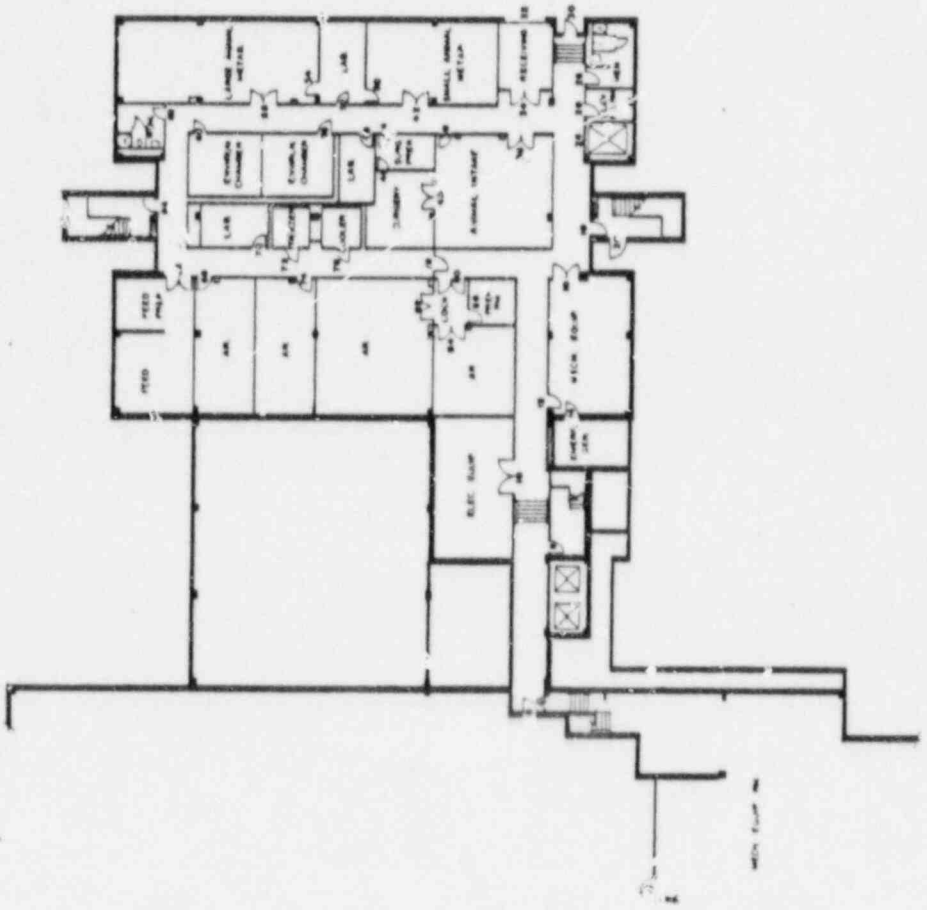
RADIOACTIVE MATERIAL USE AND STORAGE LOCATIONS

ANAEROBE LABORATORY - (CODE 305)

135 - Satellite Tracking Station
437 - Greenhouse
438 - Poultry Isolation Building
439 - Hay Drying Shed
439A - Hog Building
439B - Feeding Pen
439C - Holding Building
440 - Goat House
440A - Chicken House
440B - Storage House
440C - Chicken Rangers (6)
440D - Chicken Coops (5)
440E - Holding Pens
440F - Silo
440K - Grain Storage
440L - Calf Barn
440M - Holding Pens
440N - Holding Pens
441 - Disease Research Laboratory
441A - Anaerobic Laboratory
442 - Poultry Virus Holding
443 - Poultry Virus Holding
444 - Poultry Virus Holding
445 - Heater & Storage
446 - Biochemistry & Nutrition Bldg.
447 - Virus Isolation Bldg. #2
447A - Virus Holding Bldg.
447B - Virus Holding Bldg.
447C - Virus Holding Bldg.
447D - Virus Holding Bldg.
448 - Virus Isolation Bldg. #3
449 - Virus Isolation Bldg. #4
450 - Swine Disease Research
450A - (7) Buildings
451 - Jim Walters House
452 - Poultry Virus Holding
440P - Vet. Science Metal Storage Bldg.

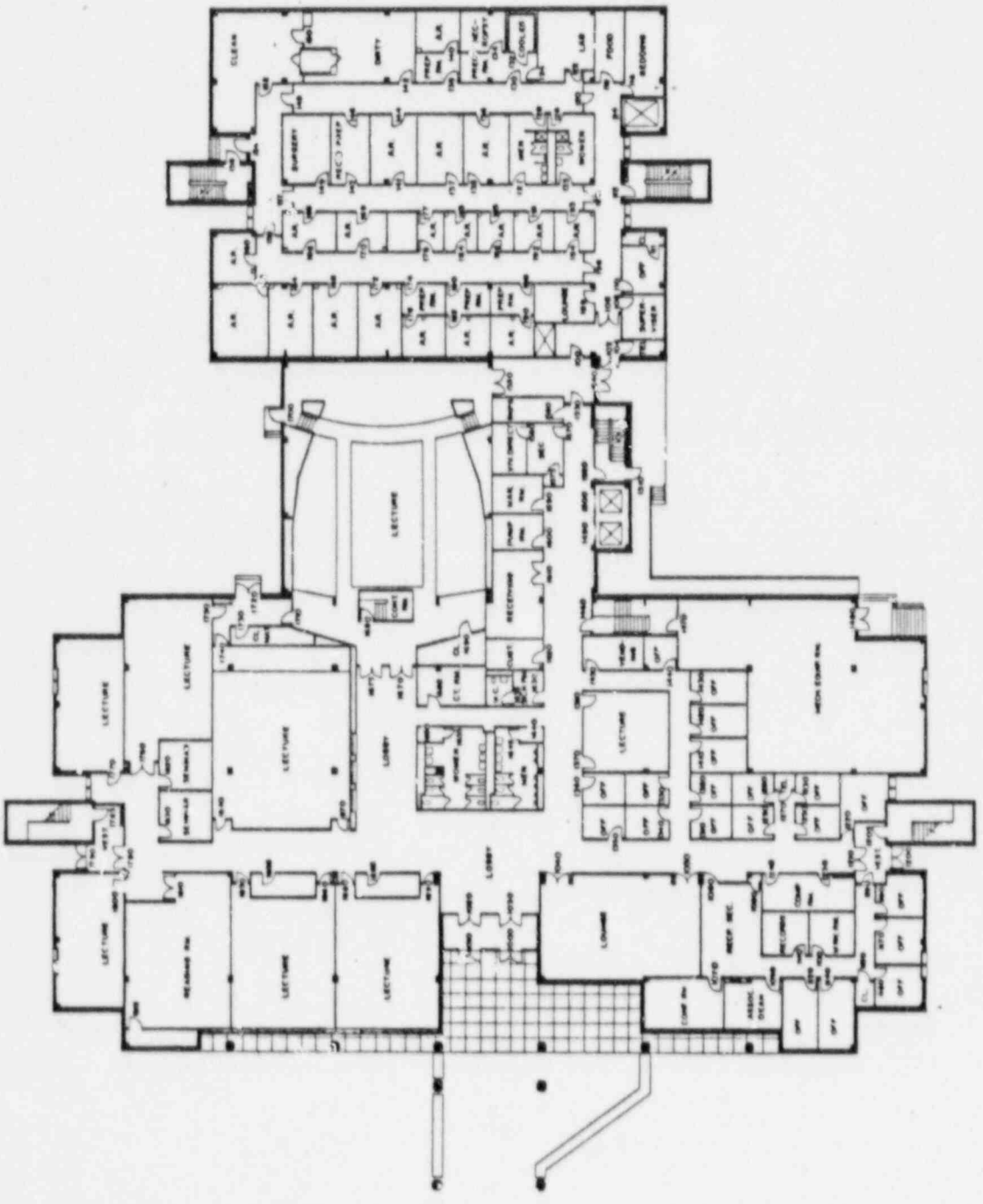


II-2



DRAWN VA	ANIMAL SCIENCE BLDG 118	
CHKD	VIRGINIA POLYTECHNIC INSTITUTE & STATE UNIVERSITY	
APPD	BLACKSBURG, VIRGINIA	
APPD	PHYSICAL PLANT DEPT PLANNING & ENGINEERING DIVISION	
DATE 5-28-81	SCALE 1-16-0 SHEET 1 OF 4	DWG NO

II-3

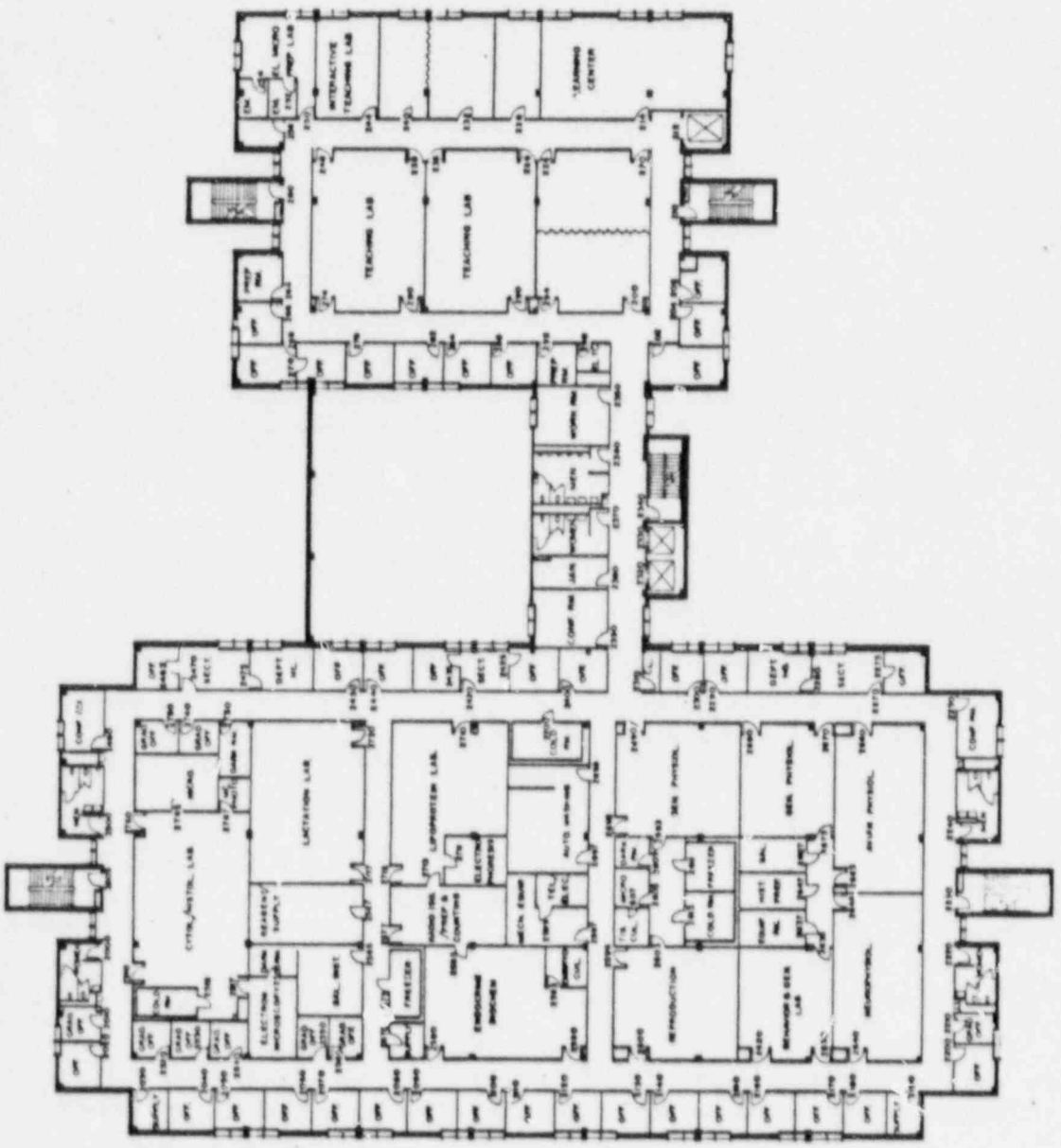


DRWN V.A.
CHKD
APPD
APPD
DATE 19 FEB 81

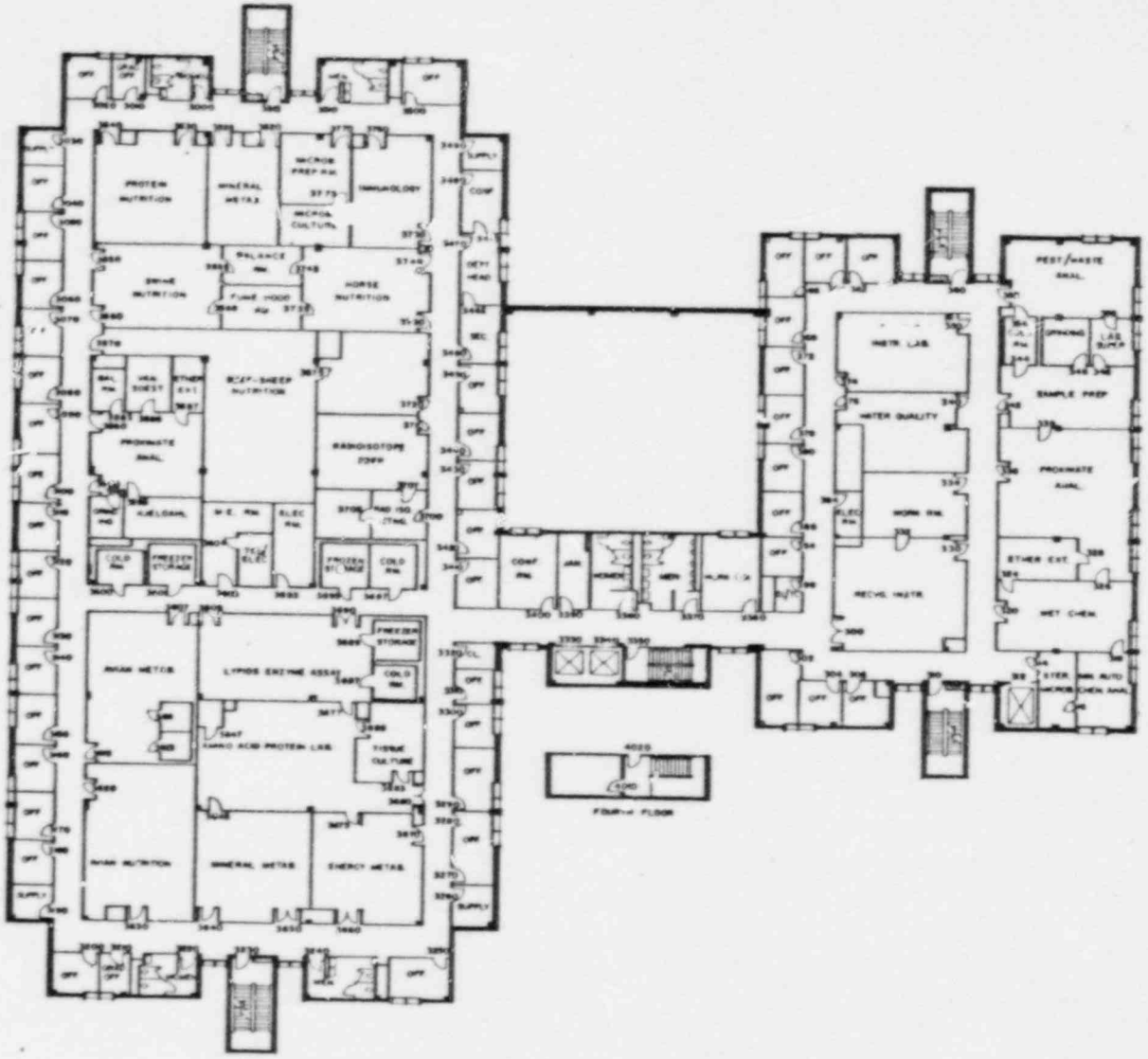
ANIMAL SCIENCE BLDG. 118

VIRGINIA POLYTECHNIC INSTITUTE & STATE UNIVERSITY
BLACKSBURG, VIRGINIA
PHYSICAL PLANT DEPT. PLANNING & CONSTRUCTION DIVISION

SCALE 1/8" = 1'-0" SHEET 2 OF 4 DRG. 1



DRWN: V.A.	ANIMAL SCIENCE BLDG 118		
CHKD:			
APPD:	VIRGINIA POLYTECHNIC INSTITUTE & STATE UNIVERSITY		
APPD:	DIVISION OF PLANNING & ENGINEERING SERVICES		
DATE: 3-1-68	SCALE: 1/8"-0"	SHEET 1 OF 4	DRG NO



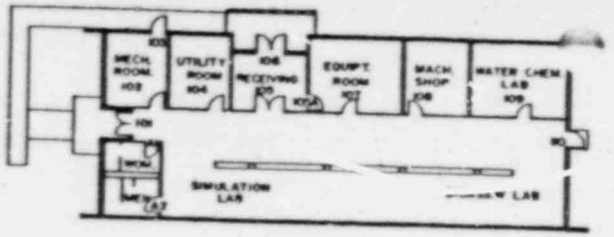
Drwn. V.A.	ANIMAL SCIENCE BLDG. 118	
Chkd.		
Appd.	VIRGINIA POLYTECHNIC INSTITUTE & STATE UNIVERSITY BLACKSBURG, VIRGINIA	
Appd.	PHYSICAL PLANT DEPT. - PLANNING & ENGINEERING DIVISION	
Date: 5-17-68	Scale 1/8"-0"	Sheet 4 of 4

S-II

II-6

CAMPUS - SMITHFIELD AREA (CODE 308)

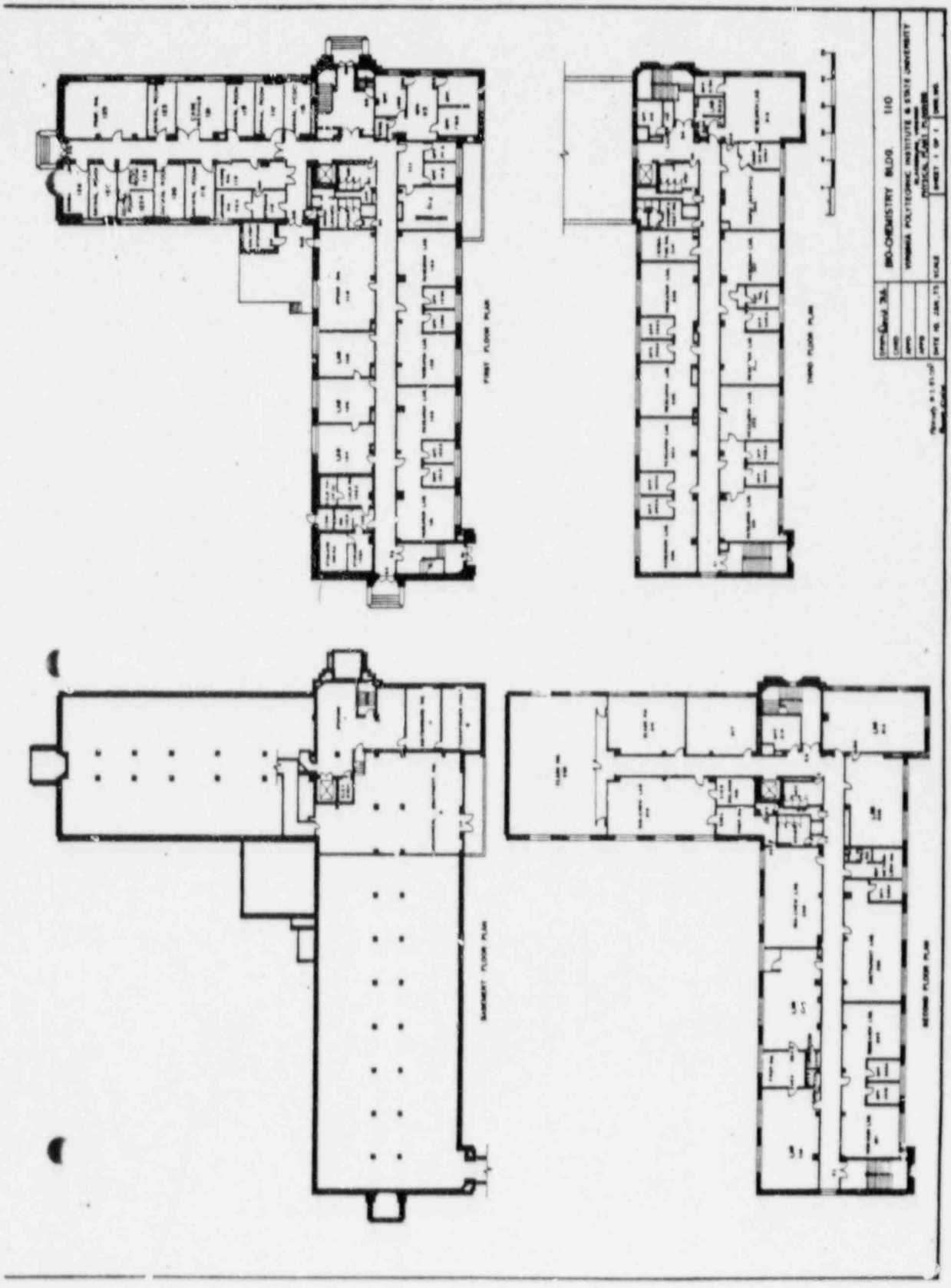
479 - Milking Barn
479A - Barn
479B - Sheep Feeder Barn
479C - Shed
480 - Feeder Pen
480A - Storage Building (Metal)
480B - Horse Barn
290 - Aquatic Ecology Lab

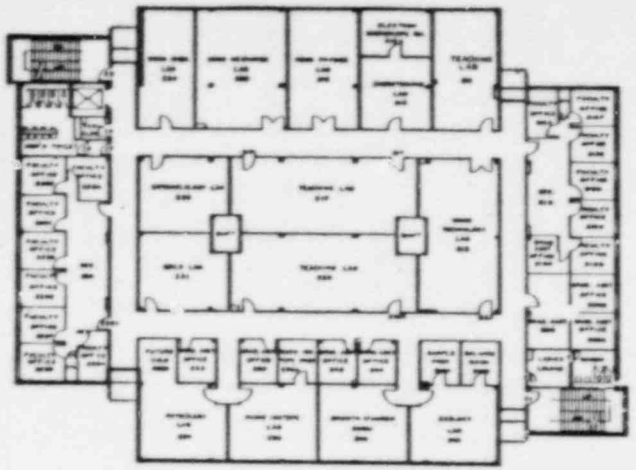


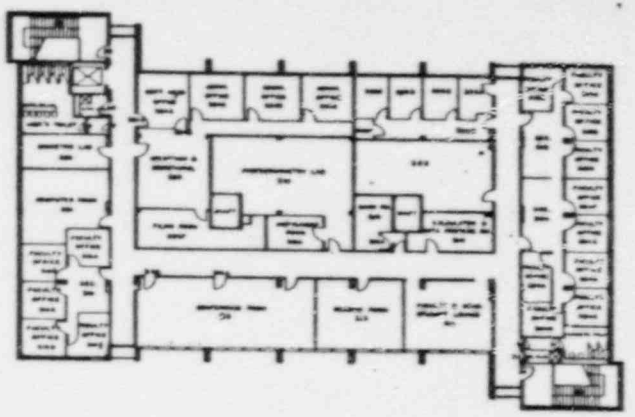
FLOOR PLAN — AQUATIC ECOLOGY LAB

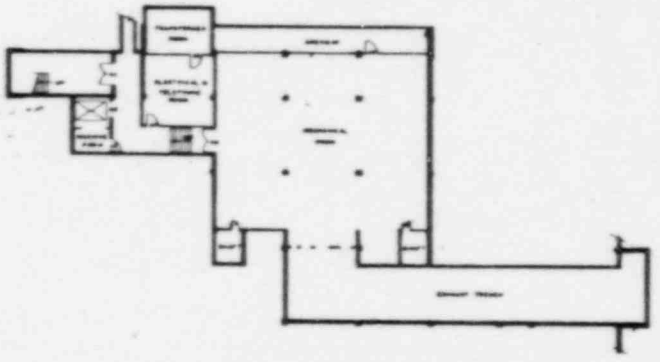
II-7

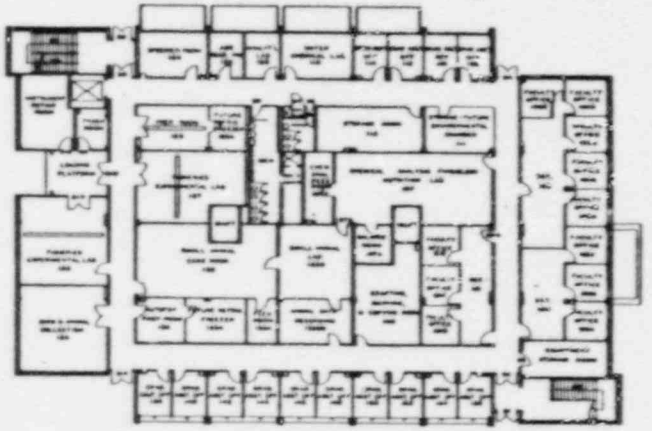
DRWN:	AQUATIC ECOLOGY LAB Z90
CHKD:	
APPD:	VIRGINIA POLYTECHNIC INSTITUTE & STATE UNIVERSITY
APPD:	BLACKSBURG, VIRGINIA
	PHYSICAL PLANT DEPT. - PLANNING & ENGINEERING DIVISION


BIOCHEMISTRY BLDG 110
VIRGINIA POLYTECHNIC INSTITUTE & STATE UNIVERSITY
BASEMENT FLOOR PLAN
FIRST FLOOR PLAN
THIRD FLOOR PLAN
SECOND FLOOR PLAN





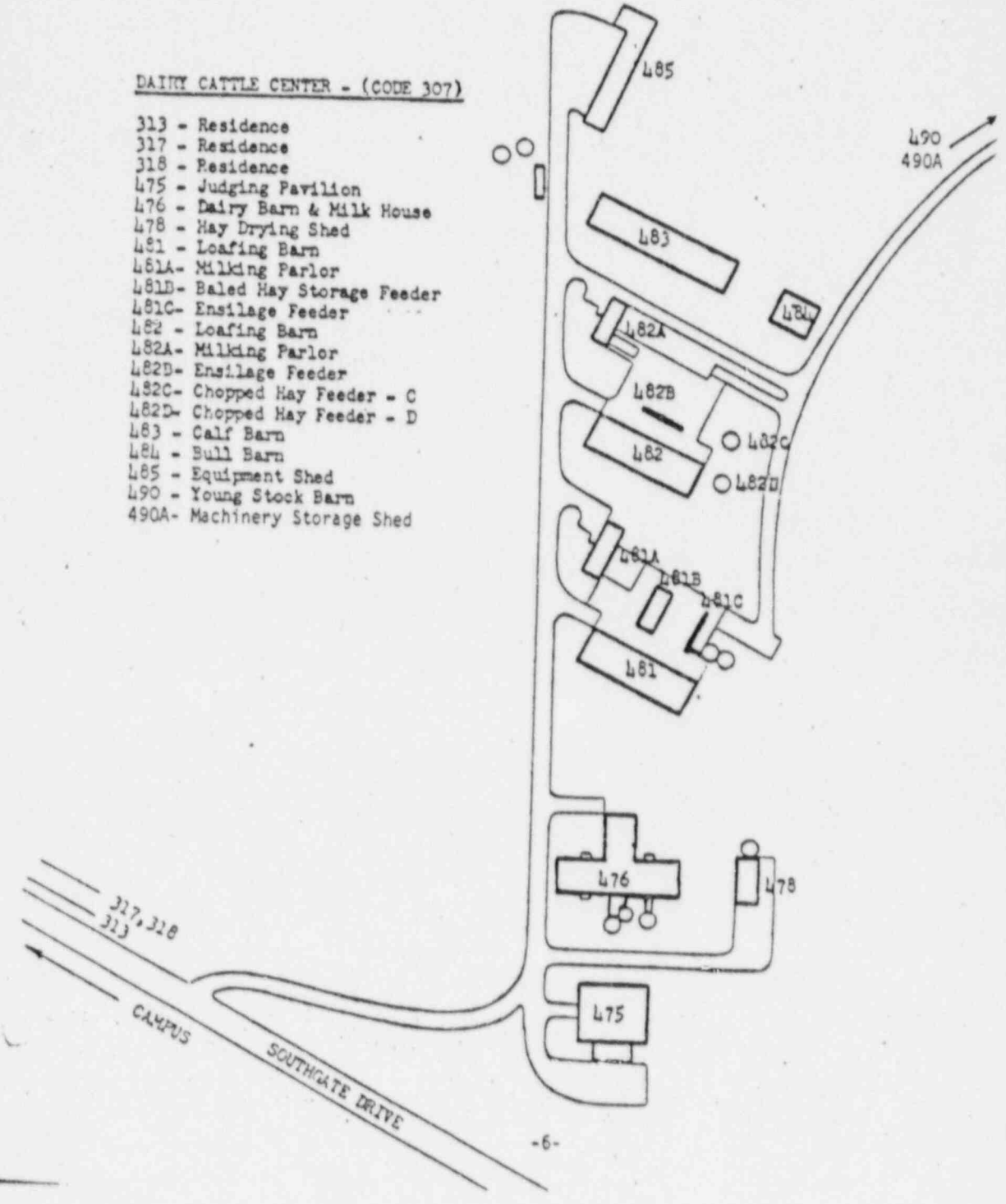




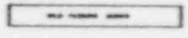
II-6

DAIRY CATTLE CENTER - (CODE 307)

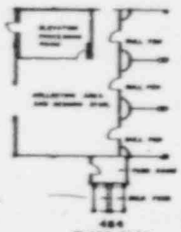
313 - Residence
317 - Residence
318 - Residence
475 - Judging Pavilion
476 - Dairy Barn & Milk House
478 - Hay Drying Shed
481 - Loafing Barn
481A- Milking Parlor
481B- Baled Hay Storage Feeder
481C- Ensilage Feeder
482 - Loafing Barn
482A- Milking Parlor
482B- Ensilage Feeder
482C- Chopped Hay Feeder - C
482D- Chopped Hay Feeder - D
483 - Calf Barn
484 - Bull Barn
485 - Equipment Shed
490 - Young Stock Barn
490A- Machinery Storage Shed



482-C
FLOOR PLAN

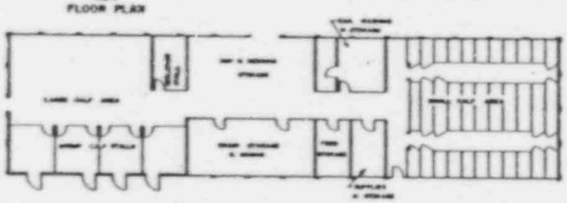


482-B

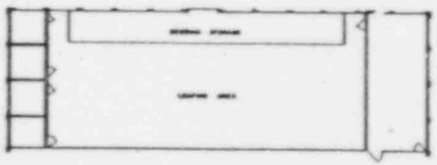


484
FLOOR PLAN

482-A
FLOOR PLAN



483
FLOOR PLAN

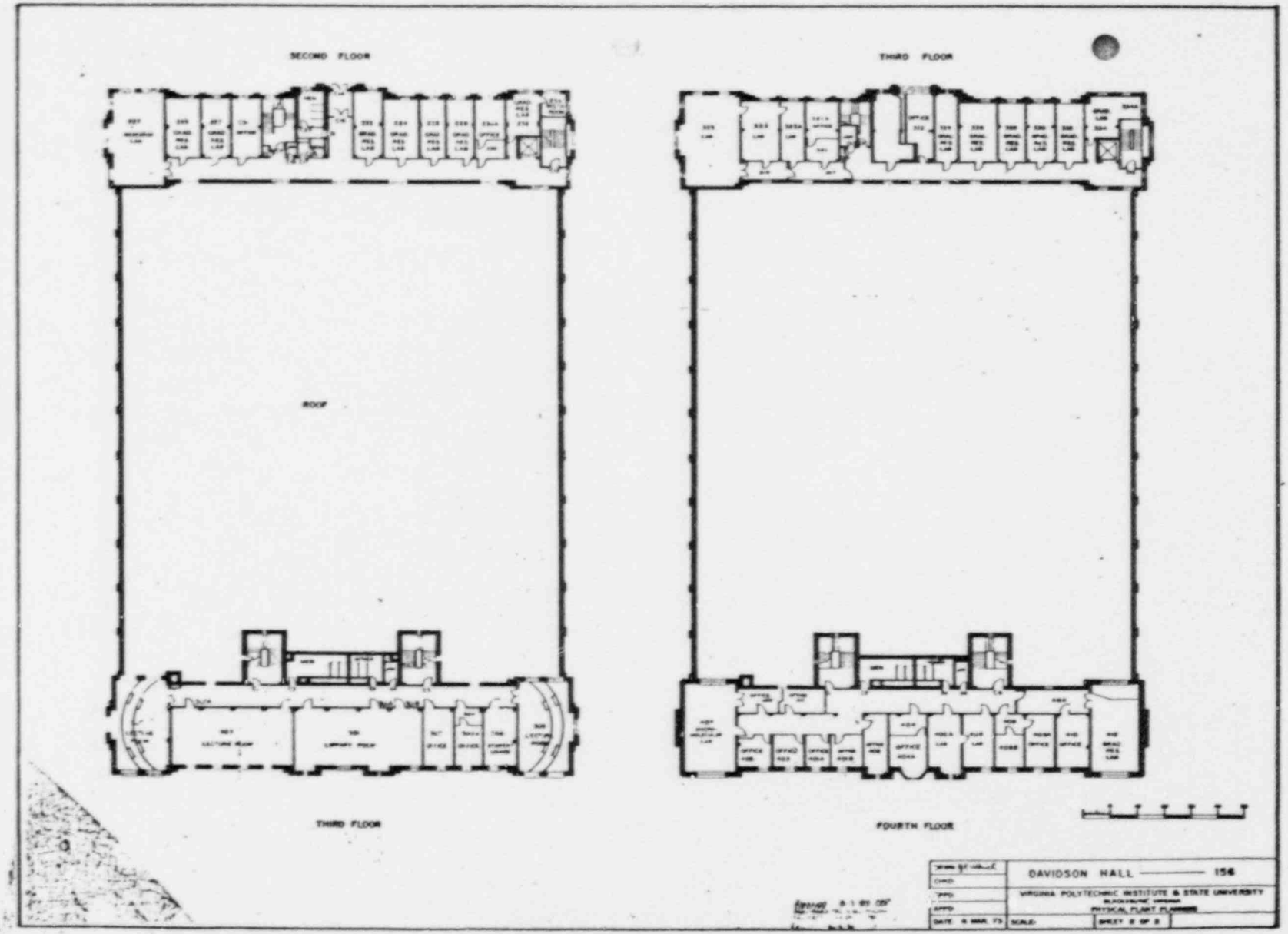


482
FLOOR PLAN

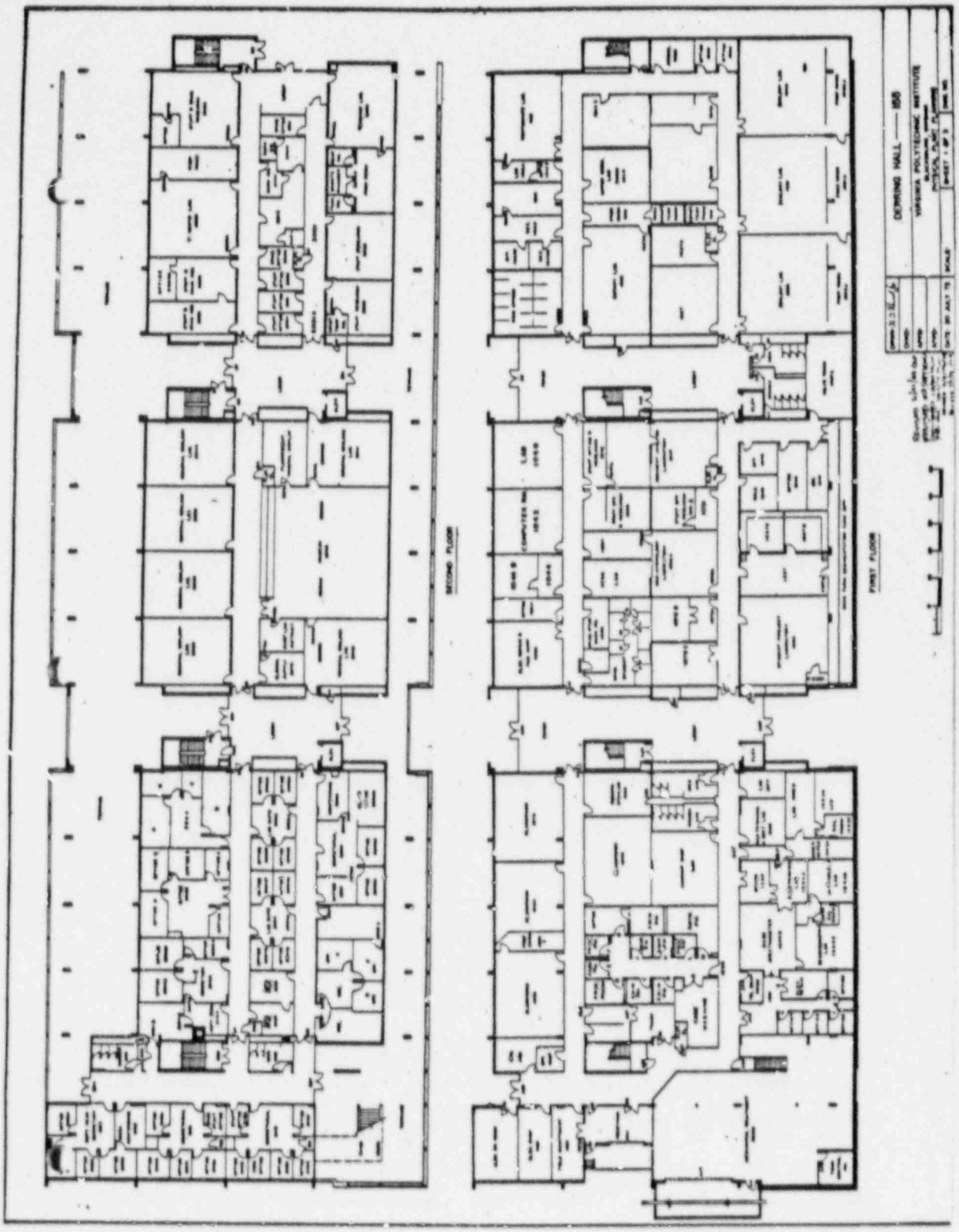
482-D
FLOOR PLAN

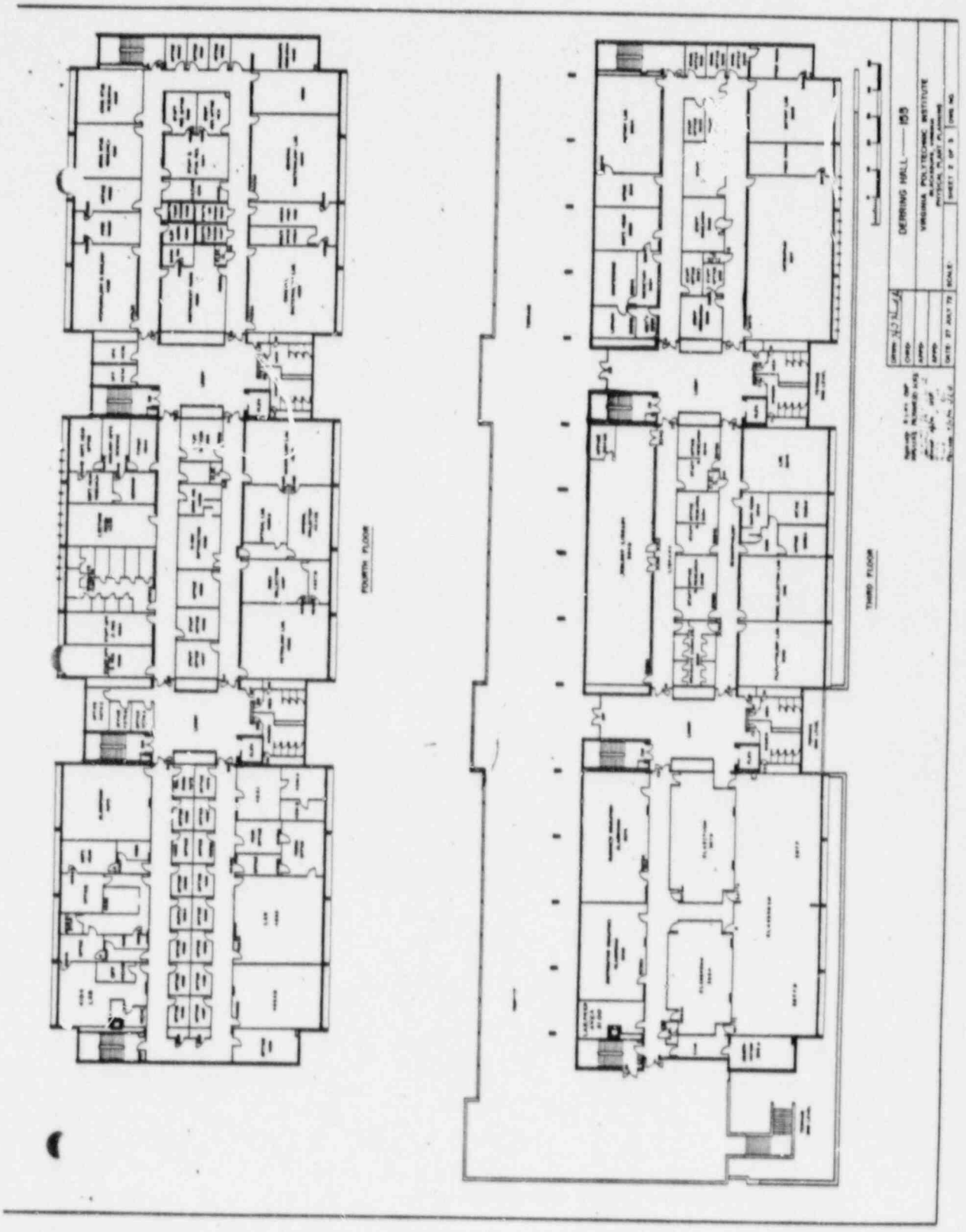
DRWN: [illegible]	DAIRY BARNS
CHKD:	VIRGINIA POLYTECHNIC INSTITUTE & STATE UNIVERSITY
APPD:	BLACKSBURG, VIRGINIA
APPD:	PHYSICAL PLANT PLANNING

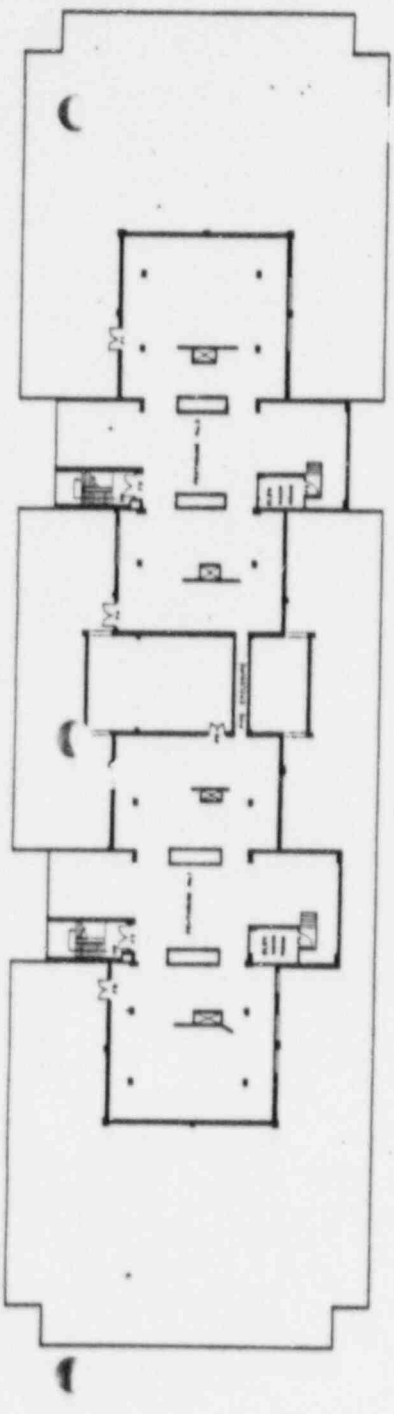
II-11


SECOND FLOOR
THIRD FLOOR
ROOF
THIRD FLOOR
FOURTH FLOOR
DAVIDSON HALL ——— 156
VIRGINIA POLYTECHNIC INSTITUTE & STATE UNIVERSITY
PHYSICAL PLANT PLANNING

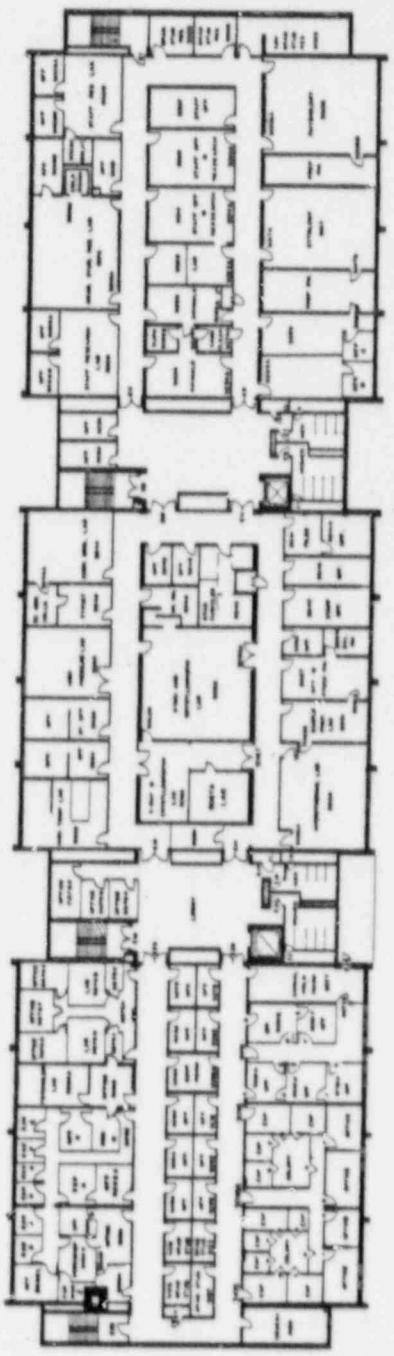
II-12


DORING HALL — 850
VIRGINIA POLYTECHNIC INSTITUTE
SECOND FLOOR
FIRST FLOOR


DERRING HALL — 153
VIRGINIA POLYTECHNIC INSTITUTE
BLACKSBURG, VIRGINIA
PHYSICAL PLANT ADMIN
DATE 27 JULY 72
SHEET 2 OF 5
FOURTH FLOOR
THIRD FLOOR



PENTHOUSE PLAN

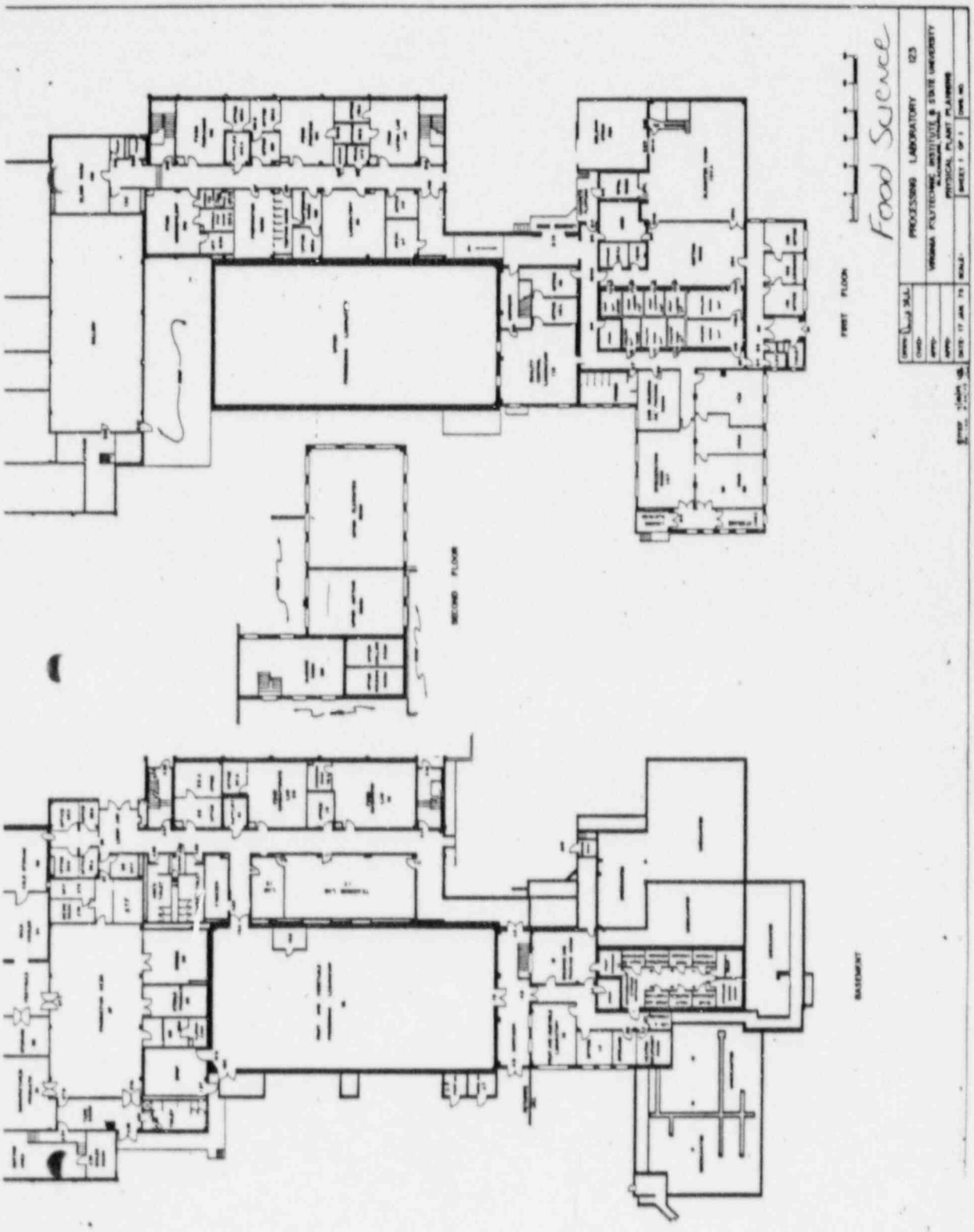


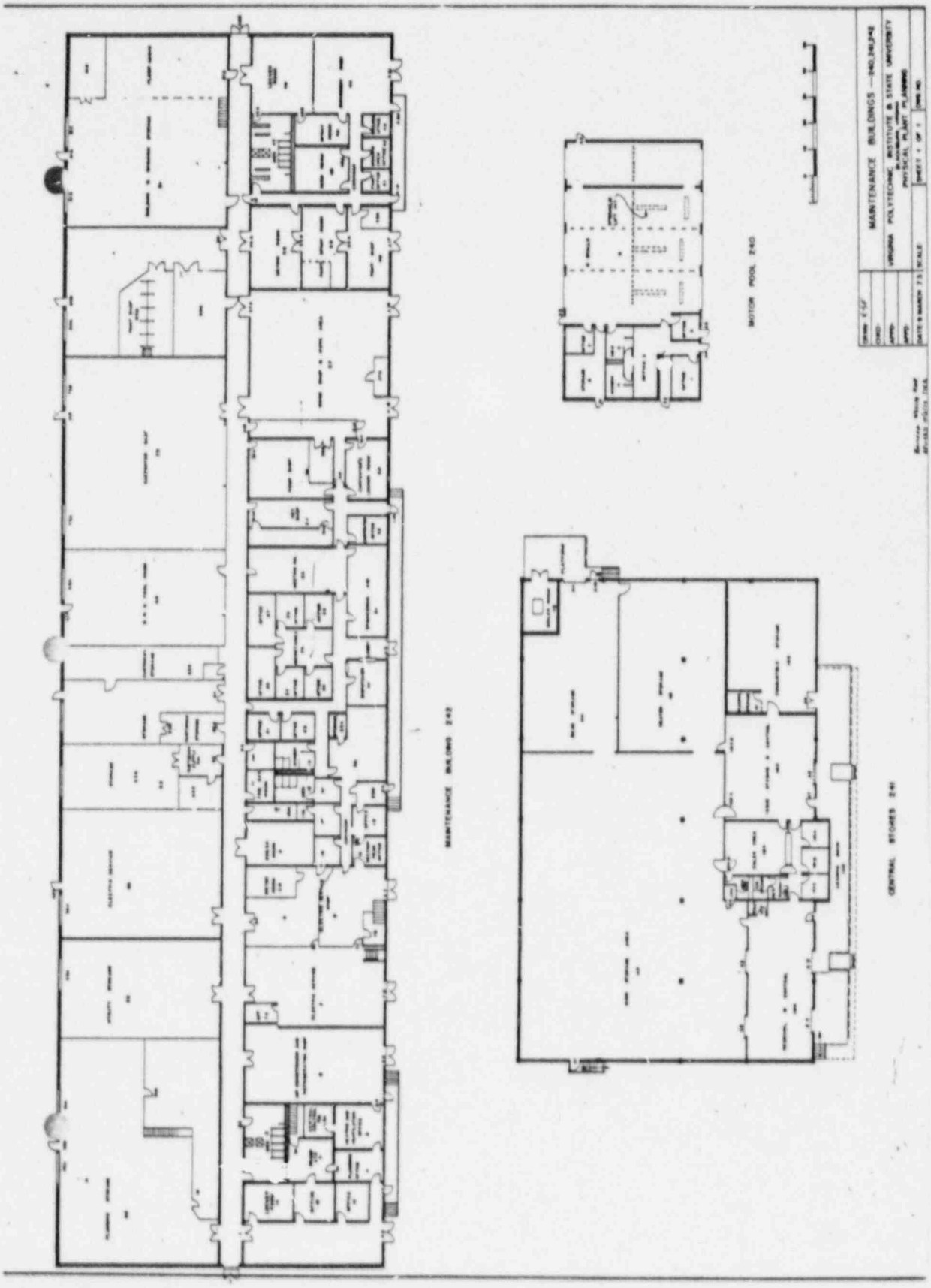
FIFTH FLOOR

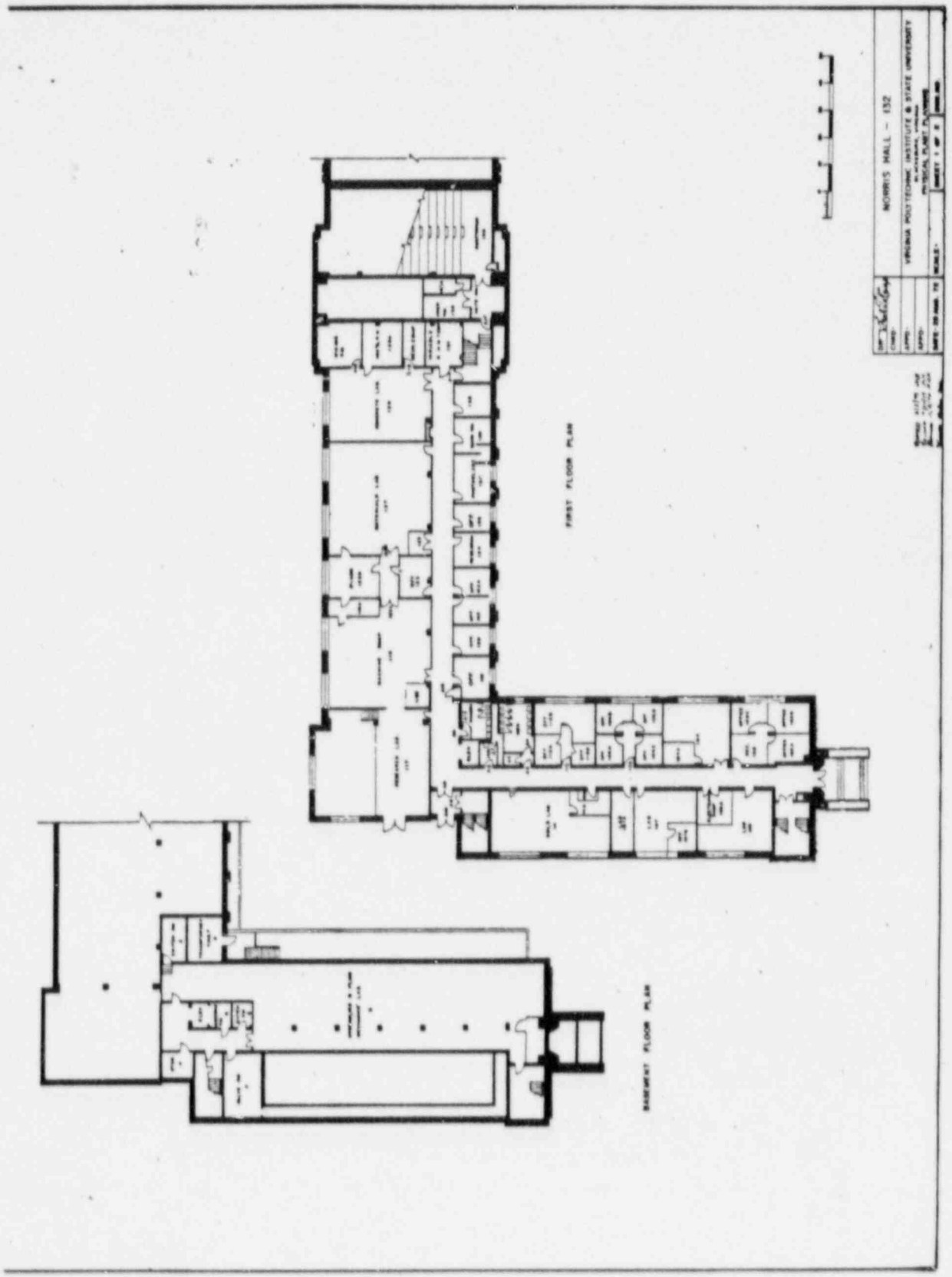
DERRING HALL - 155

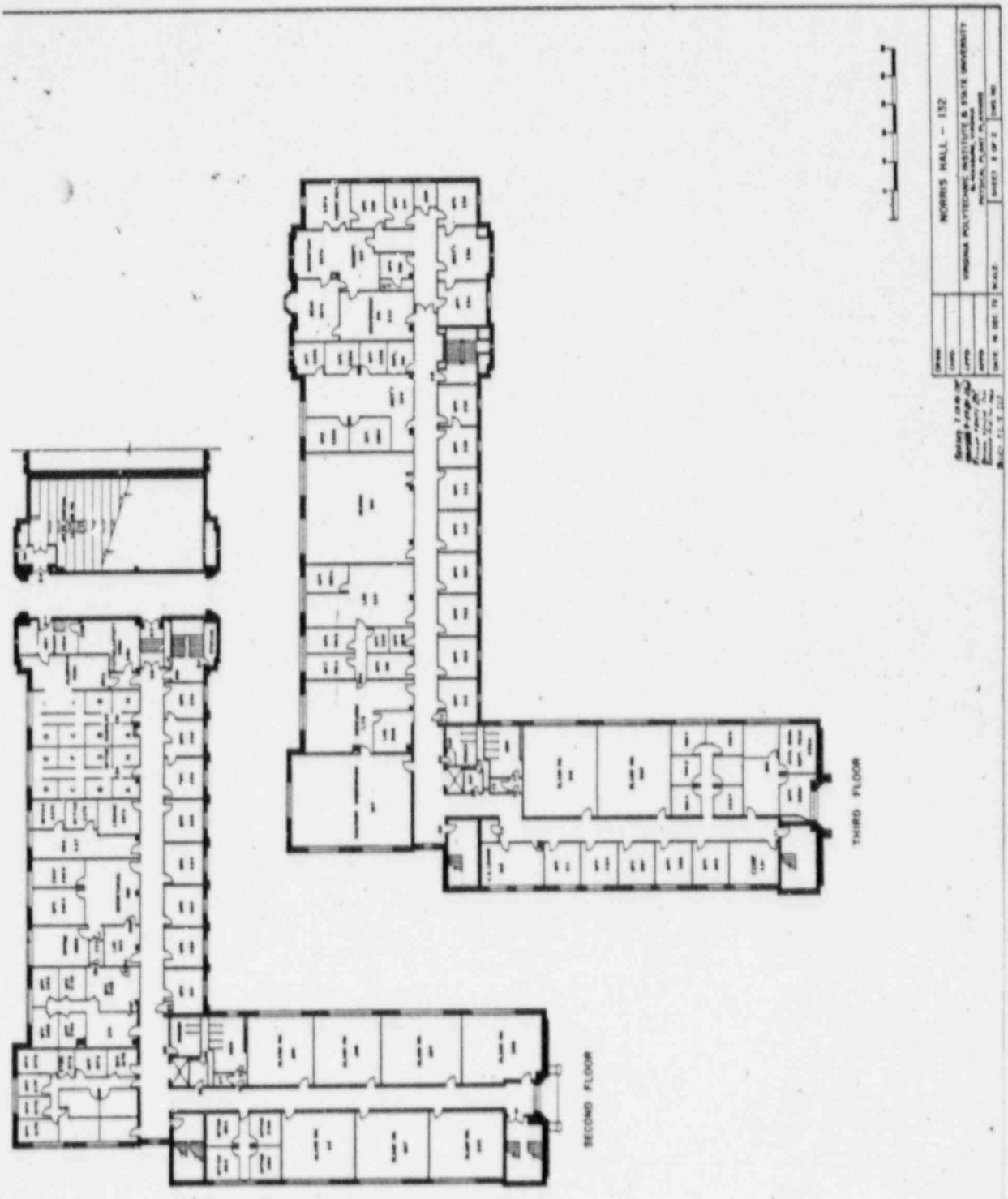
VIRGINIA POLYTECHNIC INSTITUTE & STATE UNIVERSITY

II-16


Food Science
FIRST FLOOR
SECOND FLOOR
BASEMENT
PROCESSING LABORATORY 123
VIRGINIA POLYTECHNIC INSTITUTE & STATE UNIVERSITY
PHYSICAL PLANT PLANNING


MAINTENANCE BUILDINGS — ENGINEERS
VIRGINIA POLYTECHNIC INSTITUTE & STATE UNIVERSITY
PHYSICAL PLANT PLANNING
MAINTENANCE BUILDING 240
MOTOR POOL 240
CENTRAL STORES 241


NORRIS HALL - 132
VIRGINIA POLYTECHNIC INSTITUTE & STATE UNIVERSITY
PHYSICAL PLANT PLANNING
FIRST FLOOR PLAN
BASEMENT FLOOR PLAN

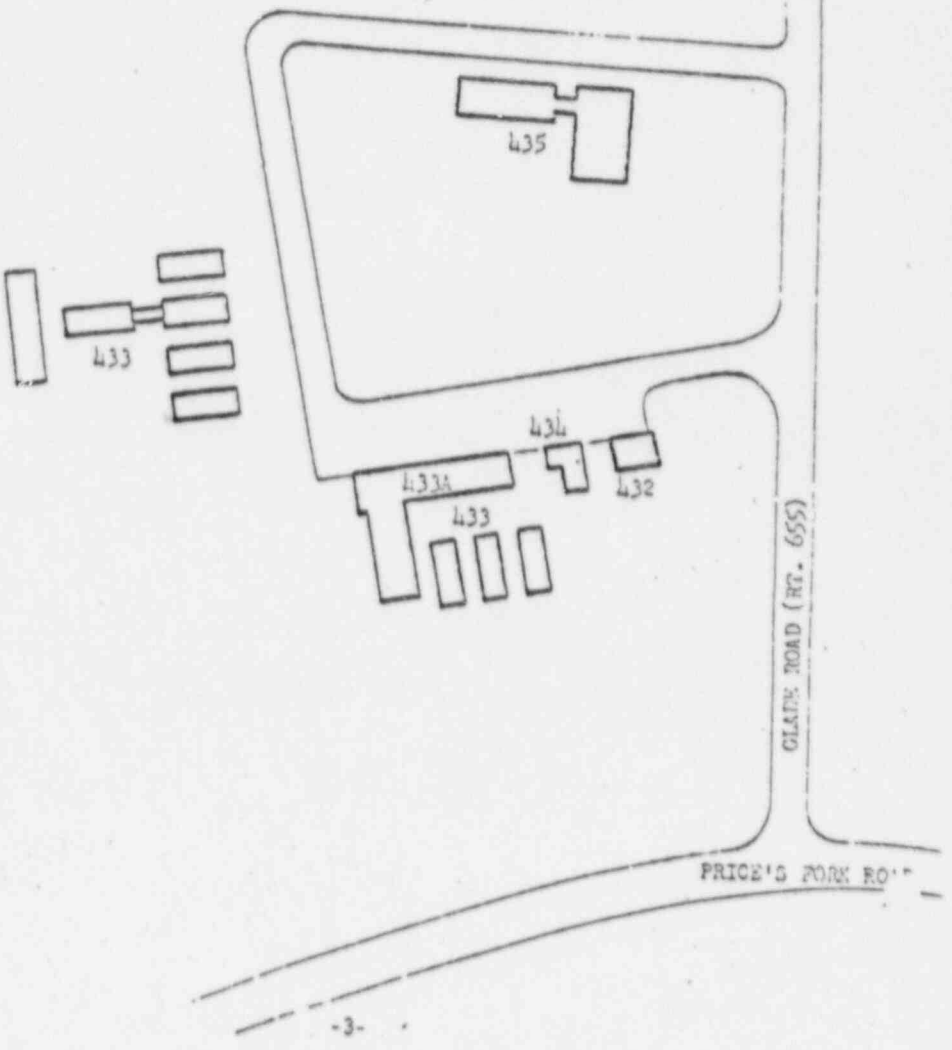

NORRIS HALL – 132
VIRGINIA POLYTECHNIC INSTITUTE & STATE UNIVERSITY
PHYSICAL PLANT PLANNING
THIRD FLOOR
SECOND FLOOR

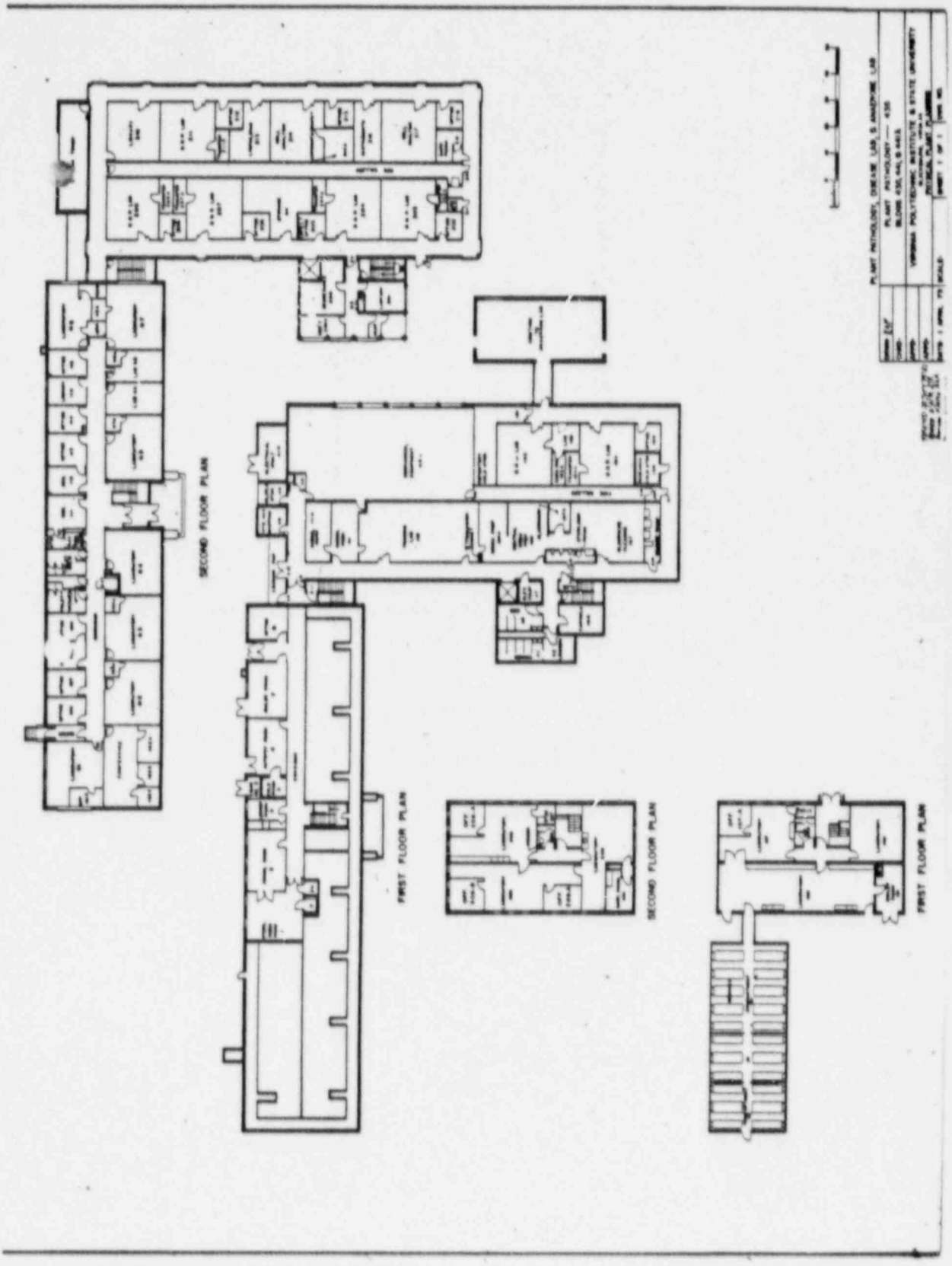
Glade Rd Research Center

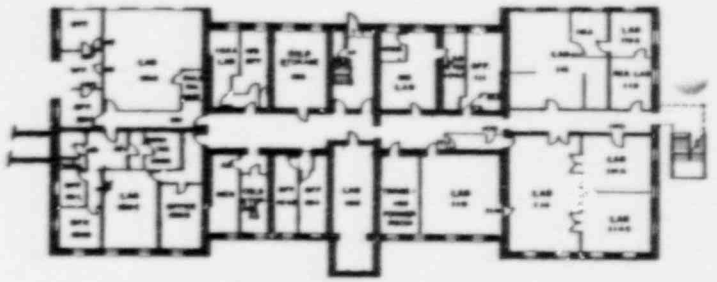
II-20

PLANT PATHOLOGY LAB. - (CODE 304)

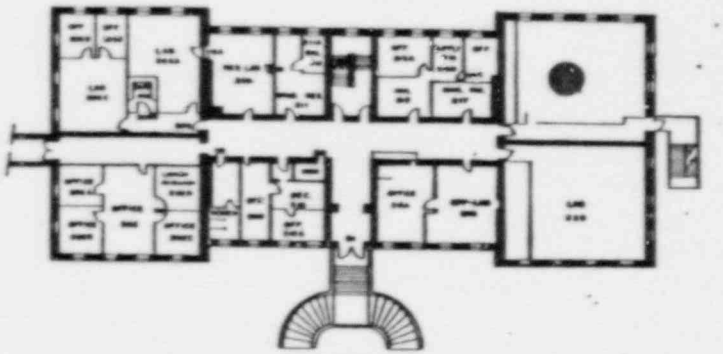
432 - Entomology Service Building
433 - Plant Pathology Greenhouses
433A - Plant Pathology Garage & Shop
434 - Horticulture Storage
435 - Plant Pathology Laboratory



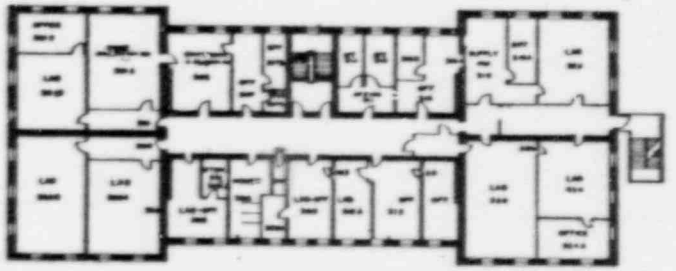

SECOND FLOOR PLAN
FIRST FLOOR PLAN
SECOND FLOOR PLAN
FIRST FLOOR PLAN



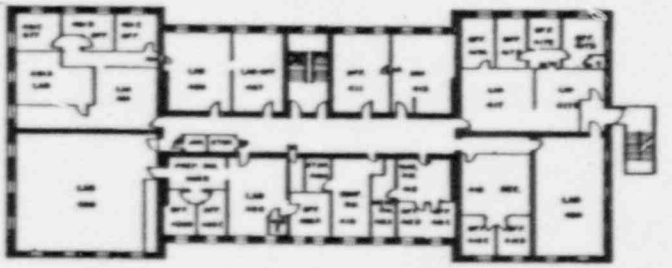
FIRST FLOOR PLAN



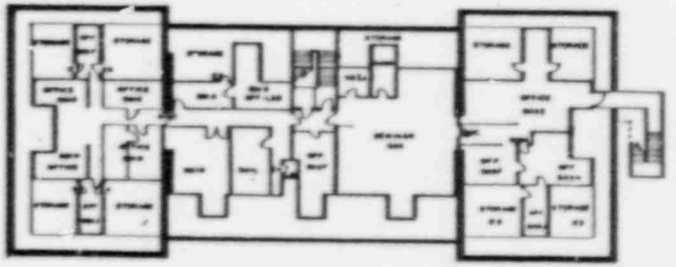
SECOND FLOOR PLAN



THIRD FLOOR PLAN



FOURTH FLOOR PLAN

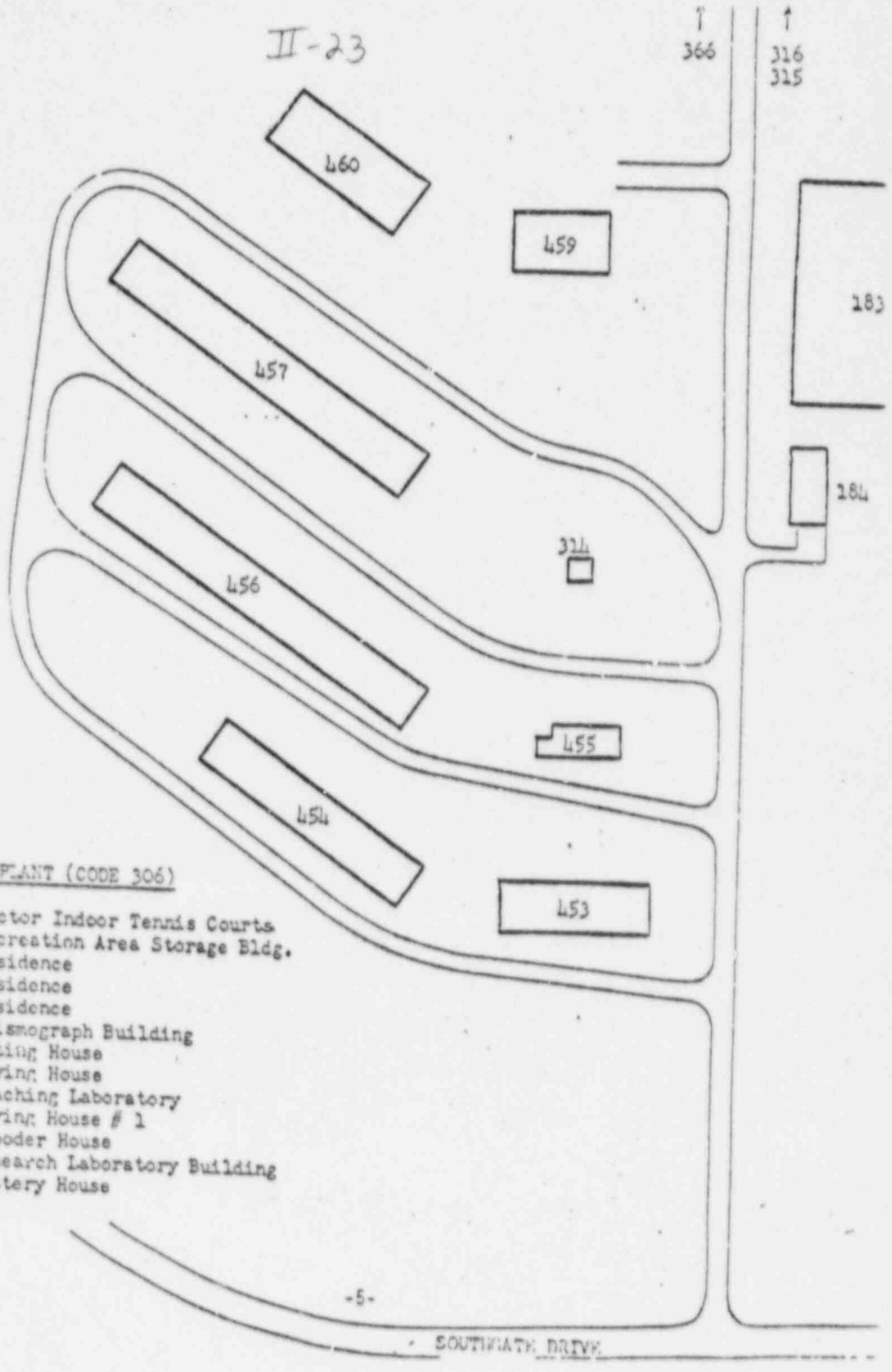


FIFTH FLOOR PLAN

DRWN.		PRICE HALL - 902
CHKD.		VIRGINIA POLYTECHNIC INSTITUTE
REVD.		PHYSICAL PLANT PLANNING
REVD.		
DATE 10 AUG 73	SCALE:	SHEET 1 OF 1

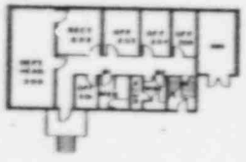
II-22

II-23

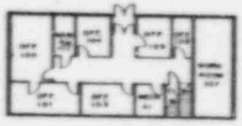


POULTRY PLANT (CODE 306)

183 - Rector Indoor Tennis Courts
184 - Recreation Area Storage Bldg.
314 - Residence
315 - Residence
316 - Residence
366 - Seismograph Building
453 - Mating House
454 - Laying House
455 - Teaching Laboratory
456 - Laying House # 1
457 - Brooder House
459 - Research Laboratory Building
460 - Battery House

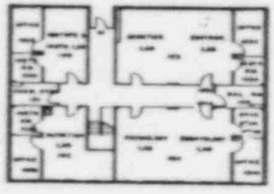


FIRST FLOOR



GROUND FLR.

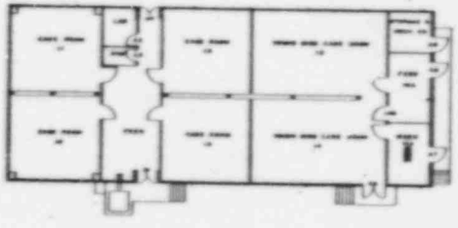
TEACHING LAB — 455



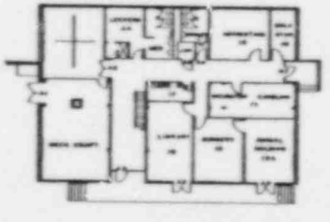
FIRST FLOOR

HEALTH & SAFETY

RESEARCH LAB -476



BATTERY HOUSE - 480

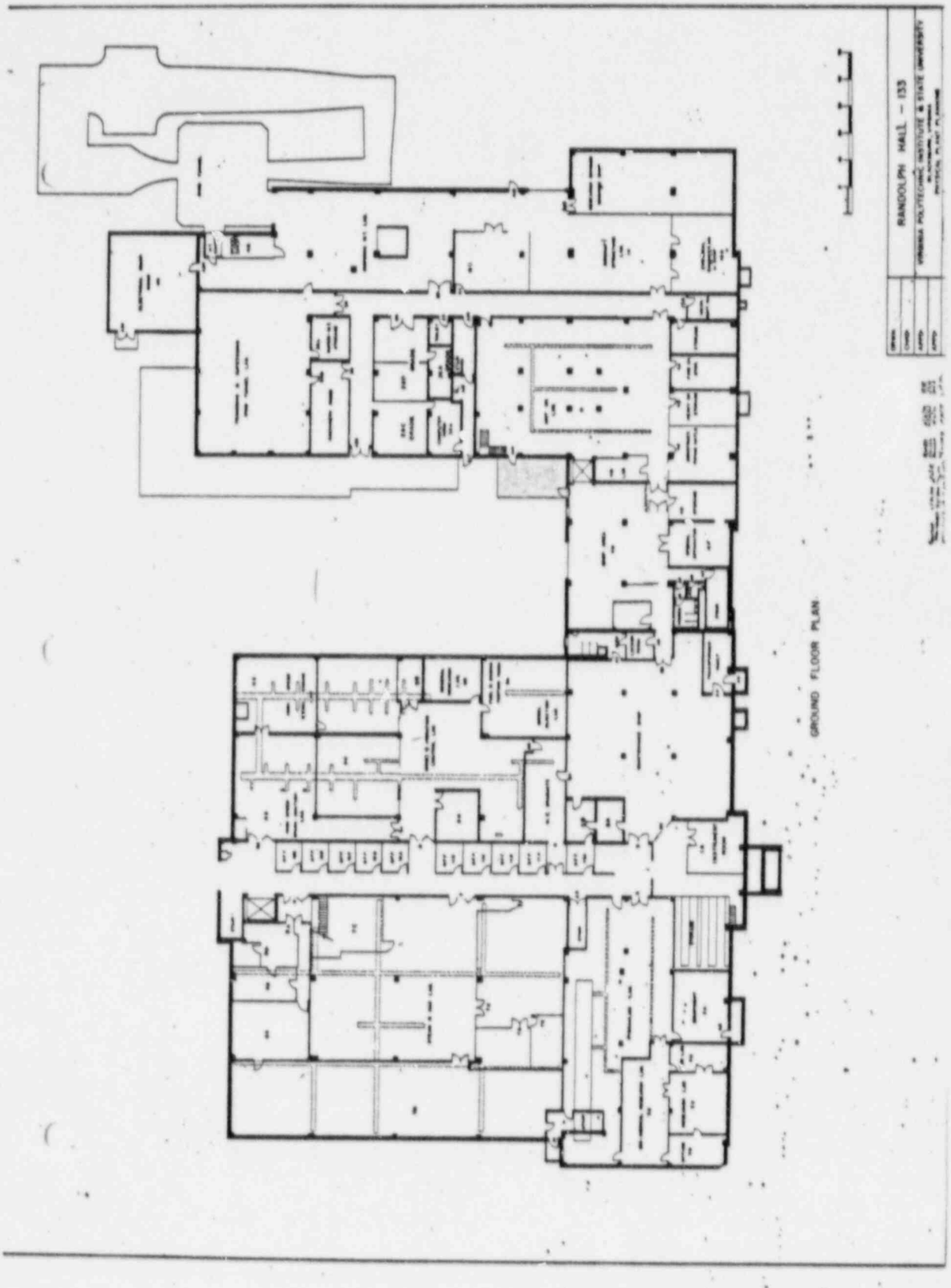


BASEMENT FLOOR

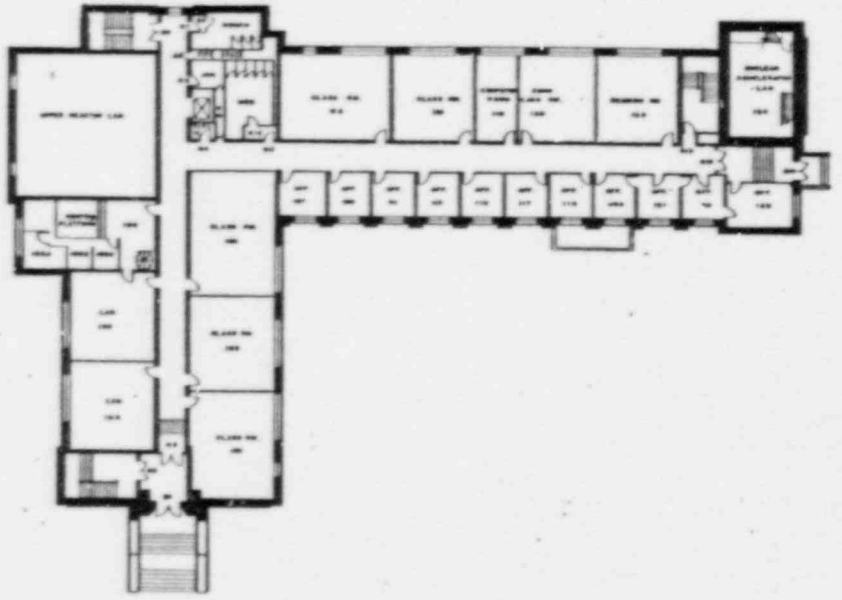
HEALTH & SAFETY

DRAWN	~~POULTRY PLANT~~ 455-459-460
CHKD.	VIRGINIA POLYTECHNIC INSTITUTE & STATE UNIVERSITY
APPD.	BLACKSBURG, VIRGINIA
APPD.	PHYSICAL PLANT PLANNING
DATE: 15 AUG 71	SCALE: SHEET OF

II-24


RANDOLPH HALL - 133
VIRGINIA POLYTECHNIC INSTITUTE & STATE UNIVERSITY
GROUND FLOOR PLAN

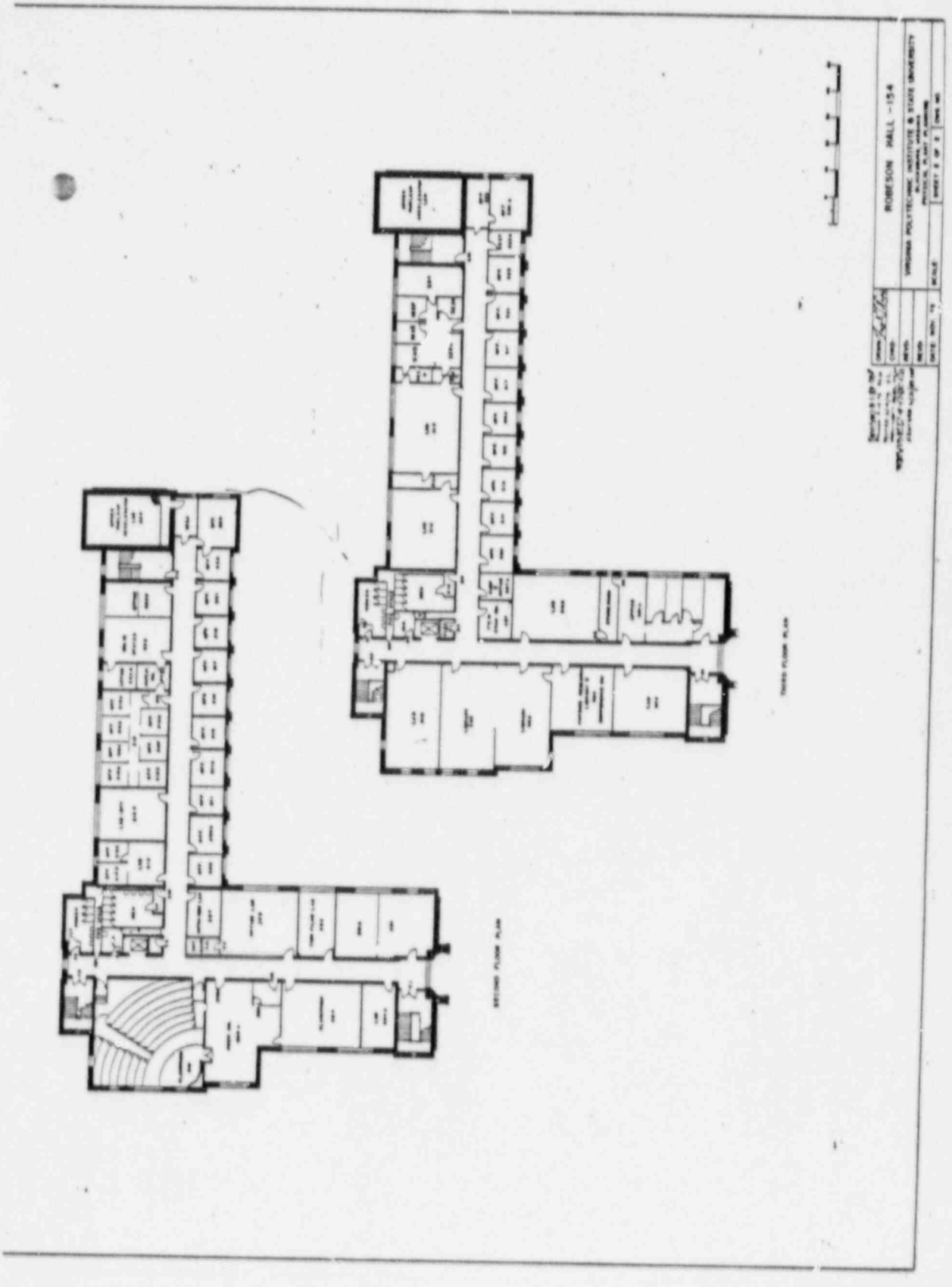
GROUND FLOOR PLAN

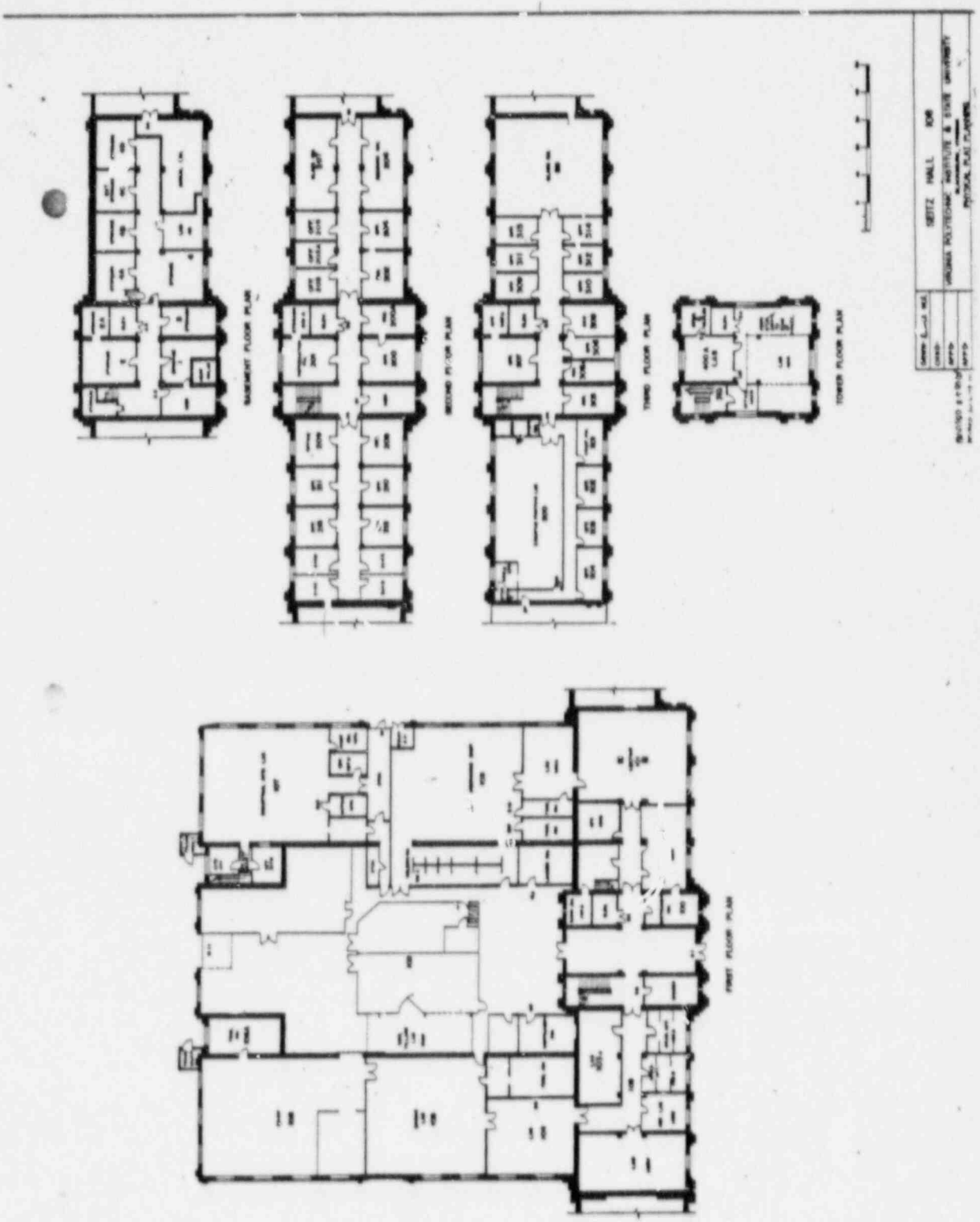


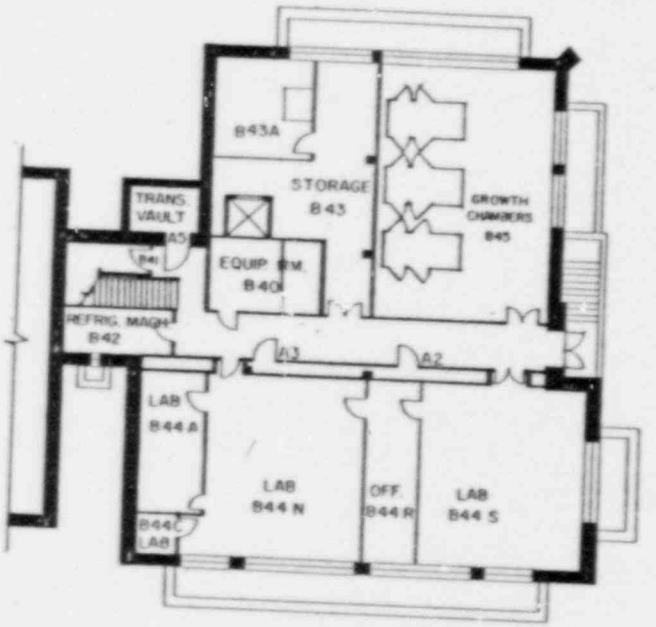
FIRST FLOOR PLAN

DRWN:	ROBESON HALL 154
CHKD:	
APPD:	VIRGINIA POLYTECHNIC INSTITUTE & STATE UNIVERSITY
APPD:	BLACKSBURG, VIRGINIA
	PHYSICAL PLANT PLANNING

II-26


ROBESON HALL - 154
VIRGINIA POLYTECHNIC INSTITUTE & STATE UNIVERSITY

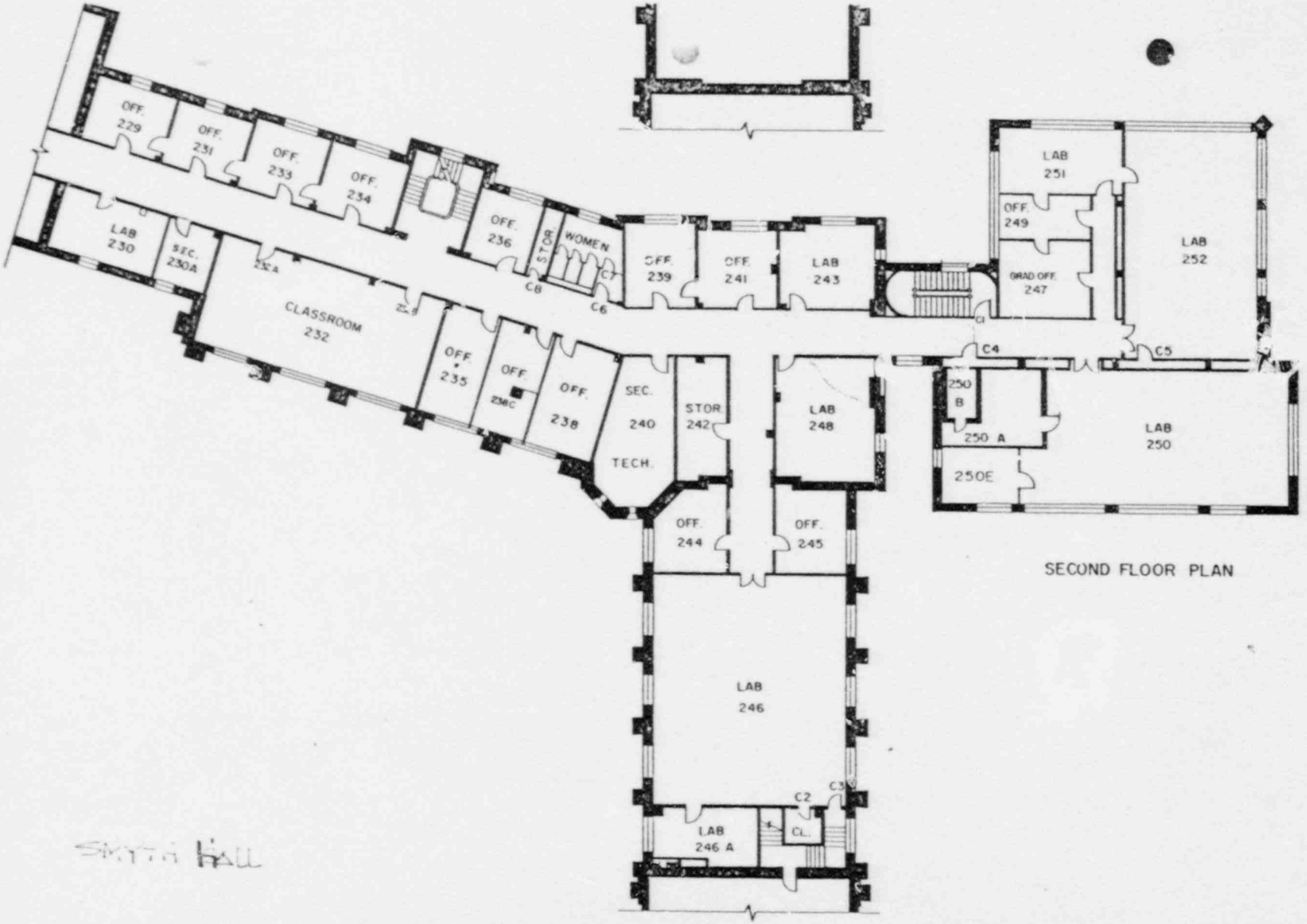

SEITZ HALL
VIRGINIA POLYTECHNIC INSTITUTE & STATE UNIVERSITY
BASEMENT FLOOR PLAN
SECOND FLOOR PLAN
THIRD FLOOR PLAN
TOWER FLOOR PLAN
FIRST FLOOR PLAN



BASEMENT FLOOR PLAN

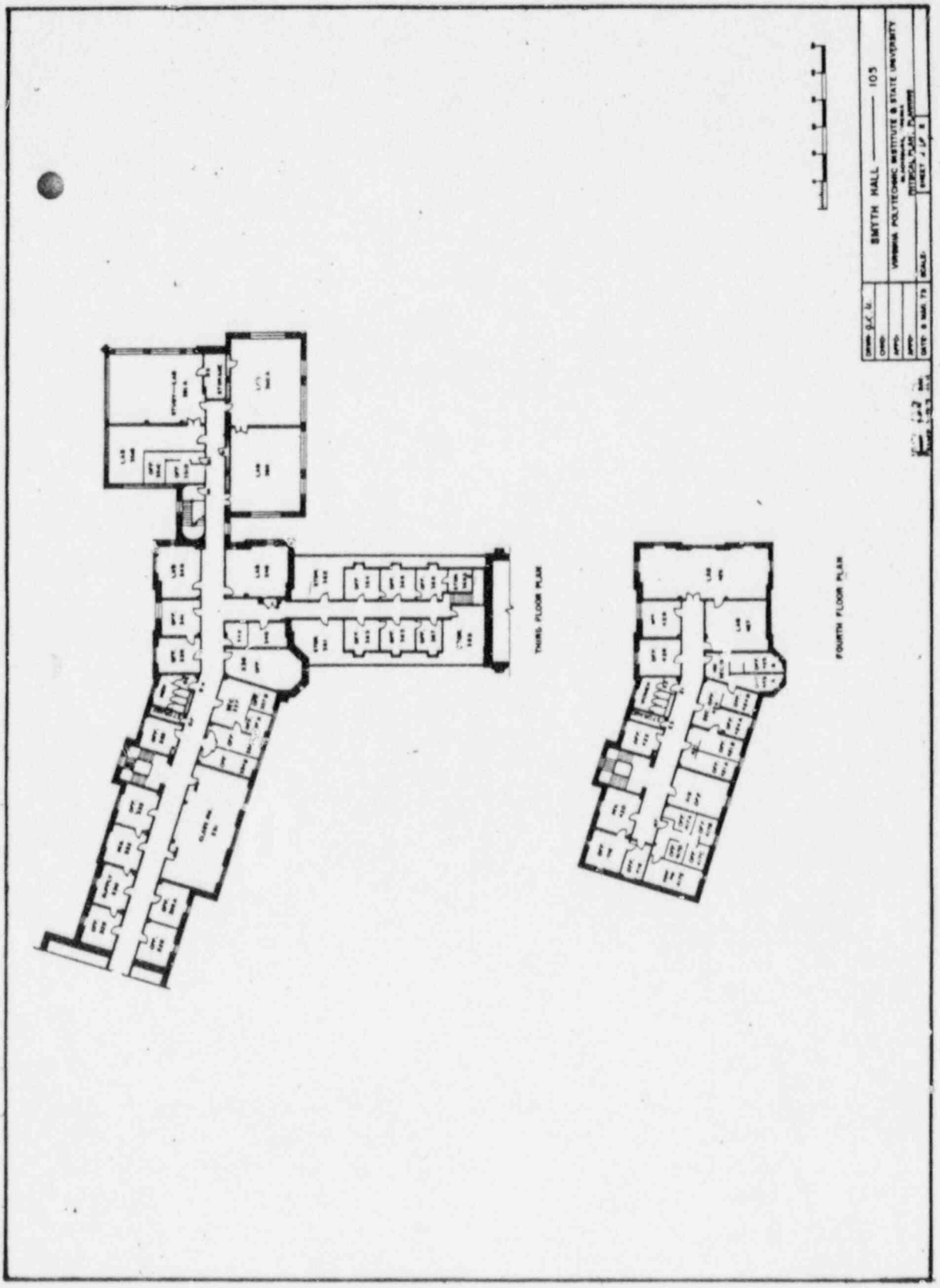
II-29

SMYTH HALL



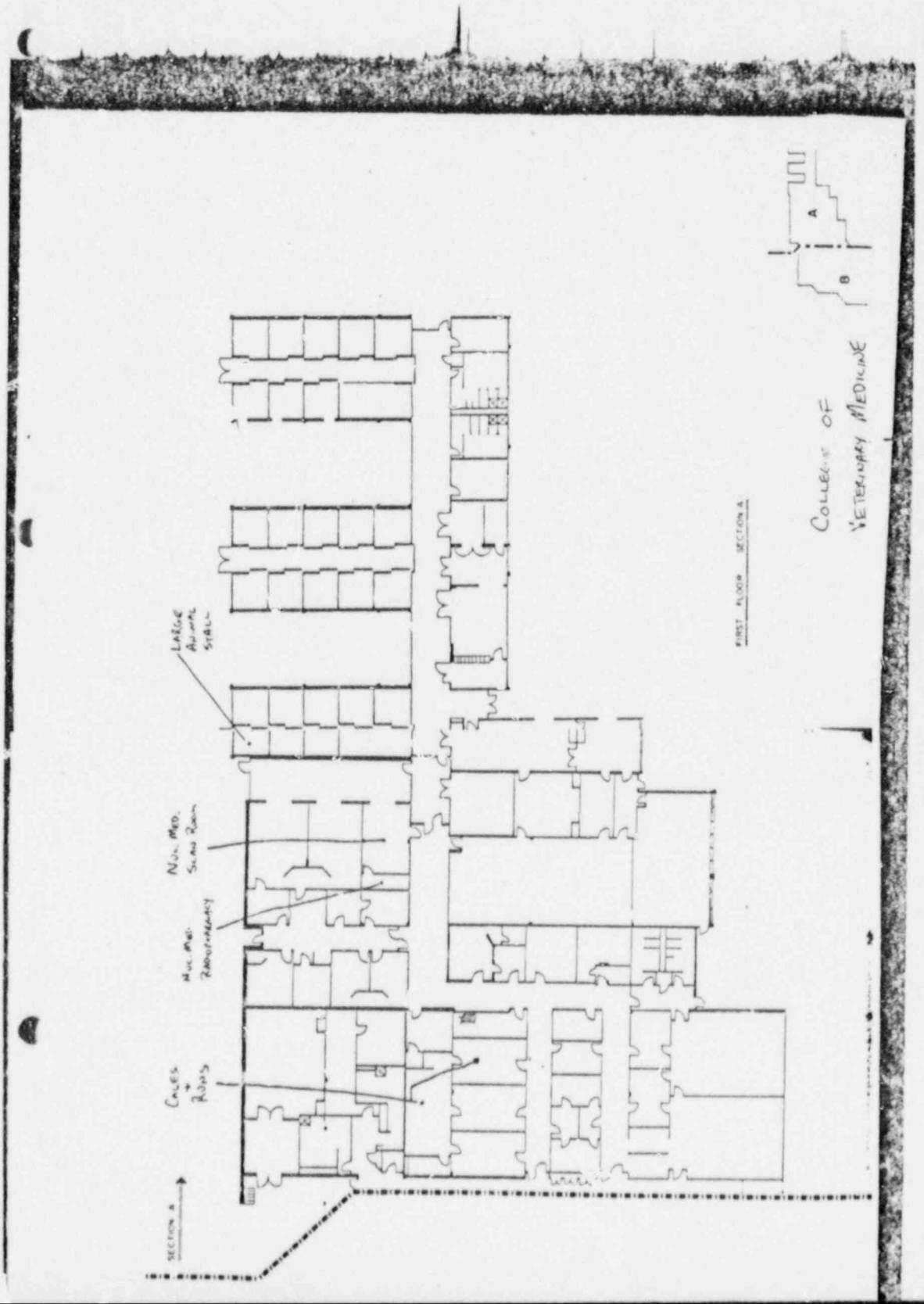
SECOND FLOOR PLAN

SMYTH HALL


SMYTH HALL — 105
VIRGINIA POLYTECHNIC INSTITUTE & STATE UNIVERSITY
THIRD FLOOR PLAN
FOURTH FLOOR PLAN

VETERINARY MEDICINE PHASE II A BLDG 150

SECOND FLOOR PLAN

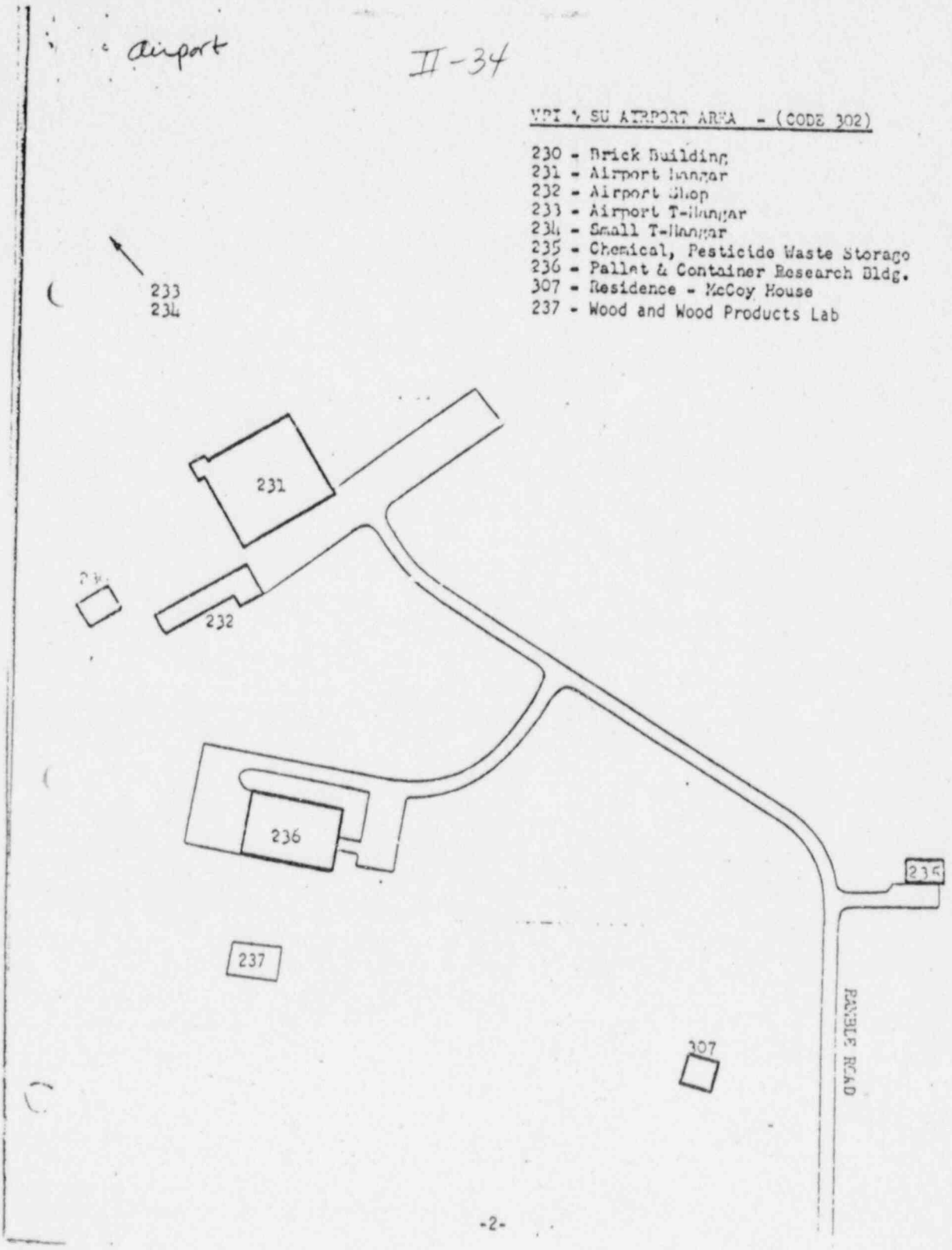

College of
Veterinary Medicine
A
B
First Floor Section A
Large Animal Stalls
Calves & Adults
Section A

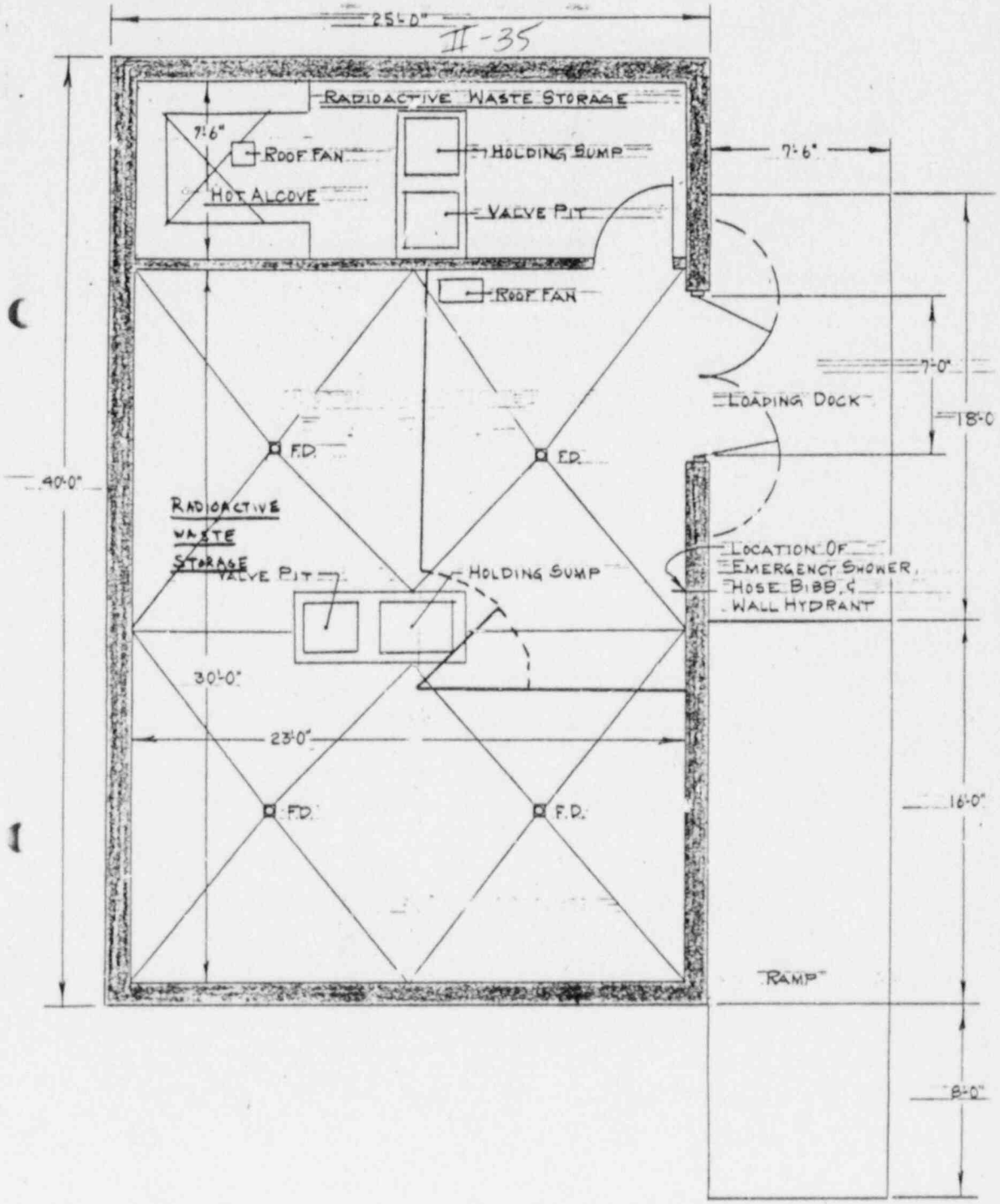
airport

II-34

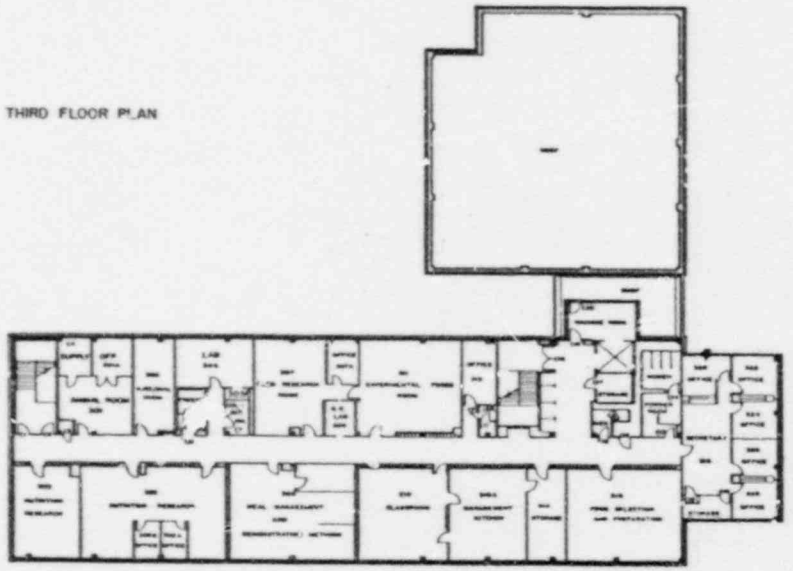
VPI & SU AIRPORT AREA - (CODE 302)

230 - Brick Building
231 - Airport Hangar
232 - Airport Shop
233 - Airport T-Hangar
234 - Small T-Hangar
235 - Chemical, Pesticide Waste Storage
236 - Pallet & Container Research Bldg.
307 - Residence - McCoy House
237 - Wood and Wood Products Lab




25'-0"
RADIOACTIVE WASTE STORAGE
7'-6"
ROOF FAN
HOLDING SUMP
HOT ALCOVE
VALVE PIT
7'-6"
ROOF FAN
7'-0"
LOADING DOCK
18'-0
F.D.
F.D.
40'-0"
RADIOACTIVE
WASTE
STORAGE
VALVE PIT
HOLDING SUMP
LOCATION OF
EMERGENCY SHOWER,
HOSE BIBB, &
WALL HYDRANT
30'-0"
23'-0"
F.D.
F.D.
16'-0"
RAMP
8'-0"

THIRD FLOOR PLAN



DRWN	WALLACE HALL — 115	
CHKD		
APPD	VIRGINIA POLYTECHNIC INSTITUTE & STATE UNIVERSITY BLACKSBURG, VIRGINIA PHYSICAL PLANT PLANNING	
APPD		
DATE 30 NOV 72	SCALE	SHEET 2 OF 2 DWG NO

II-36

A T T A C H M E N T III

RADIATION SAFETY HANDBOOK