

NRC FORM 313 (4-2004) 10 CFR 30, 32, 33, 34, 35, 36, 39, and 40	U.S. NUCLEAR REGULATORY COMMISSION	APPROVED BY OMB: NO. 3150-0120 Estimated burden per response to comply with this mandatory collection request: 7 hours. Submittal of the application is necessary to determine that the applicant is qualified and that adequate procedures exist to protect the public health and safety. Send comments regarding burden estimate to the Records and FOIA/Privacy Services Branch (T-5 F52), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to infocollects@nrc.gov , and to the Desk Officer, Office of Information and Regulatory Affairs, NEOB-10202, (3150-0120), Office of Management and Budget, Washington, DC 20503. If a means used to impose an information collection does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to, the information collection.				
<h2 style="margin: 0;">APPLICATION FOR MATERIAL LICENSE</h2>						
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.						
APPLICATION FOR DISTRIBUTION OF EXEMPT PRODUCTS FILE APPLICATIONS WITH: DIVISION OF INDUSTRIAL AND MEDICAL NUCLEAR SAFETY OFFICE OF NUCLEAR MATERIALS SAFETY AND SAFEGUARDS U.S. NUCLEAR REGULATORY COMMISSION WASHINGTON, DC 20555-0001 ALL OTHER PERSONS FILE APPLICATIONS AS FOLLOWS: IF YOU ARE LOCATED IN: ALABAMA, CONNECTICUT, DELAWARE, DISTRICT OF COLUMBIA, FLORIDA, GEORGIA, KENTUCKY, MAINE, MARYLAND, MASSACHUSETTS, MISSISSIPPI, NEW HAMPSHIRE, NEW JERSEY, NEW YORK, NORTH CAROLINA, PENNSYLVANIA, PUERTO RICO, RHODE ISLAND, SOUTH CAROLINA, TENNESSEE, VERMONT, VIRGINIA, VIRGIN ISLANDS, OR WEST VIRGINIA, SEND APPLICATIONS TO: LICENSING ASSISTANCE TEAM DIVISION OF NUCLEAR MATERIALS SAFETY U.S. NUCLEAR REGULATORY COMMISSION, REGION I 475 ALLENDALE ROAD KING OF PRUSSIA, PA 19406-1415	IF YOU ARE LOCATED IN: ILLINOIS, INDIANA, IOWA, MICHIGAN, MINNESOTA, MISSOURI, OHIO, OR WISCONSIN, SEND APPLICATIONS TO: MATERIALS LICENSING BRANCH U.S. NUCLEAR REGULATORY COMMISSION, REGION III 2443 WARRENVILLE ROAD, SUITE 210 LISLE, IL 60532-4352 ALASKA, ARIZONA, ARKANSAS, CALIFORNIA, COLORADO, HAWAII, IDAHO, KANSAS, LOUISIANA, MONTANA, NEBRASKA, NEVADA, NEW MEXICO, NORTH DAKOTA, OKLAHOMA, OREGON, PACIFIC TRUST TERRITORIES, SOUTH DAKOTA, TEXAS, UTAH, WASHINGTON, OR WYOMING, SEND APPLICATIONS TO: NUCLEAR MATERIALS LICENSING BRANCH U.S. NUCLEAR REGULATORY COMMISSION, REGION IV 611 RYAN PLAZA DRIVE, SUITE 400 ARLINGTON, TX 76011-4005					
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 JURISDICTIONS.						
1. THIS IS AN APPLICATION FOR (Check appropriate item) <input type="checkbox"/> A. NEW LICENSE <input type="checkbox"/> B. AMENDMENT TO LICENSE NUMBER _____ <input checked="" type="checkbox"/> C. RENEWAL OF LICENSE NUMBER <u>06-09045-03</u>	2. NAME AND MAILING ADDRESS OF APPLICANT (include ZIP code) Trinity College c/o Dr. Kathleen Archer Dept. Biology, 300 Summit St. Hartford, CT 06106					
3. ADDRESS WHERE LICENSED MATERIAL WILL BE USED OR POSSESSED Trinity College 300 Summit St. Hartford, CT 06106	4. NAME OF PERSON TO BE CONTACTED ABOUT THIS APPLICATION Dr. Kathleen Archer TELEPHONE NUMBER (860) 297-2226					
SUBMIT ITEMS 5 THROUGH 11 ON 8-1/2 X 11" PAPER. THE TYPE AND SCOPE OF INFORMATION TO BE PROVIDED IS DESCRIBED IN THE LICENSE APPLICATION GUIDE.						
5. RADIOACTIVE MATERIAL 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 EXPERIENCE.	8. TRAINING FOR INDIVIDUALS WORKING IN OR FREQUENTING RESTRICTED AREAS.					
9. FACILITIES AND EQUIPMENT.	10. RADIATION SAFETY PROGRAM.					
11. WASTE MANAGEMENT.	12. LICENSE FEES (See 10 CFR 170 and Section 170.31) <table style="width:100%; border: none;"> <tr> <td style="border: none;">FEE CATEGORY</td> <td style="border: none;">3 L</td> <td style="border: none;">AMOUNT ENCLOSED</td> <td style="border: none;">\$ 640.00</td> </tr> </table>		FEE CATEGORY	3 L	AMOUNT ENCLOSED	\$ 640.00
FEE CATEGORY	3 L	AMOUNT ENCLOSED	\$ 640.00			
13. CERTIFICATION. (Must be completed by applicant) THE APPLICANT UNDERSTANDS THAT ALL STATEMENTS AND REPRESENTATIONS MADE IN THIS APPLICATION ARE BINDING UPON THE APPLICANT. THE APPLICANT AND ANY OFFICIAL EXECUTING THIS CERTIFICATION ON BEHALF OF THE APPLICANT, NAMED IN ITEM 2, CERTIFY THAT THIS APPLICATION IS PREPARED IN CONFORMITY WITH TITLE 10, CODE OF FEDERAL REGULATIONS, PARTS 30, 32, 33, 34, 35, 36, 39, 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.						
CERTIFYING OFFICER -- TYPED/PRINTED NAME AND TITLE Dr. Frank Kirkpatrick, Dean of Faculty	SIGNATURE 	DATE 6-8-05				
FOR NRC USE ONLY						
TYPE OF FEE	FEE LOG	FEE CATEGORY	AMOUNT RECEIVED \$	CHECK NUMBER	COMMENTS	
APPROVED BY				DATE		

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Renewal for License # 06-09045-03

K. Archer, RSO

5. Radioactive Material

A. Unsealed sources

Element and mass number	Chemical and/or physical form	Maximum amount possessed at any one time
Hydrogen 3	Any	100 mCi
Carbon 14	Any	80 mCi
Phosphorus 32	Any	15 mCi
Sulfur 35	Any	20 mCi
TOTAL		215 mCi

Note: Our current license includes the following isotopes not requested here: 45-Ca, 125-I, 131-I. We do not currently have any authorized users who anticipate needing these isotopes, and so we would like to have them removed from our license.

B 1. Sealed sources - isotope totals

Element and mass number	Chemical and/or physical form	Maximum amount possessed at any one time
60-Co	sealed	8.91 uCi
137-Cs	sealed	31 uCi
137-Cs/Ba isotope generator	sealed	< 10 uCi
137-Cs / 65-Zn mixture	sealed	0.5 uCi / 1 uCi
90-Sr	sealed	0.7 uCi
TOTAL		52.11 uCi

Note: The sealed sources above are not listed on previous licenses. They represent sealed sources used in Physics laboratory exercises for students, and are stored in locked safes in the Physics Department. Because the previous RSO at Trinity did not list them, the current RSO (K. Archer) was unaware of their existence until the death of

Table 5 B-2. Sealed sources with model #s and manufacturers

Element and atomic #	Number of sealed disks	Amount	Manufacturer and model #
60-Co	6	1.0 uCi each	Model # RSS-5, Spectrum Technologies, Oak Ridge, TN
	1	1.0 uCi	Model RSS-8, Spectrum Technologies, Oak Ridge, TN
	1	0.91 uCi	No model #, New England Nuclear, Boston, MA
	1	1.0 uCi	No model #, The Nucleus, Oak Ridge, TN
137-Cs	6	5.0 uCi each	Model # RSS-5, Spectrum Technologies, Oak Ridge, TN
	1	1.0	Model RSS-8, Spectrum Technologies, Oak Ridge, TN
137-Cs/Ba isotope generator	1	< 10 uCi	No model #, Spectrum Technologies, Oak Ridge, TN
90-Sr	6	0.1 uCi each	Model # RSS-5, Spectrum Technologies, Oak Ridge, TN
	1	0.1	No model #, The Nucleus, Oak Ridge, TN
137-Cs/65-Zn mix	1	0.5/1.0 uCi	Model RSS-8, Spectrum Technologies, Oak Ridge, TN

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a Physics Department faculty member, and the subsequent cleanup of his laboratory, brought them to light. Please see the attached table (Table 5 B-2) which lists individual disk sources with their manufacturers and model numbers.

6. Purpose for which licensed material will be used.

Research and development as defined in 10 CFR 30.4, and education.

7. Individuals responsible for radiation safety program.

Executive Management: Dean of Faculty

The RSO reports directly to the Dean of Faculty. The RSO prepares narrative reports on an annual basis, covering the inventory, the internal audit, any accidents or spills, any other issues of concern.

Radiation Safety Officer: Dr. Kathleen Archer

Training

Radiation Safety Officer Course presented by Engelhardt and Associates, Inc. Forty hours of training on May 17 - 21, 1999, in Madison, WI.

Experience

Used radionuclides in biological research during graduate work (1979-1984), post-doctoral work (1984-1990), and as primary investigator (1990 - present). Experienced in use of 3-H, 14-C, 35-S, and 32P.

RSO Duties and Responsibilities

The Radiation Safety Officer is responsible for implementing the radiation safety program and for reviewing the radiation safety program in annual audits. The RSO has full access to all activities involving the use of radionuclides, and the authority to terminate any activity in which health and safety appear to be compromised. Duties include supervision of the following:

- a. Monitoring areas in which radioactive material is used
- b. Overseeing the ordering and reception of radioactive material
- c. Preparing radioactive waste for shipment to offsite disposal.
- d. Monitoring exposure to radiation and insuring exposure is within permissible limits
- e. Training of personnel
- f. Managing radioactive waste disposal
- g. Maintaining inventory and leak tests of sealed sources
- h. Decontamination
- i. Investigation of spills and responding to emergencies
- j. Maintaining records.

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Delegation of Authority

Trinity College is committed to keeping exposure to ionizing radiation as low as reasonably achievable (the ALARA concept). In keeping with this commitment, the College delegates authority to the RSO for implementing the ALARA concept in the College's radiation safety program (see "Delegation of Authority" document).

Criteria for approval of new users and uses

Principle investigators (usually faculty) who wish permission to use radioisotopes, or to supervise the use of radioisotopes, must obtain authorization from the RSO. The applicant must have prior training in radiation safety and should provide a written description of this training and all prior experience with isotope use. If the applicant has no prior radiation safety training or experience, the RSO will require training sessions sufficient to insure that the applicant understands proper safety and handling of isotopes, and adheres to the ALARA concept.

For authorization as a temporary radiation worker (generally a student), the applicant must receive appropriate training in the safe use of the isotope to be used in the teaching exercise or research project by the supervising principle investigator (faculty member), or by the RSO.

8. Training for Radiation Workers

The training model is based on NUREG 1556 vol. 7.

A. Principle Investigators (Faculty)

Training will cover the topics listed in 10 CFR Part 19.12(a) "Instructions to Workers" and will include:

- Radiation theory
- Biological effects of exposure
- Practical protection
- Hands-on use of radioactive materials
- Handling emergencies
- Regulations

Training sessions will be provided annually, either by the RSO, or by attendance at courses provided by commercial radiation safety consultants. Training will take the form of lectures, hands-on demonstrations, and/or self-study. Training success will be assessed by examination.

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B. Temporary Radiation Workers (Students)

Training by the Principle Investigator or the RSO will occur prior to use of radioactive material by the applicant, and will be refreshed annually. Topics will include:

- Radiation theory
- Biological effects of exposure
- Practical protection
- Hands-on use of radioactive materials
- Handling emergencies
- Regulations

Training success will be assessed by examination.

C. Ancillary workers

Radiation use at Trinity College is low-level and no area of the Life Sciences building has access restricted from ancillary workers except for the waste storage room (B-28). Ancillary workers (custodial staff, etc.) who enter labs where radiation is stored or used will be given instruction on what radiation is, what the radiation symbol means, what health effects are associated with exposure, and information on how to protect themselves. They will be instructed on how to work in rooms that contain radiation materials, and what to do in an emergency.

9. Facilities and Equipment

Unsealed radioactive isotopes are used in research and teaching laboratories in the Life Sciences Building. Labs feature linoleum tile floors, non-absorbent benchtops and seamless construction sinks. They are equipped with fume hoods which are calibrated annually to insure minimum flow rates of 100 fpm. The rooms are secured with both keyed and electronic locks, and can be opened by entering a code assigned uniquely to each individual with authorization to enter the room.

Sealed sources are stored in the MCEC building in room 224. The room is secured by lock, and the sources are stored in a locked safe or locked steel cabinet.

Waste that is in storage-to-decay, and waste being held prior to shipment is stored in Life Sciences B-28 in the basement. The floor is linoleum tile, and the door is secured with a keyed lock. Only the RSO and Environmental Health and Safety Manager have keys.

In the IAIA classification scheme of toxicity, our facility uses unsealed isotopes in

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the moderate to low groups (Group 3 and Group 4).

Included in this application are diagrams showing floor plan, fume hoods, and the location of radiation work spaces and storage.

10. Radiation Safety Program

Audit Program

Management and radiation safety audits

Executive management receives annual reports of the audits. Periodically, the RSO will meet with executive management to brief them on the radiation safety program, remind them of NRC regulations and any issues of concern. Executive management will be periodically invited to tour the facilities where radioisotopes are used.

Internal audit

The RSO conducts internal audits on an annual basis. Inventory and survey records are checked, waste records reviewed, signage checked, training records checked, receipt records checked, work areas inspected. A narrative report is prepared for the executive management.

Record-keeping

Records of audits are retained on file.

Radiation Monitoring Equipment

Monitoring equipment resides with the RSO and is loaned to authorized users during experiments. RSO is responsible for insuring maintenance and annual calibration. We have two Geiger-type monitors (Ludlum Model 14C, and RPI Rad-Monitor 9000-GMI). They are calibrated annually by a private calibration company (RSA Laboratories, NRC License # 06-30007-01, expiration April 30, 2013). The monitors are used to monitor experiments whenever 32-P, 35-S and 14-C isotopes are being used. We have a scintillation counter (RackBeta) for monitoring wipe tests and 3-H isotope use and quantitating 14-C, 35-S and 32-P. The instrument is inspected and calibrated annually by service contract people.

Material Receipt and Accountability

The RSO oversees centralized reception of all radioisotope. Shipments are delivered directly to the Life Sciences building, not to a central receiving facility, and no shipments are received on Saturday or Sunday. A written log is kept of every incoming package of radioisotope, along with the record of the package survey for leakage. Each Authorized Principle Investigator is responsible for

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maintaining a running inventory of use, and for insuring that stock containers of isotope are stored in a secure room.

Occupational Dose

Trinity adheres to the NRC regulations for occupational dose limits. Dosimetry is not used for the isotopes 3-H, 14-C, 35-S because their beta emissions are not of sufficient energy to be detected by dosimeters. We expect to use ring badges for workers using 32-P in amounts of 5 mCi or more, based on the recommendations of Schiager, et al., 1996 (Health Physics 71(6):960-965; "Consensus radiation protection practices for academic research institutions". Generally, 32-P is used in quantities 0.5 mCi or less, and for these amounts badge dosimeters are not required.

Public Dose

The dose likely to be received by a member of the public was estimated with wall dosimeters stationed outside the B-28 storage room, and on the wall near the storage refrigerator in LSC 248. Dosages were at or near background, and were no more than 8 mrem/month.

Safe Use of Radionuclides and Emergency Procedures

We will adopt the procedures for the safe use of radionuclides and emergencies as published in Appendix R of NUREG-1556, Volume 11, "Program-Specific Guidance About Licenses of Broad Scope."

Surveys

Procedures to evaluate radiological hazard

We will survey our facility and maintain contamination levels and perform bioassays of occupationally exposed workers in accordance with the survey frequencies and contamination levels published in Appendix S of NUREG-1556, Volume 11, "Program-Specific Guidance About Licenses of Broad Scope".

Leak test procedures

We will implement the model leak test program published in Appendix T of NUREG-1556, Volume 11, "Program-Specific Guidance About Licenses of Broad Scope."

11. Waste Management**Waste Collection**

Dry and wet waste will be segregated from each other, with each isotope kept separately of all others. In the case of isotopes where waste is to be decayed in



Trinity College

HARTFORD CONNECTICUT

Radiation Safety Officer Delegation of Authority

I, the chief academic officer of Trinity College, affirm the College's commitment to keeping exposure to ionizing radiation as low as reasonably achievable (the ALARA concept). I delegate to the Radiation Safety Officer (RSO) authority for implementing the ALARA concept on Trinity's campus, and for managing the radiation safety program. The RSO will have complete access to any activities involving the use of radionuclides, and the authority to terminate any activity in which health and safety appear to be compromised.

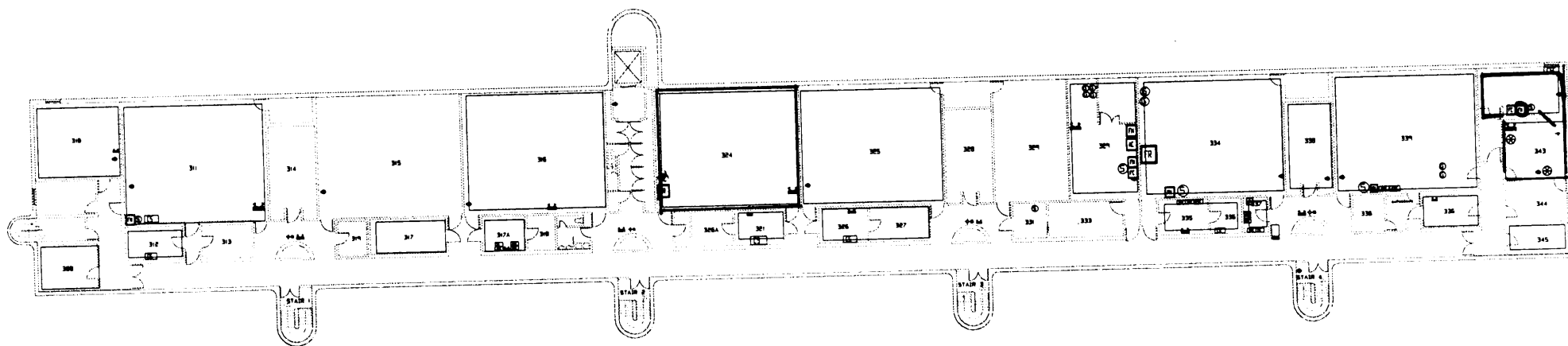
Prof. Frank Kirkpatrick
Interim Dean of the Faculty

5-11-05

Date

DEPARTMENT OF BIOLOGY

300 SUMMIT STREET, HARTFORD, CT 06106-3100
TEL (860) 297-2539 FAX (860) 297-2538 www.trincoll.edu



Red = rooms where radio isotope
is used or stored

Green = Fine work

Third Floor Plan Jacobs Life Science Center

QUEST
OLOGIES

's Academic!

On Management System For Higher

TCJLSC03.DWG

Trinity College
Buildings and Grounds Department

238 New Britain Avenue
Hartford, Connecticut 06106

FLOOR
*03

PRINT DATE
June 1, 1999

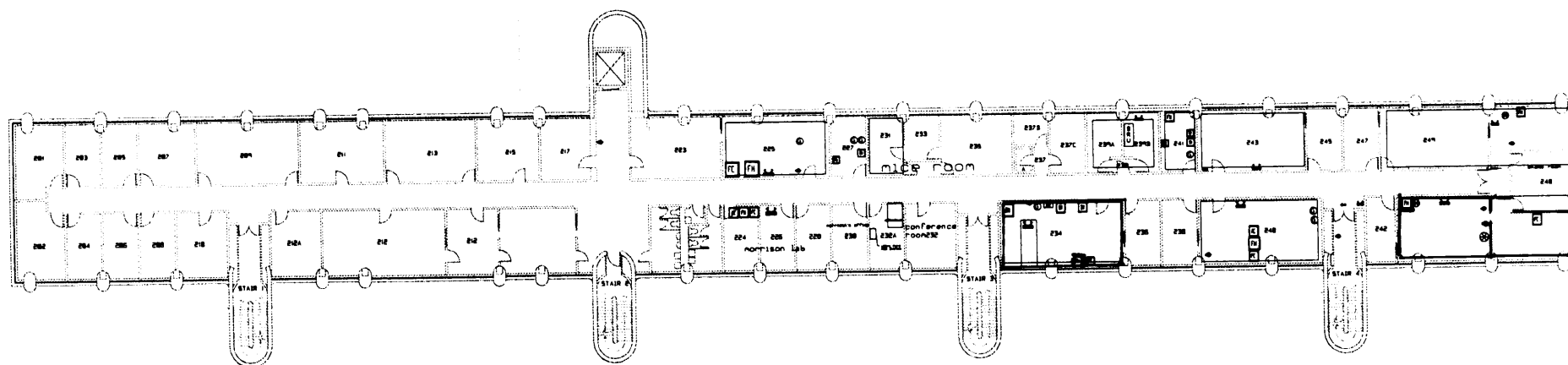
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BUILDING C
42

BUILDING NA
Jacobs Life Science C.

SURVEY DA
May 29, 1999



Second Floor Plan
Jacobs Life Science Center

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TECHNOLOGIES

It's Academic!

Facility Management System for Higher Education

E: TCJLSC02.DWG

Trinity College
Buildings and Grounds Department
238 New Britain Avenue
Hartford, Connecticut 06106

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BUILDING
42

PRINT DATE
June 1, 1999

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Jacobs Life Science

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SURVEY D
May 29, 1999



238 New Britain Avenue
Hartford, Connecticut 06106

Trinity College Buildings and Grounds Department



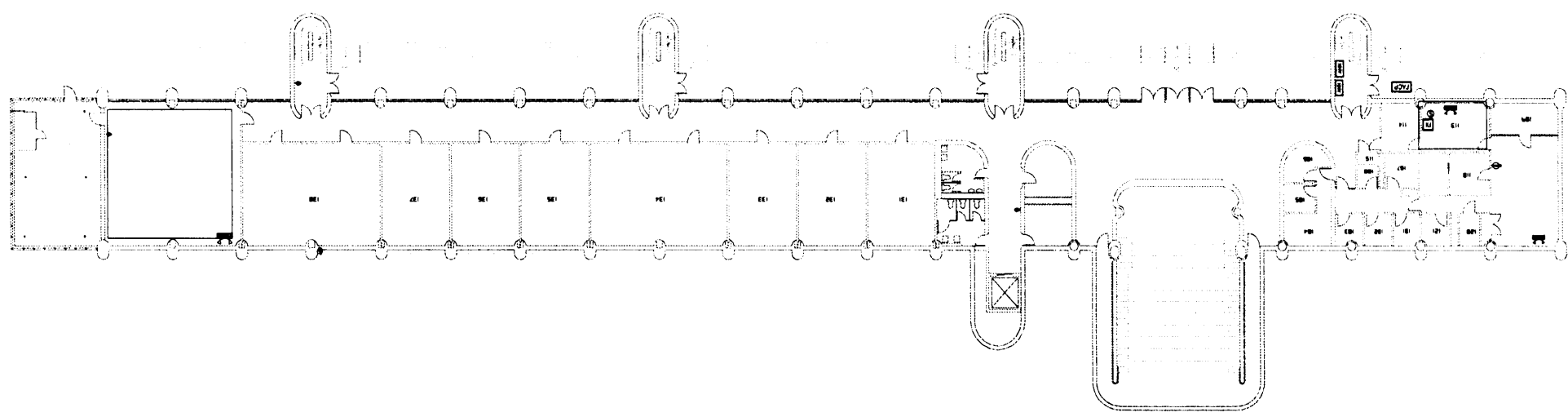
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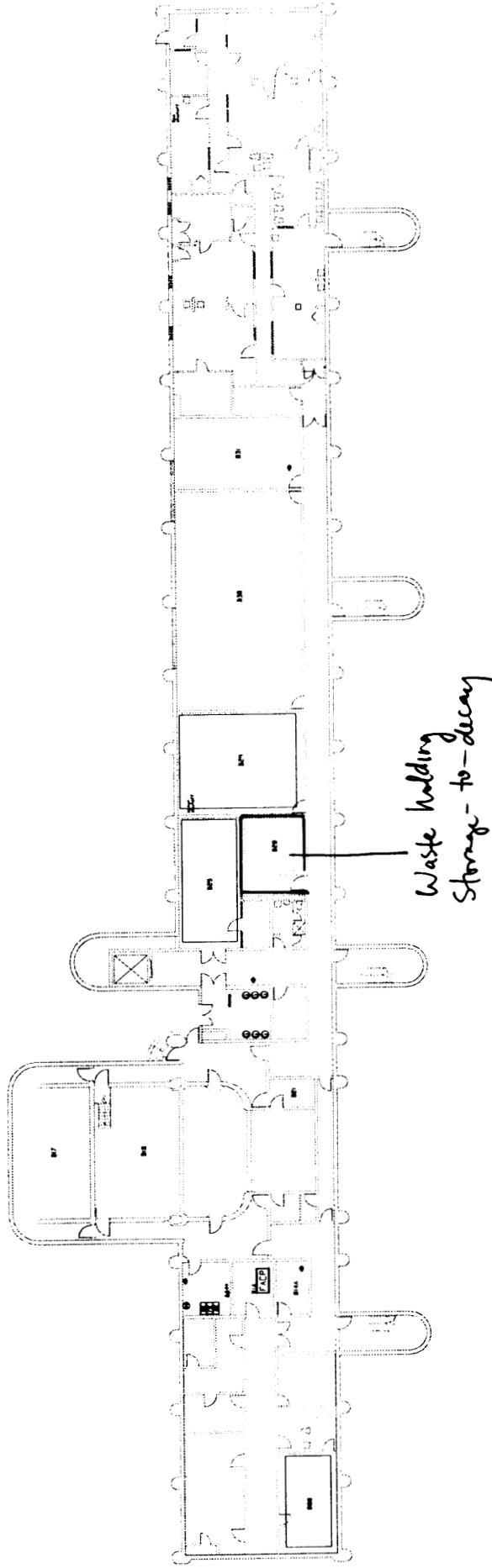
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BUILDING CO
42
BUILDING NAME
Jacobs Life Science Center
SURVEY DATE
May 29, 1999

*No storage or use of
radioactivity on 1st floor*

First Floor Plan Jacobs Life Science Center





Basement Floor Plan Jacobs Life Science Center

QUEST
ENGINEERING

It's Academic!

Engineering Management System for Higher

E:TCJLSC00.DWG

Trinity College

Buildings and Grounds Department

238 New Britain Avenue
Hartford, Connecticut 06106

FLOOR
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PRINT DATE
March 30, 2004

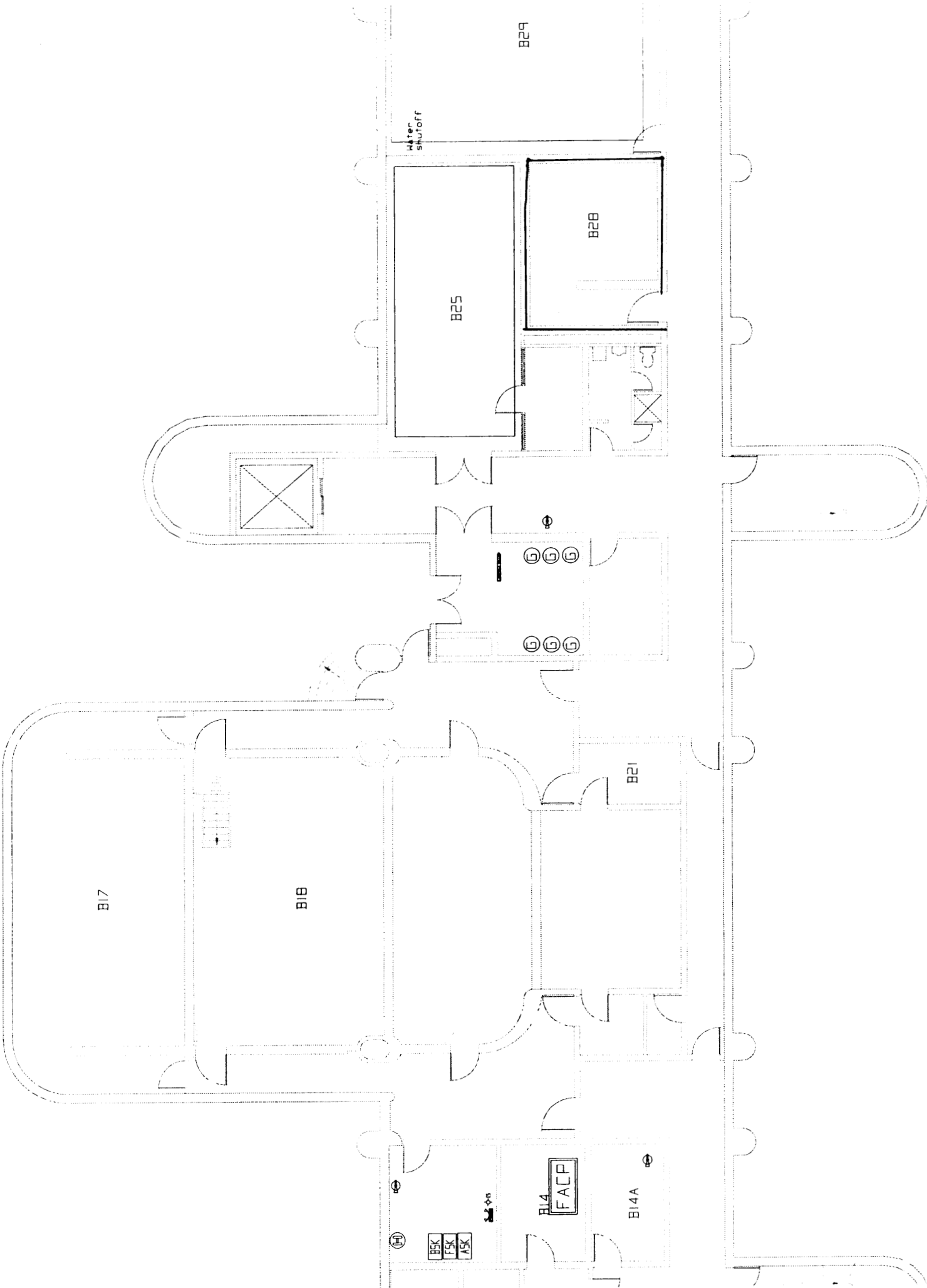
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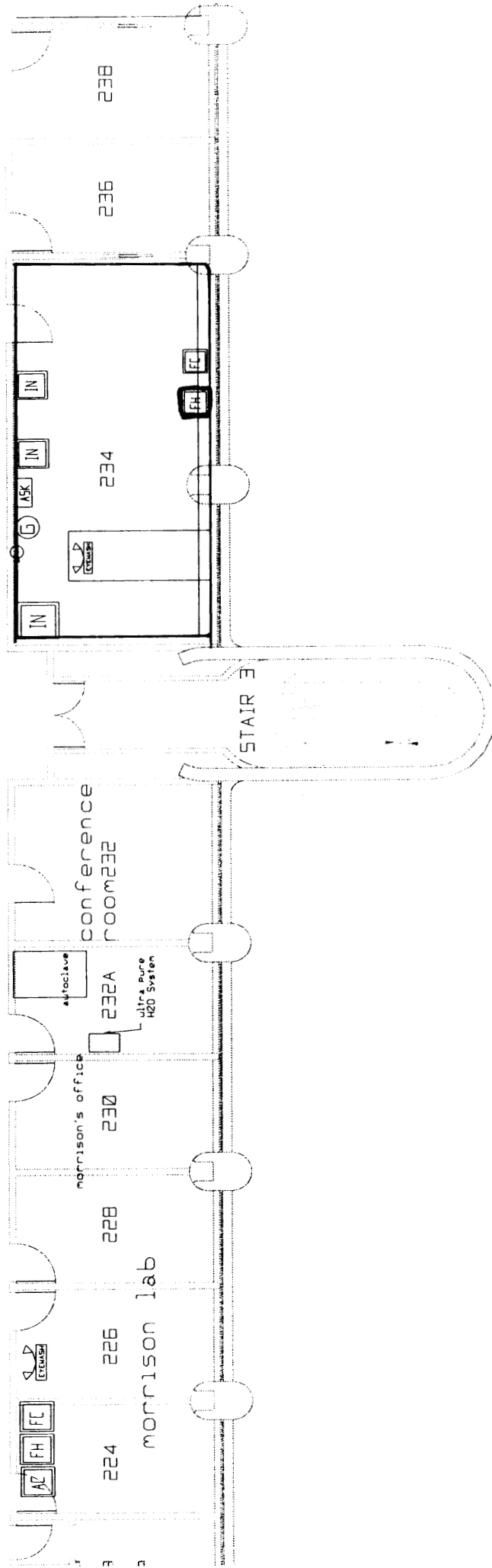
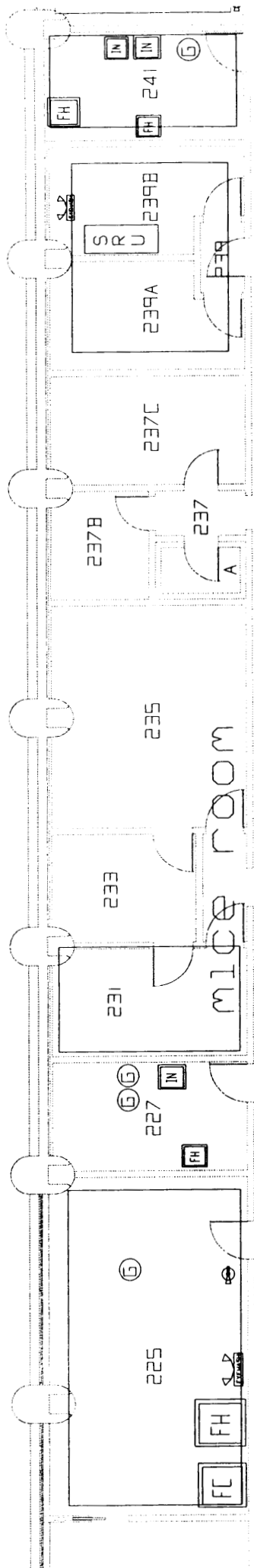


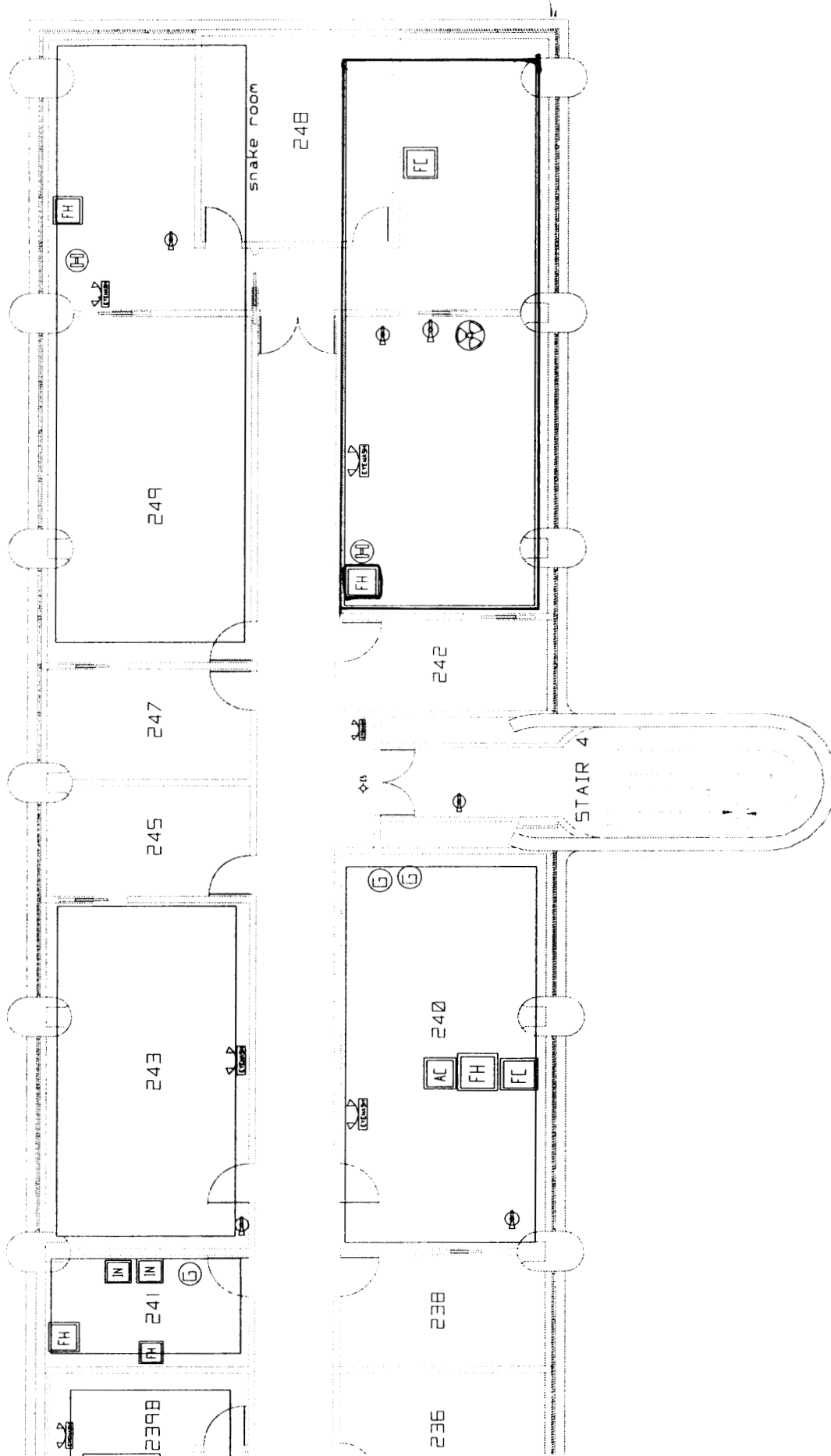
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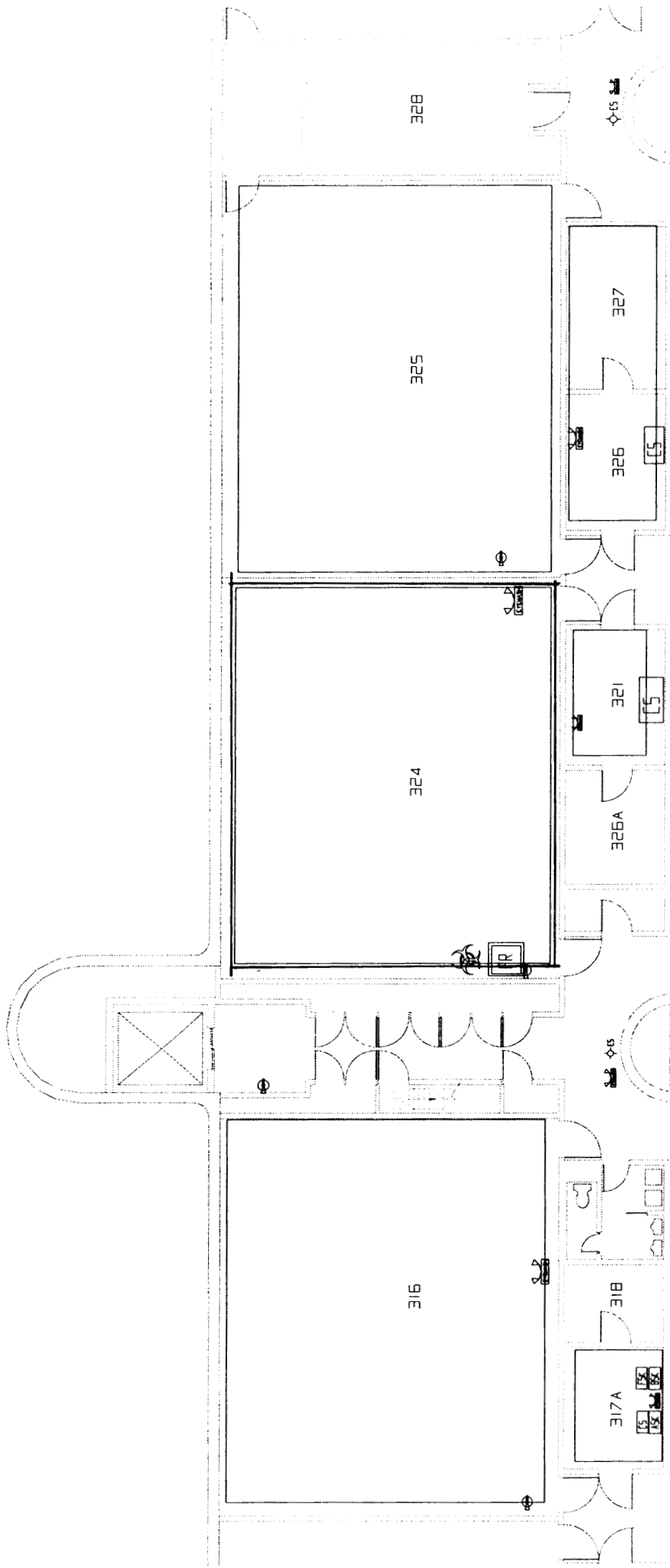
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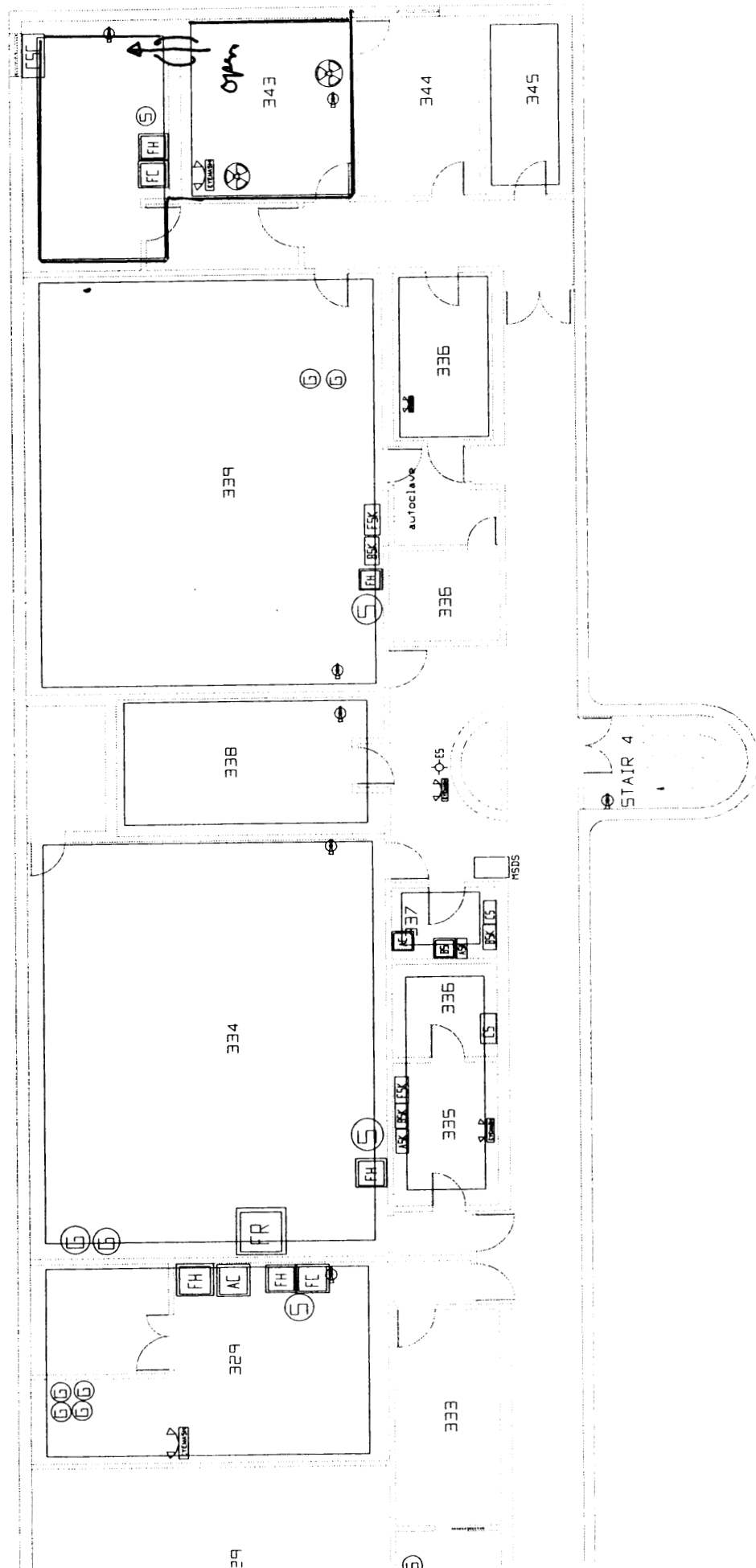
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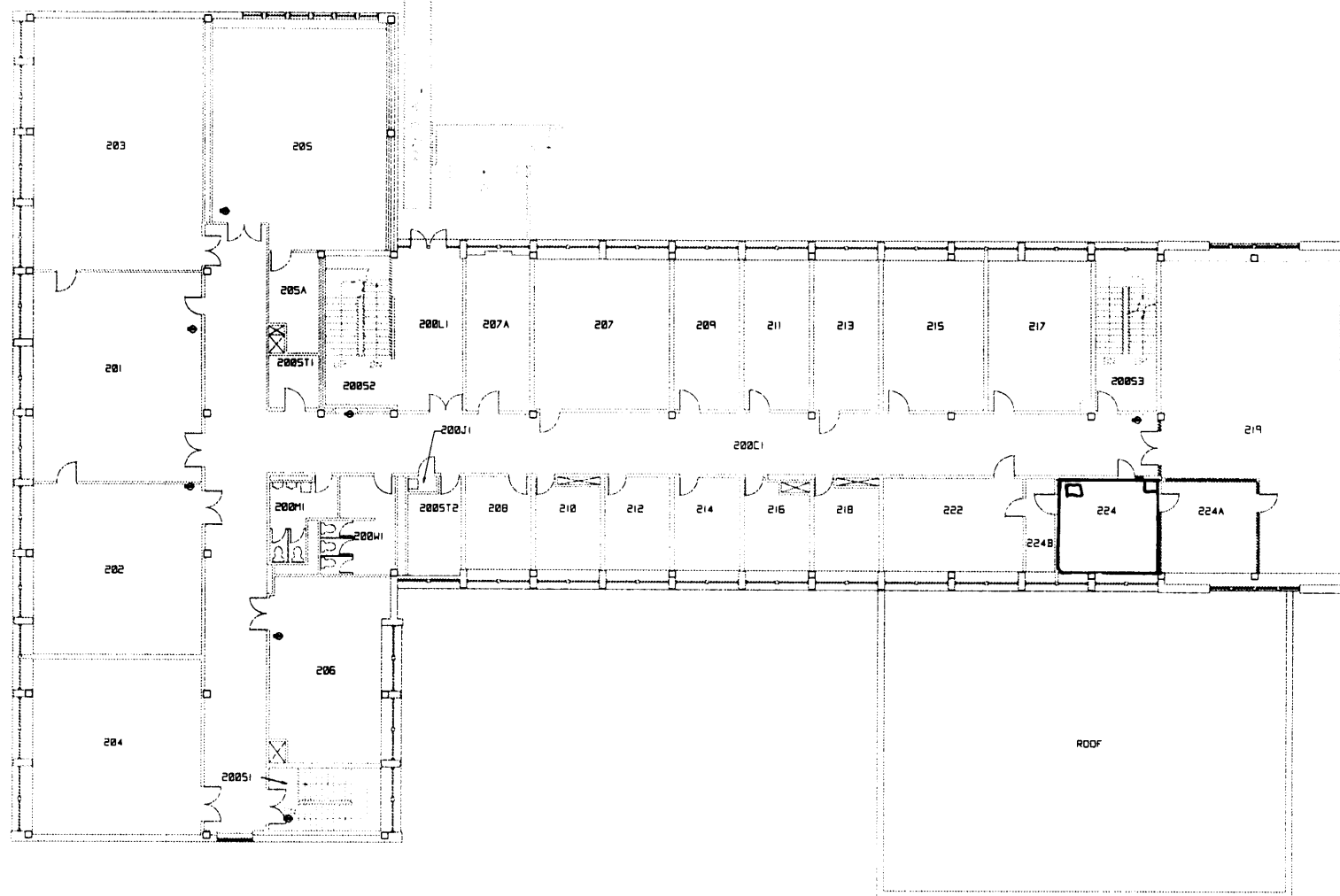












Second Floor Plan
McCook Physics Building

This is to acknowledge the receipt of your letter/application dated

6/8/2005, and to inform you that the initial processing which includes an administrative review has been performed.

☒ Renew 06-09045-03
There were no administrative omissions. Your application was assigned to a technical reviewer. Please note that the technical review may identify additional omissions or require additional information.

☐ Please provide to this office within 30 days of your receipt of this card

A copy of your action has been forwarded to our License Fee & Accounts Receivable Branch, who will contact you separately if there is a fee issue involved.

Your action has been assigned Mail Control Number 137227.
When calling to inquire about this action, please refer to this control number.
You may call us on (610) 337-5398, or 337-5260.

(FOR LFMS USE)
INFORMATION FROM LTS

BETWEEN:

License Fee Management Branch, ARM
and
Regional Licensing Sections

Program Code: 03620
Status Code: 2
Fee Category: EX 3M
Exp. Date: 20050731
Fee Comments: 170.11(A) (4)
Decom Fin Assur Req'd: N

.....

LICENSE FEE TRANSMITTAL

A. REGION **I**

1. APPLICATION ATTACHED

Applicant/Licensee: TRINITY COLLEGE
Received Date: 20050628
Docket No: 3010179
Control No.: 137227
License No.: 06-09045-03
Action Type: Renewal

2. FEE ATTACHED

Amount: 1410.00
Check No.: 124520

3. COMMENTS

**No Fee Due for
Renewal**

Signed
Date

Roberta Ford
6/16/2005

B. LICENSE FEE MANAGEMENT BRANCH (Check when milestone 03 is entered /__ /)

1. Fee Category and Amount: _____

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

Amendment _____
Renewal _____
License _____

3. OTHER _____

Signed
Date

