NRC Form 313 I (12-81) 10 CFR 30

U.S. NUCLEAR REGULATORY COMMISSION

APPLICATION FOR BYPRODUCT MATERIAL LICENSE
INDUSTRIAL

See attached instructions for details.

Completed applications are filed in duplicate with the Division of Fuel Cycle and Material Safety, Office of Nuclear Material Safety, and Safeguards, U.S. Nuclear Regulatory Commission, Washington, DC 20555 or applications may be filed in person at the Commission's office at 1717 H Street, NW, Washington, D. C. or 7915 Eastern Avenue, Silver Spring, Maryland.

1. APPLICATION FOR: *(Check and/or complete as appropriate)*

	a. NEW LICENSE
	b. AMENDMENT TO LICENSE NUMBER
X	c. RENEWAL OF LICENSE NUMBER 20-11124-01

2. APPLICANT'S NAME *(Institution, firm, person, etc.)*

Collaborative Research, Incorporated

TELEPHONE NUMBER: AREA CODE - NUMBER EXTENSION

(617)861-9700

3. NAME AND TITLE OF PERSON TO BE CONTACTED REGARDING THIS APPLICATION

Robert Greenlee, Asst. Rad.Safety Officer

TELEPHONE NUMBER: AREA CODE - NUMBER EXTENSION

(617)861-9700 x239

4. APPLICANT'S MAILING ADDRESS *(Include Zip Code)*
(Address to which NRC correspondence, notices, bulletins, etc., should be sent.)

128 Spring Street
Lexington Massachusetts 02173

5. STREET ADDRESS WHERE LICENSED MATERIAL WILL BE USED *(Include Zip Code)*

128 Spring Street, Lexington MA
1365 Main Street, Waltham MA

(IF MORE SPACE IS NEEDED FOR ANY ITEM, USE ADDITIONAL PROPERLY KEYED PAGES.)

6. INDIVIDUAL(S) WHO WILL USE OR DIRECTLY SUPERVISE THE USE OF LICENSED MATERIAL
(See Items 16 and 17 for required training and experience of each individual named below)

	FULL NAME	TITLE
a.	Robert E. Greenlee	Production Supervisor and Assistant Radiation Safety Officer
b.	Thomas C. Gravius	Research Scientist
c.	Christine Aubin	Quality Control Supervisor

7. RADIATION PROTECTION OFFICER

Paul R. Kelley

Attach a resume of person's training and experience as outlined in Items 16 and 17 and describe his responsibilities under Item 15.

8. LICENSED MATERIAL continued on attached sheet.

LINE NO.	A ELEMENT AND MASS NUMBER	B CHEMICAL AND/OR PHYSICAL FORM	C NAME OF MANUFACTURER AND MODEL NUMBER *(If Sealed Source)*	D MAXIMUM NUMBER OF MILLICURIES AND/OR SEALED SOURCES AND MAXIMUM ACTIVITY PER SOURCE WHICH WILL BE POSSESSED AT ANY ONE TIME
(1)	Hydrogen-3	Any	NA	500 millicuries
(2)	Carbon - 14	Any	NA	100 millicuries
(3)	Phosphorous - 32	Any	NA	500 millicuries
(4)	Sulfur- 35	Any	NA	20 millicuries

	E DESCRIBE USE OF LICENSED MATERIAL
(1)	For all licensed isotopes: Incorporation into biological materials; preparation of
(2)	tagged proteins and nucleic acids; metabolic studies using micro-organisms and
(3)	laboatory animals. Commercial processing and distribution to persons authorized to
(4)	receive the licensed material pursuant to the terms and conditions of specific licenses issued by the NRC or and agreement state.

License Fee Information on Next Page

9. STORAGE OF SEALED SOURCES

LINE NO.	CONTAINER AND/OR DEVICE IN WHICH EACH SEALED SOURCE WILL BE STORED OR USED. A.	NAME OF MANUFACTURER B.	MODEL NUMBER C.
(1)	Not applic ble		
(2)			
(3)			
(4)			

10. RADIATION DETECTION INSTRUMENTS continued on attached sheet

LINE NO.	TYPE OF INSTRUMENT A	MANUFACTURER'S NAME B	MODEL NUMBER C	NUMBER AVAILABLE D	RADIATION DETECTED (alpha, beta, gamma, neutron) E	SENSITIVITY RANGE (milliroentgens/hour or counts/minute) F
(1)	Liquid scint-illation counter	Beckman	LS 7000	1	Beta	100-10^7 cpm
(2)	Gamma Spectrometer	Nuclear Chicago	1185	1	Gamma	100-10^7 cpm
(3)	Geiger Counter	Ludlum	2	5	Beta, gamma	20-50,000 cpm or 0.1-50 mR/hr
(4)	Geiger counter	Ludlum	3	2	Beta, gamma	0.1-20 mR/hr

11. CALIBRATION OF INSTRUMENTS LISTED IN ITEM 10

☒ a. CALIBRATED BY SERVICE COMPANY

NAME, ADDRESS, AND FREQUENCY

Mr. Edward Karaian
30 Klasson Lane, Weymouth MA 02188
Semiannual calibration

☐ b. CALIBRATED BY APPLICANT

Attach a separate sheet describing method, frequency and standards used for calibrating instruments.

12. PERSONNEL MONITORING DEVICES

TYPE (Check and/or complete as appropriate.) A	SUPPLIER (Service Company) B	EXCHANGE FREQUENCY C
☒ (1) FILM BADGE ☒ (2) THERMOLUMINESCENCE DOSIMETER (TLD) ☐ (3) OTHER (Specify): _____	Siemens Gammasonics 2000 Nuclear Drive Des Plaines Illinois 60018	☒ MONTHLY ☐ QUARTERLY ☐ OTHER (Specify): _____

13. FACILITIES AND EQUIPMENT (Check were appropriate and attach annotated sketch(es) and description(s).

☒ a. LABORATORY FACILITIES, PLANT FACILITIES, FUME HOODS (Include filtration, if any), ETC.
☒ b. STORAGE FACILITIES, CONTAINERS, SPECIAL SHIELDING (fixed and/or temporary), ETC.
☐ c. REMOTE HANDLING TOOLS OR EQUIPMENT, ETC.
☐ d. RESPIRATORY PROTECTIVE EQUIPMENT, ETC.

14. WASTE DISPOSAL

a. NAME OF COMMERCIAL WASTE DISPOSAL SERVICE EMPLOYED

Interex Corporation

b. IF COMMERCIAL WASTE DISPOSAL SERVICE IS NOT EMPLOYED, SUBMIT A DETAILED DESCRIPTION OF METHODS WHICH WILL BE USED FOR DISPOSING OF RADIOACTIVE WASTES AND ESTIMATES OF THE TYPE AND AMOUNT OF ACTIVITY INVOLVED. IF THE APPLICATION IS FOR SEALED SOURCES AND DEVICES AND THEY WILL BE RETURNED TO THE MANUFACTURER, SO STATE.

In addition to wastes handled by the disposal company, a decay in storage program is used for handling wastes containing the short-lived isotopes(^{125}I and ^{32}P).

INFORMATION REQUIRED FOR ITEMS 15, 16 AND 17

Describe in detail the information required for Items 15, 16 and 17. Begin each item on a separate page and key to the application as follows:

15. RADIATION PROTECTION PROGRAM. Describe the radiation protection program as appropriate for the material to be used including the duties and responsibilities of the Radiation Protection Officer, control measures, bioassay procedures *(if needed)*, day-to-day general safety instruction to be followed, etc. If the application is for sealed source's also submit leak testing procedures, or if leak testing will be performed using a leak test kit, specify manufacturer and model number of the leak test kit.

16. FORMAL TRAINING IN RADIATION SAFETY. Attach a resume for each individual named in Items 6 and 7. Describe individual's formal training in the following areas where applicable. Include the name of person or institution providing the training, duration of training, when training was received, etc.

    a. Principles and practices of radiation protection.

    b. Radioactivity measurement standardization and monitoring techniques and instruments.

    c. Mathematics and calculations basic to the use and measurement of radioactivity.

    d. Biological effects of radiation.

17. EXPERIENCE. Attach a resume for each individual named in Items 6 and 7. Describe individual's work experience with radiation, including where experience was obtained. Work experience or on-the-job training should be commensurate with the proposed use. Include list of radioisotopes and maximum activity of each used.

Applicant: Henry 1
Docket: 020746
1700-38 & 240
Type of: Renewal
Date Rec'd: 5/24/85
Received by: [illegible]
refunded

18. CERTIFICATE

(This item must be completed by applicant)

The applicant and any official executing this certificate on behalf of the applicant named in Item 2, certify that this application is prepared in conformity with Title 10, Code of Federal Regulations, Part 30, and that all information contained herein, including any supplements attached hereto, is true and correct to the best of our 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.

a. LICENSE FEE REQUIRED *(See Section 170.31, 10 CFR 170)*	b. CERTIFYING OFFICIAL *(Signature)*
$700	Paul R Kelley
	c. NAME *(Type or print)* Paul R. Kelley
(1) LICENSE FEE CATEGORY: 3A	d. TITLE Radiation Safety Officer
(2) LICENSE FEE ENCLOSED: $700	e. DATE 5/14/85

NRC FORM 313 I (12-81)

GPO 886-426

Addendum to license application Sheet 1

Item 8.	A	B	C	D
(5)	Chromium - 51	Any	NA	20 millicuries
(6)	Iodine - 125	Any	NA	200 millicuries
(7)	Iodine -131	Any	NA	20 Millicuries

Item 10.	A	B	C	D	E	F
(6)	Rate meter	NICO	MD-3	1	Gamma	100-3×10^5 cpm
(7)	Rate meter	Eberline	RM-13	1	Gamma	100- 5×10^5 cpm

Item 11 a. See attched resume and letter of Mr. Karaian.

Radiation Protection Consulting and Services

EDWARD KARAIAN
30 KLASSON LANE
WEYMOUTH, MA 02188
TEL. 617-337-9602
253-4203

Radiological Safety Officer presently employed at the Massachusetts Institute of Technology as Reactor Radiation Protection Officer.

NICO,Inc. Cambridge, Mass. President, Designers and Manufacturers of Nuclear Instruments.

Member of the Health Physics Society

Northeastern University, 1954. B.B.A.M.E.

From 1949 to the present, I have been working in the field of Radiation Protection at the Massachusetts Institute of Technology.

From 1967 to the present, I am the Reactor Radiation Protection Officer for the M.I.T Reactor. I have supervised the safe handling of several curies of unsealed activity, multi-curie amounts of sealed sources and spent fuel elements. I have supervised the dismantling and rebuilding of the M.I.T. Reactor. I review and approve all experiments that are conducted at the M.I.T. Reactor.

I have developed and am implementing the service and calibration procedures for all reactor radiation protection instruments at the M.I.T. Reactor, which include the following:

1. Particulate and gaseous monitoring systems.
2. Liquid monitoring systems.
3. Scintillation counting systems.
4. Environmental monitoring systems.
5. Portable radiation instruments.
    a. Geiger-Muller counters.
    b. Ionization chambers.
    c. Alpha counters.
    d. Neutron counters.

1985

Radiation Protection Consulting and Services

EDWARD KARAIAN
30 KLASSON LANE
WEYMOUTH, MA 02188
TEL. 617-337-9602
253-4203

United States Regulatory Commission
Materials Licensing Branch
Division of Fuel Cycle and Material Safety

Dear Sir:

I do not have a license number from the N.R.C. and was told (Verbally) by your office that it would not be necessary as long as I submitted information as to my calibration procedure. I have submitted such information on several licenses. I am aware of such Regulatory Guides as 10.6, 10.8, 8.30 etc. In January 1985 I received a phone call from your office requesting that I submit a application for my services. This application is now being prepared and will be submitted. I request that this does not cause a delay in your review of this licence.

I have various standards available, such as a 48 mCi Radium standard, certified by the National Bureau of Standards, for gamma calibration of instruments. Tests on instruments are made prior to calibration, such as visual inspection, cable and high voltage checks, meter response, etc.

Each instrument, that is calibrated, has a label attached with calibration information-see example below:

Gamma Calibration: ±10%

Beta Calibration: 0.51 mev.

Meter reading of 1 mR/hr
equals 25,000 D/M.

Edward Karaian
Date:_____

A calibration certificate is also supplied.

I hope that this information will be sufficient for completion of your review of this license.

Very truly yours,

Edward Karaian

April 22, 1985

Addendum to license renewal

Item 13 a.

Lexington location Ledgemont Research Center, 128 Spring Street, Lexington MA

Collaborative Research's facilities in Lexington are located within a five story building at this address. Construction of the building is Class A throughout. Within the laboratory areas walls are of painted cinder block, floors are of vinyl tile, and benchtops are of a non-porous polymer.

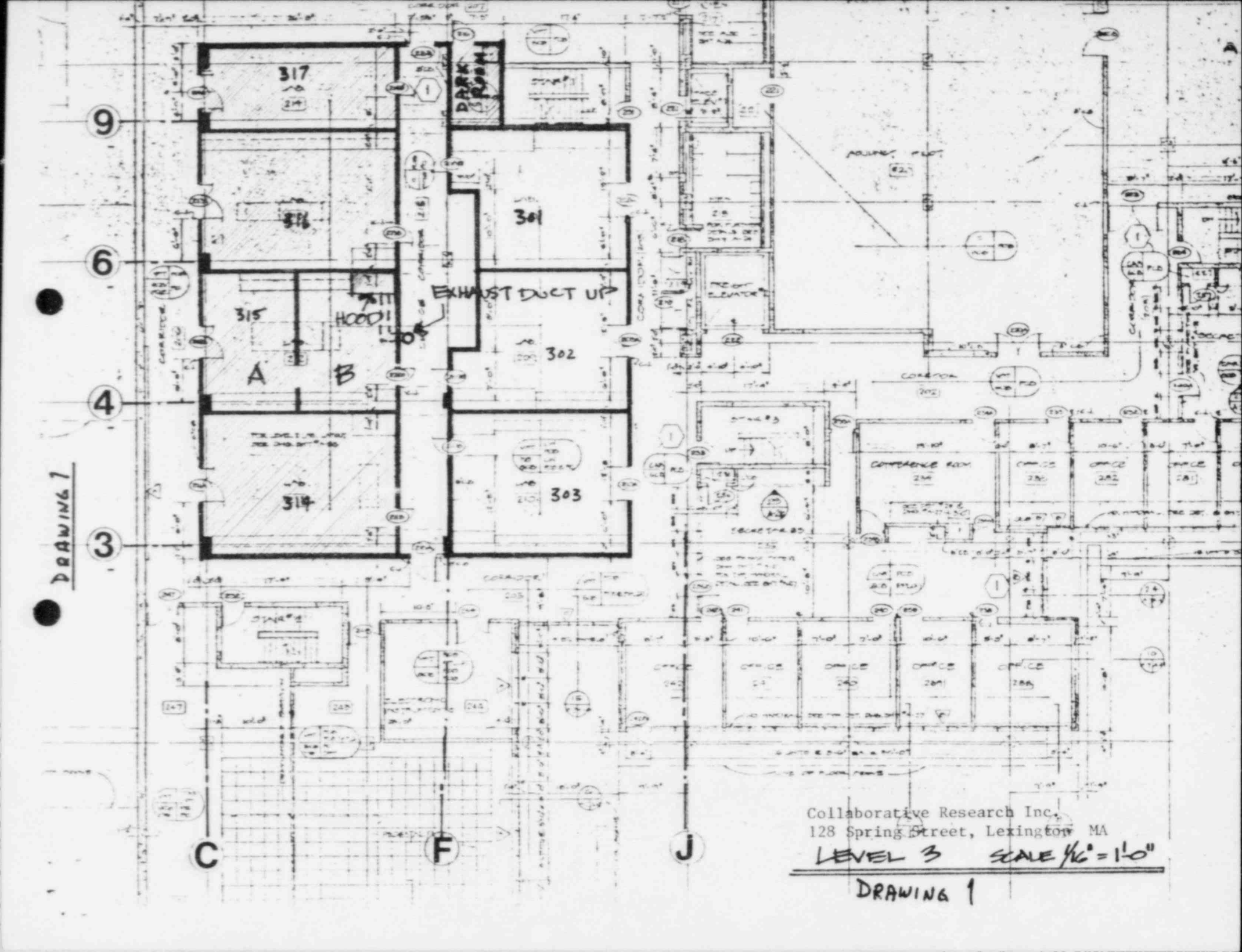
Location of the laboratories where radioisotopes are used is detailed on the attached drawings one and two. Each laboratory is supplied with sufficient equipment to meet work requirements without removal of equipment to unrestricted areas.

Use of ^{32}P and ^{125}I is restricted to the laboratories designated 315A and 315B, respectively. Autoradiography employing small amounts of these isotopes is performed in the "dark room" shown in the drawing.

The location of the hood where volatile ^{125}I is used and its associated ductwork is detailed on drawings 1, 2, and 3 attached. The face of this hood is 3 feet by 5 feet. It draws a face velocity of 100-160 feet per minute. This hood vents to the outside through an activated carbon filter which has a depth of one inch and a total surface area of 2096 square inches. Air sampling for release of ^{125}I to the environment is performed from the air stream after passage through this filter as detailed in section 15 of this application (the survey section of the description of the radiation protection program). Other fume hoods located in the radio-isotope laboratories are used only for handling volatile solvents; no work using volatile forms of isotopes other than ^{125}I is performed at this facility.

Waltham location- 1365 Main Street, Waltham MA

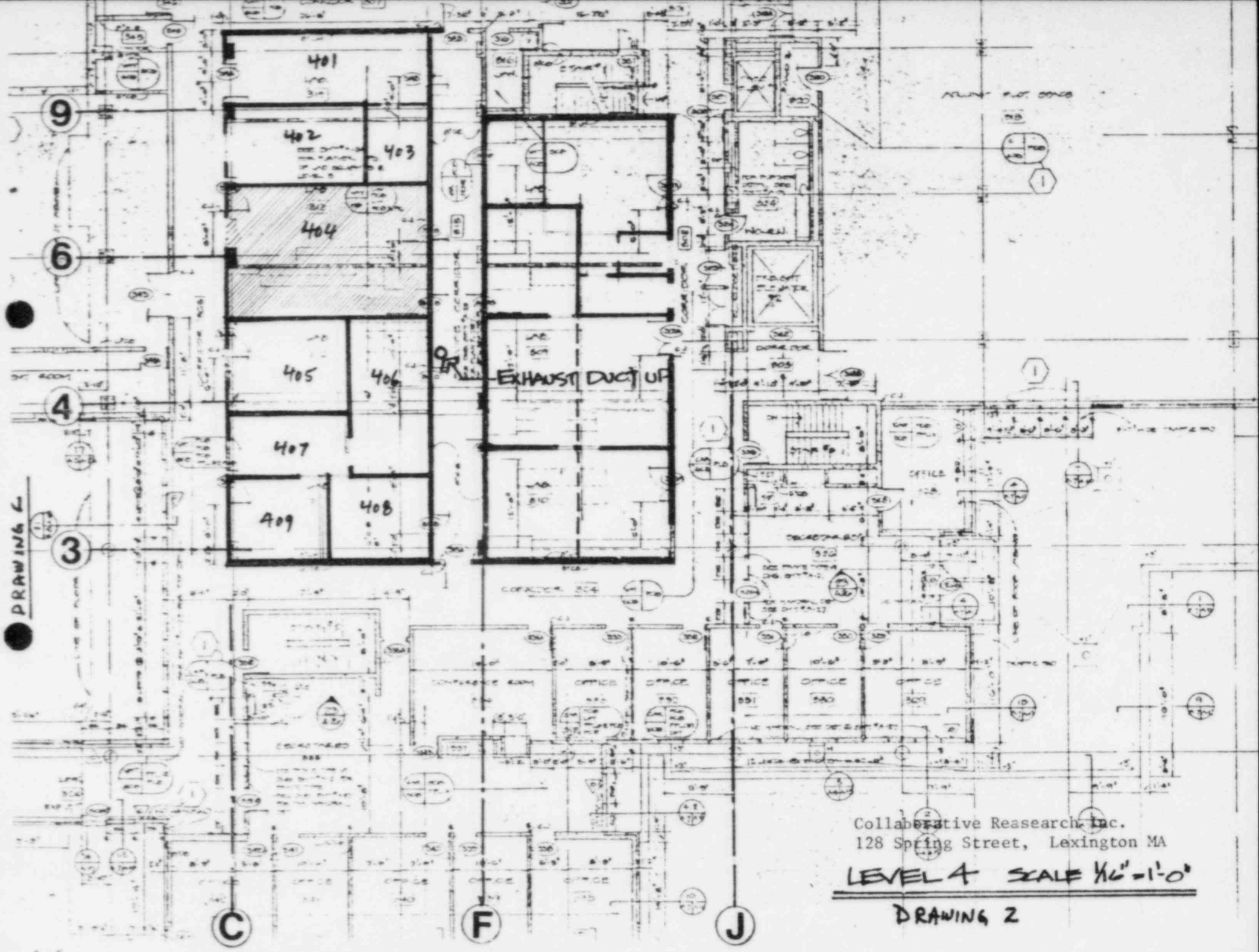
The laboratories at this location are housed in a two story brick and cinder block building. Interior construction includes sheet vinyl flooring, painted cinder block and painted wal-board walls, and non-porous polymer benchtops. The areas within the building where radioisotopes are used are designated by cross-hatching on the attached drawing four. Fume hoods within the laboratory areas are used for ventin volatile organic solvent vapors. The work performed at this facility does not involve any volatile forms of radioisotopes.



Collaborative Research Inc.
128 Spring Street, Lexington MA

LEVEL 3 SCALE 1/8" = 1'-0"

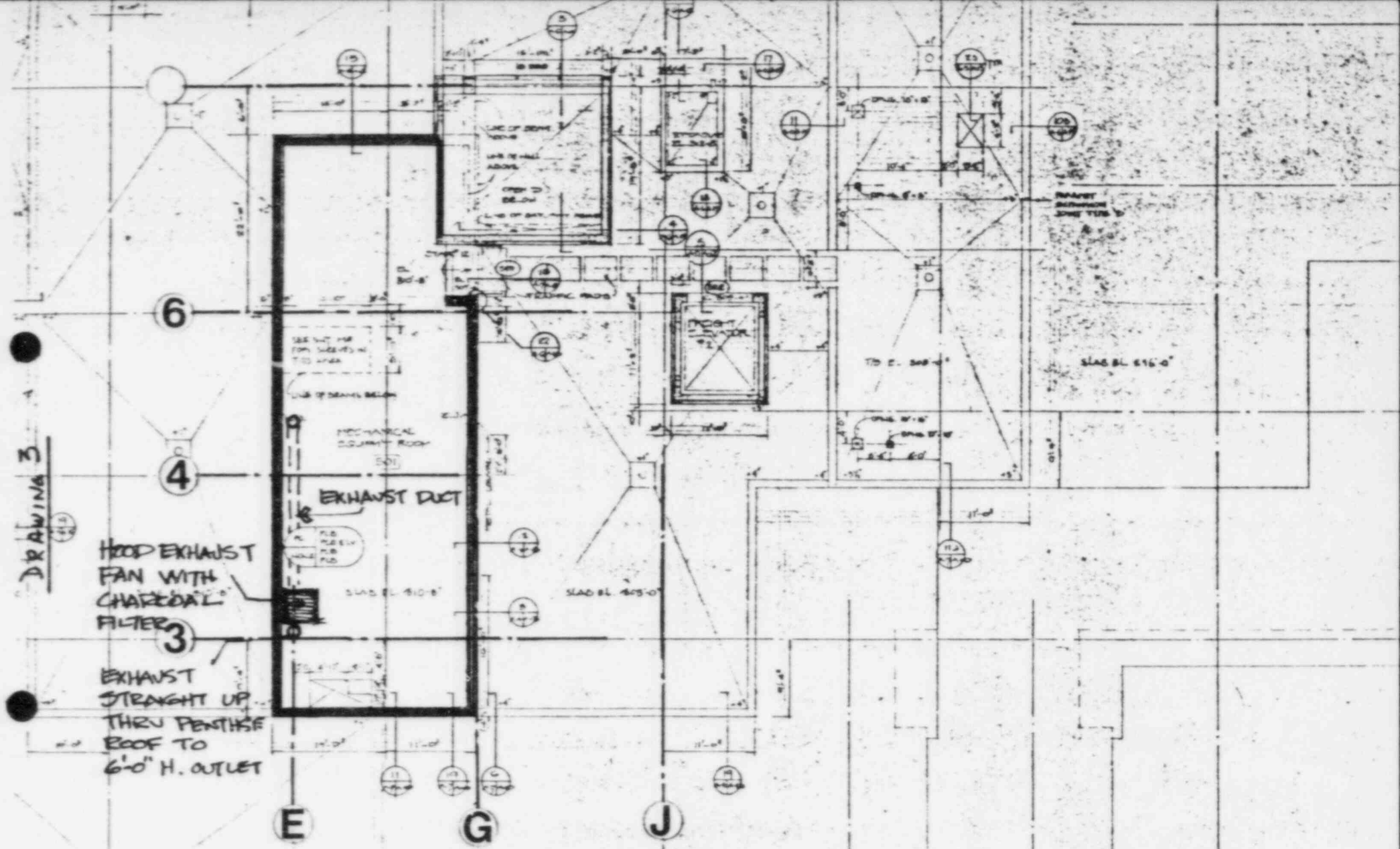
DRAWING 1



Collaborative Reasearch Inc.
128 Spring Street, Lexington MA

LEVEL 4 SCALE 1/4"-1'-0"

DRAWING 2



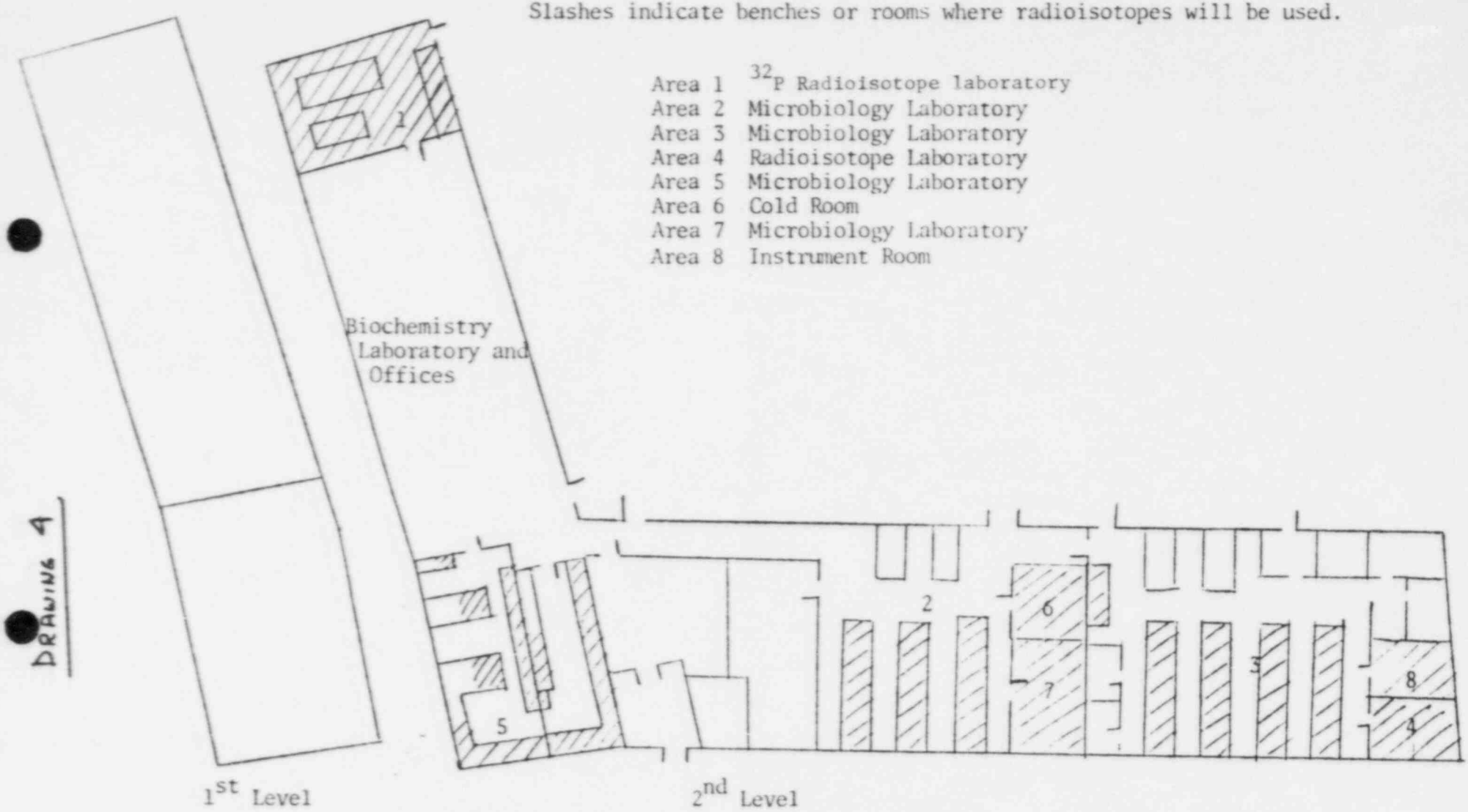
Collaborative Research Inc.
128 Spring Street, Lexington MA

LEVEL 6 - MECH PENTHOUSE
SCALE 1/16" = 1'-0"

DRAWING 3

Slashes indicate benches or rooms where radioisotopes will be used.

Area 1 ^{32}P Radioisotope laboratory
Area 2 Microbiology Laboratory
Area 3 Microbiology Laboratory
Area 4 Radioisotope Laboratory
Area 5 Microbiology Laboratory
Area 6 Cold Room
Area 7 Microbiology Laboratory
Area 8 Instrument Room



DRAWING 4

Collaborative Research ,Inc. Facilities at 1365 Main Street, Waltham MA

DRAWING 4

Addendum to license renewal application

Item 13 b. Storage facilities, shielding, etc.

Sufficient shielded storage facilities are provided for the types and forms of radioisotopes used in our research and production endeavors. These facilities include a lead-lined freezer and a lead-lined refrigerator for storing ^{125}I-containing compounds, and various types of plexiglass containers and shielding devices for storage of ^{32}P-containing compounds.

Waste storage - ^{3}H-contaminated dry solid waste is collected into a household-type trash compactor for volume reduction, then transferred to 55 gallon type 17H drums for storage until picked up by the waste disposal broker.

^{32}P-contaminated dry solid waste is collected uncompacted into 55 gallon type 17H drums for decay in storage. ^{32}P-contaminated waste liquid is held in plexiglass-shielded bottles for decay.

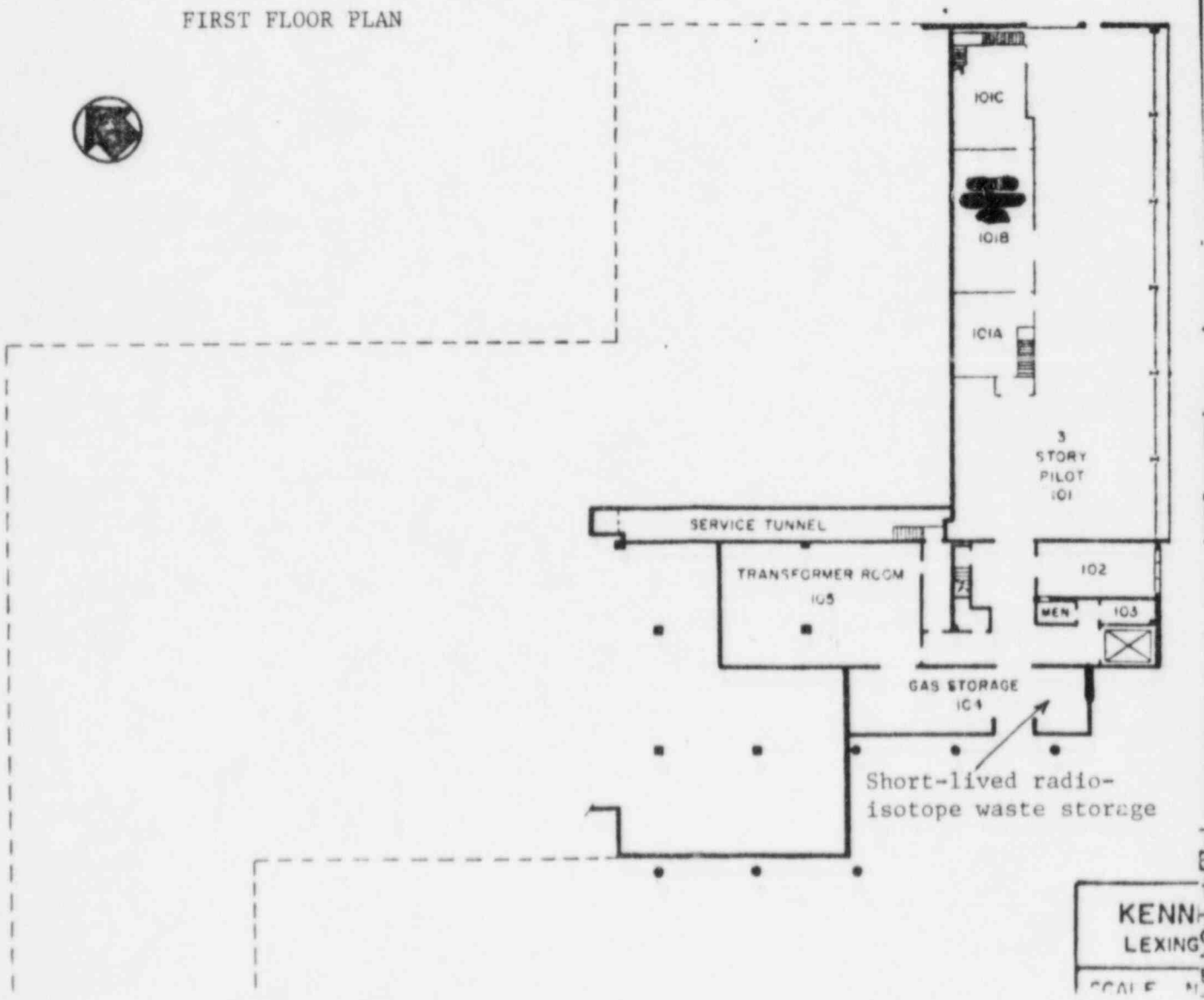
^{125}I-contaminated solid waste is collected into a household-type trash compactor for volume reduction and then transferred to 55 gallon type 17H drums for decay in storage. ^{125}I-contaminated waste liquid is collected into lead-shielded plastic bottles containing diatomaceous earth for adsorption. These bottles are stored for decay in 55 gallon type 17H drums.

The area where short-lived isotopes (^{32}P, ^{35}S, and ^{125}I) are stored for decay is shown on the attached drawing (#5). This area is located on the exterior of the building at 128 Spring Street at level 1. The area is enclosed on allsides by brick walls: on two sides to full height, on the remaining two sides to a height of approximately eleven feet; these two walls are topped by a chainlink metal fence. Both the interior and the exterior doors are wired to the building alarm system. Keys to the alarm system are held by the building maintenance department and/or the security guard.

DRAWING 5

LEDGEMONT RESEARCH CENTER
128 Spring Street
Lexington, MA

FIRST FLOOR PLAN



Addendum to license renewal application

Item 14. Description of the STorage for Decay Program

Wastes contaminated with the short lived isotopes ^{32}P, ^{35}S, and ^{125}I are handled by a storage for decay program. The intent of this program is to preserve land burial facilities and to avoid release of radioisotopes to unrestricted areas.

Wastes are segregated into designated 55 gallon type 17H barrels at the time of collection in the radioisotope laboratories. Barrels are designated for ^{32}P dry solid waste, and for ^{35}S or ^{125}I dry solid or absorbed liquid waste. When filled, these drums are sealed, surveyed for surface radiation level, and logged into the decay in storage records. Filled drums are then transferred to the radioisotope waste storage area shown on drawing five (attached to Item 13 b sheet).

Barrels containing ^{32}P are held for six months. Barrels containing ^{35}S or ^{125}I are held for two years. At the end of the decay period, the drums are unsealed and the contents are monitored using the appropriate detection instrument to ensure that decay to a background level has been effected. The decayed waste is then discarded as normal trash. Records of disposal and the results of monitoring at the time of disposal are kept with the storage for decay records.

Addendum to license application

Item 15. Radiation protection program

The radiation protection officer is responsible for the administration of the radiation protection program and oversees compliance with the applicable Nuclear Regulatory Commission requirements. He is supported in this effort by an assistant who is responsible for the waste management program, employee training, record keeping and employee liaison; and by a survey technician who is responsible for periodic surveys within the areas where radioisotopes are used and maintenance of records of these surveys.

It is the policy of the company that every effort be made by all individuals to manintain exposure as low as is reasonably achievable.

Survey Program In areas where ^{32}P or ^{125}I are used or stored, weekly surveys are performed using a Geiger-Mueller end-window detector and/or sodium iodide crystal detector. Written records detailing the results of these surveys are maintained.

All areas where isotopes are used or stored are monitored by monthly swipe tests. Dry filter paper swipes from 100 cm^2 areas of surfaces in the laboratory areas are counted by liquid scintillation counting. Surface contamination levels will be maintained within limits stated in Regulatory Guide 8.23.

Air sampling from the stack effluent of the hood located in room 315B is performed continuously. A calibrated sampling pump draws a contiouous sample from the air stream after the charcoal filter bed. The continuous sample is passed through two charcoal-impregnated filter paper sheets which adsorb gaseous iodine with approximately 75% efficiency. The filter papers are removed and counted in the gamma counter once each month. Records of the results and the resulting calculation of ^{125}I released to the environment are maintained.

Results of all surveys are reviewed by radiation safety personnel to implement any indicated required action.

Item 15 (continuation)

Radiation Safety Training Program

All employees who work with radioisotopes are issued, during their initial training, copies of the CRI "Handbook on Radiation Safety" (copy included as an appendix to this application). This handbook details routine safety precautions to be observed in handling radioisotopes, general information on radiation hazards, and emergency response procedures. This document is the basis for the radiation safety training program. The written inforation is expanded upon during a radiation safety lecture which all new employees are required to attend (if they will be working with radioisotopes). At this session important points are emphasized and further expanded; specific handling techniques are detailed and explained; biological effects of ionizing radiation are explained; and the special case of fetal exposure to occupational radiation of working women is explained. Periodic follow-up review sessions are held with individuals or groups as work orientation or personnel assignments change.

Bioassay Program

Two types of bioassays are performed: urinalysis and thyroid monitoring. Urine specimens are collected from all employees who handle radioisotopes twice each year. Aliquots from these specimens are counted by liquid scintillation counting to detect the presence of any beta-emmitting isotope. Thyroid monitoring is performed by each individual on himself using a shielded sodium iodide crystal detector within the time period of 24 to 100 hours following performance of an iodination. In vivo thyroid measurements are scheduled quarterly for persons performing any iodination reactions during the calendar quarter. Measurements are made by Edward Karaian, consultant, using a more sensitive whole body shadow shield monitor. Regulatory Guide 8.20 is used for the development and implementation of the bioassay program.

Individuals who continuously handle more than 10 mCi of ^{3}H in unsealed form are scheduled for monthly urinalysis measurements.

TRAINING AND EXPERIENCE

Paul R. Kelley
Radiation Safety Officer, Collaborative Research Inc.
Item 16 of Form NRC-313

Type of Training	Where Trained	Duration of Training	On the Job	Formal Course
a. Principles and practices of radiation protection.	Tufts University CollaborativeResearch	1 semester 10 yr	 X	X
b. Radioactivity measurement standardization and monitoring technique and instruments.	" "	10 yr	X	X
c. Mathematics and calculations basic to the use and measurement of radioactivity.	" "	10 yr	X	
d. Biological effects of radiation.	" "	10 yr	X	

Item 17 of Form NRC-313 (Experience with Radiation)

Isotope	Max. Amount	Where Experience was Gained	Duration of Experience	Type of Use
^{125}I	5 mCi	Collaborative Research	15 yr	Research, Development and Production
^{14}C	20 uCi	"	"	"
^{3}H	1 mCi	"	"	"
^{32}P	10 mCi	"	"	Research and Development

TRAINING AND EXPERIENCE

Robert E. Greenlee

Item 16 of Form NRC-313

Type of Training	Where Trained	Duration of Training	On the Job	Formal Course
a. Principles and practices of radiation protection.	Collaborative Research	5 yr	X	
b. Radioactivity measurement standardization and monitoring technique and instruments.	Northeastern Univ. and CRI	1 Quarter 5 yr	 X	X
c. Mathematics and calculations basic to the use and measurement of radioactivity.	CRI	5 yr	X	
d. Biological effects of radiation.	CRI	5 yr	X	

Item 17 of Form NRC-313 (Experience with Radiation)

Isotope	Max. Amount	Where Experience was Gained	Duration of Experience	Type of Use
^{125}I	2 mCi	CRI	12 yr	Incorporation reactions *in vitro* assays
^{3}H	0.5 mCi	CRI	12 yr	*In vitro* assays
^{235}U	1 mCi	Battelle Memorial Institute	6 mo.	Metallography

TRAINING AND EXPERIENCE

Thomas C. Gravius

Item 16 of Form NRC-313

Type of Training	Where Trained	Duration of Training	On the Job	Formal Course
a. Principles and practices of radiation protection.	Brandeis Univ. and Collaborative Research	2 hour formal course	X	X
b. Radioactivity measurement standardization and monitoring technique and instruments.	" "	7 yr.	X	
c. Mathematics and calculations basic to the use and measurement of radioactivity.	" "	7 yr.	X	
d. Biological effects of radiation.	Collaborative Research	2 hr.		X

Item 17 of Form NRC-313 (Experience with Radiation)

Isotope	Max. Amount	Where Experience was Gained	Duration of Experience	Type of Use
^{3}H	20 uCi	Brandeis Univ. and MIT	5 yr.	In vitro labelling
^{32}P	1 mCi	Brandeis, MIT and Collaborative	7 yr.	In vitro labelling
^{125}I	200 uCi	Collaborative	2 yr.	Western blotting

TRAINING AND EXPERIENCE

Christine Aubin

Item 16 of Form NRC-313

Type of Training	Where Trained	Duration of Training	On the Job	Formal Course
a. Principles and practices of radiation protection.	Collaborative Research	2 hour formal course + 5 yr.	X	X
b. Radioactivity measurement standardization and monitoring technique and instruments.	Collaborative Research	5 yr.	X	
c. Mathematics and calculations basic to the use and measurement of radioactivity.	Collaborative Research	5 yr.	X	
d. Biological effects of radiation.	Collaborative Research	2 hour formal course		X

Item 17 of Form NRC-313 (Experience with Radiation)

Isotope	Max. Amount	Where Experience was Gained	Duration of Experience	Type of Use
^{3}H	1 mCi	Collaborative Research	5 yr.	Enzyme incorporation assays, nucleotide labelling, cell studies
^{32}P	1 mCi	" "	5 yr.	Nucleotide phosphorylations, enzyme incorporation assay
^{35}S	1 mCi	" "	3 mos.	Protein incorporation assays
^{14}C	1 mCi	" "	1 yr.	Cell uptake studies

APPENDIX TO LICENSE RENEWAL APPLICATION

TO: CRI Technical Employees

FROM: Safety Committee

RE: Level III Radiation Safety Training

Level III training in radiation safety is required for all technical personnel who will work with radioisotopes here at CRI. The accompanying handbook is the basic "textbook" for level III training. It contains all the basic and general information required for safe handling of the radioisotopes commonly used in our laboratories. You should keep your copy at hand for future reference.

A handbook such as this cannot provide all the specific information required for safety in all the various procedures which are performed here. Supervisory personnel are expected to have sufficient understanding of the basis of radiation safety and of the specific hazards or requirements of the isotopes with which they work to develop more specific safety procedures as required. Questions regarding any area of radiation safety may be directed to any of the radiation protection staff or to members of the Radiation Safety Committee.

This handbook and the required level III training can not be considered as the completion of radiation safety training. Your supervisor should provide you with on-the-job training as you work with isotopes. As changes in procedures or facilities occur, memoranda will be issued by the Radiation Protection Staff to keep all workers up to date. These should be filed with your copy of the handbook for future reference.