B-22305 REV. 10-83

DUPONT
ESTABLISHED 1802
E. I. DU PONT DE NEMOURS & COMPANY
INCORPORATED
GLENOLDEN LABORATORY
GLENOLDEN, PENNSYLVANIA 19036

PHARMACEUTICALS
BIOMEDICAL PRODUCTS DEPARTMENT

October 24, 1986

U. S. Nuclear Regulatory Commission, Region I
Nuclear Material Section B
631 Park Avenue
King of Prussia, PA 19406

Attention: Dr. John Glenn

Dear Dr. Glenn:

Please be advised by this letter that we wish to apply for renewal of NRC License No. 07-00455-37, expiring November 30, 1986. The license is for broad scope use of laboratory quantities of byproduct material at 500 S. Ridgeway Avenue, Glenolden, Pennsylvania. A check for $700.00 is enclosed to cover the renewal application fee.

All information on the original 1981 application, as modified by letter dated October 21, 1981 and Amendments Nos. 1-6 remain the same, except as indicated by changes in the text below:

Reference: NRC Form 313(9-85)

Item 1

Application for renewal of 07-00455-37.

Item 2

Same as expiring license application Item 4 (Form NRC 313 I, 3-80).

Item 3

Same as expiring license application Item 5 (Form NRC 313 I, 3-80).

Item 4

Name of person to be contacted about this application is George W. Moncrief, Telephone No. (215) 237-7735, replacing Gary L. Sontchi.

Item 5

Same as exp ring license application Item 8A-D (Form NRC 313 I, 3-80) except it is being requested that the site limit for Iodine-125 be raised to 200mCi.

Item 6

Same as expiring license application Item 8E (Form NRC 313 I, 3-80).

Item 7

Line management is ultimately responsible for all safety matters including radiation safety. Within that framework the Radiation Safety Committee is responsible for the radiation safety program to the extent that the committee grants approval to individual investigators after reviewing their qualification records and proposed protocols, oversees training programs and audits for compliance with practices and procedures set forth in this license application. Site management is represented on this committee.

Committee membership is scheduled for reorganization on December 1, 1986 to coincide with renewal of this license and will consist of both salaried and hourly (non-exempt salary) employees as follows:

Russell H. Neubauer, Research Supervisor (Committee Chairman)
David C. Eustice, Research Biochemist
James Huang, Principal Scientist
Kam Leung, Principal Scientist
Susan Niederland, Lab Technician
Michael C. Fredericks, Safety & Health Technician (Asst RSO)
George W. Moncrief, Safety & Health Supervisor (RSO)
Stafford McQuillin, Site Manager

Training and experience records for each are attached (Attachments 1-8).

ITEM 8 - TRAINING

The training and experience record of each investigator requesting authorization to purchase (or acquire through transfer) radioisotopes is scrutinized by the radiation safety committee. Once authorized, the investigator may direct one or more scientists or technicians under his supervision to use

isotopes in specific procedures established by the investigator. The investigator is responsible for the on-job training of the technician.

To supplement on-job training, a formal classroom training program is given to employees. Attendance is mandatory for all lab technicians and optional for investigators who may wish to update their knowledge.

This 6-hour (minimum) course covers principles and fundamentals of radiation safety as well as practical laboratory safe practices, use of radiation detection instruments, biological effects of radiation and governmental regulations.

The course is currently presented by Radiation Safety Consultant and Director of Radiological Health and Biohazard Control at Temple University, Dr. Ronald Zelac. Other qualified instructors may be used.

ITEM 9 - FACILITIES

Same as expiring license application Item 13 (Form NRC 313 I, 3-80), as amended, but with the following changes:

(1) expand storage facilities for low level radioactive waste storage as described under Waste Management (Item 11 of this renewal application form).

(2) delete the two chemical fume hood laboratory cited in original application as a typical configuration (Lab 229). This is no longer a typical configuration.

(3) change Lab 225 from a typical one biohood laboratory to a typical one biohood and one chemical hood laboratory (previously cited as Lab 131), and

(4) add Lab 226 as a typical two biohood laboratory.

Sketches are attached (attachments 9 & 10).

ITEM 10 - RADIATION SAFETY PROGRAM
SAFETY PHILOSOPHY

The Du Pont Company operates on the philosophy that the safety and health of employees are of the greatest importance, ranking along with quality, production, employee relations and costs. Safe operating procedures and practices are of benefit far beyond any dollar savings, the human values involved being much greater to employer, employee and community. Success of the Glenolden Laboratory effort depends upon a thorough understanding and acceptance of the following principles:

1. All injuries or any damage to health can be prevented.

2. The prevention of bodily injury and the safeguarding of an individual's health must be the first consideration in all actions and are the responsibility of each employee.

3. Rules and procedures to minimize the possibility of bodily injury or damage to health are essential parts of the Company safety and health program. Each individual is responsible for knowing and following the safety and health rules and procedures applicable to their assignments. In addition to strict adherence to these rules, each individual is responsible for using sound judgement on each assignment and for being aware of potential hazards to himself or others before taking action.

4. Supervision is responsible for correcting work conditions and employee actions which cause bodily injury or damage to health, property, and environment and to inform employees of known potential hazards encountered in the workplace.

5. Supervision is responsible for training individuals and making equipment and appropriate job procedures available so that each assignment can be completed without bodily injury or damage to health, property, or environment.

6. Orderliness and cleanliness (housekeeping) of the work environment are integral parts of the prevention of injuries and damage to health.

Additionally, a Radiation Safety Committee is established to oversee radiation safety programs associated with both this broad scope license and an existing irradiator covered under a separate license (NRC License No. 07-00455-36). The function and composition of the committee is as described above (Item 7).

ITEM 10.1 - PERSONNEL MONITORING EQUIPMENT

Personnel monitoring is as described in original application except that a change in the frequency of reading badges is requested from monthly to quarterly. Our five year experience with monthly badge readings is as follows:

PERSONNEL MONITORING - GLENOLDEN LABORATORY

Annual Dose Ranges	1981		1982		1983		1984		1985		1986 to Date	
	Whole Body Badges	Ring Badges	Whole Body Badges	Ring Badges	Whole Body Badges	Ring Badges	Whole Body Badges	Ring Badges	Whole Body Badges	Ring Badges	Whole Body Badges	Ring Badges
(millirems)												
No measurable exposure	25	8	98	5	113	9	74	16	95	8	126	13
Measurable but < 100	0	14	7	14	10	25	2	5	10	18	4	21
100 to 250	0	0	0	8	0	1	0	1	0	1	0	0
250 to 500	0	0	0	0	0	2	0	0	0	2	0	2
500 to 750	0	0	0	0	0	0	0	0	0	2	0	1
500 to 1000	0	0	0	0	0	0	0	0	0	0	0	0
1000 to 2000	0	0	0	0	0	0	0	0	0	0	0	0
>2000	0	0	0	0	0	0	0	0	0	0	0	0

WHOLE BODY ALLOWABLE LIMIT IS 5000 MILLIREMS/YR

RING BADGE ALLOWABLE LIMIT IS 75000 MILLIREMS/YR

ITEM 10.2 - RADIATION DETECTION INSTRUMENTS

In accordance with paragraph 20.201(b) of 10 CFR 20 properly maintained and calibrated survey meters are available for use at all times.

Instruments are as follows:

* Eberline Model E120 with HP270 probe for hard beta and gamma detection.

* Ludlum Model 3 with 44-3 low energy gamma scintillation probe for I-125 detection.

* Eberline Model E120 with HP190 thin window probe for P-32 detection.

* Victoreen Model 470A ionization chamber rate meter for general health physics surveys.

* Ludlum Model 2200 single channel scaler with Model 44-3 low energy gamma scintillation probe for performing thyroid bioassays.

* Packard Model 3255 Tri-Carb liquid scintillation spectrometer for low level H-3, C-14 or S-35, and P-32 wipe testing and urine bioassays.

* Packard Multi-Prias gamma counter for low level I-25, Cr-51, and other gamma emitters for wipe testing and urine bioassay purposes.

* Three Du Pont constant flow air sampling pumps for measuring airborne radioactivity in hood exhaust effluents and in operator's breathing zones for operations such as, but not limited to, iodinations. For example, calibrated pumps would be used to collect and absorb volatile iodine on charcoal for counting in the Packard Multi-Prias gamma counter. Another example would be to collect C-14 labelled carbon dioxide by bubbling through an impinger containing CO2-absorbing scintillation fluid and then counting in the Packard Tri-carb scintillation counter.

Procedures and frequency for calibrating the above listed survey instruments are to be done either by the instrument manufacturer, a calibration service company such as Applied Health Physics, or by Du Pont using in-house facilities.

In-house calibration will utilize an NBS traceable 10mCi Cesium-137 calibration source or a Ludlum Model 500 pulser. Calibration will be at least annually and after servicing such that readings are within +/- 10% of the actual values over the range of the instruments up to 3 R/hr. Energy dependent instruments will be calibrated with the Ludlum Model 500 pulse generator and an appropriate reference source to set or check the input sensitivity of each meter.

ITEM 10.3 LEAK TESTING

Leak testing of sealed sources is performed every 6-months using leak test kits sufficiently sensitive to detect 0.005 microcuries of removable contamination. Kits are supplied by Applied Health Physics, Inc.. (or equivalent).

ITEM 10.4 OPERATING AND EMERGENCY PROCEDURES

Specific procedures for handling radioisotopes including millicurie quantities of P-32 and I-125, receiving and opening

packages, conducting periodic wipe tests, and controlling emergencies are as described in original application as amended except as follows:

* Instead of the user opening packages in the presence of RSO or his designate, the RSO or his designate will open all packages. Wearing protective gloves, he will inspect and identify the contents against the purchase requisition. He will also check for contamination on the outside of inner containers and wipe test outside of packages containing more than 10mCi of H-3, C-14, S-35, P-32 or I-125 or as specified in 10CFR 20.205 and retain all required records. Users will then be notified that their isotope may be obtained from the Radioisotope Laboratory and taken to their laboratory provided quantities are limited to that permitted in Controlled Area laboratories. Quantity limits in Controlled Areas versus Strictly Controlled Areas remain as described in original application.

* The locking of non-exempt quantities of licensed material in Controlled Areas when unattended is to be interpreted to mean that these materials will be under lock and key when left at the end of the day or other non-working period but could be left unattended for short periods of time during normal working hours provided laboratory doors are closed and work areas are posted with signs indicating the presence of radioactive materials. Strictly Controlled Areas will continue to be locked when unattended.

* Laboratory coats will not be required for casual visits to Strictly Controlled Areas or when no work is performed with open quantities of licensed material.

ITEM 11 WASTE MANAGEMENT

Waste management is as described in original application (as amended to include sanitary sewer disposal) except that permission is hereby requested for disposal by decay.

Low level solid and liquid laboratory waste contaminated with short-lived isotopes are to be retained in a secure storage area for a minimum of 7 half-lives after which time such waste material will be discarded as non-radioactive if no radioactivity can be detected by a gieger counter. Radiation signs and labels will be removed or negated prior to final disposal.

The storage area for retaining this waste for the passage of 7 half-lives will be one or more of the four radioactive waste cells shown in Attachment 11. This drawing is intended to supercede the drawing identified as Appendix 8 in original application (ITEM 13, Form 313 I).

A new 19' X 13' covered outdoor radioactive waste drum storage pad has been constructed to hold full drums of low level radioactive waste awaiting pick-up by a licensed radioactive

waste broker (e.g. Teledyne Isotopes of Westwood, NJ). The storage pad is completely fenced-in with cyclone fencing and locked gates. Additionally, the pad is located within the security fence surroundig site property and is included in the 24 hour/day security surveillance for the site. Attachment 12 illustrates the location of this drum storage pad relative to the main building.

This drum storage pad is intended to also provide a 3 to 6 month storage buffer in the event of closure of existing low-level waste burial sites currently available to us. If such an event were to occur, this buffer should provide sufficient time for us to construct a suitable larger storage facility as might be deemed necessary.

Sincerely,

G. W. Moncrief, Supervisor
Safety, Health & Fire Protection

GWM:bd

Attachments (12)

Attachment 1

TRAINING & EXPERIENCE

STAFFORD J. MCQUILLIN, SITE MANAGER

Management representative on Radiation Safety Committee

Education	B.S.I.E. 1957	Georgia Institute of Technology Industrial Engineering
	M.B.A. 1969	Ohio University Management

Managerial Experience

Production Supervision Washington Works, W. Va.	1959 - 1969
Personnel Superintendent Washington Works, W. Va.	1969 - 1977
Employee Relations Manager Haskell Laboratory	1977 - 1981
Employee Relations & Site Services Manager Haskell Laboratory	1981 - 1983
Personnel & Compensation Manager Central Res. & Dev.	1983 - 1985
Site Manager Glenolden Laboratory	1985 -

Name: David C. Eus[redacted]e

Date: 9/5/85

Attachment 2

TRAINING & EXPERIENCE

TYPE OF TRAINING	WHERE TRAINED	DURATION OF TRAINING	ON-THE-JOB (Circle Answer)	FORMAL COURSE (Circle Answer)
a. Principles and practices of radiation protection	Suny @ Binghamton Dartmouth Med. Sch. Univ of Rochester	3 yrs 1.5 yrs 3.5 yrs	(Yes) No	(Yes) No U of R
b. Radioactivity measurements and standardiza- and monitoring techniques and instruments	Suny @ Binghamton Dartmouth Med. Sch. Univ of Rochester	3 yrs. 1.5 yrs. 3.5 yrs.	(Yes) No	(Yes) No U of R
c. Mathematics and calcluations basic to the use and measurement of radioactivity.	Suny @ Binghamton Dartmouth Med. Sch. Univ of Rochester	3 yrs. 1.5 yrs. 3.5 yrs.	(Yes) No	(Yes) No U of R
d. Biological effects of radiation	Suny @ Binghamton Dartmouth Med. Sch. Univ of Rochester	3 yrs. 1.5 yrs. 3.5 yrs.	(Yes) No	(Yes) No U of R

Experience with Radiation (Actual use of radioisotopes or equivalent experience)

Isotope	Maximum Amount	Where Experience was Gained	Duration of Experience	Type of Use
^{75}Se	550 uCi	Suny @ Binghamton	3 yrs.	In Vitro
^{35}S	1 mCi	Suny @ Binghamton	3 yrs.	In Vitro
^{3}H	10 mCi	Suny @ Binghamton Dartmouth & U of R	8 yrs.	In Vitro & In Vivo
^{14}C	200 uCi	Suny @ Binghamton Dartmouth and U of R	8 yrs.	In Vitro
^{32}P	100 uCi	U of R	6 mo.	In Vitro

Attachment 3

Name: Michael C. Fredericks Date: September 6, 1983

TRAINING & EXPERIENCE

Type of Training	Where Trained	Duration Of Training	On The Job (Circle Answer)		Formal Cou (Circle Answer)	
a. Principles and practices of radiation protection	U.S. Army, Ft. Knox Kentucky Applied Health Co Albany, NY DuPont, Glenolden	2 months 2 weeks 6 hours	Yes	No	Yes	N
b. Radioactivity measurements standardization and monitoring techniques and instruments			Yes	No	Yes	N
c. Mathematics and calculations basic to the use and measurement of radioactivity.			Yes	No	Yes	N
d. Biological effects of radiation.			Yes	No	Yes	N

Experience with Radiation (Actual use of radioisotopes or equivalent experience).

Isotope	Maximum Amount	Where Experience was gained	Duration of Experience	Type of Use
Fission Products	Hypothetical Situation	U.S. Army Nuclear Biological warfare GRP Fort Knox, Kentucky.	2 months	Emergency Response Training
14C, 3H, 125I	$\leq$ 10 uCi	Albany Medical Center Albany, N.Y. (contractor) applied Health).	3 months	Medical Diagnostic Testing
14C, 3H, 125I, 32P, 51CR, 35S, 137Cs, etc.	variable quantities up to several curies	DuPont Company, Glenolden Glenolden, PA	1.75 years	Pharmaceutical Research under broad scope license.

Attachment 4

Name: James J. Huang Date 9/29/86

TRAINING & EXPERIENCE

TYPE OF TRAINING	WHERE TRAINED	DURATION OF TRAINING	ON-THE-JOB (Circle Answer)	FORMAL COURSE (Circle Answer)
a. Principles and practices of radiation protection	North Carolina State Univ.	1 semester	(Yes) No	(Yes) No
b. Radioactivity measurements and standardiza- and monitoring techniques and instruments	North Carolina State Univ.	1 semester	(Yes) No	(Yes) No
c. Mathematics and calcluations basic to the use and measurement of radioactivity.	North Carolina State Univ.	1 semester	(Yes) No	(Yes) No
d. Biological effects of radiation	North Carolina State Univ.	1 semester	(Yes) No	(Yes) No

Experience with Radiation (Actual use of radioisotopes or equivalent experience)

Isotope	Maximum Amount	Where Experience was Gained	Duration of Experience	Type of Use
^{32}P	1 mCi	Purdue University Du Pont Glenolden	1 year	Sequencing DNA probe
^{35}S	1 mCi	Centocor	6 mo.	Protein Labelling

Attachment 5

Name: Kam Leung Date 10/9/85

TRAINING & EXPERIENCE

TYPE OF TRAINING	WHERE TRAINED	DURATION OF TRAINING	ON-THE-JOB (Circle Answer)	FORMAL COURSE (Circle Answer)
a. Principles and practices of radiation protection	Duke RPMI	1 week 1day	Yes No	(Yes) No
b. Radioactivity measurements and standardiza- and monitoring techniques and instruments	UNC Duke	1 week 1 week	Yes No	(Yes) No
c. Mathematics and calcluations basic to the use and measurement of radioactivity.	UNC Duke	1 month 1 month	Yes No	(Yes) No
d. Biological effects of radiation	Roswell Park Mem. Inst.	1 month	Yes No	(Yes) No

Experience with Radiation (Actual use of radioisotopes or equivalent experience)

Isotope	Maximum Amount	Where Experience was Gained	Duration of Experience	Type of Use
^{3}H	10 mCi	Roswell Park Duke	10 yrs.	RIA, drug metabolism incorporation into cells
^{14}C	1 mCi	Roswell Park Duke	9 yrs.	RIA drug metabolism incorporation
^{51}Cr	10 mCi	Roswell Park Duke	10 yrs.	Cell labelling ^{51}Cr release assay
^{125}I	100 uCi	Duke	1 yr.	RIA

Attachment 6.

Name: GEORGE W. MONCRIEF Date: 7/22/86

TRAINING & EXPERIENCE

TYPE OF TRAINING	WHERE TRAINED	DURATION OF TRAINING	ON-THE-JOB (Circle Answer)	FORMAL COURSE (Circle Answer)
a. Principles and practices of radiation protection	DuPont Engineering Service Div.	5 days	(Yes) No	(Yes) No
b. Radioactivity measurements and standardiza- and monitoring techniques and instruments	"	"	(Yes) No	(Yes) No
c. Mathematics and calcluations basic to the use and measurement of radioactivity.	"	"	(Yes) No	(Yes) No
d. Biological effects of radiation	"	"	(Yes) No	(Yes) No

Experience with Radiation (Actual use of radioisotopes or equivalent experience)

Isotope	Maximum Amount	Where Experience was Gained	Duration of Experience	Type of Use
3H,14C,32P, 125I,35S, 51CR,137CS	100 mCi	DuPont Glenolden Laboratory RPO for Broad Scope license and irradiator license	5 yrs	RPO
X-RAYS		DuPont Jackson Laboratory Safety Engineer	13 yrs	X-RAY Diffraction

Name: Russell H. Neu[illegible]der Date: 9/29/86 Attach 7

TRAINING & EXPERIENCE

TYPE OF TRAINING	WHERE TRAINED	DURATION OF TRAINING	ON-THE-JOB (Circle Answer)	FORMAL COURSE (Circle Answer)
a. Principles and practices of radiation protection	Univ. Maryland Litton Bionetics NCI-FCRF	1 day 1 day 1 day	(Yes) No	(Yes) No
b. Radioactivity measurements and standardiza- and monitoring techniques and instruments	Univ Maryland Litton Bionetics NCI-FCRF	1 day 1 day 1 day	(Yes) No	(Yes) No
c. Mathematics and calcluations basic to the use and measurement of radioactivity.	NCI-FCRF	1 day	(Yes) No	(Yes) No
d. Biological effects of radiation	Univ Maryland NCI-FCRF	1 semester 1 day	(Yes) No	(Yes) No

Experience with Radiation (Actual use of radioisotopes or equivalent experience)

Isotope	Maximum Amount	Where Experience was Gained	Duration of Experience	Type of Use
3H	100 mCi	Univ. of Maryland Litton Bionetics NCI-FCRF	14 years	metabolic labelling Borohydride labelling
14C	1 mCi	Univ. of Maryland	1 year	metabolic labelling
35S	5 mCi	NCI-FCRF	3 years	metabolic labelling
51CR	2 mCi	Litton Bionetics NCI-FCRF	7 years	cytotoxicity ass /s

Name: Russell H. Ne[redacted]auer Dat[redacted] 9/29/86

TRAINING & EXPERIENCE

TYPE OF TRAINING	WHERE TRAINED	DURATION OF TRAINING	ON-THE-JOB (Circle Answer)	FORMAL COURSE (Circle Answer)
a. Principles and practices of radiation protection			Yes No	Yes No
b. Radioactivity measurements and standardiza- and monitoring techniques and instruments			Yes No	Yes No
c. Mathematics and calcluations basic to the use and measurement of radioactivity.			Yes No	Yes No
d. Biological effects of radiation			Yes No	Yes No

Experience with Radiation (Actual use of radioisotopes or equivalent experience)

Isotope	Maximum Amount	Where Experience was Gained	Duration of Experience	Type of Use
125I	5 mCi	NCI-FCRF	4 years	Radioiodinations metabolic labelling
32P	2 mCi	Litton Bionetics	2 years	metabolic labelling

Attachment 8

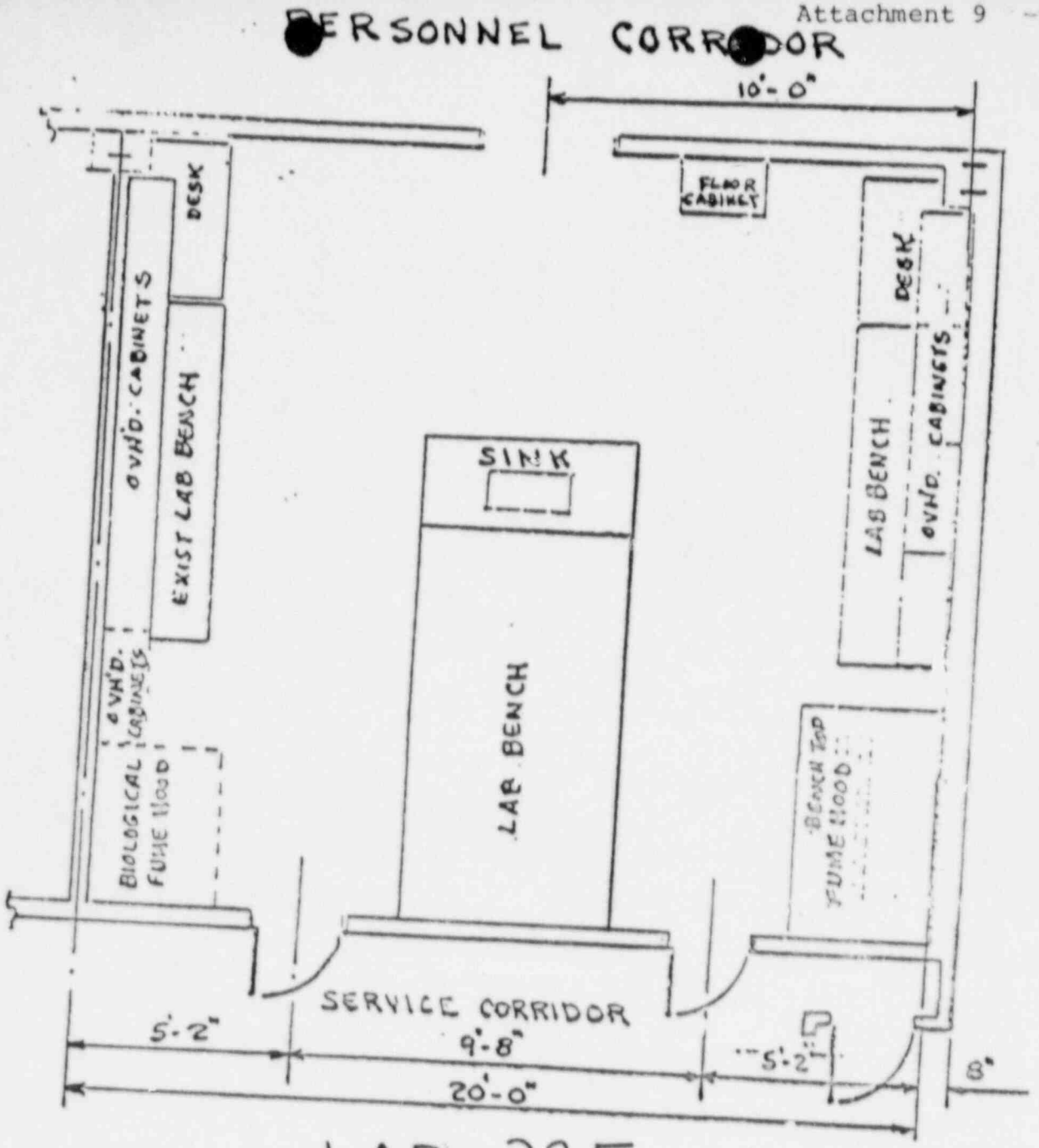
Name: Susan Nieder[redacted]d Dat[redacted] 9/25/86

TRAINING & EXPERIENCE

TYPE OF TRAINING	WHERE TRAINED	DURATION OF TRAINING	ON-THE-JOB (Circle Answer)	FORMAL COURSE (Circle Answer)
a. Principles and practices of radiation protection	DuPont Glasgow Site & Glenolden	7 mos.	(Yes) No	Yes (No)
b. Radioactivity measurements and standardiza- and monitoring techniques and instruments	DuPont Glasgow Site & Glenolden	7 mos.	(Yes) No	Yes (No)
c. Mathematics and calcluations basic to the use and measurement of radioactivity.	Du Pont, Glenolden	7 mos.	(Yes) No	Yes (No)
d. Biological effects of radiation	Univ. of DE DuPont, Glenolden	2 weeks. 7 mos	(Yes) No	(Yes) No

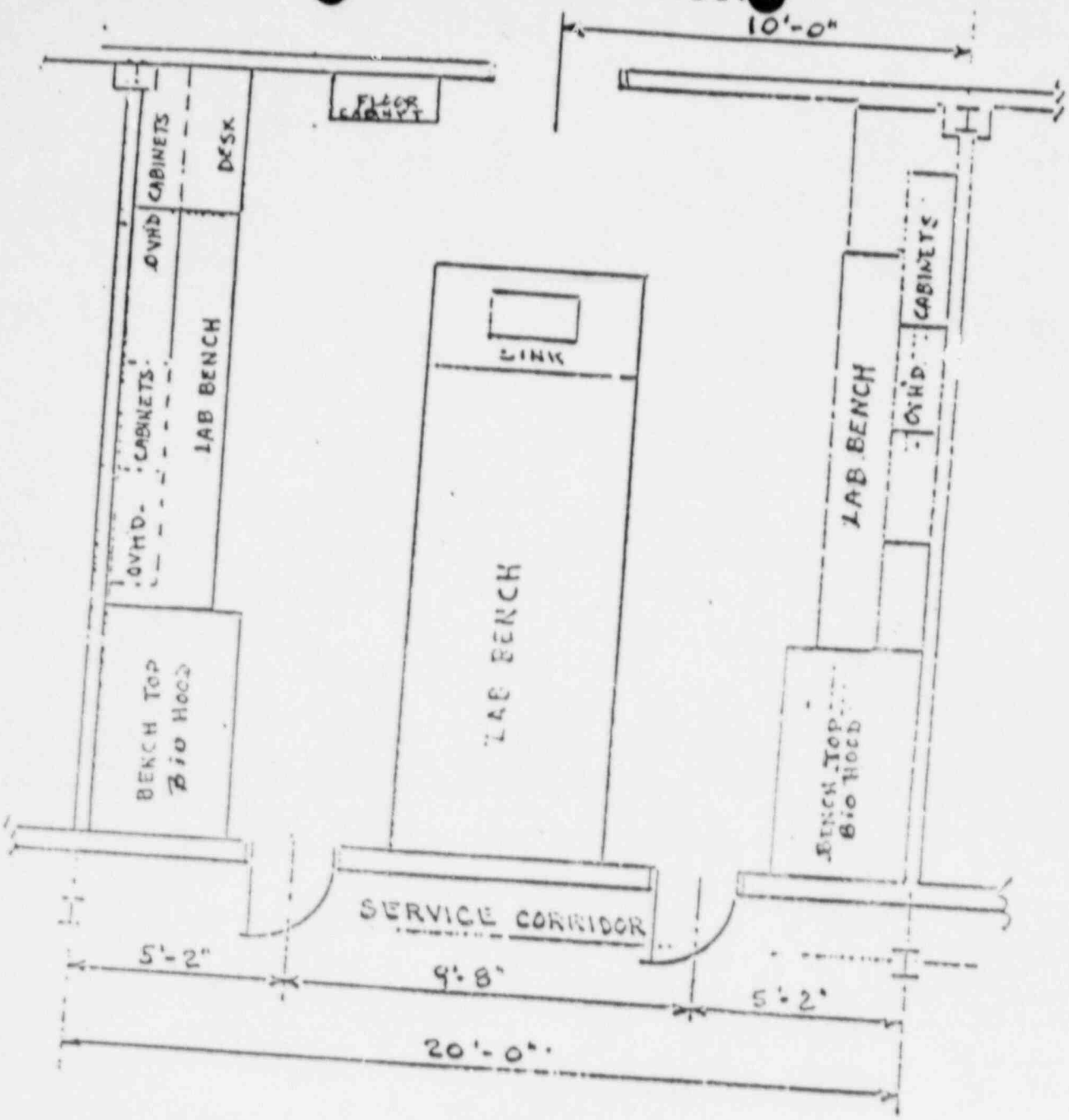
Experience with Radiation (Actual use of radioisotopes or equivalent experience)

Isotope	Maximum Amount	Where Experience was Gained	Duration of Experience	Type of Use
^{125}I	5 mCi	Du Pont, Glenolden	7 mos.	iodinations
^{3}H	1 mCi	Du Pont, Glenolden	7 mos.	^{3}H Thymidine



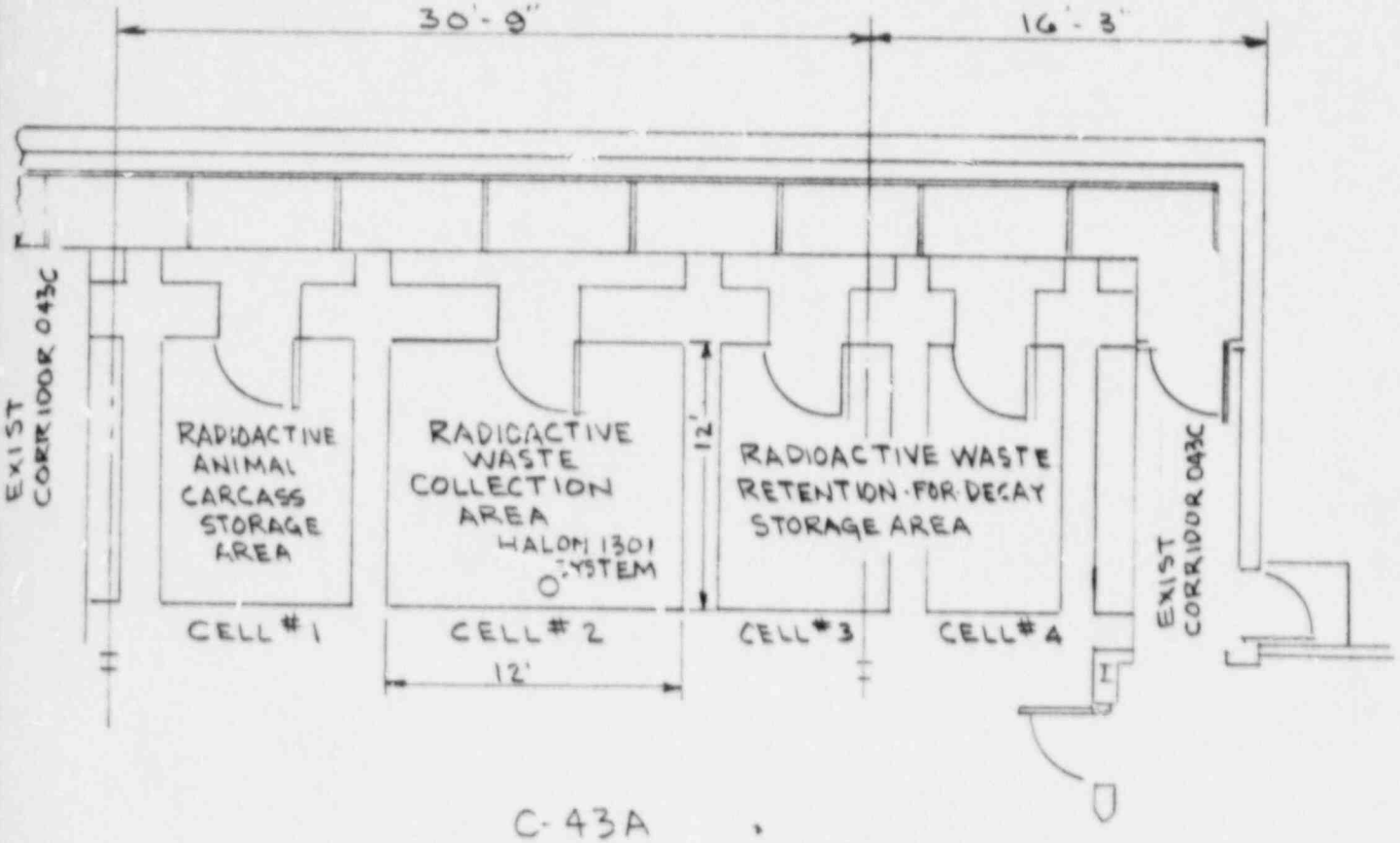
LAB-225

TYPICAL-ONE BIO HOOD & ONE CHEMICAL FUME HOOD



LAB-226

TYPICAL-TWO Biological FUME HOODS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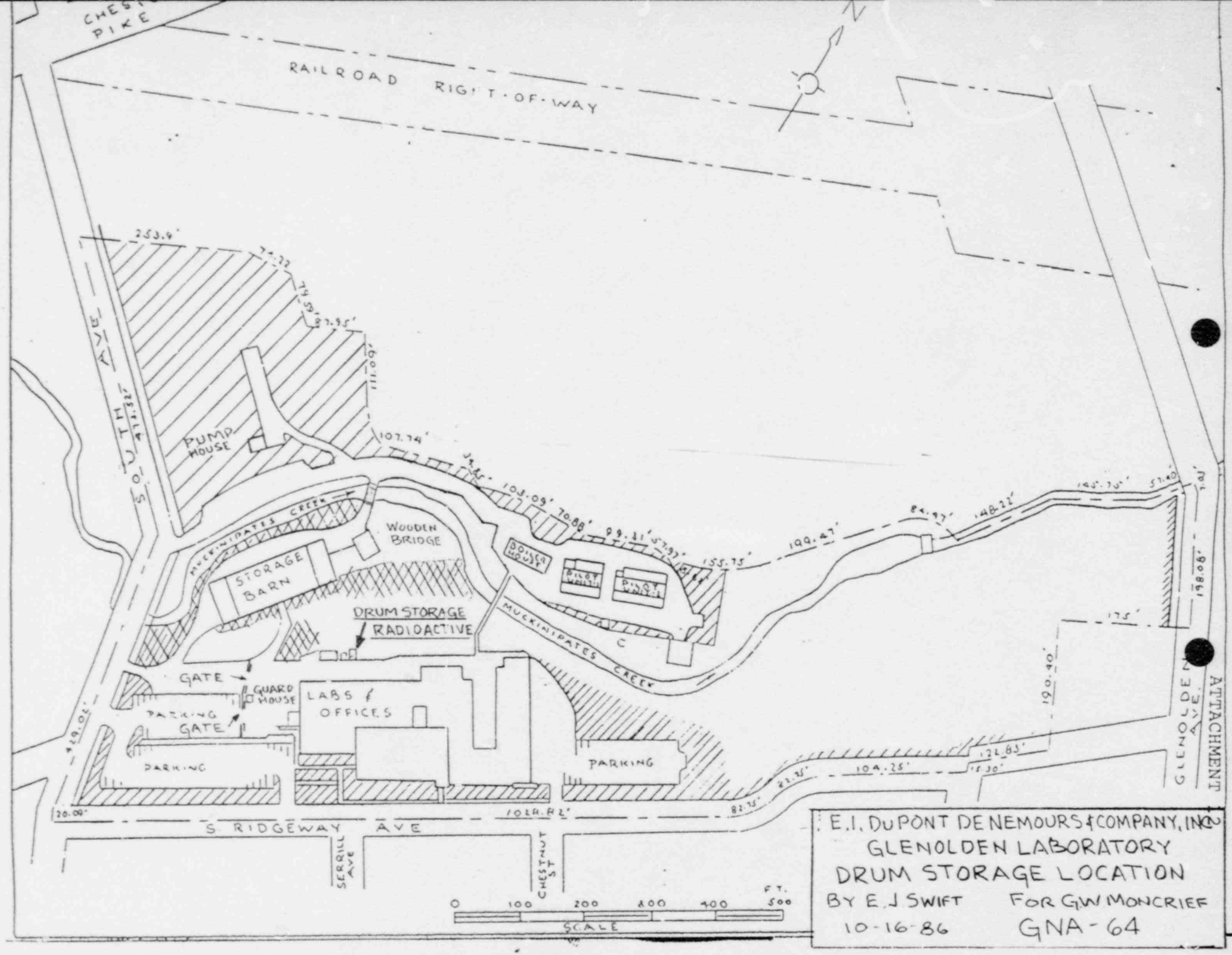
16'-3"
EXIST CORRIDOR 043C
RADIOACTIVE ANIMAL CARCASS STORAGE AREA
RADIOACTIVE WASTE COLLECTION AREA
HALON 1301 SYSTEM
12'
RADIOACTIVE WASTE RETENTION FOR DECAY STORAGE AREA
EXIST CORRIDOR 043C
CELL #1
CELL #2
12'
CELL #3
CELL #4

C-43A



ATTACHMENT 2

ORIGINAL

0 6 19346
0 3610
11/86

BETWEEN: William O. Miller, Chief
License Fee Management Branch
Office of Administration

John E. Glenn, Chief
Nuclear Materials Section B
Division of Engineering and
Technical Programs

LICENSE FEE TRANSMITTAL

A. REGION I

1. APPLICATION ATTACHED

Applicant/Licensee: E. I. DuPont

Application Dated: 9-23-86

Control No.: 106331

License No.: 07-00455-37

2. FEE ATTACHED

Amount: $700

Check No.: 381-90513

3. COMMENTS

Signed SLJ

Date 10-29-86

B. LICENSE FEE MANAGEMENT BRANCH

1. Fee Category and Amount: 3L ($700)

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

Amendment _____

Renewal ✓

License _____

Signed [signature]

Date 11/4/86

REGION I FORM 213
(MARCH 1983)