Form AEC-313
(2-73)
10 CFR 30

UNITED STATES ATOMIC ENERGY COMMISSION

APPLICATION FOR BYPRODUCT MATERIAL LICENSE

Form approved
Budget Bur[illegible] No. 38-R0027

INSTRUCTIONS.—Complete Items 1 through 16 if this is an initial application or an application for renewal of a license. Information contained in previous applications filed with the Commission with respect to Items 8 through 15 may be incorporated by reference provided *references are clear and specific*. Use supplemental sheets where necessary. Item 16 must be completed on all applications. Mail two copies to: U.S. Atomic Energy Commission, Washington, D.C., 20545, Attention: Materials Branch, Directorate of Licensing. Upon approval of this application, the applicant will receive an AEC Byproduct Material License. An AEC Byproduct Material License is issued in accordance with the general requirements contained in Title 10, Code of Federal Regulations, Part 30, and the Licensee is subject to Title 10, Code of Federal Regulations, Part 20, and the license fee provisions of Title 10, Code of Federal Regulations, Part 170. The license fee category should be stated in Item 16 and the appropriate fee enclosed. (See Note in Instruction Sheet).

Lta 16784

1. (a) NAME AND STREET ADDRESS OF APPLICANT. *(Institution, firm, hospital person, etc. Include ZIP Code and telephone number.)*

Reference Laboratory Division
Diamond Shamrock Health Sciences Inc.
2775 Home Road
Powell, Ohio 43065

(b) STREET ADDRESS(ES) AT WHICH BYPRODUCT MATERIAL WILL BE USED. *(If different from 1(a). Include ZIP Code.)*

Reference Laboratory Division
Diamond Shamrock Health Sciences Inc.
2775 Home Road
Powell, Ohio 43065

030-11638
03620-13

2. DEPARTMENT TO USE BYPRODUCT MATERIAL

Reference Laboratory Division

3. PREVIOUS LICENSE NUMBER(S). *(If this is an application for renewal of a license, please indicate and give number.)*

34-10463-01 Searle Diagnostics Inc.
Acquired by Diamond Shamrock Health Sciences

4. INDIVIDUAL USER(S). *(Name and title of individual(s) who will use or directly supervise use of byproduct material. Give training and experience in Items 8 and 9.)*

Leo E. Gaudette, Ph.D
Nguyen Huu Chinh, Ph.D.
C. Agnes Gaudette B.S.
Carol Mount, B.S.
Gary Wilkinson, B.S.
Edward Harris, B.S.

5. RADIATION PROTECTION OFFICER. *(Name of person designated as radiation protection officer if other than individual user. Attach resume of his training and experience as in Items 8 and 9.)*

Keith Keplinger, B.S.

6. (a) BYPRODUCT MATERIAL. *(Elements and mass number of each.)*	(b) CHEMICAL AND/OR PHYSICAL FORM AND MAXIMUM NUMBER OF MILLICURIES OF EACH CHEMICAL AND/OR PHYSICAL FORM THAT YOU WILL POSSESS AT ANY ONE TIME. *(If sealed source(s), also state name of manufacturer, model number, number of sources and maximum activity per source.)*
Tritium - 10 Ci	10 Ci Steroid, hormones, drugs, biometabolite in solvent/solution
Carbon 14- 5 mCi	Steroids, biologic metabolites in solvent/ solutions
Iodine 125- 200 mCi	Iodide
10 mCi	Iodinated polypeptides, steroids, drugs, metabolites in solvent/ solution
Iodine 131 - 10 mCi	Iodide
5 mCi	Iodinated polypeptides in solvent/solutions
Cobalt 60 - 500 uCi	B_{12} in aqueous solutions
	Sealed Sources
	H^3 Packard - N1139; H^3 Isocap - 181340
	C^{14} Packard - 0196; C^{14} Isocap - 181330
	Ce^{137} Nuclear Chicago 18462
	$Sim^{125}I$ Nuclear Chicago - 184681

7. DESCRIBE PURPOSE FOR WHICH BYPRODUCT MATERIAL WILL BE USED. *(If byproduct material is for "human use," supplement A (Form AEC-313a) must be completed in lieu of this item. If byproduct material is in the form of a sealed source, include the make and model number of the storage container and/or device in which the source will be stored and/or used.)*

ALL IN VITRO STUDIES:
Radioimmunoassay of hormones and chemotherapeutic agents in clinical and research biologic samples for clinical diagnosis.

Developments of reagents and methods for lab analysis, and, application to laboratory sample analysis.

Iodination of protein hormones, non-protein hormone derivatives, small molecules entities and biologic metabolites for routine use in radioimmunoassay.

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(Continued on reverse side)

TRAINING AND EXPERIENCE OF EACH INDIVIDUAL NAMED IN ITEM 4 *(Use supplemental sheets if necessary)*

8. TYPE OF TRAINING	WHERE TRAINED	DURATION OF TRAINING	ON THE JOB (Circle answer)	FORMAL COURSE (Circle answer)
a. Principles and practices of radiation protection	PLEASE SEE ATTACHED		Yes No	Yes No
b. Radioactivity measurement standardization and monitoring techniques and instruments			Yes No	Yes No
c. Mathematics and calculations basic to the use and measurement of radioactivity			Yes No	Yes No
d. Biological effects of radiation			Yes No	Yes No

9. EXPERIENCE WITH RADIATION. *(Actual use of radioisotopes or equivalent experience.)*

ISOTOPE	MAXIMUM AMOUNT	WHERE EXPERIENCE WAS GAINED	DURATION OF EXPERIENCE	TYPE OF USE

10. RADIATION DETECTION INSTRUMENTS. *(Use supplemental sheets if necessary.)*

TYPE OF INSTRUMENTS (Include make and model number of each)	NUMBER AVAILABLE	RADIATION DETECTED	SENSITIVITY RANGE (mr/hr)	WINDOW THICKNESS (mg/cm²)	USE (Monitoring, surveying, measuring)
LSC-Packard	2	$^{3}H/^{14}C$			Measuring
Isocap, Nuclear Chicago	2	$^{3}H/^{14}C$			Measuring
Auto Gamma	2	$^{125}I/^{131}I/^{60}Co$			Measuring
Meters	2	$^{3}H/^{14}C/^{125}I/^{131}I/^{60}Co$			Surveying

11. METHOD, FREQUENCY, AND STANDARDS USED IN CALIBRATING INSTRUMENTS LISTED ABOVE.

SEE APPENDIX 4-ATTACHED

12. FILM BADGES, DOSIMETERS, AND BIO-ASSAY PROCEDURES USED. *(For film badges, specify method of calibrating and processing, or name of supplier.)*

Searle Analytic Inc., Box 367 Oakton St. Station, Des Plaines, Illinois 60018

INFORMATION TO BE SUBMITTED ON ADDITIONAL SHEETS IN DUPLICATE

13. FACILITIES AND EQUIPMENT. Describe laboratory facilities and remote handling equipment, storage containers, shielding, fume hoods, etc. Explanatory sketch of facility is attached. *(Circle answer)* (Yes) No

SEE APPENDIX 3-ATTACHED

14. RADIATION PROTECTION PROGRAM. Describe the radiation protection program including control measures. If application covers sealed sources, submit leak testing procedures where applicable, name, training, and experience of person to perform leak tests, and arrangements for performing initial radiation survey, servicing, maintenance and repair of the source.

SEE ATTACHED-RADIATION PROTECTION RULES AND REQUIRED PROCEDURES

15. WASTE DISPOSAL. If a commercial waste disposal service is employed, specify name of company. Otherwise, submit detailed description of methods which will be used for disposing of radioactive wastes and estimates of the type and amount of activity involved. Nuclear Engineering Co., P.O. Box 72

CERTIFICATE (This item must be completed by applicant) Louisville, Kentucky

16. THE APPLICANT AND ANY OFFICIAL EXECUTING THIS CERTIFICATE ON BEHALF OF THE APPLICANT NAMED IN ITEM 1, 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.

License Fee Category $ 255.00

Fee Enclosed $ 255.00

DIAMOND SHAMROCK HEALTH SCIENCES INC.

Applicant named in item 1

By: Leo P. Gonzalez

LABORATORY DIRECTOR

Title of certifying official

Date _____

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.

TRAINING AND EXPERIENCE OF EACH INDIVIDUAL NAMED IN ITEM 4 (Use supplemental sheets if necessary)

8. TYPE OF TRAINING — Leo E. Gaudette, Ph.D.	WHERE TRAINED	DURATION OF TRAINING	ON THE JOB (Circle answer)	FORMAL COURSE (Circle answer)
a. Principles and practices of radiation protection	Holy Cross, Georgetown N.I.H., W.E.E.B., New England Nuclear	1,3,5,2,12 years	(Yes) No	(Yes) No
b. Radioactivity measurement standardization and monitoring techniques and instruments	"	"	(Yes) No	(Yes) No
c. Mathematics and calculations basic to the use and measurement of radioactivity	"	"	(Yes) No	(Yes) No
d. Biological effects of radiation	"	"	(Yes) No	(Yes) No

9. 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	Ci's +++	1°NENC -2° All others	12-20 years	RESH., DID, RIA, in vit
^{14}C	Ci's +	1°NENC 2° All others	12-20 years	" "
^{125}I	mCi's	1°NENC 2° All others	12 years	Research, RIA
^{131}I	mCi	1°NIH	1 year	Research, in vitro/in v
^{60}Co	uCi	1° NENC	3 years	RIA

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TRAINING AND EXPERIENCE OF EACH INDIVIDUAL NAMED IN ITEM 4 (Use supplemental sheets if necessary)

8. TYPE OF TRAINING — (Dr. N. Chinh)	WHERE TRAINED	DURATION OF TRAINING	ON THE JOB (Circle answer)	FORMAL COURSE (Circle answer)
a. Principles and practices of radiation protection	Georgetown University; Howard Univ.; Washington Ref. Lab; Piedmont Hosp.	1,1,2,2 yrs	(Yes) No	(Yes) No
b. Radioactivity measurement standardization and monitoring techniques and instruments	"	"	(Yes) No	(Yes) No
c. Mathematics and calculations basic to the use and measurement of radioactivity	"	"	(Yes) No	(Yes) No
d. Biological effects of radiation	"	"	(Yes) No	(Yes) No

9. 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	Ci's +++	Georgetown; Howard; Washington Ref. Lab; Piedmont Hosp.	5	R&D; Clin Chem
^{14}C	Ci's +	"	5	"
^{125}I	mCi's	"	5	"

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TRAINING AND EXPERIENCE OF EACH INDIVIDUAL NAMED IN ITEM 4 (Use supplemental sheets if necessary)

8. 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 measurement standardization and monitoring techniques and instruments			Yes No	Yes No
c. Mathematics and calculations basic to the use and measurement of radioactivity			Yes No	Yes No
d. Biological effects of radiation			Yes No	Yes No

9. EXPERIENCE WITH RADIATION (Actual use of radioisotopes or equivalent experience.)

ISOTOPE	MAXIMUM AMOUNT	WHERE EXPERIENCE WAS GAINED	DURATION OF EXPERIENCE	TYPE OF USE

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TRAINING AND EXPERIENCE OF EACH INDIVIDUAL NAMED IN ITEM 4 (Use supplemental sheets if necessary)

8. TYPE OF TRAINING (G. Wilkinson)	WHERE TRAINED	DURATION OF TRAINING	ON THE JOB (Circle answer)	FORMAL COURSE (Circle answer)
a. Principles and practices of radiation protection	Ohio State University/Dept of Ob/GYN; Searle Diagnostic Inc.	2yrs/1yr	(Yes) No	Yes (No)
b. Radioactivity measurement standardization and monitoring techniques and instruments	Ohio State University Searle Diagnostic Inc.	2 yrs 1 yr	(Yes) No	Yes (No)
c. Mathematics and calculations basic to the use and measurement of radioactivity	OSU/SDI	2yr/1yr	(Yes) No	Yes (No)
d. Biological effects of radiation			Yes No	Yes No

9. 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	uCi	Ohio State University	2 yrs	Routine Assays
^{131}I	mCi	Ohio State University	2 yrs	Iodination &Routine As
^{125}I	mCi	Searle Diagnostic Inc.	1 yr	Routine Assays

TRAINING AND EXPERIENCE OF EACH INDIVIDUAL NAMED IN ITEM 4 (Use supplemental sheets if necessary)

8. TYPE OF TRAINING (E. Harris)	WHERE TRAINED	DURATION OF TRAINING	ON THE JOB (Circle answer)	FORMAL COURSE (Circle answer)
a. Principles and practices of radiation protection	Searle Diagnostic Inc.	3&1/2yr	(Yes) No	Yes (No)
b. Radioactivity measurement standardization and monitoring techniques and instruments	Searle Diagnostic Inc.	3&1/2yr	(Yes) No	Yes (No)
c. Mathematics and calculations basic to the use and measurement of radioactivity	Searle Diagnostic Inc.	3&1/2yrs	(Yes) No	Yes (No)
d. Biological effects of radiation			Yes No	Yes No

9. 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	uCi	Searle Diagnostic Inc.	3 & 1/2 yr.	Routine Assays, KS.F,
C_{14}	mCi	Searle Diagnostic Inc.	3 & 1/2 yrs	Routine Assays F.Estrg
^{125}I	uCi	Diamond Shamrock Health Sc.	present	Routine Assays

TRAINING AND EXPERIENCE OF EACH INDIVIDUAL NAMED IN ITEM 4 (Use supplemental sheets if necessary)

8. TYPE OF TRAINING (C. Mount)	WHERE TRAINED	DURATION OF TRAINING	ON THE JOB (Circle answer)	FORMAL COURSE (Circle answer)
a. Principles and practices of radiation protection	Searle Diagnostic Inc.	4 yrs	(Yes) No	Yes (No)
b. Radioactivity measurement standardization and monitoring techniques and instruments	Searle Diagnostic Inc.	4 yrs	(Yes) No	Yes (No)
c. Mathematics and calculations basic to the use and measurement of radioactivity	Searle Diagnostic Inc.	4 yrs	(Yes) No	Yes (No)
d. Biological effects of radiation	Searle Diagnostic Inc.	4 yrs	(Yes) No	Yes (No)

9. 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	uCi	Searle Diagnostic Inc.	4 yrs	Radioimmunoassay
I^{125}	uCi	Searle Diagnostic Inc.	1 yr	Radioimmunoassay

TRAINING AND EXPERIENCE OF EACH INDIVIDUAL NAMED IN ITEM 4 (Use supplemental sheets if necessary)

8. TYPE OF TRAINING (C. Mount)	WHERE TRAINED	DURATION OF TRAINING	ON THE JOB (Circle answer)	FORMAL COURSE (Circle answer)
a. Principles and practices of radiation protection	Chicago, Illinois Searle Radio-assay workshop	4 days	Yes No	(Yes) No
b. Radioactivity measurement standardization and monitoring techniques and instruments	"	"	Yes No	(Yes) No
c. Mathematics and calculations basic to the use and measurement of radioactivity	"	"	Yes No	(Yes) No
d. Biological effects of radiation	"	"	Yes No	(Yes) No

9. EXPERIENCE WITH RADIATION (Actual use of radioisotopes or equivalent experience.)

ISOTOPE	MAXIMUM AMOUNT	WHERE EXPERIENCE WAS GAINED	DURATION OF EXPERIENCE	TYPE OF USE

TRAINING AND EXPERIENCE OF EACH INDIVIDUAL NAMED IN ITEM 4 (Use supplemental sheets if necessary)

8. TYPE OF TRAINING (K. Keplinger)	WHERE TRAINED	DURATION OF TRAINING	ON THE JOB (Circle answer)	FORMAL COURSE (Circle answer)
a. Principles and practices of radiation protection	Searle Diagnostic Inc., Diamond Shamrock Health Sciences	7/73-present	(Yes) No	Yes (No)
b. Radioactivity measurement standardization and monitoring techniques and instruments	"	"	(Yes) No	Yes (No)
c. Mathematics and calculations basic to the use and measurement of radioactivity	"	"	(Yes) No	Yes (No)
d. Biological effects of radiation	"	"	(Yes) No	Yes (No)

9. 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	2.5 mCi	S-RIA; Searle / DSHS	2 yrs	R+D, RIA
$I]25$	20 mCi	P-RIA; Searle/DSHS	2 yrs	

TRAINING AND EXPERIENCE OF EACH INDIVIDUAL NAMED IN ITEM 4 (Use supplemental sheets if necessary)

8. TYPE OF TRAINING (A. Gaudette)	WHERE TRAINED	DURATION OF TRAINING	ON THE JOB (Circle answer)	FORMAL COURSE (Circle answer)
a. Principles and practices of radiation protection	New England Nuclear Corp, Boston Brookhaven Nat'l. Long Island, N.Y.	5 yrs 1 yr	(Yes) No	Yes (No)
b. Radioactivity measurement standardization and monitoring techniques and instruments	"	"	(Yes) No	Yes (No)
c. Mathematics and calculations basic to the use and measurement of radioactivity	"	"	(Yes) No	Yes (No)
d. Biological effects of radiation	"	"	(Yes) No	Yes (No)

9. 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	Ci's +	New England Nuclear	5 years	R&D/Clin. Assays
^{14}C	Ci's +	Brookhaven/NENC	1yr/5 yr	R&D/Org. Synt.
$]25_{I}$	mCi's +	NENC	5 yrs.	R&D/Clin. Assays
^{235}U	mCi's +	Brookhaven	1 yr	R&D/Org. Synt.

RADIATION PROTECTION

RULES AND REQUIRED PROCEDURES

Radiation Protection Rules and Required Procedures

1. Radiation Protection Responsibilities

A. Enviroment Control Director (ECD)
The Division Laboratory Director will also function as Division ECD and will be responsible for developing and maintaining a radiation protection program.

B. Radiation Protection Officer RPO

The RPO is responsible directly to the ECD for:

1. Implementing and maintaining radiation protection services.
2. Maintaining all records and correspondence necessary to insure compliance with government regulations.
3. Providing adequate information and training to personnel relating to radiation protection procedures.
4. Supervising radiation emergencies and special decomtamination operations.
5. Implementing decontamination procedures when allowable values for restricted and non-restricted areas as exceeded.

C. Laboratory Supervisor

Each Laboratory supervisor is responsible for:

1. Safe conduct of work performed within assigned laboratory.
2. Posting supplementary rules pertinent to individual lab operations.
3. Training assigned personnel to the lab in safe practices and procedures related tc individual lab procedures.
4. Assignment of duties to assure a secured area at close of each work period.
5. Evaluate potential hazards of new lab operations, with recommended SOP to radioisotope committee.

D. Individual Employee

Each employee is personally responsible for:

1. Learning and complying to established rules of safety and required procedures.
2. Learning and complying with all supplemental regulations within each lab.
3. Performing assigned duties in a manner to always minimize radiation exposure to self, collegue and general public.
4. Report immediately any real and/or suspected incident of radiation exposure.

E. Radioisotope Committee (RIC)

The RIC will be responsible for:

1. Establishing a Radiation Protection Program commensurate with government regulations and personnel safety.
2. Review all recommended SOP for new lab operations
3. Review all incidents of radiation responses and non-compliance of rules and procedures.
4. Review all posted supplementary safety rules and regulations.

II. Authorization to Handle Radioactive Materials

A. The supervisor of each laboratory will be responsible for training and clearing of individual employees to use radioactive-materials according to established lab procedures.

B. Personnel cleared to handle radioactive materials will do so in accordance with established protocol:

General Laboratory Areas

1. No radioactivity in excess of 10 μc is to be employed.
2. Standard lab coats are to be worn by all personnel, buttoned and sleeves worn extended to cover arms and wrists. Individually assigned and non-transferrable coats will be routinely monitored and changed weekly.
3. Mouth pipetting is prohibited and protective gloves are compulsory whenever operations are performed that may produce hand contamination.
4. Pregnant female employees are not to be permitted to handle any radioactive materials. It is encumbent on individual employees to advise their supervisor.

Restricted Laboratory Areas

1. Disposable lab coats, shoe covers and protective gloves are to be worn at all times in restricted areas.
2. There shall be no smoking or eating (including gum chewing) in restricted areas.
3. Mouth pipetting is absolutely prohibited.
4. Personal articles are not to be taken into restricted areas.

Restricted Areas con't.

5. Operation within a restricted area are to be carried out with all doors of entry closed.
6. All operations in restricted area are to be carried out in isotope hoods provided.
7. Each restricted area hood is to be operated at "high speed" during normal work day when radioactive materials are being handled. The hoods are to be left on "low speed" at all other times.
8. Before the end of each work day, and/or upon completion of any specific operation, work areas and equipment shall be inspected, surveyed and cleaned as needed.
9. Work in restricted areas is permitted only during normal work day, and film badges and dosimeters are to be worn by all personnel.
10. Before removal of any radioactive material from restricted area, it must be:

    (a) Contained in shatter-proof container
    (b) Labeled for CAUTION RADIOACTIVE MATERIAL
    (c) Identified as to isotope, quantity and nature
    (d) Less than the following levels:
        α - 0.1 uCi
        γ - 1.0 uCi
        β - 10 uCi

11. Auxiliary equipment will not be removed from restricted areas unless completely decontaminated.

    Routine equipment (glassware) employed must be all disposable and discarded in appropriately labeled waste containers.

12. No protective cover is to be removed from any restricted area except as disposable waste material. Used protection cover is to be disposed in proper waste containers located in the change area, upon leaving the area.
13. On leaving a restricted area, each employee shall:

    (a) Dispose of protective gloves
    (b) Store lab coat in assigned area
    (c) Wash and monitor hands
    (d) Monitor personal clothing

14. Each person working in restricted areas shall submit upon request by the RPO

    (a) a bioassay sample
    (b) badges and dosimeters for evaluation
    (c) specific organ scanning

III. Receipt, Transport and Storage Radioactive Materials

A. All incoming radioisotope shipments must be inspected, monitored and transported to assigned laboratories by RPO or his designated authorized representative.

B. Appropriately labeled product identified as to quantity, kind, source and lot numbers accompanied by an inventory log sheet will be stored according to level of activity.

Restricted Area - All activity in excess of 1 μc for gamma emitters and 10 μc for betas.
General Area - Quantities less than above.

Inventory will be maintained for each so as to monitor inventory of all raw materials on an on-going basis.

C. Radioactive waste disposal will observe protocol delineated herein:

1. Liquid Waste Disposal
   a. No radioactive waste into sewage system.
   b. Prepare for disposal as follows:
      i. Aqueous liquid waste into specified containers - "Aqueous Waste"
      ii. Organic liquid waste into specified containers - "Organic Waste"
      iii. Acid liquid waste into specified containers - "Acid Waste"
   c. All liquid wastes solidified with solid absorbent, (monitor radiation not to exceed 5mR/hr at a distance of one foot and less than 200 mR/hr at contact).
   d. Solid waste and solidified waste to be disposed of in 55 gal. sealable metal containers labeled "Solid Waste"
   e. Volatile radioactive waste vented through hood ducts is to be trapped by charcoal filters which are to be routinely changed and charcoal handled as solid waste.
   f. Solid waste barrels sealed for commercial disposal and monitored radioactive not to exceed 5 mR/hr at one foot and 200 mR/hr at contact.

IV. Emergency Procedure to be Observed for Radioactive Contamination

A. General Laboratory
   1. Contact RPO immediately.
   2. Close hoods to safety position to maximize venting of volatiles.
   3. Isolate potentially contaminated area from re-entry.
   4. Assemble potentially contaminated personnel and monitor them for contamination.
   5. Remain in area until released by RPO.
   6. Under directions of the RPO, institute clean up and decontamination procedures of the area.
   7. Monitor until background levels are achieved.

B. Restricted Area
   1. Contact RPO immediately
   2. Close hoods to safety position to maximize venting of volatile.
   3. Isolate contaminated area.
   4. Monitor related personnel for contamination.
   5. Remain in area until released by RPO.
   6. Under RPO directions decontaminate.
   7. Monitor until background levels are achieved.

C. Exceptions
   1. In the event of a contamination problem arising from volatile gases or liquids:
      a. Evacuate the area to a specified location of safety.
      b. Close & lock room doors to prevent re-entry, after maximizing air flow through charcoal filtration.
   2. In the event of a contamination problem with associated injury:
      a. Evacuate injured personnel to specified location of safety.
      b. Proceed with safety procedure as specified in A and/or B.

V. Guide for control for radiation exposure

A. Personnel
   1. Exposure
      a. Dosimeter
      b. Badges
      c. Bioassay
      d. Specific Organ Scanning
   2. Monitoring
      a. Hand/Shoe Survey
      b. Protective clothing
   3. Medical Services
      a. Emergency procedures
      b. Annual physical exams
   4. Operations
      a. Review of procedures and facility
      b. Training programs
      c. Monitoring equipment
   5. Records
      a. Tally of internal and external exposure
      b. Historical records

B. Environment
   1. Exposure
      a. Environmental Monitoring
   2. Contamination
      a. Floor and general wipe surveys
      b. Routine use monitoring equipment
   3. Waste disposal program
   4. Routine record keeping

APPENDIX I - INVENTORY RECORD
WEEKLY INVENTORY OF RADIOCHEMICALS

Date_____
Lab_____

DAILY USAGE

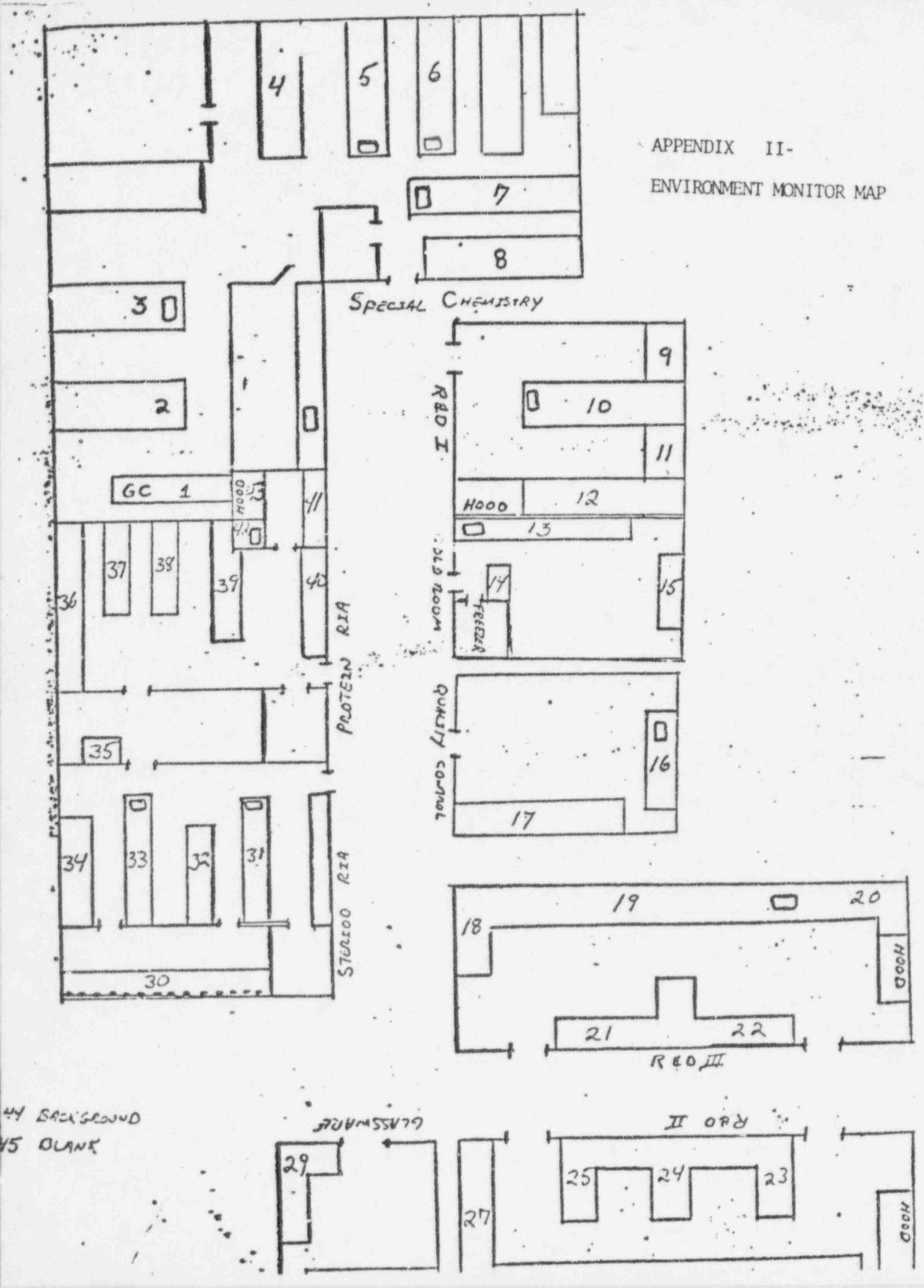
Date	Isotope	Compound	Amount (mCi or uCi)	Where used or disposed of

RADIOCHEMICALS RECEIVED

Date	Isotope	Compound	Amount (mCi or uCi)	Where used or disposed of

APPENDIX II-

ENVIRONMENT MONITOR MAP



APPENDIX III - Environmental Monitor Record

MONTHLY MONITOR REPORT

Date_____

Background
C14 _____cpm
H3 _____cpm
I125 and I131_____mr/hr

Blank
Water
C14_____cpm
H3 _____cpm

Methanol
C14_____cpm
H3 _____cpm

Survey Meter
15.5 Source_____mr/h
3.0 Source _____mr/h

Lab and Area	C14 cpm	H3 cpm	I125 & I131 mr/hr	Solution	Comments

APPENDIX - IV

CALIBRATION OF GAMMA COUNTERS

Model 1185:

Count daily and record (plot) counts in the A window and in the B window the following standards:

(a) Blank for background
(b) Simulated I^{125} Standard (I^{129} - 0.1 uCi- #S1567)
(c) Cesium - 137 Standard (0.1 uCi - April 1971 - # 184642)

Model 1285:

Count daily and record (plot) the counts of the following standards. These standards are not removed from the machine and are always counted in the same position.

	Column #1	Column #2	Column #3
Row #1	100-184681-C	100-184681-D	100-18468-F
Row #2	100-184681-E	100-184681-H	100-18468-G
Row #3	100-184681-B	100-184681-A	Blank for background

Weekly count junk label by pipetting 30 tubes with label and counting 10 tubes in each column. Calculate, mean, standard deviation and C.V. and record mean as well as the per cent variation between the means of the three columns.

CALIBRATION -LSC

Packard/Nuclear Chicago:

Count daily and plot counts of the following standards:

Isocap- 181330-C^{14}
181340-H^{3}
181350 - Blank

Packard- N1139 - H^{3}
O 196 - C^{14}