

FORM NRC-313 I U.S. NUCLEAR REGULATORY COMMISSION
 (3-80) 10 CFR 30

APPLICATION FOR BYPRODUCT MATERIAL LICENSE INDUSTRIAL

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

a. NEW LICENSE

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.

X b. AMENDMENT TO:
 LICENSE NUMBER
 29-020-85-01
 AMENDMENT #37

c. RENEWAL OF:
 LICENSE NUMBER

2. APPLICANT'S NAME (Institution, firm, person, etc.)
 AIRCO, INCORPORATED
 AIRCO INDUSTRIAL GASES
 RARE & SPECIALTY GASES DEPT.
 TELEPHONE NUMBER: AREA CODE - NUMBER EXTENSION
 609-829-7878

3. NAME AND TITLE OF PERSON TO BE CONTACTED REGARDING THIS APPLICATION
 LAWRENCE G. PETRO, REGIONAL PRODUCTION MGR.
 TELEPHONE NUMBER: AREA CODE - NUMBER EXTENSION
 (609) 829-7878 - EXT. 2902

4. APPLICANT'S MAILING ADDRESS (Include Zip Code)
 (Address to which NRC correspondence, notices, bulletins, etc., should be sent.)
 RIVER & UNION LANDING PDS.
 RIVERTON, NEW JERSEY 08077

5. STREET ADDRESS WHERE LICENSED MATERIAL WILL BE USED
 (Include Zip Code)
 RIVER & UNION LANDING RDS.
 RIVERTON, NEW JERSEY 08077

(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. SUPPLEMENTAL SHEET	
b.	
c.	

7. RADIATION PROTECTION OFFICER

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

LINE NO.	ELEMENT AND MASS NUMBER	CHEMICAL AND/OR PHYSICAL FORM	NAME OF MANUFACTURER AND MODEL NUMBER (If Sealed Source)	MAXIMUM NUMBER OF MILLICURIES AND/OR SEALED SOURCES AND MAXIMUM ACTIVITY PER SOURCE WHICH WILL BE POSSESSED AT ANY ONE TIME
(1)	HYDROGEN-3	GAS		200 CURIES
(2)	CARBON-14	ANY		1 CURIE
(3)	KRYPTON-85	GAS		1,500 CURIES
(4)	XENON-133	GAS		20 CURIES

LOG - *Out 82*
 Remitter - *The PDC GP.*
 Check No. - *284937*
 Amount - *840*
 Fee Category - *3P*
 Type of Exp. - *AMD*
 Date Check Rec'd. - *10/11/88*
 Date Completed - *11/1/88*
 By - *J. L. ...*

DESCRIBE USE OF LICENSED MATERIAL
 E

SUPPLEMENTAL SHEET

9001170341 881125
 REG1 LIC30
 29-02085-01 PDR

109571

9. STORAGE OF SEALED SOURCES

LINE NO.	CONTAINER AND/OR DEVICE IN WHICH EACH SEALED SOURCE WILL BE STORED OR USED.	NAME OF MANUFACTURER	MODEL NUMBER
	A.	B.	C.
(1)			
(2)			
(3)			
(4)			

10. RADIATION DETECTION INSTRUMENTS

LINE NO.	TYPE OF INSTRUMENT	MANUFACTURER'S NAME	MODEL NUMBER	NUMBER AVAILABLE	RADIATION DETECTED <i>(alpha, beta, gamma, neutron)</i>	SENSITIVITY RANGE <i>(milliroentgens/hour or counts/minute)</i>
	A	B	C	D	E	F
(1)	SUPPLEMENTAL SHEET					
(2)						
(3)						
(4)						

11. CALIBRATION OF INSTRUMENTS LISTED IN ITEM 10

<input type="checkbox"/> a. CALIBRATED BY SERVICE COMPANY NAME, ADDRESS, AND FREQUENCY SUPPLEMENTAL SHEET	<input type="checkbox"/> b. CALIBRATED BY APPLICANT Attach a separate sheet describing method, frequency and standards used for calibrating instruments.
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12. PERSONNEL MONITORING DEVICES

TYPE <i>(Check and/or complete as appropriate.)</i>	SUPPLIER <i>(Service Company)</i>	EXCHANGE FREQUENCY
A	B	C
<input checked="" type="checkbox"/> (1) FILM BADGE <input checked="" type="checkbox"/> (2) THERMOLUMINESCENCE DOSIMETER (TLD) <input type="checkbox"/> (3) OTHER <i>(Specify):</i> _____ _____ _____	SUPPLEMENTAL SHEET	<input type="checkbox"/> MONTHLY <input type="checkbox"/> QUARTERLY <input checked="" type="checkbox"/> OTHER <i>(Specify):</i> SUPPLEMENTAL SHEET _____

13. FACILITIES AND EQUIPMENT (Check where 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.
- SUPPLEMENTAL SHEET

14. WASTE DISPOSAL

a. NAME OF COMMERCIAL WASTE DISPOSAL SERVICE EMPLOYED
 SUPPLEMENTAL SHEET

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.

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.

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 <i>(See Section 170.31, 10 CFR 170)</i> \$60.00	b. CERTIFYING OFFICIAL <i>(Signature)</i> 
	c. NAME <i>(Type or print)</i> LAWRENCE G. PETRO
(1) LICENSE FEE CATEGORY: 3P	d. TITLE REGIONAL PRODUCTION MANAGER
(2) LICENSE FEE ENCLOSED: \$ \$60.00	e. DATE 9/12/88

N.R.C. LICENSE NO. 29-02085-01 AMENDMENT 37 SUPPLEMENT SHEET ITEM 6

- (a) Larry Petro REGIONAL PRODUCTION MANAGER
- (b) Eric Forstrom ASSISTANT PLANT MANAGER
- (c) John L. Weber OPERATIONS FOREMAN

1. Radioisotopes will be diluted with inert and/or compatible gases to concentrations which will satisfy our customer's requirements. These gas mixtures will be distributed to Nuclear Regulatory Commission and/or agreement state licensed users in containers requested by our customers and permitted for shipment by the Nuclear Regulatory Commission and the Department of Transportation.

2. Kr-85, in the undiluted form, i.e., in the form received from our suppliers, will be transferred and/or distributed to the Department of Energy or a primary contractor of the Department of Energy, or any Nuclear Regulatory Commission and/or agreement state licensed users. The Kr-85 will be transferred and/or distributed in the sealed, whole package increments that are received from our suppliers.

METHOD, FREQUENCY AND STANDARDS USED IN CALIBRATING INSTRUMENTS

VICTOREEN 490

Calibrated by Radiation Management Corp. at intervals not greater than six months.

VICTOREEN 491

Calibrated by Radiation Management Corp. at intervals not greater than six months.

VICTOREEN 740-F

Calibrated by Radiation Management Corp. at intervals not greater than six months.

REACTOR EXPERIMENTS 816

Calibrated by Xetex, Inc. at intervals not greater than six months.

JOHNSTON LABORATORIES 955-B

Calibration checked by using the Johnston Laboratories DL-1 calibrator designed to check this instrument. Calibration of instrument checked at intervals not greater than six months.

CANBERRA SERIES 35 MULTI-CHANNEL ANALYZER

Calibration checked monthly using aliquots of a Krypton-85 standard traceable to the National Bureau of Standards standard.

REACTOR EXPERIMENTS B10-B

These instruments will be used as a backup for the Reactor Experiments 816. If these instruments are used, they will be calibrated within six months by Xetex, Inc.

VICTOREEN 045 SYSTEM

Electrically checked daily. Calibration checked by Radiation Management Corp. at intervals not greater than six months.

STANDARDS AVAILABLE

<u>ISOTOPE</u>	<u>ACTIVITY</u>	<u>ESTIMATED ERROR</u>	<u>MANUFACTURER</u>
Kr-85	1 to 3 mCi/l	+/- 10%	Gollob Analytical Service
Kr-85	2 to 5 mCi/l	+/- 10%	National Bureau Of Standards
H-3	4.63 uCi/l	+/- 10%	Johnston Laboratories

STANDARD SUPPLIERS

Gollob Analytical Service
 47 Industrial Road
 Berkley Heights, New Jersey 07992

National Bureau Of Standards
 Quince Orchard & Clopper Roads
 Gaithersburg, Maryland 20878

Johnston Laboratories, Inc.
 3 Industry Lane
 Cockeysville, Maryland 21030

CALIBRATION SERVICE

Radiation Management Corp.
 University City Service Center
 3508 Market Street
 Philadelphia, Pennsylvania 19104

Xetex, Inc.
 660 National Avenue
 Mountainview, California 94043

FILM BADGES, DOSIMETERS AND BIOASSAY PROCEDURES

All employees who may be exposed to radiation in excess of 25% of 1.25 Rem per calendar quarter in plant operations are provided with a film badge. Badges will be changed once a month. If any employee receives an exposure in excess of 400 mRem per calendar quarter, their badge will be changed once every two weeks until that employee achieves an exposure of less than 400 mRem per calendar quarter for two consecutive quarters. Badges will be developed by and results recorded by an outside agency. The current agency is:

R. S. Landauer, Jr. & Co.
Glenwood Science Park
Glenwood, Illinois 60425

All Radioactive Gas Technicians are provided with a cumulative digital dosimeter to be worn on their person at all times. They will read and record their indicated exposures at the end of each working day.

All Radioactive Gas Technicians are provided with thermoluminescence ring badges to be developed on the same schedule as their film badges.

All Radioactive Gas Technicians will submit samples for a urine bioassay for Tritium. Bioassays will be performed once a month. If the tritium concentration exceeds 28 uCi/liter, bioassays will be performed twice weekly until the tritium concentration falls below 28 uCi/liter. If at any time tritium gas is filled, bioassays will be performed twice weekly for a period of at least one month after the last filling operation. The urine samples will be analyzed and recorded by an outside agency. The current agency is:

M. Latif and E. Macowiack
Temple University
Health Science Center
School of Pharmacy
Philadelphia, Pennsylvania 19104

FACILITIES AND EQUIPMENT

Refer to general diagrams A, B and C

13.1 GENERAL DESCRIPTION

The radioactive gas operations facility has been designed to separate operations for radioactive gases of differing hazards. Each radioactive gas filling operations area can be utilized independently and have independent monitoring systems. All doors open outwards against the normal air flow and close automatically. All doors to the exterior of the building are fitted with dead bolt type locks. The door into the facility from the Radioactive Materials Office will be of self locking design with unique key access. All air entering the facility leaves through the stack. With all doors closed, the air flow is sufficient to change the total volume of air in the facility once every ten minutes.

13.2 RADIOACTIVE MATERIALS (RAM) OFFICE

The RAM office is the main entrance to the radioactive gas filling facility for employees coming from the non-restricted work area. It will contain a desk for recordkeeping, shelves, a locker for storage and remote readout of all monitoring equipment (see ITEM 10).

13.3 KRYPTON-85 AND XENON-133 FILLING ROOM

The Krypton-85, Xenon-133 filling room is approximately 26 ft. by 25 ft. 8 in., composed of concrete block walls, filled and smooth finished. This finish coupled with a fiberglass sheet ceiling and proper electrical fixtures allows for complete washdown of this area. The floor is sloped to a drain which connects to a waste water storage tank in the east corner of the facility. The sink waste line also connects to this storage tank system.

The southwest wall of this room is a double course of solid 8 inch concrete block with joints completely filled with mortar and offset from one and other. This coupled with the 12 inch hollow concrete block wall of the factory area will provide greater than four tenth value layers of shielding for 0.5 MeV gamma radiation. The storage area for Krypton-85 and Xenon-133 cylinders waiting for shipment is along this wall and has sides of double courses of 8 inch solid concrete block.

13.4 KRYPTON-85 AND XENON-133 STORAGE VAULT

The storage vault is approximately 8 ft. by 16 ft. with exterior walls composed of two courses of 8 inch solid concrete block. The wall common to the filling area is of similar construction. The two courses of block are offset and joints completely filled with mortar. An interior baffle, 6 ft high, of similar construction provides shadow shielding for the work area. The concrete block construction provides greater than 3.5 tenth value layers of shielding for 0.5 MeV gamma radiation. The room is vented with an independent blower system through the stack. A monitor connected to a chart recorder monitors the radiation level in the vault. The storage vault door will be lined with 1/4 inch lead with an alarm system to indicate unauthorized entry. The door will be automatically locking with unique key access.

13.5 TRITIUM AND CARBON-14 FILLING ROOM

The Tritium and Carbon-14 filling room is approximately 26 ft. 8 in. by 16 ft. The exterior wall is 12 inch hollow concrete block. The wall common to the Krypton-85 and Xenon-133 filling room is one course of 8 in. solid concrete block with joints completely filled with mortar. The waste water from the sink and floor drain is collected in the storage tanks in the east corner of the building. Complete washdown is possible.

13.6 SHIPPING - RECEIVING AREA

The area designated for shipping and receiving is approximately 16 ft. by 9 ft. and is provided with a shower head and water lines to permit washdown of incoming and outgoing gas cylinders. Waste water from this operation is collected in the waste water storage tanks.

13.7 HOODS

Hoods for transfer of radioactive gases are provided in each filling room. All radioactive gas transfer operations will be conducted within the hoods by techniques common to the compressed gas industry. The hoods will be 72 in. wide, 44 in. deep and 74 in. high. The construction will be of 5/8 in. plexiglass and stainless steel. Each hood will have an independent blower system. The blower system will be sufficient to maintain an air flow of greater than 100 linear feet per minute across the face with the doors open.

13.8 STACK

A stack 30 in. in diameter and 48 ft. in height is provided at the northeast corner of the building. Effluents from each hood and storage vault will exit via this stack. Effluents are monitored for radioactive materials concentration (see ITEM 10).

13.9 OUTSIDE STORAGE AREA

The area designated for outside storage is the enclosed area around the waste water storage tanks. This area is enclosed by a 6 ft. high chain link fence topped with 3 strands of barbed wire. Access to this area is through either one of two 3 ft. wide gates or one 8 ft. wide gate, all of which are locked to prevent unauthorized entry.

13.10 SIGN POSTINGS

All entrances to the facility are posted with a sign:

"CAUTION, RADIOACTIVE MATERIALS"
"CAUTION, RADIATION AREA"
"AUTHORIZED PERSONNEL ONLY"

The storage vault is equipped with an alarm system to indicate unauthorized entry and is posted with a sign:

"CAUTION, HIGH RADIATION AREA"
"AUTHORIZED PERSONNEL ONLY"

The outside storage area is posted on all sides with signs:

"CAUTION, RADIATION AREA"
"CAUTION, RADIOACTIVE MATERIALS"

13.11 STORAGE VAULT ALARM SYSTEM

Refer to Alarm System Diagram.

The storage vault is equipped with an alarm system which will activate upon unauthorized entry. This alarm system is provided as an interlocking part of the Victoreen 845 Area Monitor System.

The ionization chamber type gamma detector (Victoreen 847-1) is located inside the storage vault above the entrance door. The remote alarm meter (Victoreen 848-5) is located adjacent to the storage vault and is capable of energizing a loud buzzer and red light through (S-1).

The readout module (Victoreen 946-2) is located in the RAM office (see General Diagram A) together with remote readouts of all monitoring equipment. This unit will energize the remote alarm meter adjacent to the vault.

Switch (S-1) shall be adjusted to provide continuous electrical power to the red light at radiation levels just below maximum permissible exposure and greater.

Unique keys for the storage vault door and alarm system will be provided to employees when access to the storage vault is necessary and shall otherwise be kept in a secure location under strict supervision.

13.12 RESPIRATORY PROTECTIVE EQUIPMENT

Scott Air Pack and compressed air cylinders with Scott Mask are available to be used, as necessary, when working with radioactive gases and emergency uses.

14.1 CONTAMINATED CLOTHING

All Radioactive Gas Technicians shall be provided with disposable protective clothing in the form of coveralls, rubber gloves and boots. These garments will be worn as necessary while working within the radioactive materials facility. These garments shall be worn for a period not exceeding five (5) working days and shall then be placed in a container supplied by a commercial disposal service, licensed for radioactive materials disposal for final disposition.

14.2 CONTAMINATED MATERIALS

All paper towels and other similar materials, as well as scrap paper and order sheets used within the radioactive gas filling facility, shall be disposed of by a commercial disposal service, licensed for radioactive material disposal.

14.3 WASTE WATER

All waste water from sinks, drainage trench and floor drains shall be collected in a storage tank. Prior to release to the sanitary sewage system, the radioactive material level shall be determined to assure compliance 10 C.F.R. 20.303. Should the level of radioactive material exceed those levels prescribed in 10 C.F.R. 20.303, the contaminated water shall be disposed of by a commercial disposal service licensed for radioactive material disposal.

14.4 RADIOACTIVE MATERIAL WASTE

Present transfer techniques for radioactive gases require no waste disposal methods. Should such need arise, waste materials shall be disposed of by a commercial disposal service licensed for radioactive materials or by methods prescribed by 10 C.F.R. 20.301.

14.5 COMMERCIAL WASTE DISPOSAL SERVICE

The current commercial service utilized is:

Radiac Research Corp.
261 Kent Avenue
Brooklyn, New York 11211

15.1 RADIATION SAFETY POLICY

Protection against unnecessary exposure to radiation by employees is a primary concern of the management of Airco Rare and Special Gases. Completion of assigned work is, of course, important but under all circumstances, safety is the paramount concern.

Implementation of programs to keep exposures to radiation as low as reasonably achievable is the responsibility of the supervisory staff but of equal importance is the employee's commitment to safe operations and low exposures.

It is the responsibility of the supervisory staff to monitor operations and fully establish the safety of the operations. It is the responsibility of the Assistant Operations Managers and Radiation Safety Officer to implement programs designed to reduce exposures of individual employees to radiation and to determine that the gas filling operations meet the safety requirements of the Nuclear Regulatory Commission.

Further, it is the responsibility of those supervisors to ensure that the radiation protection program as outlined in our Nuclear Regulatory Commission license is enforced. This program includes a commitment to adequate training to employees as well as operational instrumentation and personal protective devices. The program also requires quarterly audits of operations and constant review of procedures in order that the philosophy of "as low as reasonably achievable" exposure to radiation is a functional philosophy.

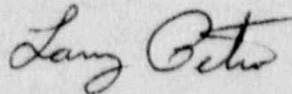
It is also my responsibility and that of the other supervisors of the Rare and Specialty Gas Department to see that all recommendations by employees are thoroughly reviewed and formally acted upon.

The company has provided the employees with the training, instrumentation and protective devices necessary to determine and reduce the level of radiation exposure received during gas filling operations. It is important that employees fully utilize these in order to satisfy themselves and

reviewers of our procedures that operations are, in fact, safe. If the safety of any operation is in question, then it is your responsibility as an employee to advise the Radiation Safety Officer of the questionable aspects of the operation.

It is your right to question decisions of supervisors if there is doubt concerning your personal safety. No employee will be required to perform an operation without first being convinced of its safety.

It is only through the joint efforts of supervisors and you, the employee, that a safe working environment can be assured and maintained.



LARRY PETRO
REGIONAL PRODUCTION MANAGER

DATE

cc: F. Dux, Murray Hill
E. Forstrom, Riverton
E. Kemp, Riverton
W. Miller, Riverton
J. Weber, Riverton
J. Wert, Murray Hill
D. Wilson, Murray Hill
B. Wilson, Murray Hill

15.2 TRAINING OF NEW EMPLOYEES

A. New Employees

Prior to undertaking filling operations, all new Radioactive Gas Technicians shall attend a seminar in which the following topics will be addressed:

Basic principles of radiation.

Units of activity and exposure.

Biological effects of ionizing radiation.

Basic principles of radiation protection.

N.R.C. regulations, 10 C.F.R. 19 and 20.

Department of Transportation Regulations, Sections 173.389 through 173.9099, as applicable.

The operation of available radiation detection instrumentation.

Emergency procedures.

B. Periodic Review

At intervals not to exceed six months, a seminar as described in 15.2A shall be presented to all Radioactive Gas Technicians. Emphasis will be on continued understanding and application of relevant safety procedures.

C. Training by an Outside Agency

At intervals not to exceed three years, training as prescribed in 15.2A or similar will be presented by our outside consulting firm or institution of recognized standing in the field of radiation safety. Emphasis will be on updating knowledge of employees.

15.3 MEDICAL EVALUATION

A medical examination shall be provided to each Radioactive Gas Technician at intervals not to exceed one year.

15.4 PERIODIC AUDIT

The "Individual Users" and Radiation Safety Officer Listed in ITEM 6 and ITEM 7 of this application and the outside radiological consultant shall conduct a complete audit of radioactive gas filling operation at intervals not exceeding three months. Information to be reviewed shall include:

Exposure records.

Radiation level survey logs.

Operating procedures.

Consultation with workers.

Upon completion of review, those persons listed in ITEM 6 and ITEM 7 of this application and the outside radiological consultant shall propose how best to reduce exposures of individual workers. Those proposals shall be documented and acted upon as soon as possible.

15.5 RADIATION SURVEYS

In addition to those surveys noted in ITEM 12 of this application, the following surveys shall also be performed:

A. Twice daily, all monitoring instrumentation shall be checked for operation and the radiation level determined and recorded.

B. At intervals not to exceed one week, a survey shall be conducted with a suitable portable survey meter to determine radiation levels. These measurements will be logged. The points of monitoring shall be as indicated on Portable Survey Diagrams A and B.

C. At intervals not to exceed one month, smears of the facility as indicated on the Swipe Test Diagram will be taken to monitor for contamination.

15.6 RADIATION SAFETY OFFICER (RSO)

A. QUALIFICATIONS

The R.S.O. must be familiar with the operations of a radioactive gas filling facility. He must have the supervisory capability to direct the work of employees required to implement the radiation protection program. He must have a Bachelor's degree in Engineering or a science and also have training in radiation protection conducted by an outside consulting firm or institution recognized standing in the field of radiation safety.

B. RESPONSIBILITIES

1. REPORTS: It shall be the responsibility of the R.S.O. to maintain all film badge and bioassay reports noting any unusual exposures or trends of changes in exposures and report these results and recommendations to the individuals in ITEM 6 of this application.
2. TRAINING: It shall be the responsibility of the R.S.O. to provide the training outlined in section 15.2 of this program.
3. PERIODIC AUDIT: It shall be the responsibility of the R.S.O. to participate in the quarterly audit as outlined in section 15.5 of this program.
4. RADIATION SURVEYS: It shall be the responsibility of the R.S.O. to conduct or supervise the surveys outlined in section 15.5 of this program.
5. INCIDENT REPORTS: It shall be the responsibility of the R.S.O. to fully investigate any unusual exposures to individuals, accidental releases of radioactive gas or excessive survey reports and communicate the results of this investigation to the individuals listed in ITEM 6 of this application. The R.S.O. will also recommend any changes in operating procedure necessary to prevent a re-occurrence of the incident and make appropriate changes in the radiation protection program.
6. MODIFICATION OF OPERATING PROCEDURE: The R.S.O. shall continually review operating procedures and note any changes which might help reduce exposure to employees and communicate these recommendations to the individuals listed in ITEM 6 of this application.
7. INSTRUMENTATION: The R.S.O. will be responsible for ensuring that proper equipment and supplies are available to evaluate exposures. The R.S.O. shall be responsible for the periodic calibration of instrumentation.

C. AUTHORITY

The R.S.O. shall have authority over all operations involving radioactive materials. His authority shall extend to the supervision of operation, if necessary, to insure the safety of concerned personnel.

Supplemental Sheet Items 16 and 17

Amendment No. 37

N.R.C. LICENSE No. 29-02085-01

Item 17 - RADIATION SAFETY OFFICER
JACK B. WERT

A. TRAINING:

1979: Radioisotope Methodology Course, 3 semester hours, Trenton State College, experience in all aspects of radioisotope methodology including radiation detection (i.e., G-M counting, solid scintillation, gas flow proportional counting, liquid scintillation, autoradiography), source preparation and waste disposal procedures with many of the common isotopes (i.e., Cs-137, Sr-90, Tl-204, H-3, Am-241, Mn-54, and Co-60).

1981: Radiation Safety Specialist Program, October 19-23. Presented by Oklahoma State University.

1983: Impact of Proposed Changes to 10 CFR 20, September 20-21. Presented by Technical Management Services.

1986: Impact of Proposed Changes to 10 CFR 20, February 17-18. Presented by Technical Management Services.

1986: Personal Computer Applications In Health Physics, March 24-26. Presented by Technical Management Services.

1987: Radiation Safety Seminar, September 9. Presented by Airco radiological consultants, M. Latif, Health Physicist and E. Mackowiak, Ph.D.

1988: Radiation Safety Seminar, June 23. Presented by Airco radiological consultant, M. Latif and Adel Baryoun.

B. EDUCATION

1979: B.A., Biology, Trenton State College, graduated Cum Laude.

C. EXPERIENCE

1/81 to Present: Radiation Safety Officer, Airco Industrial Gases. Responsible for all aspects of the radioactive gas filling facility licensed for 1500 Ci Kr-85, 200 Ci H-3, 20 Ci Xe-133, and 1 Ci C-14.

SUPPLEMENTAL SHEET ITEMS 16 AND 17 (PAGE 2)

AMENDMENT No. 37

N.R.C. LICENSE No. 29-02085-01

Radioisotope Training and Experience (as of July 1988)

L. Petro, Regional Production Manager, Rare and Special Gases.

Type of Training	Where Trained	Duration of Training	On The Job	Formal Course
Principles and practices of radiation protection.	[a] AIRCO	1973-present	YES <input checked="" type="radio"/> NO	YES <input checked="" type="radio"/> NO
	[b] Consultant	1 Day Seminar	YES <input checked="" type="radio"/> NO	<input checked="" type="radio"/> YES NO
Radioactivity measurement, standardization, monitoring techniques and instrumentation.	[a] AIRCO	1973-present	YES <input checked="" type="radio"/> NO	YES <input checked="" type="radio"/> NO
	[b] Consultant	1 Day Seminar	YES <input checked="" type="radio"/> NO	<input checked="" type="radio"/> YES NO
Mathematical calculations basic to the use and measurement of radioactivity.	[a] AIRCO	1973-present	YES <input checked="" type="radio"/> NO	YES <input checked="" type="radio"/> NO
	[b] Consultant	1 Day Seminar	YES <input checked="" type="radio"/> NO	<input checked="" type="radio"/> YES NO
Biological effects of radiation.	[a] AIRCO	1973-present	YES <input checked="" type="radio"/> NO	YES <input checked="" type="radio"/> NO
	[b] Consultant	1 Day Seminar	YES <input checked="" type="radio"/> NO	<input checked="" type="radio"/> YES NO

SUPPLEMENTAL SHEET ITEMS 16 AND 17 (PAGE 3)

AMENDMENT No. 37

N.R.C. LICENSE No. 29-02085-01

Radioisotope Training and Experience (as of July 1988)

E. Forstrom, Assistant Plant Manager, Rare and Special Gases.

Type of Training	Where Trained	Duration of Training	On The Job	Formal Course
Principles and practices of radiation protection.	[a] AIRCO	1973-present	YES <input checked="" type="radio"/> NO	YES <input checked="" type="radio"/> NO
	[b] Consultant	1 Day Seminar	YES <input checked="" type="radio"/> NO	<input checked="" type="radio"/> YES NO
Radioactivity measurement, standardization, monitoring techniques and instrumentation.	[a] AIRCO	1973-present	YES <input checked="" type="radio"/> NO	YES <input checked="" type="radio"/> NO
	[b] Consultant	1 Day Seminar	YES <input checked="" type="radio"/> NO	<input checked="" type="radio"/> YES NO
Mathematical calculations basic to the use and measurement of radioactivity.	[a] AIRCO	1973-present	YES <input checked="" type="radio"/> NO	YES <input checked="" type="radio"/> NO
	[b] Consultant	1 Day Seminar	YES <input checked="" type="radio"/> NO	<input checked="" type="radio"/> YES NO
Biological effects of radiation.	[a] AIRCO	1973-present	YES <input checked="" type="radio"/> NO	YES <input checked="" type="radio"/> NO
	[b] Consultant	1 Day Seminar	YES <input checked="" type="radio"/> NO	<input checked="" type="radio"/> YES NO

SUPPLEMENTAL SHEET ITEMS 16 AND 17 (PAGE 1)

AMENDMENT NO 37

N.R.C. LICENSE NO. 29-02085-01

RADIOISOTOPE TRAINING AND EXPERIENCE

Name John L. Weber-Operations Foreman

Department Rare & Specialty Gases

Date April 15 & 18, 1980

TYPE OF TRAINING

WHERE TRAINED

DURATION OF TRAINING

ON THE JOB
(Circle Answer)

FORMAL COURSE
(Circle Answer)

Principles & practices of radiation protection * * * *

a. Airco	1973 - Present	Yes	No	Yes	No
b. Mohammed Latif and Gerald Nicholls, PhD Outside Radiation Safety Consultants	2 Days	Yes	No	Yes	No

Radioactivity measurement standardisation & monitoring techniques & instruments * *

a. Airco	1973 - Present	Yes	No	Yes	No
b. Mohammed Latif and Gerald Nicholls, PhD Outside Radiation Safety Consultants	2 Days	Yes	No	Yes	No

Mathematical & calculations basic to the use & measurement of radioactivity * * * * *

a. Airco	1973 - Present	Yes	No	Yes	No
b. Mohammed Latif and Gerald Nicholls, PhD Outside Radiation Safety Consultants	2 Days	Yes	No	Yes	No

Biological effects of radiation * * * * *

a. Airco	1973 - Present	Yes	No	Yes	No
b. Mohammed Latif and Gerald Nicholls, PhD Outside Radiation Safety Consultants	2 Days	Yes	No	Yes	No

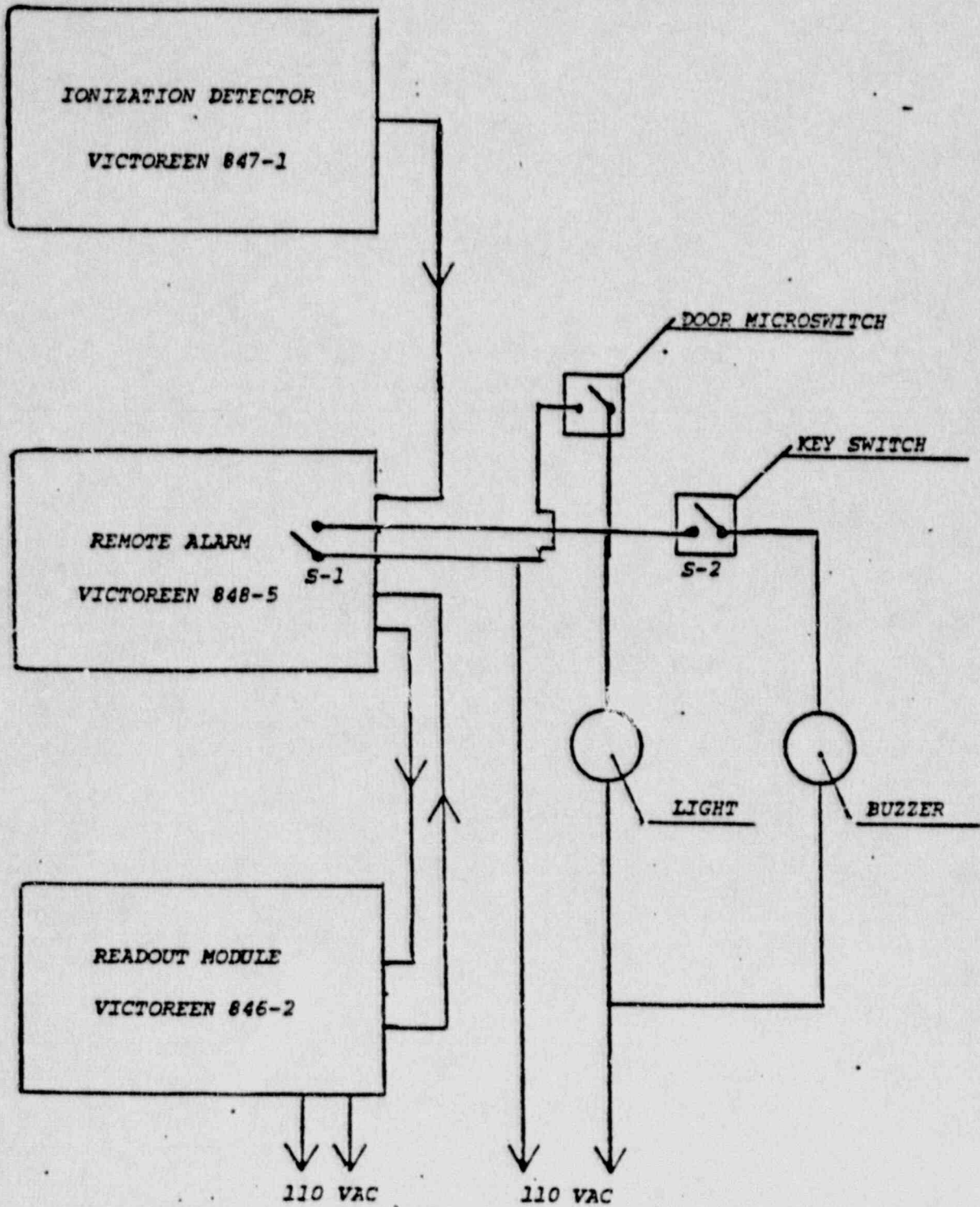
EXPERIENCE WITH RADIATION (Actual use of radioisotopes or equivalent experience)

ISOTOPE	MAXIMUM AMOUNT	WHERE EXPERIENCE WAS GAINED	DURATION OF EXPERIENCE	TYPE
H-3	200 Curies	Airco	1973 - Present	Gas Mixing
C-14	1 Curie	Airco	1973 - Present	Gas Mixing
Kr-85	1200 Curies	Airco	1973 - Present	Gas Mixing
Xe-133	20 Curies	Airco	1973 - Present	Gas Mixing

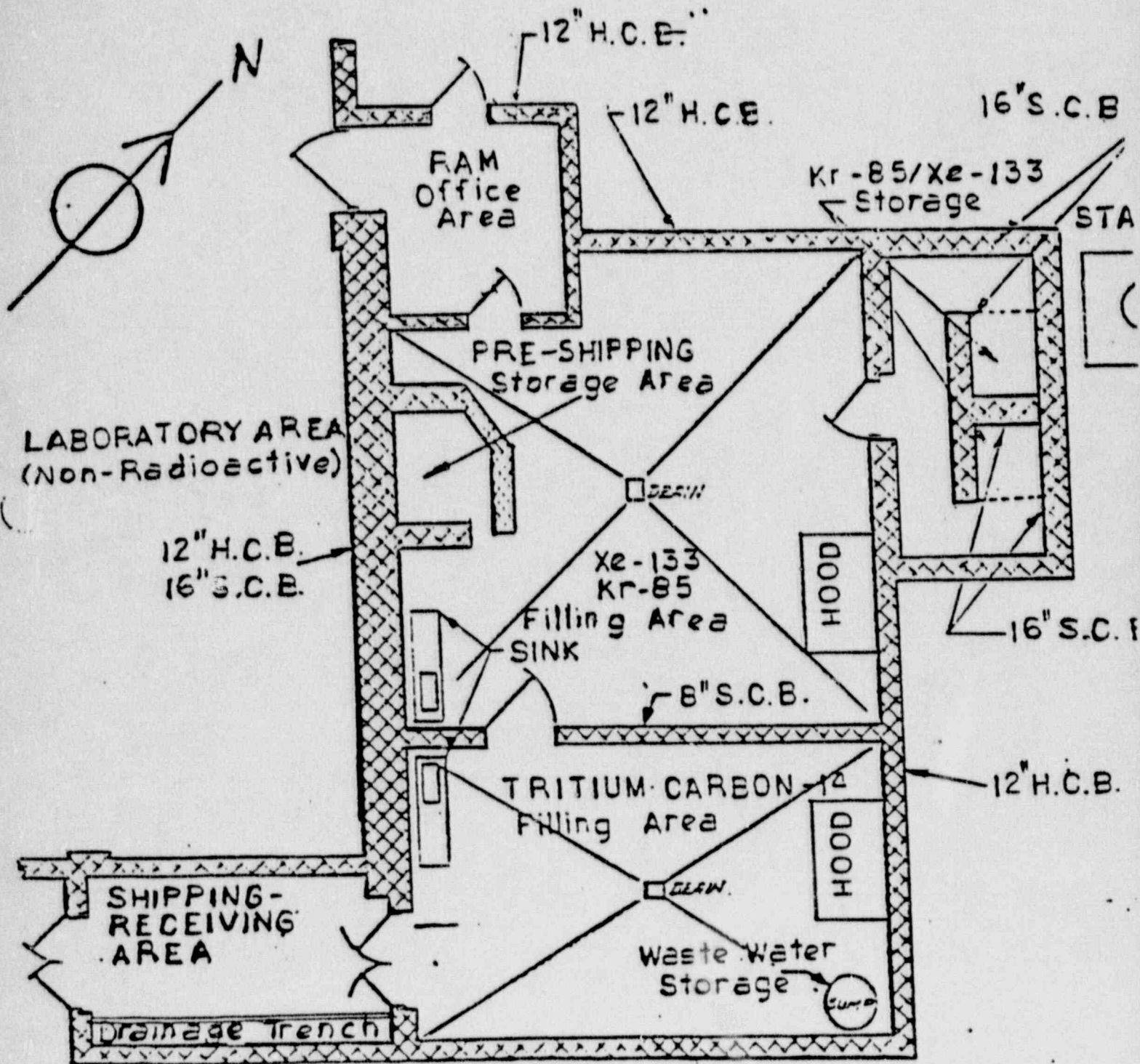
ALARM SYSTEM DIAGRAM

AMENDMENT NO. 37

N.R.C. LICENSE NO. 29-02085-01



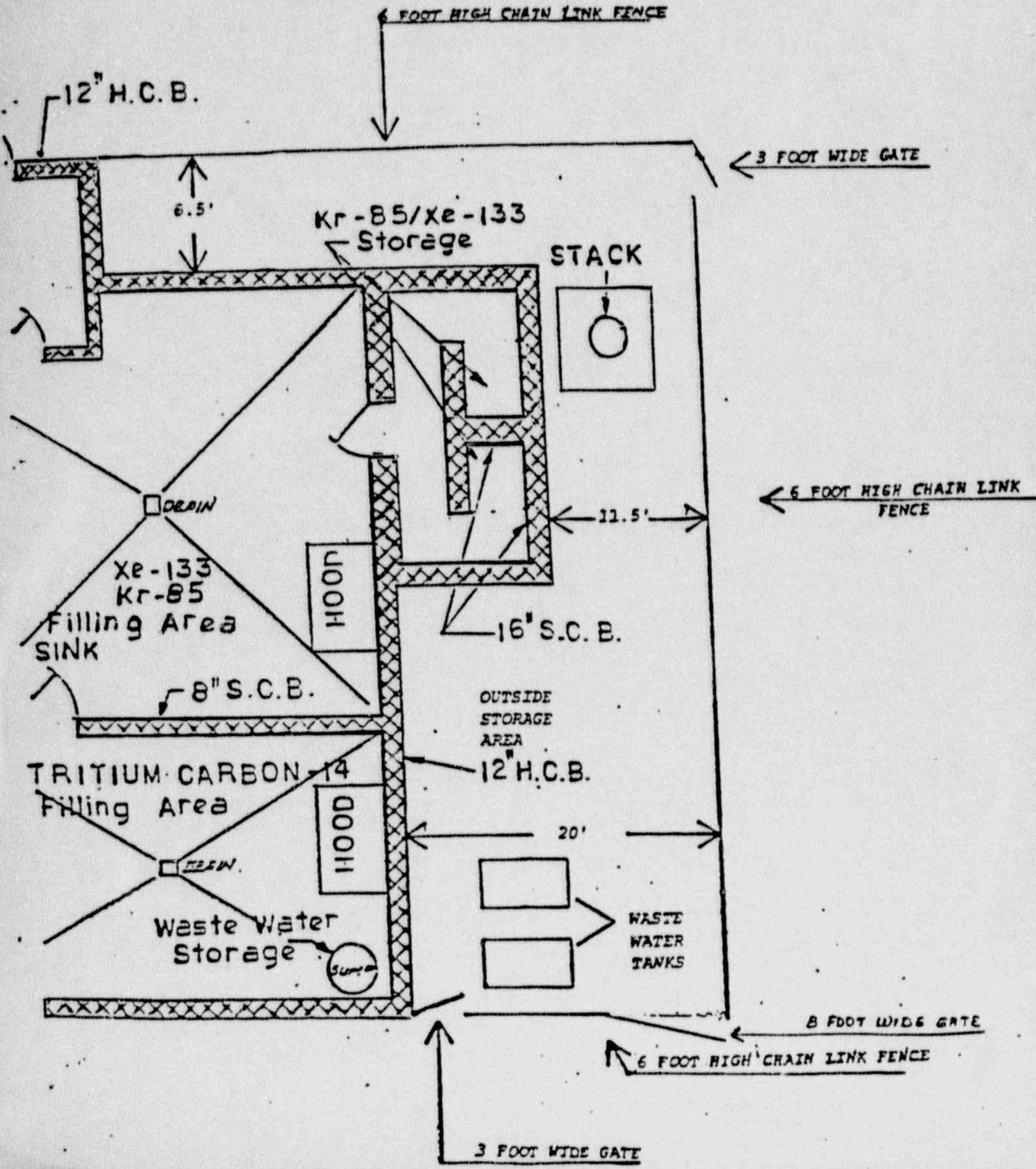
GENERAL DIAGRAM A
AMENDMENT NO 37
N.R.C. LICENSE NO. 29-02085-01



GENERAL DIAGRAM B

AMENDMENT NO. 37

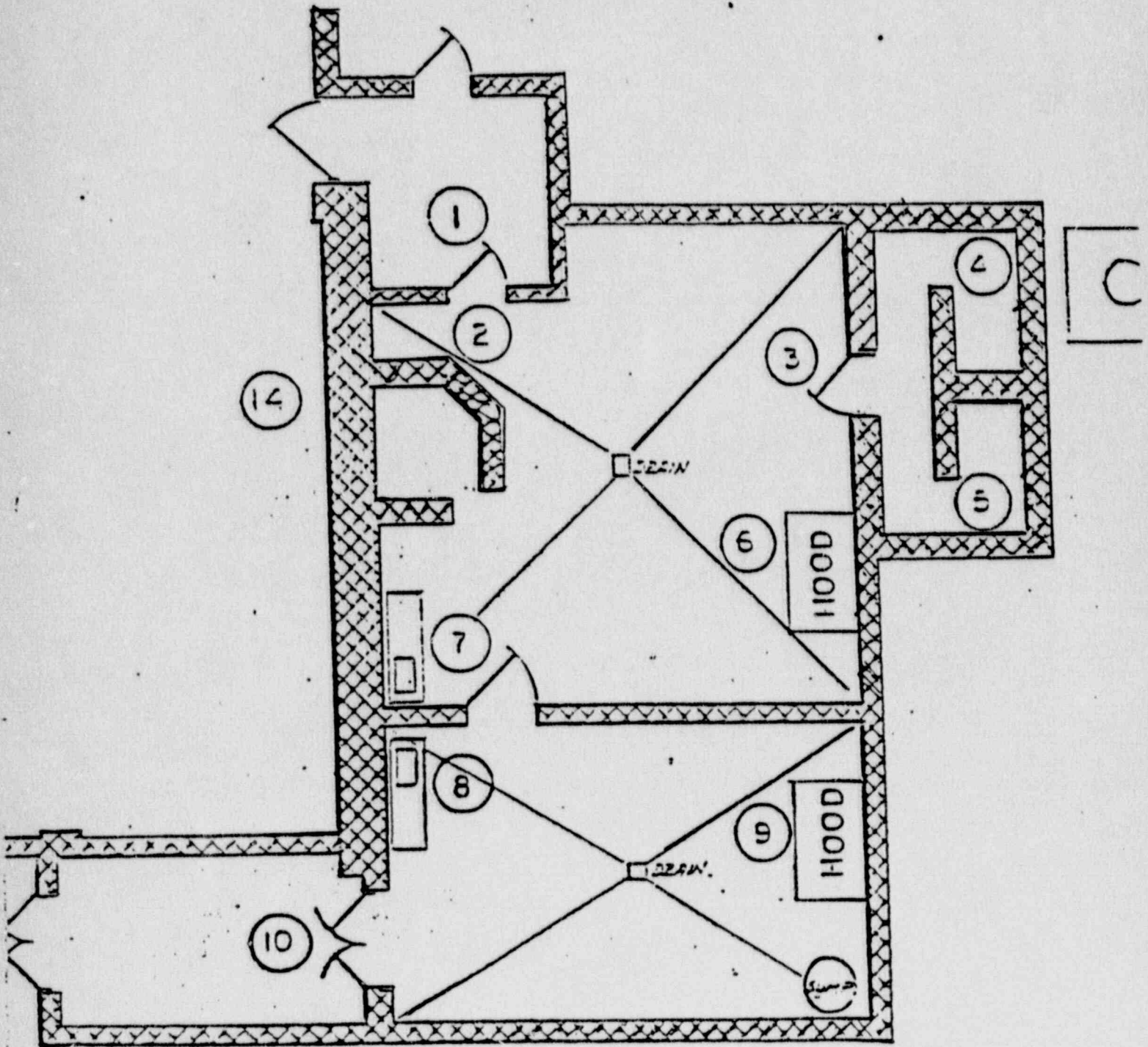
N.R.C. LICENSE NO. 29-02085-01



PORTABLE METER SURVEY DIAGRAM A

AMENDMENT NO. 37

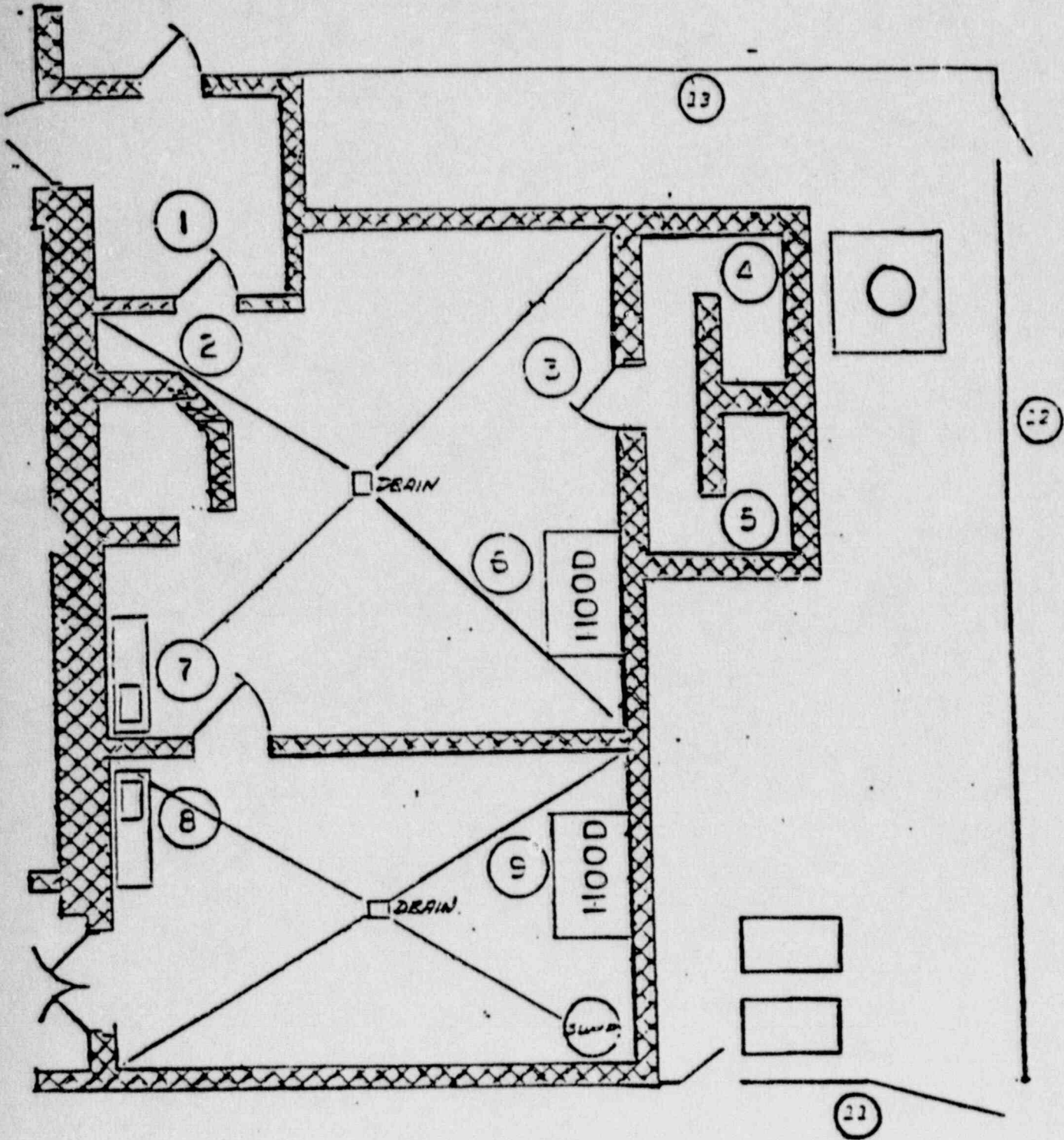
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PORTABLE SURVEY METER DIAGRAM B

AMENDMENT NO 37

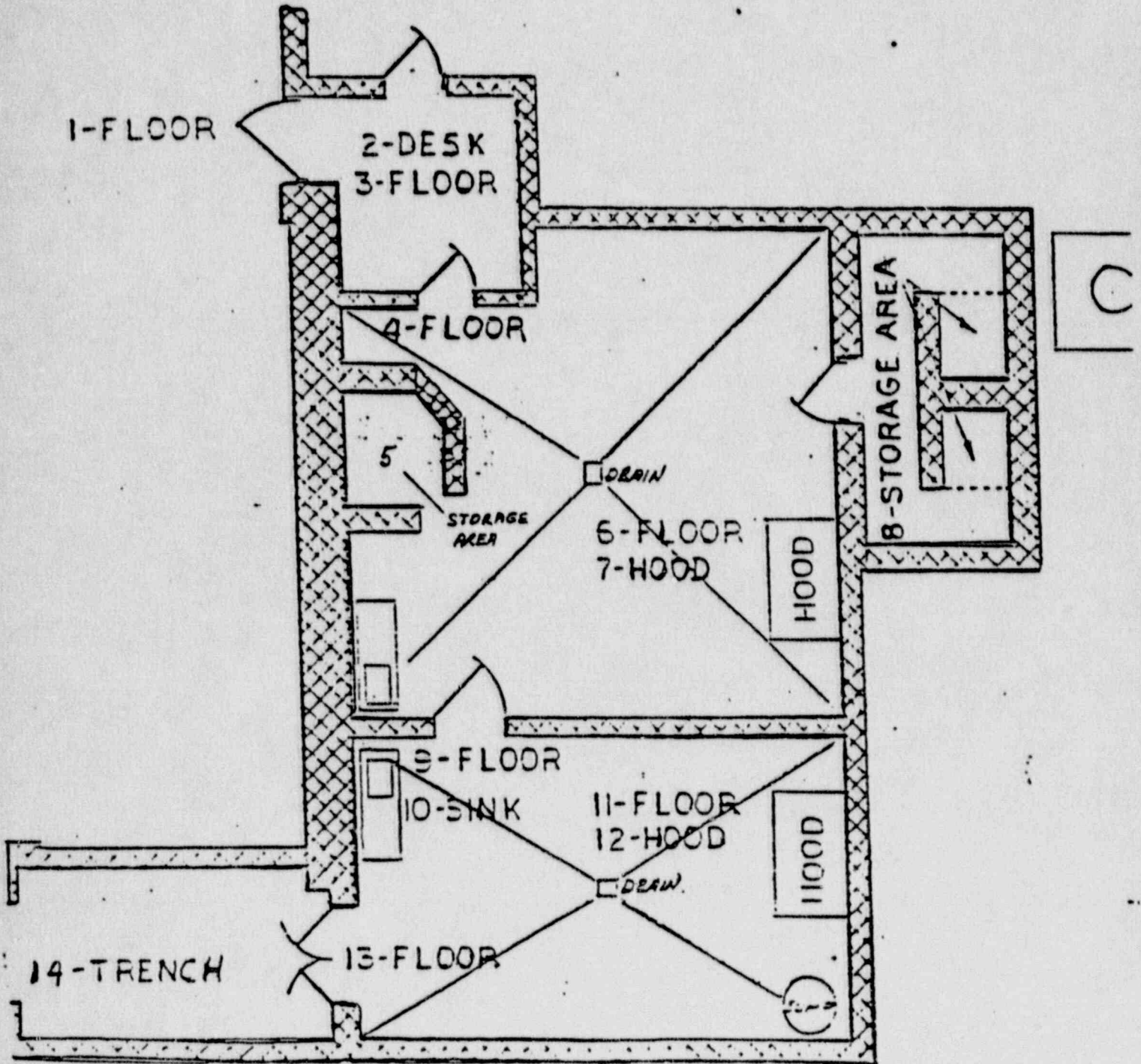
N.R.C. LICENSE NO. 29-02085-01



SWIPE TEST DIAGRAM

AMENDMENT NO. 37

N.R.C. LICENSE NO. 29-02085-01



15-LOCKER ROOM FLOOR
16-SHIPING AREA - DECK
17-OFFICE AREA

109571
13 SEP 1988

(FOR LFMS USE)
INFORMATION FROM LTS

BETWEEN:

LICENSE FEE MANAGEMENT BRANCH, ARM
AND
REGIONAL LICENSING SECTIONS

PROGRAM CODE: 03214
STATUS CODE: 0
FEE CATEGORY: 3P
EXP. DATE: 19920731
FEE COMMENTS: 3P_EFF._9/14/87
.....

LICENSE FEE TRANSMITTAL

A. REGION I

1. APPLICATION ATTACHED
APPLICANT/LICENSEE: AIRCO, INC.
RECEIVED DATE: 880913
DOCKET NO.: 3005272
CONTROL NO.: 109571
LICENSE NO.: 29-02085-01
ACTION TYPE: AMENDMENT

2. FEE ATTACHED \$60
AMOUNT: 289937
CHECK NO.: 289937

3. COMMENTS

SIGNED Jarte
DATE 9/23/88

B. LICENSE FEE MANAGEMENT BRANCH (CHECK WHEN MILESTONE 03 IS ENTERED 1-45)

1. FEE CATEGORY AND AMOUNT: 3P \$60

2. CORRECT FEE PAID. APPLICATION MAY BE PROCESSED FOR:
AMENDMENT ✓
RENEWAL _____
LICENSE _____

3. OTHER _____

SIGNED J. Kimberly
DATE 11/17/87