

NUCLEAR DEPARTMENT
TRAINING PROCEDURE AUTHORIZATION

COURSE TITLE Radiation Worker Training and Regualification

TRAINING PROCEDURE NO. 202

SUBMITTED BY: James Beattie
Training Specialist/Supervisor

3/23/84
Date

APPROVED: N/A
Principal Training Supervisor

Date

APPROVED: Robert L. Cannon
Training Department Head

3/26/84
Date

REVIEWED AND
ACCEPTED: James Beattie
General Manager - Salem Operations

3/30/84
Date

APPROVED: John Hansen
Manager - Nuclear Training

4-2-84
Date

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REG1 LIC30
29-15062-02 PDR

Date 03/15/84

Rev. 3

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RADIATION WORKER TRAINING

1.0 Course Description

The purpose of Radiation Worker Training (RWT) is to provide personnel requiring unescorted access to the Controlled Access Area of the Nuclear Generating Station with basic knowledge of radiation fundamentals, theory, and practical applications such that they can complete their tasks without endangering themselves or others. This training shall include how to work with radiation, radioactive materials, and contamination. Enrollment shall be at the discretion of the Station Management.

1.1 Instructional Objectives - Trainee will be capable of performing the following:

1. Complete radiation exposure history forms with assistance.
2. Recognize workers rights under federal regulation.
3. State federally prescribed permissible dose limits.
4. Discuss the government prescribed permissible concentration MPC in air.
5. Respond to posted radiological warning signs.
6. Identify the possible biological effects of exposure to ionizing radiation.
7. Identify federally recommended practices concerning the fertile female.
8. Explain the rules for eating, drinking, smoking and chewing in radiologically controlled areas (when applicable).

9. Identify station prescribed administrative guidelines.
10. Identify radiological exposure permits (REP) requirements.
11. Respond to radiological alarms.
12. Report radiological incidents and emergencies.
13. Comply with ALARA program
14. Properly wear, read, and interpret personnel dosimetry.
15. Recognize source of contamination.
16. Recognize contamination controlled areas.
17. Don and remove anti-contamination clothing.
18. Enter and leave contaminated areas.
19. Minimize the dispersal of radioactive material while working.
20. Minimize radioactive waste generation.
21. Identify the methods of personal contamination monitoring.
22. Identify respiratory protection characteristics.
23. Identify qualification requirements for wearing respiratory protective equipment.
24. Explain requirement for wearing respiratory protection equipment.

2.0 General Information

2.1 Lesson Plans

Lesson Plans and exams for the programs are maintained in the training file after being approved by the Training Manager.

2.2 Lesson Content

Radiation Worker Training (RWT)

This program is for those individuals having little or no radiation worker experience, and for personnel who have not been requalified within the past 24 months. The objective is to introduce the individual to the types of radiation and contamination, local and federal limits, means of minimizing exposure, use of portable detectors and protective clothing. The course shall last approximately 12 hours, including testing and self-study time, and shall also include Reg. Guide 8.13 Indoctrination and Respirator classroom training. Refer to section 9.0 for course content. Each student will be required to don P.C.'s and Frisk in order to complete training.

Radiation Worker Training Short Course

At the discretion of the Radiation Protection Engineer, the Radiation Worker Review (see 6.0 RWR Requalification) course may be utilized as a Radiation Worker Training Short Course for personnel with prior experience and/or training in radiation safety. This is accomplished by the Radiation Protection Engineer completing the form "Radiation Worker Training Short Course Authorization" (Attachment 1) and submitting the signed form to the Training Specialist or his representative. Personnel attending the Radiation Worker Review course as a Short Course are required to successfully complete the Radiation Worker Training

examinations. The Short Course does not fulfill the requirements for GEI. When no RWR class is scheduled the instructor may advise student of site related procedures and administer Radiation Worker Test.

3.0 Monitoring Course/Testing

A written examination will be administered at the end of each course. To successfully complete a course an individual must achieve a score of 70% or greater. Written examinations evaluate an individual's understanding of the information provided. Examinations also ensure the individual has sufficient reading and writing skills to work independently at the site. For this reason, oral examinations will not be administered.

Examinations will be reviewed with the students to insure all questions are understood. Part of the Radiation Worker Training test will be INPO Standardized GEI-RP test. All students will be required to demonstrate their ability to don and de-robe Protective clothing.

4.0 Attendance Requirements

RWT Course - 100% attendance with allowance for short absences of which the instructor has been informed and approves.

RWT (Short Course) - 100% attendance is required.

Upon successful completion of Radiation Worker Training, Radiation Worker Review, and Radiation Worker Training (Short Course) the Training Department shall complete a blue card for each individual. This card shall be

forwarded to the Station Radiation Protection Engineer, by the class instructor or by the student. The individual may now be granted unescorted access to the Controlled Access Area within any limitations imposed by Security and/or Radiation Protection. An individual satisfactorily completing this program may act as an escort for untrained personnel.

4.1 In order to comply with 10CFR50.70 and NRC Letter 50-272, 50-311 (Attachment 4), NRC Inspector will be issued blue cards upon completion of site-specific training. No test will be required.

5.0 Scheduling

Classes will be scheduled by the Training Department as need is determined.

6.0 Regualification - RWR

Radiation workers must be requalified annually. This is accomplished by attending the Radiation Worker Review Course (RWR). The Lesson Plan and exam requirements of 2.1 (of the Procedure) apply to this program.

An individual must achieve 70% or greater on the appropriate exams and 100% attendance is required to successfully complete the course. Successful completion satisfies the requirement for General Employee Indoctrination requalification and Radiation Worker Training Requalification. In the event that 24 months or greater has elapsed since the last RWT or requalification was completed, the complete RWT course must be retaken. Refer to section 9.1 for course content of RWR.

By virtue of their frequent association with Radiation Protection requirements, the following personnel are exempt from the classroom portion of the course:

NRC Senior and Reactor Operator Licensed Personnel

Radiation Protection and Chemistry Department Supervisors

Radiation Protection Technicians

Nuclear Department Managers (who meet qualifications)

Requalification for all persons is accomplished by achieving greater than 70% on the Final Exam accompanied with documentation on Attachment 2. If a worker does not achieve 70% on the Final Exam, Security and Radiation Protection Departments will be notified by using Attachment 3.

7.0 Recordkeeping

Records shall be kept to verify radiation worker initial and requalification training using Attachment 2.

Attachment 2 will be kept on file until microfilmed along with the signed answer sheets for the exams.

A computer record of individuals currently in training will be maintained by the training department.

When lesson plans, exams and handouts are revised the outdated lesson plans, exams and handouts will be marked as to the last date used prior to being microfilmed.

The Mid-Atlantic Training Group is an organization with representatives from various utilities who work together to standardize radiation worker training at member sites. The member utilities should issue a card to document satisfactory completion of Radiation Worker Training at a member site, and the

card is honored by all member utilities. Personnel bearing such a card do not, therefore, have to participate in generic Radiation Worker Training Courses at other member utilities' sites during the period for which the card is issued. Instead, the Radiation Worker Training Short Course is attended. (See Section 2.2)

8.0 References

8.1 Title 10 Code of Federal Regulations Part 19

8.2 Standard for Selection and Training of Personnel for Nuclear Power Plants. ANSI N 18.1 - 1971.

8.3 Salem Generating Station Administrative Procedure No. 14.

8.4 Salem Generating Station Administrative Procedure No. 24.

9.0 Radiation Worker Training

I. Radiation

- A. Definition
- B. Background Radiation
- C. Types of Nuclear Radiation at Nuclear Power Plants
- D. Units of Radiation
- E. Radiation Biological Effects
- F. Biological Effects of Radiation
- G. NRC External Radiation Limits
- H. Areas of concern about radiation risk that may result in changing the NRC dose limit
- I. Typical worker dose
- J. Individual Exposure Reports

- K. Radiation Signs
- L. Minimizing your radiation dose
- M. Area Designation
- N. Radiation Worker responsibilities
- O. Radiation Worker rights

II. Contamination

- A. Definition
- B. Types
- C. Units of measurement
- D. Hazards of contamination
- E. Measurement
- F. Methods of contamination control

III. Radioactive

- A. Sources of Radioactive Waste
- B. Problems Presented
- C. Disposal of Radioactive Waste
- D. Amount of radioactive waste must be limited

IV. Instruments

- A. EM-14 Frisker
- B. Area Radiation Monitor
- C. Dosimetry

V. Control Point

VI. Respiratory Protection

- A. Purpose
- B. Types
- C. Prerequisites for respirator use
- D. Respirator issue
- E. Respirator failure

VII. Protective Clothing

- A. Purpose
- B. Proper method of donning protective clothing
- C. Proper method of removing protective clothing

VIII. Site Specifics

- A. Salem Generating Station radiation exposure limits
- B. REP/EREP
- C. Contamination Procedures
- D. Containment Air Lock
- E. Lost Dosimeter

9.1 Radiation Worker Review

I. Radiation

- A. Radiation Biological Effects
- B. NRC External Limits

- C. Areas of concern about radiation risk that may result in changing NRC dose limits
- D. Typical Worker doses
- E. Individual Exposure Reports
- F. Minimizing your radiation dose
- G. Area Designations
- H. Radiation Workers' Responsibilities
- I. Radiation Workers' Rights

II. Contamination

- A. Hazards of contamination
- B. Measurement
- C. Methods of contamination control

III. Minimizing Radioactive Waste

IV. Control Point

V. Respiratory Protection

- A. Purpose
- B. Airborne material
- C. Types
- D. Prerequisites for respirator use
- E. Respirator Issue
- F. Types
- G. Alternatives to respirator use
- H. Respirator failure

VI. Site Specifics

- A. Salem Generating Station radiation exposure limits
- B. REP/EREP
- C. Containment Air Locks

VII. Station Alarms

- A. Fire Alarms
- B. Cardox Evacuation Alarm
- C. Containment or fuel handling evacuation alarms
- D. Radiation Alert Alarms
- E. Halon Fire Suppression System

VIII. Personnel Accountability System

IX. Site Evacuation Procedure

X. Security System

- A. Purpose
- B. Components
- C. Use of Card Readers
- D. Security System Procedures

XI. Page Lights

RADIATION WORKER TRAINING

SHORT COURSE AUTHORIZATION

Date _____

Employee Name_____
Social Security Number_____
Company_____
Supervisor

Employees Radiation related background (list)

The above listed employee is qualified to attend Radiation
Worker Training Short Course.

Date_____
Radiation Protection Engineer

Please present this approval form to training instructor before start
of Radiation Worker Review class.

TO: Supervisor Security
Supervisor Radiation Protection

RADIATION WORKER REVIEW - NOTIFICATION OF FAILURE

TP-202

DATE:

[illegible]

DATE: 03/15/84
REV: 3

The below listed individuals have failed Radiation Worker Review.
Please take the appropriate action:

NAMESOCIAL SECURITY NUMBERCOMPANY/DEPARTMENT

ATTACHMENT TO APPLICATION FOR BYPRODUCT MATERIAL LICENSE
PSE&G NUCLEAR TRAINING CENTER

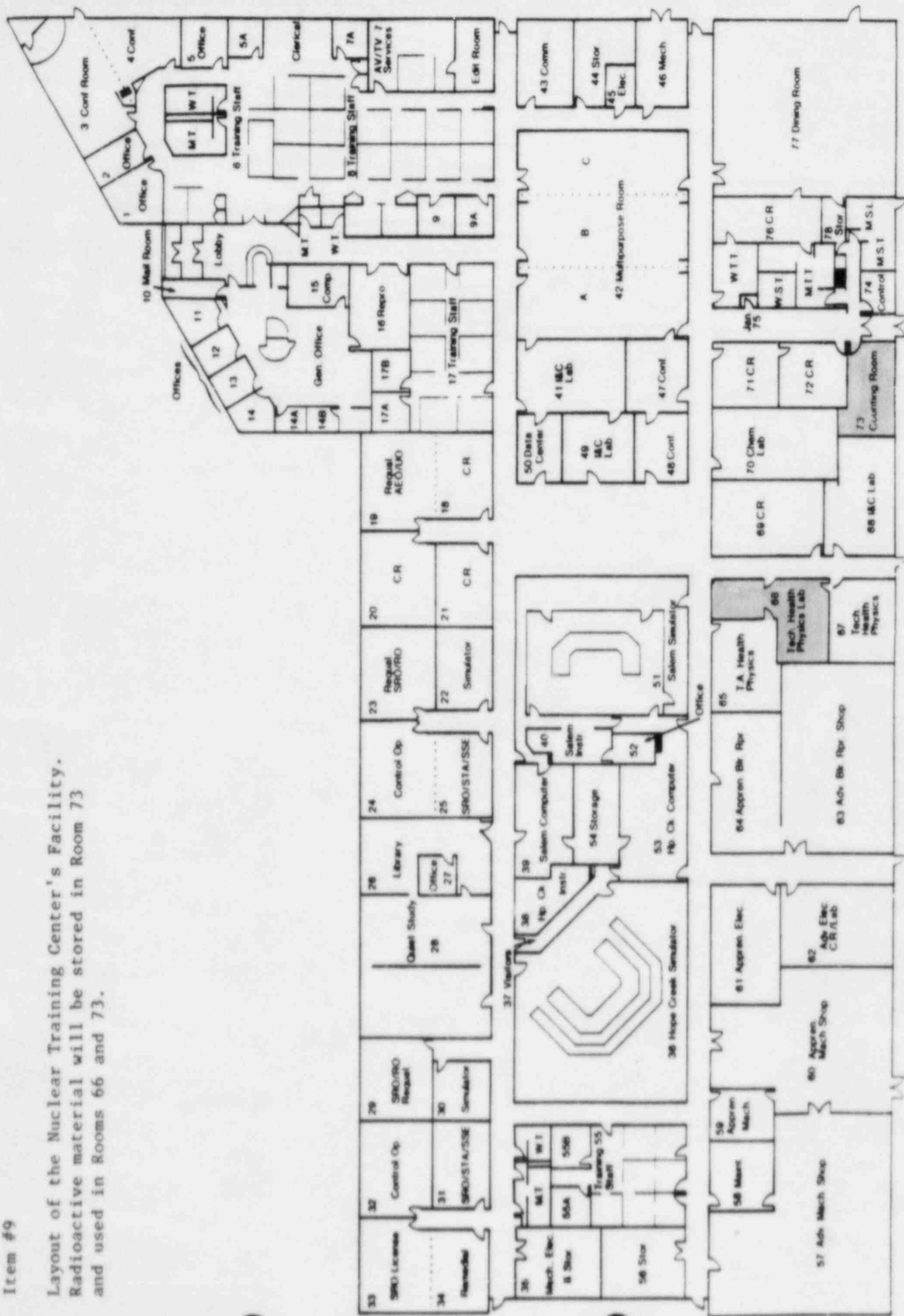
9. Facilities and Equipment

(See attached sketches of the facilities where radioactive material will be stored and used.) A locked safe will be employed for the actual storage of the sealed sources. This safe shall be of the type to provide for adequate shielding and to provide for protection against the unauthorized removal of said material, as per 10 CFR 20.207. Keys shall be kept under the protection of the Principal Training Supervisor - Health Physics and released to qualified individuals only.

Attachment to Byproduct Materials License
Public Service Electric & Gas Company
Nuclear Training Center

Item #9

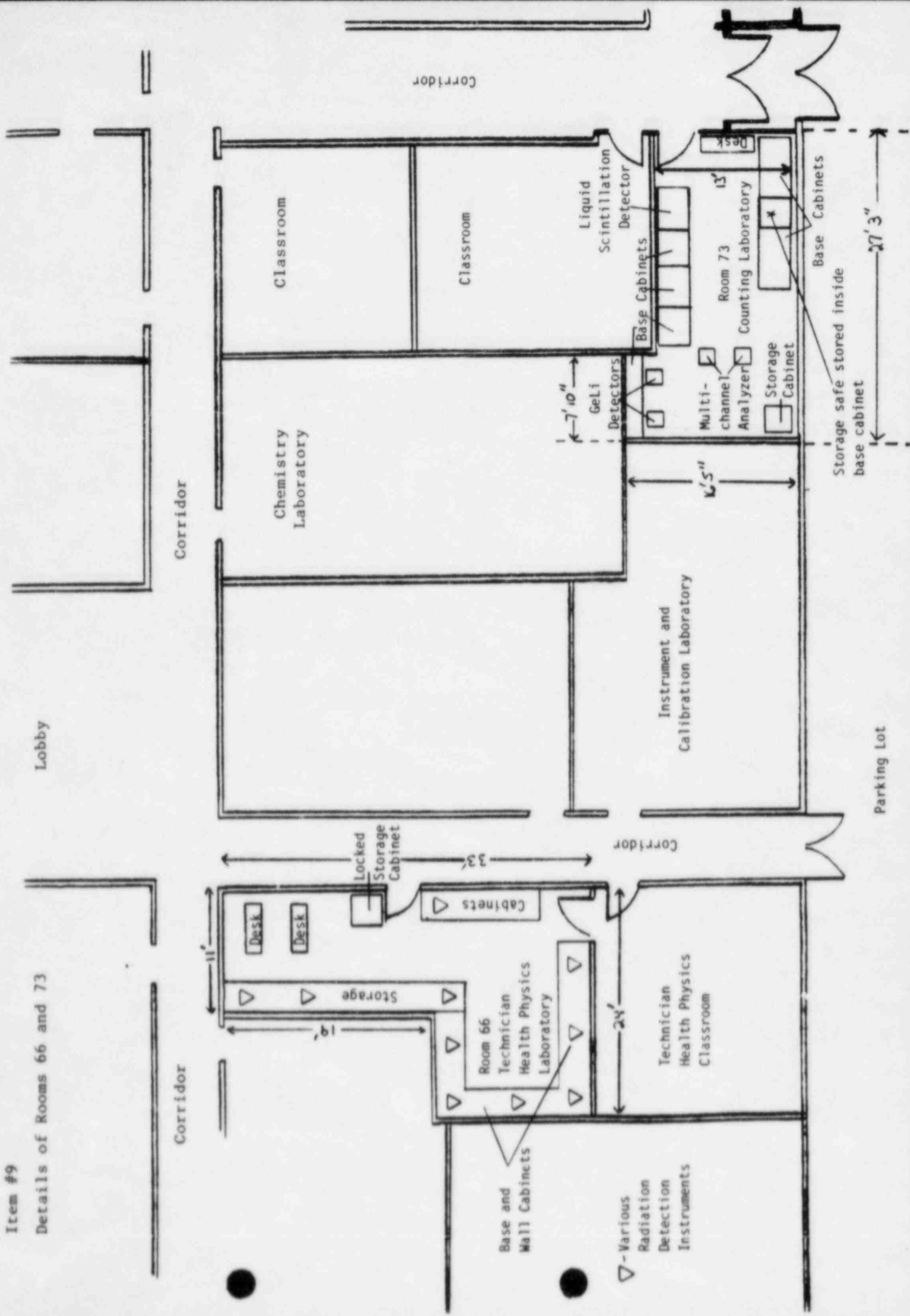
Layout of the Nuclear Training Center's Facility.
Radioactive material will be stored in Room 73
and used in Rooms 66 and 73.



Attachment to Byproduct Material License
Public Service Electric and Gas
Nuclear Training Center

Item #9

Details of Rooms 66 and 73



ATTACHMENT TO APPLICATION FOR BYPRODUCT MATERIAL LICENSE
PSE&G NUCLEAR TRAINING CENTER

10. Radiation Safety Program

The Public Service Electric and Gas Company's Nuclear Training Center is responsible for training both the Salem and Hope Creek Generating Stations personnel in the methodology and application of good Health Physics practices. Because of this function, the center is staffed with highly qualified individuals and will ensure that its own Radiation Safety Program is conducted in accordance with approved procedures consistent with State and Federal regulations.

The Radiation Safety Program is designed to protect the general public and radiation workers from unwarranted exposure to radiation and radioactive materials. The program is under the direction of the individuals listed in item 7.

Each area or rooms in which licensed material is used or stored and which contains any radioactive material in an amount exceeding ten times the quantity specified in 10 CFR 20 Appendix C, shall be posted with a sign or signs bearing the radiation symbol (trefoil) and the words:

"CAUTION (OR DANGER)"

"Radioactive Material(s)"

Surveys of rooms where radioactive materials are used or stored shall be conducted to assure that no individual working in the area is likely to receive a dose in any calendar quarter in excess of 25 percent of the applicable value specified in paragraph (a) of 10 CFR 20.101, or 10 percent of the applicable value for individuals under 18 years of age. Such a survey shall be conducted by the use of appropriate B, γ survey meters such as the Eberline RO-2 or E-520. It is not anticipated that the normal use of these sealed sources will require personnel monitoring; however, if a survey reveals that an unanticipated use of a source could likely yield these levels, then appropriate monitoring devices shall be used consistent with common practices and regulatory requirements.

Inventory and leak tests of sealed sources are to be performed at six month intervals. Wipes will be made by laboratory technicians and counted on bench type equipment such as the Eberline BC-4 GM Counter, or the Tennelec LB-5100 gas flow proportional counter with an automatic

ATTACHMENT TO APPLICATION FOR BYPRODUCT MATERIAL LICENSE
PSE&G NUCLEAR TRAINING CENTER

10. (Continued)

sample changer. Should such tests show greater than 0.005 uCi removable from any source, that source shall be discarded in accordance with item 11. Records of these tests will be maintained for 3 years.

All survey and counting equipment used in the Nuclear Training Center in conjunction with these radioactive materials shall be tested and calibrated semi-annually by the Public Service Electric and Gas's Corporate Radiation Protection Services group in accordance with written procedures (RP 9.038 for the Eberline RO-2 Ion Chamber is attached.) Calibration of these instruments will be performed at the Salem Nuclear Generating Station using sources possessed via our Part 50 license. The only exception to this being the calibration and testing of the Germanium Lithium detectors. This shall be done under the supervision of a Nuclear Training Supervisor at the Nuclear Training Center, in accordance with vendor supplied instructions.

Materials will be stored as per item 9 to provide restricted access and to ensure personnel safety. All individuals working in or frequenting restricted areas will be provided training as per item 8.

SALEM GENERATING STATION	Radiation Protection Instruction	RP 9.038
	CALIBRATION OF THE RO-2 & RO-2A ION CHAMBER	PAGE 1 OF 4 REVISION 2

Purpose

This procedure describes the calibration of the Eberline RO-2 & RO-2A ion chambers.

Apparatus/Material

1. RO-2 or RO-2A Ion Chambers
2. Eberline Multiple Source Gamma Calibrator, Model 1000
3. Proper calibration logs and sticker
4. Beta source

Prerequisites

1. It is essential that this instrument be properly calibrated to insure the accuracy of dose measurements. This is done prior to placing a new instrument into service, as required by IO cards, when readings are questionable, and after any repair work. The maximum time between calibrations is six (6) months.
2. Personnel performing calibration shall have documented qualification in the use of this procedure and of the Eberline Multiple Source Gamma Calibrator, Model 1000.
3. Insure that the dose rate calculations used from the graph are current.
4. Document data on Instrument Calibration Record (Attachment 1, RP 9.015).

Precautions

1. Follow proper ALARA practices to minimize personnel exposure from the source.

Limitations and Actions

1. If the initial AS FOUND meter reading on any scale is off by more than $\pm 20\%$ from the exposure rate, or if the AS LEFT on any scale is off by more than $\pm 10\%$, report this to a Technical Supervisor,

SALEM GENERATING STATION	Radiation Protection Instruction	RP 9.038
	CALIBRATION OF THE RO-2 & RO-2A ION CHAMBER	PAGE 2 OF 4 REVISION 2

Radiation Protection using Calibration Corrective Action Form (Attachment 2, RP 9.015). The instrument is to be removed from service until the completed form is returned, stating action to be taken.

Procedure

1. This procedure will check each scale, at two places on each scale, if possible. The scales should be checked using exposures to provide readings of approximately 25% and 75% of full scale.
2. Check the batteries by placing the selector switch in each of the BATT positions. The meter should read in the upper 3/4 of the BATT OK region of the meter, on both positions. If it does not, change all of the 9 volt batteries, (located inside the case) and repeat the battery check.

CAUTION

Insure switch is in the OFF position prior to removing instrument from case.

3. The RO-2 & RO-2A both have a box of desiccant mounted on top of the batteries. The desiccant crystals should be a deep blue color. If they are white or clear, replace the desiccant box.
4. Turn the selector switch to the ZERO position and rotate the ZERO SET control until the meter reads zero. Do this carefully as any error can cause excessive errors in exposure rate measurements.

NOTE

The difference between the RO-2 and RO-2A is the RO-2 reads a factor of 10 lower than the RO-2A.

5. Turn the selector switch to the lowest mR/hr range.
6. Select a source and shelf height, using calibration graphs, to obtain an exposure rate of approximately 75% of full scale of the selected meter range.
7. Place the instrument in the calibrator at the selected height and adjust the mirror so that the meter can be viewed indirectly.

SALEM GENERATING STATION	Radiation Protection Instruction	RP 9.038
	CALIBRATION OF THE RO-2 & RO-2A ION CHAMBER	PAGE 3 OF 4 REVISION 2

Expose the selected source, read the meter, and record this reading in the AS FOUND column.

8. If the meter reading does not agree within $\pm 10\%$ of the selected exposure rate, adjust the range potentiometer (located on top of case) to obtain the desired reading. Record this reading in the AS LEFT column.
9. Select a source and a height, using the calibration graphs, to obtain a reading of approximately 25% full scale and expose the source.
10. Record the reading in the AS LEFT column.
11. The calibration for the three higher ranges will be done in the same manner as the lowest range using Steps 6 thru 11. The exposure rate and meter reading will each increase by a factor of 10 for each range. Each range has its own adjustment which will be made if the reading is not within $\pm 10\%$ of calculated exposure rate.
12. Place a beta slab source next to the window on the bottom of the case. Slide the shield door back for this reading. The reading will vary depending on the source used. For a depleted uranium slab, the beta dose rate is approximately 226 mrad/hr. To calculate the correction factor for the instrument, obtain the following contact readings:

Window open (WO) _____

Window closed (WC) _____

Divide 226 by the difference between (WO-WC).

$$\frac{226}{(\text{Window Open} - \text{Window closed})} = \text{correction factor}$$

The correction factor should be either 3.0 or 4.0 (if necessary, round a fractional number up to 3 or 4). Place a label on the instrument indicating the correction factor and record the factor on the calibration sheet.

13. When the instrument is properly calibrated, replace the calibration sticker with a new one, properly filled out, including your

SALEM GENERATING STATION	Radiation Protection Instruction	RP 9.038
	CALIBRATION OF THE RO-2 & RO-2A ION CHAMBER	PAGE 4 OF 4 REVISION 2

initials. Insure Instrument Calibration Record is complete and initialed, and fill out the IO Card if required.

14. Replace instrument in service and return it to the issue room.

Attachments

None

References

1. Technical Manual, Eberline Instrument Corp. RO-2 & RO-2A Ion Chambers, July 1, 1981
2. RP 7.007 - Use of MSGC Model 1000 Calibrator
3. RP 8.020 - Use of RO-2 and RO-2A Ion Chambers
4. RP 9.015 - Completion of Instrument Calibration Record Forms

ATTACHMENT TO APPLICATION FOR BYPRODUCT MATERIAL LICENSE
PSE&G NUCLEAR TRAINING CENTER

11. Waste Management

Since radioactive materials used at the Nuclear Training Center are long-lived, low activity, sealed sources and shall only be disposed of when at such time that its activity shall only be so low as to no longer serve a useful purpose in the calibration of radiation detection devices, the waste management program can be described simply.

When such time comes that a source needs to be discarded (or fails the leak rate test as specified in Item 10), it shall be transferred to the Salem Generating Station (License #DPR 70 and 75) as per the requirements of 10 CFR 30.41. At such a point, it shall then be disposed of in accordance with 10 CFR 20, 49, 61 and the Salem radwaste license.

The Nuclear Training Center will maintain records on the receipt, transfer and disposal of said byproduct material as specified in 10 CFR 30.51. All applicable State, Commission and D.O.T. requirements shall be met during the transportation of radioactive material between the Training Center and the Salem Generating Stations.

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

Fee Exempt

1. APPLICATION ATTACHED

Applicant/Licensee: Public Service Electric and Gas

Application Dated: 4/14/85

Control No.: 03702

License No.: New

2. FEE ATTACHED

Amount: 0

Check No.: 0

3. COMMENTS

Signed Brenda P. Latchek

Date 4/23/85

B. LICENSE FEE MANAGEMENT BRANCH

1. Fee Category and Amount: Exempt - No fee Due

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

Amendment

Renewal

License ✓

Signed Frances Brown

Date 4/26/85

4/29/85