U.S. NUCLEAR REGULATORY COMMISSION

Region I

Report No. 50-272/81-30

Docket No. 50-272

License No. DPR-70 Priority _____ Category C

Licensee: Public Service Electric and Gas Company
80 Park Place
Newark, New Jersey 07101

Facility Name: Salem Nuclear Generating Station, Unit 1

Inspection at: Hancocks Bridge, New Jersey

Inspection conducted: November 23-25, 1981

Inspectors: K. E. Plumlee, Radiation Specialist — 3/11/82 date signed

M. H. D. McBride, Ph.D., Radiation Specialist — 3/11/82 date signed

Approved by: P. J. Knapp, Chief, Facility Radiation Protection Section Technical Inspection Branch — 3/11/82 date signed

Inspection Summary:
Inspection on November 23-25, 1981 (Report No. 50-272/81-30)
Areas Inspected: Routine, unannounced inspection of preparations for radiation protection during refueling including: Procedures, advanced planning and preparations, training, exposure control, respiratory protection program, posting, radioactive and contaminated material control, surveys, independent measurements, and outstanding items from previous inspections. The inspection involved 48 inspector-hours on site by two NRC regional based inspectors.

Results: No items of noncompliance were identified.

DETAILS

1. Persons Contacted

W. Britz, Corporate Health Physicist
*A. Darelius, Quality Assurance Engineer
*J. Driscoll, Chief Engineer
*J. Jackson, Reactor Engineer
H. Midura, General Manager, Salem Operations
*J. O'Connor, Radiation Protection Senior Supervisor
A. Oguruk, Technical Supervisor
*J. Stillman, Station Quality Assurance Engineer

*denotes presence at the exit interview conducted November 25, 1981.

2. Licensee Action on Previously Identified Items

(Closed) Inspector follow item (80-28-01): Review the adequacy of the licensee bioassay procedures to identify any significant uptake of alpha or pure beta activity. No alpha activity is evident in the sample analyses and survey records. The ratio of readily detectable gamma activities, such as Co-58, Co-60, Cs-134, Cs-137, and I-131, to pure beta emitters other than tritium is greater than 500 to one. The action levels to initiate whole body counts are based on access to the controlled area, work in highly contaminated areas, exposures to airborne radioactive materials, and contamination of an individual's skin, face, or nose. Exposure to tritium is identified by air sampling and liquid waste analyses. No risk of unidentified uptakes of radioactive materials was evident.

(Closed) Inspector follow item (80-28-02): Review the evaluation by the licensee of skin exposures to two individuals. The licensee letter dated August 21, 1981, contained the revised results of exposure estimates for the skin, eyes, and various organs of the two individuals involved. Review of the method of analysis did not identify any discrepancies. No overexposures were identified. No problems with the licensee evaluations were identified.

(Closed) Items of noncompliance (80-28-03, -04, -05): Failures to survey to assure compliance with 10 CFR 20.103 (a)(1) and (b)(1) and 10 CFR 20.101. The inspector verified the completion of the corrective actions stated in the licensee letter dated March 13, 1981, applicable to the fuel transfer tube entry on October 4, 1980. The inspector also reviewed recent entries into airborne radioactive materials areas. No problems were identified.

(Closed) Item of noncompliance (80-28-06): Failure to tag a door to restrict entry to an area with radiation levels in excess of 100 rem/hr., which resulted in three individuals entering the area. The inspector verified the completion of the corrective actions stated in the licensee letter dated March 13, 1981, applicable to the entry into the area under the in-core detector seal table on October 10, 1980.

(Closed) Items of noncompliance (80-28-07, -09): Failures to inform workers of the hazards and the precautions necessary on entering the fuel transfer tube on October 4, 1980, and the area under the in-core detector seal table on October 10, 1980. The inspector verified the completion of the corrective actions stated in the licensee letter dated March 13, 1981.

(Closed) Item of noncompliance (80-28-08): Failure to control the entries into the fuel transfer tube by issuance of a radiation exposure permit required by Sections 6.11 and 6.13 of the Technical Specifications, and the implementing procedures. The inspector verified the completion of the corrective actions stated in the licensee letter dated March 13, 1981.

(Closed) Inspector follow item (80-28-10): Review of the control of the exposures of individuals whose Form NRC-4 information is incomplete. The licensee procedural administrative limits on exposures are below the limits prescribed by 10 CFR 20.101(a) and (b) and these limits are printed by the computer with the dosimetry updates. The computer printout flags any individual approaching the administrative limit, requiring a review and either an increased limit or appropriate control to prevent exceeding the administrative limit. The controls appeared to be effective.

(Closed) Inspector follow item (80-28-11): Review the adequacy of contract employee resumes. The inspector reviewed ten resumes provided by contract health physics technicians. These were specific as to dates of previous employment and job assignments. No examples were found of the licensee allowing credit for experience without an adequate basis in the resume.

(Closed) Item of noncompliance (80-28-12): Failure to require a health physics qualified individual to accompany the entries, or to carry the required survey equipment, during the entries into the fuel transfer tube. The inspector verified the completion of the corrective action described in the licensee letter dated March 13, 1981.

(Closed) Inspector follow item (80-28-13): Review the use of radiation exposure permits (REP) and sign-in sheets. The inspector toured the facility and observed the records and work practices during this inspection. No items of noncompliance were identified.

The inspector reviewed with the licensee an apparent example of a contractor employee entering the Hot Machine Shop on January 13, 1981, without signing in on the REP, documented in a letter dated August 3, 1981, to the worker. The licensee's corrective action to prevent any recurrence appeared to be effective.

(Closed) Inspector follow item (81-20-01): Review of the completion of commitments to implement a formal health physics training program. The inspector verified that the Personnel Training Manual was revised by

September 1, 1981, and that the administrative procedure on training was being revised. All of the elements of a formal training program were evident in the apprentice training program being conducted by the Training Department. Retraining of health physics technicians was conducted without some of the elements of a formal program. As an example, no documented periodic verification of their continuing proficiency was maintained other than routine performance reviews. There was no official retraining program outline. The licensee has contracted with a consultant to review and formulate a program by March 1982 that should include the retraining of these individuals.

3. Radiation Protection Procedures

The inspector toured the facility to review the licensee's procedural control of radiation work pursuant to the requirements of Technical Specifications Section 6.8, "Procedures," and 6.11, "Radiation Protection Program," during preparations for the outage.

The radiation protection procedures were reviewed during inspections 50-272/81-20 and 50-272/80-03, and the subsequent changes have been reviewed. No procedural changes were made or planned as part of the refueling outage preparations.

Review of the status of the maintenance and modification procedures showed the planning engineer was initiating the procedures for jobs not previously performed at this site. The ALARA team was reviewing each job to identify any means of reducing the exposures to personnel.

The review and authorization of procedures for the outage, and the draft outage procedure plan, appeared to comply with the licensee's administrative procedures and the technical specifications.

No violations were identified.

4. Advance Planning and Preparation for the Outage

a. Increased Health Physics Staff

Technical Specification Section 6.3.1 requries that each member of the facility staff meet the minimum qualifications of ANSI N18.1-1971 for comparable positions, except for the Radiation Protection Senior Supervisor who must meet or exceed the qualifications of Regulatory Guide 1.8, September 1975.

The licensee letter dated September 24, 1981 documented the Radiation Protection Senior Supervisor's credentials. Review by the inspector did not identify any discrepancies.

The Radiation Protection Senior Supervisor stated that, as of November 24, 1981, he headed a department of about 105 personnel. This included seven supervisors and technical assistants; about 60 personnel required for routine two-unit operation (radiation protection technicians, chemists, clerks, etc.); 30 personnel required at the time for non-routine jobs; and 8 personnel to prepare for the coming outage. About 40 of the 150 were PSEG employees, including a few who were in full-time apprentice training, and more than 60 were contractor personnel.

The licensee plans to hire about 35 additional senior contract health physics technicians and 25 junior level technicians and clerks for the outage.

The inspector verified by review of 14 contractor personnel files including resumes, training records, and job assignments that the assignments were consistent with the individual's experience and training.

No violations were identified.

b. Radiation Protection-Related Staff

A licensee representative stated that an 18-man crew from Hydro-Nuclear Services was on site to perform housekeeping, collection of trash and contaminated materials, waste packaging, and area decontamination. More will be hired during the outage.

A four-man crew was contracted to operate a leased portable (trailer-mounted) protective clothing laundry facility during the outage.

Three Chem-Nuclear Services employees were processing water through a demineralizer purification system. The licensee plans to train PSEG employees on this job.

No violations were identified.

c. Special training and equipment

Personnel to be assigned to the jobs listed below were either to be specifically instructed and trained, or were previously experienced on these assignments. Procedures, training, shielding and equipment were being provided that would permit the completion of the following jobs with adequate control of personnel exposures to radiation:

Post-LOCA sampling equipment installation
Reactor water level sensor installation
Hydro-lancing of steam generator tube sheets
Reactor cooling pump seal repairs

In-core detector thimble replacement
Reactor cavity decontamination
Inservice inspection of steam generator tubes, piping and nozzles, and reactor vessel welds

The licensee will provide enclosures and ventilating systems for steam generator work, grinding, and decontamination jobs involving potential airborne contamination.

No violations were identified.

d. Supplies and Equipment

The inspector toured the facility to observe the availability and use of survey instruments, protective clothing, respirators, shielding, decontamination materials, and special equipment.

No survey instruments or friskers were identified as inoperative or overdue for calibration. Based on the inspector's review of service records, there were no lengthy delays in return of instruments to service when due for calibration or repair.

The licensee maintains a routine restock procedure to assure an adequate stock of consumable materials required during outages.

A trailer mounted laundry for protective clothing was contracted for use during the outage. Typically, the day's collection of discarded protective clothing will be laundered and available for reuse by the next day.

The inspector noted there was dedicated space for cleaning and storing respirators, and trained personnel were provided on this job.

No shortage was observed in items such as protective clothing, respirators, shielding, barricades, and signs.

The inspector observed that two separate personnel access control points into Unit 1 were to be maintained during the outage.

No violations were identified.

5. Training

a. Training Program

The inspector reviewed the training program to verify compliance with the requirements of Section 6.4 of the Technical Specifications, Section 5.5 of ANSI N18.1-1971, and 10 CFR 19.12, and to determine consistency with Regulatory Guide 8.27 and NUREG 0761 (draft), Section 4.

The inspector examined the licensee's procedures for radiation protection training of the following categories of personnel:

Contract radiation protection technicians (CRPT)
Permanent radiation protection technicians (PRPT)
Radiation workers
Respirator users

The licensee had provided the following training to the groups of individuals shown:

Group	Type of Training	Duration (Hours)	Frequency	Evaluation Method	Status compared with Procedural Requirements
All Employees	General Indoctrination	4	Annual	Written Examination	Complies
Radiation Workers	Radiation Worker	8	Annual	Written Examination & Proficiency Demonstration	Complies
New PSEG Employees	Apprentice & Phase II Technical Assistants	1000	Once	Written Examinations, On the Job Training, etc.	Complies
Contractor Employees	Contract RPTs	8	Each Outage	Written Examinations & Proficiency Demonstration	Complies
Respirator Users	Respirator User	1	Annually	Written Examinations & Fit Test	Complies

The training program is managed by the Training Director and the Radiation Protection Supervisors. Day-to-day supervision is provided by the training staff and the Radiation Protection Supervisors. The work of the organization is carried out by a full time training staff and, during outages, senior radiation protection level contract personnel.

The inspector verified licensee compliance with the training program related procedures by interviews and by a review of the following training procedures and materials, including worker tests and records of other evaluation methods:

Personnel Training Manual
Basic Nuclear Apprentice Assistant Lesson Plan Outline
Administrative Procedure No. 24, Radiological Protection Program
Administrative Procedure No. 14, Station Training Program
Procedure RP-2, Training:

2.001 New Employee General Indoctrination
2.002 Technician Training
2.003 Respiratory Protection Training & Fit Test

With the exception of retraining of radiation protection technicians, the main elements of a formal program were in place, i.e., there were course outlines, lesson plans, examinations, and schedules.

The licensee had rescinded the portion of procedure RP-2 concerned with retraining of the PSE&G radiation protection technicians and there were no current retraining schedules, examinations, or training records assuring that two of these individuals were maintaining proficiency in the fundamentals of their jobs.

The licensee committed to develop a formal training/retraining program by March 1982, (see paragraph 2, item 81-20-01).

b. Escorted Individuals

The inspector verified that untrained individuals such as short term visitors and arrivals who had not yet attended training were instructed to stay with the escort and follow his instructions. The untrained individuals were specifically instructed to comply with emergency signals and public address system announcements and warnings; and to observe posted information and signs, barriers, and local alarms.

c. General Employee Indoctrination

Review of general employee indoctrination, provided to comply with 10 CFR 19.12, indicated that experienced instructors were provided, a program outline was followed, and procedure no. RP-2, Training, was available. This procedure formalized the examinations, passing score, and records.

No violations were identified.

6. Exposure Control

a. Dosimetry Programs

The licensee's personnel monitoring program was examined against the requirements of 10 CFR 20.101, 20.102, 20.401, and 20.408 and within the framework of the following generally accepted codes, standards, publications and examples of good practice:

Inspection and Enforcement Information Notice 81-26, Personnel Neutron Dosimeters at LWR's

Regulatory Guide 8.4, Direct Reading and Indirect Reading Pocket Dosimeters

Regulatory Guide 8.7, Occupational Radiation Exposure Records Systems

ANSI/ANS N13.11, Draft American National Standard Criteria For Testing Personnel Dosimetry

The licensee expects to issue dosimetry badges containing thermoluminescent dosimeters (TLDs) to several hundred contract workers during the outage. The TLDs are evaluated on site at least monthly and as necessary to meet procedural requirements. The TLD badges and self-reader dosimeters are picked up on entering an area requiring personnel dosimetry. The dosimeters are zeroed by the control point monitor or the user when picked up; read out by the user; and the results are recorded on the REP sign in/out sheet on leaving the controlled area.

All visitors wear the dosimetry described above on entering areas normally requiring personnel dosimetry. Exceptional unique provisions may be made infrequently, an example being escorted groups of short term visitors. Up to 500 contract personnel may be on site during a 24-hr. period wearing visitors badges.

Extremity dosimetry is provided where the head, hand, foot or various parts of the body may receive nonuniform exposures to radiation.

The outage is not expected to involve neutron dosimetry.

Facilities and equipment used to support this program and, the routine quality control checks and calibration, are as follows:

Computer record system, including keyboards, display tubes, a printer, etc. (daily operability check)

TLD reader (checked daily/calibrated monthly)

Self Reader Dosimeters (calibrated semiannually)

Survey and air sampling instruments (checked daily/calibrated quarterly or semiannually)

Gamma Radiation Calibration Facility

The external personnel dosimetry program is managed by a Technical Assistant with ten years of radiation protection experience.

The personnel monitoring program organization prepares and issues the following reports and documents:

Daily updates incorporating TLD and daily self-reader dosimeter results

Termination reports & estimates

Summary information for reports pursuant to the require ments of 10 CFR 20.407

No violations were identified.

b. Procedural Control of Exposures

The inspector verified compliance with the requirements of 10 CFR 19.13, 20.102, 20.401, and 20.408 by review of 14 completed Forms NRC-4, equivalent Forms NRC-5, termination reports, and administrative exposure limit authorizations. On November 25, 1981, the inspector reviewed several pages of the daily computer printout of dosimetry information, averaging about 40 names per page.

Except for a minor discrepancy between two licensee copies of the termination report to one individual, no problems were identified. The licensee committed to correct this discrepancy. The discrepancy had no potential to cause any overexposure in this particular example.

No violations were identified.

c. Air Monitoring

The inspector verified compliance with a portion of the requirements of 10 CFR 20.103 by review of the procedural provisions and recent records applicable to air sampling, airborne radioactive materials areas, and access controls. The inspector reviewed records of recent entries into containment and verified that records were maintained of exposures to airborne radioactive materials, and also skin exposure due to noble gases.

No violations were identified.

7. Review of Respiratory Protection Programs

a. Adherence to internal exposure limits

The inspector reviewed the 14 respiratory protection procedures to verify compliance with 10 CFR 20.103 and Regulatory Guide 8.15, Acceptable Programs for Respiratory Protection. These procedures covered respirator training, fit testing, cleaning and disinfecting, use, inspection and repair, and quality assurance.

The procedures appeared to assure compliance with the above requirements. In addition, the selection of equipment appeared adequate to meet the requirements.

During the review of personnel folders (see paragraph 4.a and 6.b) the inspector verified that records were maintained of physician's determinations of fitness to wear respirators.

Observation of working conditions during the inspection, and review of records of work permits, air samples, contamination surveys, nasal swipes, skin contamination, and whole body counts did not identify any exposures to airborne radioactive materials in excess of 10 CFR 20.103 limits.

No violations were identified.

b. Air monitoring

The inspector reviewed the licensee's procedures and records of air monitoring to verify compliance with 10 CFR 20.103 and 10 CFR 20.203(d). The inspector toured the facility to verify proper posting of airborne radioactive materials areas.

No violations were identified.

c. Bioassay Program

The inspector reviewed the bioassay program maintained pursuant to 10 CFR 20.201 to assure compliance with 10 CFR 20.103. The licensee whole body counting program requires radiation workers to be counted at least annually, or an evaluation to be made if counting is impracticable; and in the case of temporary employment, on arrival and on departure.

A worker's concerns that he had no whole body count on arrival or departure were reviewed by the inspector. No exposures to airborne radioactive materials were identified and the worker was notified that no whole body count was required.

The inspector verified the licensee procedures and equipment were adequate to identify nanocurie quantities of typical reactor activation and fission product gamma activities, and the ratio of such activities to pure beta emitters was greater than 500 to one. (See paragraph 2, item 80-28-01)

No violations were identified.

d. Temporary Engineering Controls

The inspector verified that exposures to airborne radioactive materials were controlled by decontamination of surfaces, use of plastic covers and tents to prevent spread of contamination, and use of controlled ventilation systems to prevent exposures to unacceptable concentrations of airborne radioactive materials. No omissions were identified of the use of such controls on contaminated jobs.

No violations were identified.

e. Licensee Evaluations of Controls

The inspector noted that the records of the licensee evaluations of controls appeared to verify the selection of acceptable equipment, the use of authorized protection factors, the application of preventive measures, and the evaluation of internal exposures.

No violations were identified.

f. Respiratory Protection Training and Respirator Fitting and Testing

The inspector verified during the review of personnel files (see paragraphs 4.a and 6.b) that the medical check, fitting, and training of personnel using respirators was documented and the procedures, described above, appeared to be fully implemented.

No violations were identified.

g. Respirator Cleaning and Maintenance

In order to verify adherence to the above procedures, the inspector observed the collection process for used respirators, and respirator cleaning and maintenance. The inspector also observed that each user tested the respirator fit each time the respirator was donned.

No violations were identified.

8. Posting and Control of Radiation Areas, Airborne Radioactivity Areas, and Contaminated Areas

In order to verify compliance with the requirements of 10 CFR 20.203, Caution signs, labels, signals and controls, the inspector toured the facility to observe posted radiological and survey information, barriers and enclosures. The inspector also surveyed the outdoor radioactive waste storage area fence and barrier ropes, and trailers being loaded with material to be transported.

No violations were identified.

9. Radioactive and Contaminated Material Control

The inspector observed the licensee's management of used protective clothing, contaminated trash, and radioactive waste. The inspector verified container labels, transport information and shipping documents.

It was noted that the applicable procedures appeared to be fully implemented and the exposure of personnel to radiation emanating from radioactive waste was reasonably limited by barriers, isolation and shielding.

No violations were identified.

10. Exit Interview

The inspector met with the licensee representatives denoted in paragraph 1 at the conclusion of the inspection. The inspector reviewed the inspection findings.