U. S. NUCLEAR REGULATORY COMMISSION

REGION I

Report Nos. 50-272/83-14 50-311/83-11

Docket Nos. 50-272 50-311

License Nos. DPR-70 Priority - Category C DPR-75 - C

Licensee: Public Service Electric and Gas Company P. O. Box 236 Hancocks Bridge, New Jersey 08038

Facility Name: Salem Nuclear Generating Station, Units 1 and 2

Inspection at: Hancocks Bridge, New Jersey

Inspection conducted: March 21 - 25, 1983

Inspector:

R. L. Nimitz, Senior Radiation Specialist

5383 date signed

Approved by:

M. Shanbaky, Chief, Facilities Radiation Protection Section

Inspection Summary:

Inspection on March 21 - 25, 1983 (Combined Report No. 50-272/83-14; 50-311/ 83-11)

<u>Areas Inspected</u>: Routine, safety inspection by one region-based inspector of radiological controls during refueling, including: licensee action on previous inspection findings; selection, qualification and training; posting and control; radioactive and contaminated material control; exposure control; alpha analysis, radiation protection procedure adherence; and employee concerns. The inspection involved 32 inspector-hours onsite.

<u>Results</u>: Two violations were identified in two areas (failure to adhere to radiation protection procedures as required by Technical Specification 6.11, Section 8.0; failure to use suitable measurements of airborne radioactivity as required by 10 CFR 20.103(a)(3), Section 7.0).

Details

1. Persons Contacted

1.1 Public Service Electric and Gas Company

- N. Alman, Radiation Analyst
- J. Beattie, Training Specialist
- R. Cislo, Technical Supervisor
- J. Clancy, Senior Engineer
- R. Dolan, Chemistry Engineer
- J. Driscoll, Assistant General Superintendent
- * J. Kotsch, Senior Engineer
- * J. O'Connor, Radiation Protection Engineer
- * D. Zak, Chemistry Supervisor

1.2 NRC

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W. Lazarus, Project Engineer

R. Summers, Resident Inspector

*Denotes those individuals attending the exit meeting on March 25, 1983.

The inspector also contacted other licensee and contractor personnel.

2. Licensee Action on Previous Inspection Findings

- 2.1 (Open' Inspector Follow-Up Item (50-272/77-14-02). NRC to meview lic usee determination of minimum detectable activities for effluent multions. The review indicated the licensee has not yet completed this determination. Licensee representatives indicated the determinations would be completed by September 30, 1983.
- 2.2 (Open) Inspector Follow-Up Item (50-272/81-18-01). Licensee to establish a formal radioactive waste training program. The licensee has established a formal program. The program includes such items as documented lesson plans and quizzes. This matter remains open, pending NRC review of the training program.
- 2.3 (Open) Violation (50-272/82-01-03). Personnel did not adhere to the requirement of Radiation Exposure Permits (REP). Inspector tours of the controlled area identified an instance of personnel not adhering to REP requirements (Details, section 8).
- 2.4 (Closed) Violation (50-272/82-08-01). Licensee did not deliver licensed material to a carrier for transport in accordance with 10 CFR 71.5. The review of this item indicated the corrective actions described in Public Service Electric and Gas Company letter dated June 24, 1982, were implemented.

- 2.5 (Closed) Violation (50-272/82-10-02). The licensee did not meet the requirements of Technical Specification (T.S.) 2.3.4.c during release of gaseous waste in that the monitor's sampling location was not consistant with T.S. requirements. The review of this item indicated the corrective actions described in a Public Service Electric and Gas Company letter dated June 17, 1982, were implemented. In addition, the monitoring system identified as having not been placed in service to sample the plant vent effluent releases was replaced by a continuous sampling system. This new monitor will provide for a sampling location consistant with the T.S. requirements.
- 2.6 (Closed) Violation (50-272/82-19-01). Personnel did not adhere to the radiation protection procedures in accordance with Technical Specification 6.11. The review of this item indicated the corrective actions described in a Public Service Electric and Gas Company letter dated October 28, 1982, were implemented.
- 2.7 (Closed) Unresolved Item (50-272/82-27-03). The air particulate detector process radiation monitor, which provides automatic isolation of containment purge and pressure/vacuum relief, was found with capped sample lines. Based on a review of this item during combined inspection No. 50-272/82-33; 50-311/82-31, it was determined that the finding is an apparent violation. The item has been assigned No. 50-272/82-33-01. This unresolved item is closed for administrative purposes.
- 2.8 (Open) Violation (50-220/82-28-01). Licensee did not adhere to established procedures for gaseous radwaste release calculations. The review of licensee interm actions as described in Public Service Electric and Gas Company letters dated February 4, and March 9, 1983, indicated the licensee implemented the interim actions as described therein. Licensee representatives said guidance for abnormal releases (e.g., release rates) will be incorporated into appropriate procedures by April 1, 1983, for use in making notifications of such releases as required by 10 CFR 50.72.

3. Selection, Training, Qualification

3.1 Radiation Protection Technicians

The selection, qualification, and training of licensee and contractor radiation protection personnel were reviewed with respect to the following:

- Technical Specification 6.4, "Training"
- ANSI N18.1 1971, "Selection and Training of Nuclear rower Plant Personnel"

 Salem Generating Station Radiation Protection Training Manual, Revision 0

The inspector randomly selected several licensee and contractor radiation protection technicians, providing responsible oversight of ongoing radiological work and reviewed their training and qualification. The review indicated the individuals met the selection criteria of ANSI N18.1 - 1971 and had been trained in accordance with the licensee's training manual.

No violations were identified.

3.2 Radiation Protection Engineer (RPE)

The qualifications of the licensee's RPE were reviewed with respect to the requirements of Technical Specification 6.3, "Facility Staff Qualifications."

The review of section 6.3 of the Unit 1 and 2 Technical Specifications indicated that the Unit 1 specifications did not contain qualification requirements for the RPE. However, the Unit 2 specification did specify such requirements. In addition, Figure 6.2.2 of the Unit 1 specifications contained the incorrect title for the RPE. Licensee representatives stated that a Technical Specification amendment request had been submitted to address this matter. The licensee's submittal will be reviewed (50-272/83-14-01).

The review indicated the Radiation Protection Engineer met the qualification requirements of Regulatory Guide 1.8, "Personnel Selection and Training", dated September 1975, which is referenced in the specification.

No violations were identified.

4. Posting and Control

The inspector toured the controlled areas at various times during the inspection. Radiation intensity measurements were performed to verify the licensee's compliance with the requirements of 10 CFR 20.203, "Caution signs, labels, signals and controls," and Technical Specification 6.12, "High Radiation Area."

No violations were identified.

5. Radioactive and Contaminated Material Control

The inspector toured the controlled area and reviewed licensee control of radioactive and contaminated material with respect to 10 CFR 20.203, "Caution signs, labels, signals and controls."

No violations were identified.

6. Exposure Control

6.1 Personnel Monitoring

The issuance and use of personnel monitoring equipment was reviewed with respect to 10 CFR 20.202, "Personnel Monitoring."

The use of dosimetry in the controlled area, including issuance and use during inspection and maintenance of steam generators was reviewed.

No violations were identified.

6.2 Exposure Records

The inspector reviewed selected personnel exposure records with respect to:

- 10 CFR 20.102, "Determination of prior dose,"
- 10 CFR 20.401, "Records of surveys, radiation monitoring and disposal,"
- 10 CFR 20.408, "Reports of personnel monitoring on termination of employment or work."

The review of selected records indicated the licensee was obtaining and maintaining personnel radiation exposure information in accordance with the above requirements.

Regarding terminations reports, by review of documentation and discussion with licensee personnel, the inspector was unable to determine if the licensee was providing the latest whole body count (WBC) data to terminated workers. Licensee representatives acknowledged the above and initiated a temporary procedure change to ensure that these terminated workers are provided with the required WBC information.

No violations were identified.

6.3 Surveys

6.3.1 General

The inspector selected and reviewed various radiation, contamination, and airborne radioactivity surveys made by the licensee during outage work at the facility. 10 CFR 20.201(b) requires each licensee to make or cause to be made such surveys as may be necessary for the licensee to comply with the regulation in Part 20 and are reasonable under the circumstances to evaluate the extent of radiation hazards that may be present. Paragraph (a) of §20.201 defines a survey as an evaluation of the radiation hazards incident to, among other items, the presence and disposal of radioactive materials. When appropriate, such evaluation is to include a physical survey of the location of materials and equipment and measurements of levels of radiation or concentration of radioactive material.

6.3.2 Radiation Surveys

During tours of controlled areas, licensee radiation surveys made to comply with 10 CFR 20.101, "Radiation dose standards for individuals in restricted areas," were reviewed.

No violations were identified.

6.3.3 Airborne Radioactivity Surveys

During tours of controlled areas, the inspector selected and reviewed airborne radioactivity and other surveys made by the licensee to comply with 10 CFR 20.103, "Exposure of individuals to concentrations of radioactive materials in air in restricted areas."

In examining surveys made in the area of the Unit 2 steam generators, the inspector noted that contamination smear surveys indicated the presence of alpha emitters. On or about February 9, 1983, the licensee sent selected smear samples from Unit 2 to a contractor for analysis. The following qualitative results were obtained:

Location (Unit 2)	Smear ± Error
#21 Steam Generator (Diaphragm)	347 ± 35
#23 Steam Generator (Diaphragm)	234 ± 23
#21/23 Steam Generator Platform	9.25 ± 2.7
#22 Steam Generator (Diaphragm)	53.1 ± 6.1
#24 Steam Generator (Diaphragm)	77.2 ± 7.7
#22/24 Steam Generator Platform	<.74

The inspector discussed the above with licensee representatives with repect to potential airborne activity. Licensee representatives indicated air samples collected during work in the steam generator area and in other areas within containment indicated no alpha activity other than that from natural alpha emitters.

The review of general air sample data for containment indicated such presence. However, in reviewing airborne alpha emitter data for the steam generators, the licensee was unable to provide credible data indicating the absence of airborne alpha emitters in the area of the steam generators. This is discussed in section 7 of this report.

Regarding evaluation of airborne alpha emitters, licensee representatives indicated the following actions would be taken:

- the alpha airborne radioactivity in the area of Unit 2 Steam Generators would be evaluated in light of the alpha activity identified in smear analyses. Licensee representatives stated that in the event such emitters are identified, appropriate additional monitoring and restrictions (e.g., MPC-hour control) will be established and implemented. This action will be performed within one week and/or prior to further work in the area (@ April 4, 1983).
- the alpha activity previously identified by the licensee during February 1983 in Unit 1 Steam Generator smear results will also be evaluated and appropriate personnel exposure records will be updated, if necessary, to reflect airborne alpha emitter exposure. This will be performed by July 1, 1983.

The potential alpha contamination and airborne activities will be reviewed during a subsequent inspection. This matter is unresolved (50-272/83-14-02; 50-311/83-11-01).

6.3.4 Evaluation of Alpha Emitters in Radioactive Waste

10 CFR 20.301, "General requirement - Waste Disposal," requires that no licensee dispose of licensed material except by transfer to an authorized recipient as provided in the regulation in Parts 30, 40, 60, 70 or 72 of this chapter, whichever may be applicable. 10 CFR 30.41 and 10 CFR 70.42 require the licensee to transfer byproduct and special nuclear material only to an authorized recipient.

Since the licensee transfers radioactive waste, the inspector reviewed the licensee's method for alpha emitter determination in the waste to determine if the method would ensure identification and quantification of the alpha emitters discussed in section 6.3.3 of this report. The review indicated the licensee uses the Ce-144 ratio method to quantify alpha emitters in waste. However, the inspector's review of sample data provided by the licensee did not indicate the presence of Ce-144. Consequently, the inspector was unable to determine if the method was adequate to quantify the identified alpha emitters which may appear in radioactive waste.

As a result, licensee representatives indicated the radioactive waste alpha activity will be evaluated in light of the alpha emitters identified in the steam generator. This evaluation is to be performed prior to further spent resin shipments. Licensee representatives indicated a decision will be made regarding radioactive waste shipment records correction, if necessary, subsequent to the evaluation.

This matter remains unresolved (50-272/83-14-03).

7. Alpha Analysis

Unit 2 Technical Specification 6.8, "Procedures and Programs," requires that the licensee establish, implement, and maintain the applicable procedures recommended in Appendix A of Regulatory Guide 1.33, Revision 2, February 1978. Appendix A of this guide recommends, in section 7.3, that procedures for airborne radioactivity monitoring be prepared.

10 CFR 20.103, "Exposure of individuals to concentrations of radioactive materials in air in restricted areas", states, in part, in paragraph (a)(3) that, "For purposes of determining compliance with the requirements of this section the licensees shall use suitable measurements of concentrations of radioactive materials in air for detecting and evaluating airborne radioactivity in restricted areas . . . as may be necessary for timely detection and assessment of individual intakes of radioactivity by exposed individuals."

The licensee performs air sampling with filter media and subsequent analyses of the media for detecting and evaluating alpha airborne radio-activity.

The following procedures were reviewed:

- RP 3.036, Revision 0, "Alpha Sample Collection," dated July 13, 1981.
- RP 4.008, Revision 2, "Airborne Particulate Activity Determination," dated June 11, 1981.
- RP 8.025, Revision 1, "Use of SCA-4 ALPHA Counter," dated December 3, 1981.

The inspector's review of procedures, review of ongoing alpha air sample counting by personnel, review of completed sample analyses, and discussions with licensee representatives indicated the licensee's measurements of concentrations of radioactive materials in air were not suitable for detecting and evaluating alpha airborne radioactivity in that:

- the filter media in use for routine alpha air sampling exhibited a rough surface, and the licensee had not performed an evaluation to determine a self-absorption correction factor. The correction factor would be used to correct for alpha particles not counted due to loss through self-absorption in the filter media.
- the alpha air sample counting procedure did not specify a minimum sample counting time to achieve a specified lower limit of detection (LLD) or provide other specific guidance such as filter collection efficiencies or equations for determination of net count rate.
- the background count rate on the alpha counter was a factor of about 50 higher than the counter's typical background. The higher background had not been evaluated relative to statistical error limits. The high background and lack of specific error limits could preclude identification of alpha airborne activity concentrations.
- an individual was found to be incorrectly calculating alpha airborne concentrations in that: 1) the counting efficiency for a beta detector was being used for the analyses; and 2) the individual was subtracting multiple minutes (i.e., counts per two minutes) counts from counts per minute (cpm). Licensee documentation indicated the individual was trained and qualified on the counting procedure prior to his assignment to perform alpha counting.

The inspector discussed the above with licensee representatives and said that failure to use suitable measurements of alpha airborne radioactivity was a violation of 10 CFR 20.103(a)(3) (50-272/83-14-04).

Licensee representatives indicated the following action would be taken:

- The individual identified as incorrectly calculating alpha airborne activity concentration would be immediately prohibited from performing this activity, pending his requalification. In addition, this individual's previous calculations would be reviewed.
- Specific guidance will be established for calculation of airborne alpha activity by the Radiological Controls Organization by April 1, 1983. Appropriate personnel will be trained prior to their implementing the procedure.

In addition, licensee representatives indicated that a new alpha counting system will be obtained for use in analyzing air samples for alpha activity. Licensee radiation protection representatives indicated the new system and appropriate procedures would be in place prior to further steam generator entries.

8. Radiation Protection Procedures Adherence

The inspector toured the controlled areas and reviewed personnel adherence to radiation protection procedure requirements.

Unit 1 Technical Specification 6.11, "Radiation Protection Program," requires that procedures for personnel radiation protection be prepared consistent with 10 CFR Part 20 and be approved, maintained, and adhered to for all operations involving personnel radiation exposure.

Radiation Protection Procedure RP No. 1.013, Revision 8, "Radiation Exposure Permit/Extended Radiation Exposure Permit," dated December 8, 1982, requires, in Section C - Guidelines for REP/EREP Requirements, that all entries into the Controlled Access Area be made in accordance with the governing REP or EREP.

Extended Radiation Exposure Permit (EREP) No. 9901 (Unit 1 and 2), dated January 1, 1983, required, as a minimum for entry into contaminated areas, that a cloth cap, plastic shoecovers, cotton liners and a lab coat be worn.

On March 21, 1983, at about 4:00 p.m., the inspector, accompanied by a radiation protection technician, observed an individual exiting the Unit 1 Charging Pump Area (84' elevation) via a stepoff pad. The inspector noted that the individual only wore a pair of shoecovers while in the area. Subsequent review of survey data for the area indicated contamination levels up to 24,000 dpm/100 cm² with general area contamination levels of about 5,000 dpm/100cm². The technician reinstructed the worker in the EREP requirements at the area.

The inspector discussed the above with licensee representatives and indicated the failure to adhere to radiation protection procedures was a violation of Technical Specification 6.11 requirements (50-272/83-14-05).

9. Contractor Employee Concerns

9.1 Background

On March 18, 1983, a Public Service Electric and Gas Company contractor employee, who had worked at the Salem Nuclear Power Station, Unit 2, contacted the inspector. The employee stated that his employment with the contractor was terminated after he, on his own initiative, obtained a whole body count, which he believed he was entitled to receive. In addition, the employee stated that it was a common understanding that he must remain in Unit 2 containment, even though his work was completed and he had no additional work to perform.

On March 18, 1983, the inspector contacted the licensee's Radiation Protection Engineer and discussed certain aspects of the employee's concerns.

On March 21, 1983, the inspector initiated an onsite review of the employee's concerns in conjunction with this inspection.

9.2 Whole Body Counting

The review of Radiation Exposure Permit (REP) data, discussion with licensee representatives, and discussion with the employee indicated that he had been replacing No. 24 Fan Cooler in the Unit 2 containment. The pieces he had removed from the fan cooler were not contaminated and were readily removed from containment. On the evening of March 15, 1983, he removed a piece that required bagging prior to the removal from containment apparently due to contamination. The employee stated he was not aware of the contamination on the piece. On his return to work on the evening of March 17, 1983, he requested that he be given a whole body count because he had handled the contaminated piece on a previous shift. The employee's supervisor. per the employee, said that he should return to work and he would call on him and his co-workers throughout the shift to obtain whole body counts. The employee said he stated to the supervisor that he was entitled to an immediate whole body count and left the area to obtain a count. The employee stated to the inspector that he was told by a training instructor, during his General Employee Training, that he was entitled to a whole body count if he believed his health was compromised. Subsequent to the whole body count, he and two co-workers were terminated.

The inspector review indicated the General Employee Lesson Plan did not contain the instruction that a worker is required or should be given a whole body count if he believed his health was compromised. Rather, the lesson plan stated that a whole body count (WBC) would be given initially, annually, on termination, and if deemed necessary after radiation protection review of the matter. The worker did not contact radiation protection to review this matter.

Regarding the training instructor's statement that he could obtain a WBC, the involved instructor had been terminated by the licensee for unrelated concerns. Consequently, the inspector was unable to determine if the instructor provided incorrect information, or the employee had misinterpreted the instructor's information.

Regarding the employee's work location, the inspector's review indicated the major portion of the work area (No. 24 Fan Cooler) exhibited contamination levels of <1000 dpm/100cm². The fan cooler dampers exhibited 2400 dpm/100cm². This contamination level did not represent an intake hazard due to dampers being slightly oily. Radiation and contamination surveys were performed prior to and during the work on No. 24 fan cooler, were documented, and were available for review. The employee signed in on the work permit indicating he had been briefed.

The REP required the use of appropriate protective clothing for this contamination level.

The review of the individual's WBC data, from the count received subsequent to the work, did not indicate any intake of airborne radioactive material.

The inspector discussed the above with licensee representatives. The licensee's Training Specialist said that personnel providing the radiological portion of the General Employee Training Program were made cognizant of the incident and instructed to adhere to lesson plan content. The licensee's Training specialist had routinely been reviewing instructor adherance to Lesson Plan content on a monthly basis.

Licensee representatives indicated the circumstances surrounding the employee's termination would be reviewed.

No violations were identified.

9.3 Personnel Remaining in Containment

The inspector toured the Unit 2 Containment during the inspection to determine if personnel were loitering in radiation areas while awaiting shift change. The inspector did not identify any personne loitering while waiting for shift change.

The inspector discussed the above with licensee representatives. Licensee radiation protection representatives immediately instructed Unit 2 Containment radiation protection control personnel that during their tours, they should be aware of any apparent loitering in radiation areas. If individuals were identified to be loitering in radiation areas, they will be requested to leave the area.

No violations were identified.

10. Exit Interview

The inspector met with licensee representatives (denoted in section 1) at the conclusion of the inspection on March 25, 1983. The inspector summarized the purpose, scope, and findings of the inspection.

Licensee representatives indicated the following:

- Alpha airborne radioactivity would be evaluated in the area of the steam generators (Details, section 6.3.3).
- The method for determination of alpha emitters in radioactive waste would be evaluated (Details, section 6.3.4).
- Alpha analyses equipment and procedures would be upgraded (Details, section 7.0).
- An individual identified as incorrectly calculating airborne alpha activity was prohibited from performing such calculations pending his regualification (Details, section 7).
- Unit 2 Containment Radiological Control Technicians were instructed to be aware of apparent loitering in radiation areas and take appropriate action if identified (Details, section 9.3).