

U.S. NUCLEAR REGULATORY COMMISSION  
REGION I

Report Nos. 50-272/90-16  
50-311/90-16

Docket Nos. 50-272 and 50-311

License Nos. DPR-70 and DPR-75

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

Facility Name : Salem Generating Station, Units 1 & 2

Inspection At: Hancocks Bridge, New Jersey

Inspection Conducted : May 29-June 1, 1990

Inspector:

Jason C. Jang  
Jason C. Jang, Sr. Radiation Specialist  
Effluents Radiation Protection Section (ERPS)

6-17-90  
Date

Approved by:

Robert J. Bores  
Robert J. Bores, Chief, ERPS, Facilities  
Radiological Safety and Safeguards Branch,  
Division of Radiation Safety and Safeguards

6-13-90  
Date

Inspection Summary: Inspection on May 29-June 1, 1990 (Inspection Report Nos.  
50-272/90-16 and 50-311/90-16)

**Areas Inspected:** Routine, unannounced inspection of the licensee's radioactive liquid and gaseous effluent control programs including: management controls for these programs, calibration of effluent/process radiation monitors, air cleaning systems, and implementation of the Offsite Dose Calculation Manual.

**Results:** Within the areas inspected, no violations were identified. However, an unmonitored radioactive liquid release from Unit 2 on May 21, 1990 was categorized as a non-cited violation (See Section 5.1 of this inspection report). Response to the non-cited violation is not required. The licensee's corrective actions for the Radiation Monitoring and Air Cleaning Systems were moving appropriately in the right direction.

## DETAILS

### 1.0 Individuals Contacted

#### 1.1 Licensee Personnel

J. Curham, Senior Staff Engineer  
S. Cornman, Lead Engineer, Operations  
\*J. Dierickx, Technical Supervisor, RP/Chemistry Department  
\*E. Galbraith, Principle Chemistry Engineer, RP/Chemistry Department  
J. Grimm, Lead Engineer, Technical Department  
R. Lemberger, Lead Engineer, Technical Department  
\*P. McNulty, Technical Supervisor, RP/Chemistry Department  
\*L. Miller, General Manager, Salem Operations  
\*D. Miller, Engineer, Chemistry Services  
D. Mohler, Manager, RP/Chemistry Department  
\*M. Morroni, Manager, Technical Department  
\*A. Orticelle, Manager, Maintenance Department  
\*R. Palmer, Radiation Protection Supervisor, RP/Chemistry Department  
M. Pollack, LER Coordinator  
F. Roberts, Lead Engineer, Technical Department  
T. Sacca, Lead Engineer, NQA Department  
\*F. Thomson, Assistant to General Manager  
\*E. Villar, Station Licensing Engineer  
R. Werline, Engineer, Operations

#### 1.2 NRC

\*D. Allsopp, Resident Inspector, Hope Creek/Salem Stations

\*Denotes those present at the exit interview on May 31, 1990.

Other licensee employees were contacted and interviewed during this inspection.

### 2.0 Purpose

The purpose of this inspection was to review the licensee's ability to control and quantify radioactive liquids, gases, and particulates during normal and emergency operations

### 3.0 Review of Previously Identified Items

(Open) Unresolved Item (UNR 272/89-10-02; 311/89-09-02) Provide air balance and relative humidity test results for air cleaning systems to the NRC. The licensee will establish a task team for the design, maintenance, and operation of the various HVAC systems in the near future (Licensee's Internal Memorandum MEC-90-0210 dated June 1, 1990). The initial phase will entail scoping of the total project. This phase is projected to begin in

June 1990 and be complete no later than the end of December 1990. The licensee stated that the air balance test will be performed during Unit 1 refueling outage in Fall 1990. This item remains open pending the review of air balance and humidity test results.

(Open) Unresolved Item (UNR 272/89-15-08) Oxygen concentrations in the waste gas decay tank exceeded Technical Specification limits and were not reduced within the required time. See details Section 5.2 of this inspection report.

#### 4.0 Management Controls

##### 4.1 Program Changes

There were no significant changes in the licensee's Radiological Effluent Control Programs since the previous inspection in May 1989.

##### 4.2 Audits

The inspector reviewed the results of the quality assurance audit documented in Audit Report Number NQP-89-0664. This audit covered, in part, the areas of the Offsite Dose Calculation Manual (ODCM) and liquid and gaseous effluent control programs. The inspector noted that the audit was performed by qualified auditors. The inspector also noted that the audit appeared to thoroughly assess the ODCM and liquid and gaseous effluent control programs. The inspector noted that the audit identified few findings; none of safety significance.

The inspector also reviewed the effectiveness of the licensee's audit followup tracking system using the licensee's previous audit finding documented in Audit Report Number SA-88-0036-1, alarm setpoint for the Unit 1 liquid effluent monitor (1R18). The Radiation Protection/Chemistry Department had a responsibility to reply to the above audit finding by December 23, 1988. The above audit followup item was closed on April 1, 1989 due to an extensive evaluation for the determination of alarm setpoint. Based on the review of the above finding and response to the finding, the inspector determined that the licensee was using the tracking system effectively.

No violations were identified in this area.

##### 4.3 Review of Semiannual Reports

The inspector reviewed the Radiological Semiannual Effluent Reports for 1989. These reports provided total released radioactivity for liquid and gaseous effluents including projected radiation dose to the public. No obvious mistakes or trends were noted. Through review of these reports, the inspector determined that the licensee met the Technical Specification requirements. No violations were identified.

## 5.0 Liquid and Gaseous Effluent Controls

The inspector reviewed the licensee's liquid and gaseous effluent control programs to determine implementation of the following Technical Specification (TS) requirements for both units.

- o TS 3/4.11.1, "Liquid Effluents"
- o TS 3/4.11.2, "Gaseous Effluents"
- o TS 6.14, Offsite Dose Calculation Manual (ODCM)"

The inspector reviewed the following radioactive effluent release control procedures and also reviewed selected radioactive liquid and gaseous release permits to determine the adequacy of implementation of the above requirements.

- o CH-3.8.51, "Radiological Effluent Discharge Report Generation and Completion"
- o OP II-3.2(b), "Release of Radioactive Liquid Waste to the Circulating Water System from 11 or 12 Monitor Tanks"
- o OP II-12.3.3, "Discharge of Gaseous Waste to the Plant Vent"

The inspector noted that Procedure CH-3.8.51 was sufficiently detailed to implement liquid and gaseous radioactive effluent release control programs. The reviewed liquid and gaseous release permits met the requirements for sampling and analysis at the frequencies established in the Technical Specifications. During the review of liquid release permits, the inspector noted that Operations personnel recorded the liquid effluent monitoring results, using the control room readout panel and/or strip chart, before and during releases as required by Steps 6.1 and 6.2 of OP II-3.2(b). These monitoring results were attached to the liquid release permits. The effluent monitoring results prior to initiation of the releases (Step 6.1) are expected to be lower than the monitoring results during the releases (Step 6.2), since the latter would reflect the activity in the release. The inspector randomly selected ten (10) liquid release permits for each unit and reviewed these monitoring results. Four results out of ten for Unit 1 and nine results out of ten for Unit 2 appeared to be recorded accurately based on the incremental increase seen during the discharge versus results prior to the discharge. (For the other releases, the results recorded during the releases were either the same as or lower than the results recorded before these respective releases.) The inspector compared these somewhat more accurately recorded monitoring results using the conversion factor (cpm/uCi/ml) to the gamma counting results (uCi/ml). The comparison indicated that the results were in reasonably good agreement. Based on the above reviews, the inspector stated the following actions should be taken to assure the operability of the liquid effluent monitors.

- o Steps 6.1 and 6.2 of OP II-3.2(b) should be recorded accurately.
- o Comparisons between monitoring results and gamma counting results should be performed.

- o These comparison data should be used as a management tool and to monitor trend analysis.

The licensee stated that the above recommended actions will be evaluated and appropriate actions taken in the future. The inspector stated that this area will be reviewed during a subsequent inspection. No violations were identified.

#### 5.1 Unmonitored Radioactive Liquid Release from Unit 2

On May 21, 1990, the licensee identified that radioactive liquid from Unit 2 (22 CVCS Monitor Tank) was released without monitoring during the release due to an isolation of the 2R18 liquid effluent monitoring line valve (4491HN). This valve was closed for the addition of hydrogen peroxide to the monitor tank prior to the release in order to oxidize hydrazine, because the licensee does not have a New Jersey permit to release hydrazine to the Delaware River. A Chemistry technician neglected to reopen this valve as required by Procedure SC.CH-AD.WL-0416(Q), "Chemical Addition to the Waste System" after the addition of hydrogen peroxide. The Chemistry Department, however, sampled and measured radioactivity in that monitor tank and performed dose projection to the public before release as required by the Technical Specifications. The inspector reviewed these results and determined that there was no impact on the public health and safety. To prevent recurrence, the licensee performed the following corrective actions.

- o Procedure SC.CH-AD.WL-0416(Q) has been revised requiring verification and sign-off that valve 4491HN is open after hydrogen peroxide addition.
- o A critique on the revision was given to all Chemistry technicians and the critique also stressed the necessity for absolute procedure compliance and attention to detail.
- o Operating Procedure II-1.3.6 was submitted for revision to require verification of valve positions for liquid releases.

The failure to follow Procedure SC.CH-AD.WL-0416(Q) is considered a licensee identified violation in that (1) it was identified by the licensee; (2) it fits into Severity Level IV or V; (3) the licensee took aggressive actions to correct the deficiency and to prevent recurrence; and (4) this was the first occurrence of this type of event. Consequently, no notice of violation will be issued and this issue is considered closed (50-311/90-16-01).

#### 5.2 Unresolved Item 272/89-15-08 (Oxygen Concentration)

On May 19, 1990, an Operations personnel documented an incident regarding the oxygen concentration in the Unit 1 waste gas decay tank in excess of Technical Specification limits (2%). The oxygen

concentration of the waste gas decay tank was 2.08%. The licensee reported similar events in LERs 89-016 and 89-031. The inspector also noted that this type of incident (based on LER 89-016) was identified as an unresolved item by the NRC (UNR 272/89-15-08), and the root cause of the oxygen ingress has been attributed by the licensee to system design and procedural problems. The inspector did not review the licensee system design during this inspection. The inspector reviewed the following Operations Procedures to determine the adequacy of the implementation of Section 3/4.11.2.5, "Explosive Gas Mixture" of the Technical Specifications.

- o Operating Procedure (OP) II-2.3.1, "Purging the Pressurizer Relief Tank of Oxygen"
- o OP II-3.3.4, "Placing CVCS Holdup Tanks in Service"
- o OP II-11.3.4, "Reactor Coolant Drain Tank-Normal Operation"
- o OP II-12.3.1, "Gaseous Waste Disposal System-Normal Operation"
- o ARP-OHA-D, "Alarm Response Procedure Overhead Window D"

Section 4.0, "Manual Actions" of the Procedure ARP-OHA-D requires the licensee to (1) determine cause of alarm, (2) notify Maintenance Department -I&C to correct cause of alarm, and (3) if I&C declares the Gas Analyzer inoperable, then either transfer sampling to Units 1/2 Gas Analyzer or notify Chemistry Department to commence grab sampling from Waste Gas Holdup System. Alarm Response Procedure ARP-OHA-D lacks details and does not provide further guidance to the operators. It did not cross-reference other Operating Procedures. The inspector noted that the Operating Procedures contained instructions to purge an excess oxygen content from various tanks to reduce oxygen concentration within the Technical Specifications during normal operations. Based on the above review, the inspector determined that the unresolved item will remain open pending the upgrade of the Alarm Response Procedure and Operating Procedures, as appropriate, as well as completion of any necessary system modifications.

The inspector reviewed Chemistry Department Log for oxygen analyses for 1987, 1989, and 1990 and found them satisfactory.

#### 6.0 Calibration of Effluent/Process Monitors

The inspector reviewed the most recent calibration results for both units for the following effluent/process monitors to determine the implementation of the Technical Specification requirements.

- o Liquid Radwaste Effluent Line Monitors (1,2-R18)
- o Steam Generator Blowdown Monitors (1,2-R19A, 19B, 19C, and 19D)
- o Main Steam Line Monitors (1,2-R46A, 46B, 46C, 46D, and 46E)
- o Containment Fan Cooler-Service Water Monitors (1,2-R13A, 13B, 13C, 13D, and 13E)

- o Containment Vent Monitors (1,2-R12A and R12B)
- o Plant Vent Effluent Monitors (1,2-R16)
- o Plant Vent Monitors (1-R41A, 41B, and 41C)

The I&C Department has the responsibility to perform electronic and radiological calibrations for all effluent and process monitors. Based on the review of the above monitor calibration records, the inspector determined that the calibrations were performed as required by the appropriate procedures and by the Technical Specifications. No violations were identified.

#### 7.0 Radiation Monitoring Systems (RMS)

Spurious RMS signals have initiated numerous Emergency Safety Feature (ESF) actuations and the licensee has submitted LERs based on these ESF actuations since 1988. During the previous inspection in May 1989, the inspector evaluated eleven (11) LERs and three Special Reports (SRs) regarding the RMS. The inspector determined that the major root cause of LERs and SRs was equipment failure, rather than inadequate procedures or personnel errors. The licensee, therefore, had established short and long term projects to upgrade the RMS.

During this inspection, the progress of these projects was discussed with licensee representatives. The inspector was informed that the progress of short and long term projects established in 1988 was on schedule. The short and long term projects were installation of a central process unit in 1990 and replacement of ESF radiation monitoring system in 1991, respectively. The inspector reviewed those ESF radiation monitors which will be replaced in 1991. The inspector stated that the progress of the projects will be reviewed during subsequent inspections. The inspector had no further questions in this area.

The inspector examined the operability of the following ESF radiation monitors: plant vent monitors (1,2-R41A, 41B, and 41C), plant vent effluent monitors (1,2-R16), and containment vent monitors (1,2-R12A) during this inspection. All of these monitors appeared to be functional at the time of this examination. The inspector had no further questions at this time.

#### 8.0 Air Cleaning Systems

The inspector reviewed the surveillance test results for the air cleaning systems during the previous inspection in May 1989. Consequently, the inspector reviewed the most recent surveillance test results only for the Unit 2 Control Room Emergency Filtration and Auxiliary Building Exhaust Air Ventilation Systems during this inspection. For these systems, the inspector reviewed the results of the following inspections and tests.

- o Visual Inspections
- o In-Place HEPA Leak Tests

- o In-Place Charcoal Leak Tests
- o System Air Flow Rate Tests (Air Capacity Tests)
- o Pressure Drop Tests
- o Laboratory Tests for the Iodine Collection Efficiencies

All reviewed test results were found to be within the Technical Specification acceptance criteria. No violations were identified.

The inspector noted that the Radiation Protection (RP) Department assumed the responsibility for the air cleaning system surveillance tests. The inspector discussed the air cleaning systems with the responsible individual. The inspector noted that this individual had good knowledge about the surveillance test procedures and other aspects, such as air flow test and acceptance criteria. The inspector also noted that this individual is going to attend an air cleaning system training course in the near future. The inspector stated that the licensee actions in this area were good. The inspector had no further questions.

#### 9.0 Exit Interview

The inspector met with licensee representatives (denoted in Section 1.1) on May 31, 1990. The inspector summarized the purpose, scope, and findings of the inspection. The inspection was continued after the exit interview until June 1, 1990. No additional significant findings were identified.