

U. S. NUCLEAR REGULATORY COMMISSION

REGION I

Report Nos. 50-272/85-20  
50-311/85-22

Docket Nos. 50-272  
50-311

License Nos. DPR-70  
DPR-75

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

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

Inspection At: Hancocks Bridge, New Jersey

Inspection Conducted: September 1, 1985 - September 30, 1985

Inspectors: T. J. Kenny, Senior Resident Inspector  
R. W. Borchardt, Resident Inspector

Reviewed by: *D. F. Limroth* 10-8-85  
D. F. Limroth, Project Engineer  
Reactor Projects Section No. 2B, DRP  
date

Approved by: *L. J. Norrholm* 10/10/85  
L. J. Norrholm, Chief, Reactor Projects  
Section No. 2B, Projects Branch No. 2, DRP  
date

Inspection Summary:

Inspections on September 1, 1985 - September 30, 1985 (Combined Report Numbers 50-272/85-20 and 50-311/85-22)

Areas Inspected: Routine inspections of plant operations including: followup on outstanding inspection items, operational safety verification, maintenance observations, surveillance observations, ESF system walkdown, management changes, Hurricane Gloria, review of special reports, licensee event followup, and NRC Commissioner's visit. The inspection involved 190 inspector hours by the resident NRC inspectors.

Results: This report documents one violation of practices in the calculations of Reactor Coolant Inventory Balance (leak-rate). It also documents, in the maintenance section, the results of an extensive review of the Furmanite valve repair process.

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DETAILS1. Persons Contacted

Within this report period, interviews and discussions were conducted with members of licensee management and staff as necessary to support inspection activity.

2. Followup on Outstanding Inspection Items

(Closed) Unresolved Item (311/79-26-01). QA practice of performing inspections without the use of actual physical inspection ("hands-on"). PSE&G's current management philosophy does not preclude "hands-on" inspection. This practice is now delineated in QA procedure QAP 5-2. This item is considered closed.

(Closed) Unresolved Item (272/82-05-02). Inspector's concern was that certain items with a shelf life were not being inspected for expiration dates. The licensee has included in the inspection order system (computerized) all known items with shelf lives. This item is considered closed.

(Closed) Unresolved Item (272/85-07-05). Two bolts were not properly installed during the installation of 1C battery. The inspector has reviewed a safety evaluation performed to insure that the Hilti-bolt embedments used to install 1C battery are capable of seismic support. The evaluation provides assurance that the current installation will support the battery for design seismic loads. This item is considered closed.

(Closed) Violation (311/85-08-02). Improper installation of safety related equipment (2C battery) with regard to Hilti-bolt embedments. QA coverage during and after installation was non-existent. The installation has been verified correct by the licensee and the inspector has reviewed the licensee's changes to the QA practices involving work activities for contractors without an internal QA program. This item is considered closed.

(Closed) Unresolved Item (311/85-07-06). The first out alarm system did not appear to operate properly on a surveillance test. Subsequent testing by the licensee has documented that the system functions as designed. This item is considered closed.

(Closed) Violation (311/85-17-01). Operator failure to follow procedure resulting in a reactor trip. The operator has been counseled and disciplined and subsequently retrained. Management has stressed to all operators through the retraining program the need to follow procedures. This item is considered closed.

(Closed) Violation (272/85-15-01; 311/85-17-02). Inadequate review of on-the-spot change to waste gas sampling procedure. The inspector

reviewed the licensee's response to this violation dated September 20, 1985, and determined that it adequately addressed the inspector's concerns. Immediate corrective action consisted of removing the improper on-the-spot change from the chemistry sampling procedure and performing a review and analysis of plant releases to verify that no hazard to the public existed. The licensee has also taken administrative and training actions to prevent recurrence of this event. In an effort to improve the review process associated with on-the-spot changes, the licensee significantly revised the administrative procedure governing on-the-spot changes. The Technical Specification amendments and the qualification of station qualified reviewers are both complete. This area will continue to receive close review by the inspector. On September 6, 1985, the inspector attended a session of Station Qualified Reviewer Training for purposes of evaluation. The inspector has no further questions.

### 3. Operational Safety Verification

#### 3.1 Documents Reviewed

- Selected Operators' Logs
- Senior Shift Supervisor's (SSS) Log
- Jumper Log
- Radioactive Waste Release Permits (liquid & gaseous)
- Selected Radiation Exposure Permits (REP)
- Selected Chemistry Logs
- Selected Tagouts
- Health Physics Watch Log

3.2 The inspectors conducted routine entries into the protected areas of the plants, including the control rooms, Auxiliary Building, fuel buildings, and containments (when access is possible). During the inspection activities, discussions were held with operators, technicians (HP & I&C), mechanics, supervisors, and plant management. The purpose of the inspection was to affirm the licensee's commitments and compliance with 10 CFR, Technical Specifications, and Administrative Procedures.

(1) On a daily basis, particular attention was directed to the following areas:

- Instrumentation and recorder traces for abnormalities;
- Adherence to LCO's directly observable from the control room;
- Proper control room shift manning and access control;
- Verification of the status of control room annunciators that are in alarm;

- Proper use of procedures;
  - Review of logs to obtain plant conditions; and,
  - Verification of surveillance testing for timely completion.
- (2) On a weekly basis, the inspectors confirmed the operability of selected ESF trains by:
- Verifying that accessible valves in the flow path were in the correct positions;
  - Verifying that power supplies and breakers were in the correct positions;
  - Verifying that de-energized portions of these systems were de-energized as identified by Technical Specifications;
  - Visually inspecting major components for leakage, lubrication, vibration, cooling water supply, and general operating conditions; and,
  - Visually inspecting instrumentation, where possible, for proper operability.
- (3) On a biweekly basis, the inspectors:
- Verified the correct application of a tagout to a safety-related system;
  - Observed a shift turnover;
  - Reviewed the sampling program including the liquid and gaseous effluents;
  - Verified that radiation protection and controls were properly established;
  - Verified that the physical security plan was being implemented;
  - Reviewed licensee-identified problem areas; and,
  - Verified selected portions of containment isolation lineup.

### 3.3 Inspector Comments/Findings:

The inspectors selected phases of the units operation to determine compliance with the NRC's regulations. The inspectors determined that the areas inspected and the licensee's actions did not constitute a health and safety hazard to the public or plant

personnel. The following are noteworthy areas the inspector researched in depth: During the inspector's routine review of the Jumper and Lifted Lead Log a number of discrepancies were identified. When the inspector discussed these discrepancies with the licensee he was informed that a detailed review of the use of jumpers and lifted leads throughout the plant was already in progress. At the completion of the licensee's study the inspector will review the findings and corrective actions as part of the routine inspection activities.

### Unit 1

- a. Unit 1 operated at 100% power throughout this report period with the exception of those periods discussed below.
  - The licensee entered a Technical Specification action statement (3.4.6.2.d) at 3:55 a.m. on September 16, 1985 when the identified leak rate exceeded 10 gpm. The licensee identified the source of the leak (packing on spray line isolation valve PS-25). PS-25 was placed on the back seat and the leak was returned within Technical Specification limits for primary system leakage. The licensee completed repairs to the valve and the rupture disk in the Pressurizer Relief Tank (located within the containment) that prematurely ruptured during the leak event. The licensee declared an unusual event and made all the necessary notifications. The unit remained at 100% power throughout this evolution. The unusual event was terminated at 10:15 a.m. and the action statement was terminated at 11:15 a.m. when the corrected leak rate was 0.77 gpm.
  - On September 22, 1985, from 5:46 p.m. to 8:53 p.m. the licensee performed a Reactor Coolant System (RCS) Water Inventory Balance in accordance with surveillance procedure SP(0)4.4.6.2d. The results of this leak rate test indicated a total uncorrected leak rate of 1.3 gpm. In accordance with the surveillance procedure this total uncorrected leak rate may be corrected by subtracting the total identified leakage into 1) the Pressurizer Relief Tank plus 2) the Reactor Coolant Drain Tank plus 3) other "identified" leakage. After applying corrections for the identified leakage into the Pressurizer Relief Tank and the Reactor Coolant Drain Tank, the unidentified leak rate was calculated to be 1.19 gpm which is in excess of the 1.0 gpm Technical Specification (TS) limit. An operator and the shift supervisor made a containment entry in an effort to determine the source of the increased RCS leakage and found that pressurizer spray isolation valve, 1PS28, had a packing leak. The packing leak rate was "visually estimated" to be 0.35 gpm and categorized as identified

leakage. After applying this new correction, the revised RCS unidentified leak rate was calculated to be 0.84 gpm (1.19 - .35) which is within TS limit. However, making a "visual estimate" of RCS leakage is not an authorized means of identifying that leakage for purposes of compliance with TS. The inspector's review of the RCS Water Inventory Balance surveillance procedure revealed that the operators are not given sufficient guidance on how to identify and quantify a primary to containment atmosphere leak. The failure to provide adequate procedural guidance concerning RCS identified leakage is a violation (272/85-20-01).

When upper management learned about this practice they ordered the unit to be placed in the action statement called out in Technical Specifications. After entering the action statement the leak was repaired within the time frame of the action statement and the unit continued operation.

- The licensee declared an unusual event on September 23, 1985 at 8:28 a.m., when the reactor coolant system water inventory balance determined the unidentified leak rate to be in excess of the Technical Specification limit of 1.0 gpm. An inspection inside the containment identified a body to bonnet leak from pressurizer spray isolation valve (1PS28) to be the source of the increased unidentified leakage. The body to bonnet leak was repaired and the unidentified leak rate determined to be 0.62 gpm. The unusual event was terminated at 4:23 p.m. on September 23.
- The licensee declared an unusual event on September 26, 1985 at 7:50 a.m. when the unidentified leak rate was determined to be in excess of the Technical Specification limit of 1.0 gpm. The increased leak rate was determined to be from the pressurizer spray isolation valve (1PS28) that was repaired on September 24. A Furmanite plug installed on September 24 failed and required rework by Furmanite. The licensee completed repairs to the pressurizer spray isolation valve and terminated the unusual event at 2:11 p.m. on September 26 when the reactor coolant system unidentified leakage was verified to be within Technical Specification.

- b. The repairs that were conducted on the leaking primary system valve are described in the maintenance section of this report.

#### Unit 2

- a. Unit 2 operated at 100% power throughout this report period with the exception of those periods discussed below.

- At 5:23 a.m. on September 21, 1985 the control room operators initiated a manual reactor trip when normal primary system pressure could not be maintained due to leakage past pressurizer spray valve 2PS23. The pressurizer spray valve failed to completely close resulting in a continuous spray into the pressurizer for which the pressurizer heaters could not completely compensate. An investigation by Instrument and Control technicians determined that the electric-to-pneumatic (E/P) converter for 2PS23 was providing an incorrect signal which caused the valve to remain partially open when the valve should have been fully shut. The E/P converter was replaced and the unit brought critical at 9:05 a.m. on September 22, 1985. The unit returned to 100% power at 6:00 a.m. on September 23, 1985.

One violation was identified.

#### 4. Maintenance Observations

As a result of an unusual number of repairs accomplished by the Furmanite process during this month, the resident inspector conducted an indepth inspection into the repairs as well as the entire Furmanite process. The inspector reviewed the following documents:

- Work orders 85-09-17-049-5 Repair of 1PS28  
85-09-19-027-3 Repair of 1PS1  
85-09-19-028-3 Repair of 1PS3  
85-09-26-009-5 Repair of 1PS28
- Certificate of conformances for materials used to accomplish repairs.
- Maintenance Procedure T-172 Furmanite repair.
- Safety Evaluations A11-1 for all repairs.
- Furmanite procedures for various applications of their process. (QA-4)
- Chemistry records
- Engineering evaluation SMD85-3712
- Onsite Review Committee (ORC) review of the Furmanite process, evaluations and procedures.
- Chemical analysis of Furmanite.

The inspector concluded the following as a result of this review.

- All repairs were performed using approved procedures, the records reviewed were complete.
- Furmanite utilized two processes to perform the repairs reviewed.
  - The first process was to repair a body to bonnet leak and involved placing a clamp around the flanged area, securing it and then pumping in the Furmanite. This process forms a new gasket in the void space between the flanges. The external clamp is non-pressure retaining and remains in place after the Furmanite is injected.
  - The second process was used to repair a body to bonnet leak also but a torque axial nut was installed on one of the studs that hold together the body and bonnet. The Furmanite is injected through the nut down along the stud and into the void space, outside the gasket, between the body and bonnet of the valve.
- Certificate of conformance for the materials used met or exceeded the requirements of 10 CFR 50 Appendix B, ANSI/ASME N45.2, ASME Section 3 and that 10 CFR 21 applied.
- The engineering evaluations were concurred in by PSE&G engineering and approved by the SORC.
- The chemical analysis concluded that the only significant substance to monitor for in the system being Furmanited was total organic carbon (TOC). The licensee performs routine analysis for TOC in the primary coolant system and since the use of Furmanite no increase in TOC has been detected.

No violations were identified.

#### 5. Surveillance Observations

During this inspection period, the inspector reviewed in-progress surveillance testing as well as completed surveillance packages. The inspector verified that the surveillances were performed in accordance with licensee approved procedures and NRC regulations. The inspector also verified that the instruments used were within calibration tolerances and that qualified technicians performed the surveillances.

The following surveillance was reviewed in depth with portions of the procedure witnessed by the inspector.

Procedure M2T Undervoltage and underfrequency Trip Check and Time  
Unit 1 Response of Vital and Group Buses.

No violations were identified.

6. Engineered Safety Feature (ESF) System Walkdown

The inspectors verified the operability of the selected ESF system by performing a walkdown of accessible portions of the system to confirm that system lineup procedures match plant drawings and the as-built configuration, to identify equipment conditions that might degrade performance, to determine that instrumentation is calibrated and functioning, and to verify that valves are properly positioned and locked as appropriate. The Unit 1 Safety Injection system was inspected.

No violations were identified.

7. Recent Management Changes

The licensee recently reorganized the station management structure in order to place the emphasis on the operation of the station plants rather than on plant betterment. The new structure changes the operating philosophy by:

- Placing the station planning effort directly under the General Manager of the plant.
- Combining the chemistry and H.P. department under one manager.
- Combining the I&C and Mechanical Maintenance Groups under one manager.
- Establishing an Engineering Section reporting to the Technical Manager which will directly oversee plant changes and maintenance within assigned systems.

The resident inspector reviewed the qualifications for the personnel involved in the change and determined that all newly appointed positions are staffed by people that exceed the qualifications as outlined in ANSI/ANS 3.1, 1981. "Selection, Qualification and Training for Nuclear Power Plants" and ANSI 18.1 "Selection and Training of Nuclear Power Plant Personnel."

No violations were identified.

8. Hurricane Gloria

The licensee began making preparations for Hurricane Gloria on September 25. The preparations included:

- Testing the Gas Turbine (located on site)
- Moving all solid radioactive waste, which had been packaged for shipment, inside
- Checking all water tight bulkhead doors and repairing damaged ones as necessary

- Tying down all trailers on site
- Placing additional sump pumps in class I structures as well as the turbine building
- Testing communications
- Sand bagging all doors and low lying areas of the site

The resident inspectors monitored the licensee's actions in preparation for the hurricane and remained on site during the duration of the projected times for the hurricane passing through the area. The licensee also increased the staffing on the site to cope with any emergencies that might arise.

The projected forces of the hurricane as to winds and tides were never realized at Salem Station. The maximum winds reached were gusts up to 70 mph and sustained 15 minute averages of 54 mph. The tide level reached a maximum elevation of 94 feet. The licensee's Technical Specifications and emergency plan allow operation to continue with winds up to 90 mph and tides up to 101 feet. The units operated without incident throughout the period that the hurricane was in close proximity to the station.

The licensee and resident inspectors exercised portions of the emergency plan during the hurricane period, although the emergency plan was never required to be implemented. The following portions of the plan were tested:

- Communications between NRC Region I and the site
- The Technical Support Center (TSC)
- Various equipment located throughout the site in the TSC and Operational Support Center (OSC)
- The licensee fully manned the TSC and OSC

No abnormalities were noted.

#### 9. Review of Periodic and Special Reports

Upon receipt, the inspectors reviewed periodic and special reports. The review included the following: inclusion of information required by the NRC; test results and/or supporting information consistent with design predictions and performance specifications; planned corrective action for resolution of problems, and reportability and validity of report information. The following periodic reports were reviewed:

- Unit 1 Monthly Operating Report - August 1985

- Unit 2 Monthly Operating Report - August 1985

10. Licensee Event Report Followup

The inspector reviewed the following LERs to determine that reportability requirements were fulfilled, immediate corrective action was taken, and corrective action to prevent recurrence had been accomplished in accordance with Technical Specifications.

Unit 2

LER 85-017      Reactor Trip From 100% During Solid State Protection System Testing

This item was discussed in Inspection Report 50-311/85-20. The inspector has no further questions at this time.

LER 85-018      Component Cooling Water Heat Exchanger Service Water Flow Rate Below Required Value

This event was described in Inspection Report 50-311/85-20 and was reportable due to the completion of a unit shutdown. The vibration induced failure of the 22 Component Cooling Heat Exchanger (CCHX) outlet isolation valves (22SW356) has been attributed to the removal of the Cavitrol tube bundle from the 22 CCHX flow control valve (22SW127). The tube bundle had been removed from 22SW127 because it had become plugged and deteriorated. The licensee replaced 22SW356 prior to the unit startup and is investigating long term solutions to minimize vibration in the service water line while waiting for delivery of a new Cavitrol tube bundle for 22SW127. The inspector has no further questions.

LER 85-019      Service Water Leak in Containment

On September 11, 1985, the No. 23 Containment Fan Coil Unit (CFCU) developed a service water leak from a vent line. The CFCU was quickly isolated preventing an accumulation of water inside the containment. The vent line was repaired and the 23 CFCU returned to service on September 23, 1985. No equipment was damaged during this event; however, it was reportable in accordance with IE Bulletin 80-24.

11. NRC Commissioner's Visit

Commissioner Zech met with licensee management and toured the Salem facility on September 20, 1985. The tour included the control room, auxiliary building, emergency diesel generator rooms, turbine deck and the PSE&G Nuclear Training Center. At the conclusion of the tour an exit meeting was held with the licensee followed by a short press conference.

## 12. Exit Interview

At periodic intervals during the course of the inspection, meetings were held with senior facility management to discuss the inspection scope and findings. An exit interview was held with licensee management at the end of the reporting period. The licensee did not identify any 2.790 material.