

U.S. NUCLEAR REGULATORY COMMISSION  
OFFICE OF INSPECTION AND ENFORCEMENT

Region I

Report No. 50-272/79-27  
50-311/79-34

Docket No. 50-272  
50-311

License No. DPR-70  
CPPR-53

Priority --

Category C  
B1

Licensee: Public Service Electric and Gas Company

80 Park Place

Newark, New Jersey 07101

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

Inspection at: Hancocks Bridge, New Jersey

Inspection conducted: September 10 - October 6, 1979

Inspectors: *R. R. Keimig for*  
L. J. Norrholm, Resident Inspector

10-29-79  
date signed

date signed

date signed

Approved by: *R. R. Keimig*  
R. R. Keimig, Chief, Reactor Projects Section  
No. 1, RO&NS Branch

10-31-79  
date signed

Inspection Summary:

Inspections on September 10 - October 6, 1979 (Combined Report Nos. 50-272/79-27 and 50-311/79-34)

Unit 1 Areas Inspected: Routine inspections by the resident inspector of plant operations including tours of the facility; log and record reviews; review of licensee events; followup on IE Bulletins and Circulars; observation of emergency drills; and, followup on previous inspection items. The inspections involved 46 inspector-hours by the resident NRC inspector.

Unit 2 Areas Inspected: Routine inspections by the resident inspector of plant preoperational testing including tours of the facility; staff training; test program implementation controls; storage of new fuel; fire protection; preparedness for an operating license; and, followup on previous inspection items. The inspections involved 23 hours by the resident NRC inspector.

Results: One item of noncompliance was identified relative to Unit 2 (Infraction - Failure to conduct monthly fire extinguisher inspections - Para. 7). No items of noncompliance were identified relative to Unit 1.

## DETAILS

### 1. Persons Contacted

#### PSE&G

E. Barradale, Construction Manager  
S. LaBruna, Maintenance Engineer  
A. Meyer, Site QA Engineer  
E. Meyer, Project QA Engineer  
H. Midura, Manager - Salem Generating Station  
W. Reuther, Site QAD  
F. Schnarr, Station Operating Engineer  
R. Silverio, Assistant to the Manager  
J. Stillman, Station QA Engineer  
J. Zupko, Chief Engineer

The inspector also interviewed other licensee personnel during the course of the inspections including management, clerical, maintenance, operations, performance, quality assurance, testing, and construction personnel.

### 2. Status of Previous Inspection Items

(Closed) Follow item (272/78-09-05): Replacement of stem-mounted limit switches. By direct inspection and review of design change records, the inspector verified that stem-mounted limit switches on in-containment valves had been replaced with qualified switches during this outage.

(Closed) Noncompliance (272/79-08-02): Failure to follow procedures relative to surveillance test SP(0)4.2.1.1, Axial Flux Difference. The inspector verified licensee corrective actions in changing procedure SP(0)4.2.1.1 Check Off Sheet 4.1 to clarify the source of target axial flux difference data. In addition, availability of this information in Table 3 of the Reactor Engineering Manual was verified. The inspector had no further questions on this item.

(Closed) Noncompliance (272/79-12-02): Failure to maintain controlled copy document control. The inspector reviewed licensee actions taken to establish effective control over distribution of the Maintenance Manual and changes thereto. The inspector had no questions relative to actions taken.

(Closed) Noncompliance (272/79-17-03): Failure to post documents required by 10 CFR 19.11. The inspector verified that a letter indicating the location of the required documents has been posted at the Control Point entrance, complying with the requirements of 10 CFR 19.11. The inspector had no further questions on this item.

(Closed) Unresolved item (311/79-05-01): Inspection of fire extinguishers. The inspector reviewed documentation which indicated that the fire extinguishers in question had been inspected during December 1978. Subsequent failures to inspect, or document the inspection of, portable fire extinguishers are identified as an item of noncompliance in this report.

(Closed) Unresolved item (311/79-27-01): Replacement of seismically unqualified PVD11 relays in vital switchgear. Through direct inspection and review of engineering change documentation the inspector verified that the relays in question had been replaced with qualified type PVD21 relays. Post-installation test documentation was also reviewed. The inspector had no further questions on this item.

### Unit 1

#### 3. Plant Tour

- a. In the course of the inspections including backshifts and a weekend, the inspector made observations and conducted tours of:
  - Control Room
  - Relay Room
  - Auxiliary Building
  - Yard Areas
  - Rad Waste Building
  - Site perimeter
  - Electrical penetration area
  - Control Point
  - Turbine Building
- b. The following determinations were made:
  - Logs. A sampling review of station operating logs was made to verify compliance with procedures and to verify operating parameters were within Technical Specification limits.
  - Monitoring instrumentation. The inspector frequently verified that selected instruments were functional and demonstrated parameters within Technical Specification limits.
  - Valve Positions. The inspector verified that selected valves were in the position or condition required by the Technical Specifications for the applicable plant mode.
  - Radiation Controls. The inspector verified by observation that control point procedures and posting requirements were being followed. The inspector identified no failure to properly post radiation and high radiation areas.

- Plant housekeeping conditions. Observations relative to plant housekeeping and fire hazards identified no notable conditions.
  - Fluid leaks. No fluid leaks were observed which had not been identified by station personnel with corrective action initiated, as necessary.
  - Piping vibration. No excessive piping vibrations were observed and no adverse conditions noted.
  - Selected pipe hangers and seismic restraints were observed and no adverse conditions noted.
  - Control Room annunciators. Selected lit annunciators were discussed with control room operators to verify that the reasons for them were understood and corrective action, if required, was being taken.
  - By frequent observation through the inspection including shift turnovers, the inspector verified that control room manning requirements of 10 CFR 50.54(k) and the Technical Specifications were being met. In addition, the inspector observed that frequent tours were made by shift supervision.
  - Technical Specifications. Through log review and direct observations during tours, the inspector verified compliance with selected Technical Specification Limiting Conditions for Operation. The following parameters were sampled frequently: RHR flow rate, Boric Acid Storage Tank levels and concentration, emergency and off site power availability, source range nuclear instruments.
- c. The following acceptance criteria were used for the above items.
- Technical Specifications
  - Operations Directives Manual
  - Inspector Judgement
- d. The following specific observations were made by the inspector and problems were identified promptly to station management.
- During an inspection tour of the Unit 1/Unit 2 interface areas, the inspector identified a breach in the Unit 1 vital area barrier. This finding, along with similar findings during previous inspections, is addressed in a special NRC Inspection Report (50-272/79-26).

- While making observations of shift activities in the control room, the inspector noted that operating procedures in the Station Plant Manual had been placed in protective plastic sheets. Subsequent release of printing ink onto the plastic resulted in an illegible copy, requiring removal to be read. The protective covers were removed.

The inspector had no further questions in this area.

#### 4. Shift Logs and Operating Records

- a. The inspector reviewed the following plant procedures to determine the licensee established requirements in this area in preparation for a review of selected logs and records.

- AP-5, Operating Practices, Revision 9, April 23, 1979
- Operations Directive Manual
- AP-13, Control of Lifted Leads and Jumpers, Revision 3, February 22, 1979
- AP-15, Tagging Rules, Revision 0, April 13, 1976

The inspector had no questions in this area.

- b. Shift Logs and operating records were reviewed to verify that:

- Control Room log sheet entries are filled out and initialed;
- Auxiliary log sheets are filled out and initialed;
- Log entries involving abnormal conditions provide sufficient detail to communicate equipment status, lockout status, correction, and restoration;
- Log Book reviews are being conducted by the staff;
- Operating orders do not conflict with Technical Specification requirements;
- "Plant Information Records" confirm there are no violations of Technical Specification reporting or LCO requirements; and,
- Logs and records were maintained in accordance with Technical Specifications and the procedures in 4.a. above.

- c. The review included discussions with licensee personnel and the following plant shift logs and operating records for the intervals indicated:

- Log No. 1 - Control Room Daily Log, September 8-11, 14-19, 24-26, 28-30, October 1-2.
- Log No. 3 - Control Console Reading Sheet, September 14-19, 24-26, 28-30, October 1-2

- d. On October 1, 1979, fire watches were posted as required by Technical Specification 3.7.10.3.a when it was noted by shift supervision that Cardox system level was at 45%. The minimum level specified in the Technical Specifications is 50%. Subsequent review of logs indicated that the system had been at 45% since September 26, 1979 when a discharge into the diesel generator area had occurred, apparently caused by a heating steam leak which triggered heat detectors. The system level had been recorded daily as 45% on Operations Log #6, Primary Plant Log, had been circled in red, and a notation on the cover sheet made to the effect that the Senior Shift Supervisor had been informed. The licensee reported these findings in Licensee Event Report 79-64 on October 2, 1979. System level was restored to within limits on October 2, 1979 and the fire watches secured.

The inspector stated his concern that a failure to recognize operation beyond the limits of a Limiting Condition of Operation could persist for an extended period of time, through several shift changes, with no corrective action initiated. Prompt and effective action to ensure shift cognizance of limiting conditions will be reviewed by the inspector. This item is unresolved (272/79-27-02).

## 5. Emergency Drill

On September 20, 1979, the licensee conducted an emergency drill in conjunction with the State of Delaware. The licensee used this exercise as a practice for the annual emergency drill scheduled for the following week. The scenario postulated a primary-to-secondary leak through ruptured steam generator tubes, coupled with significant fuel failure. No site evacuation was conducted during this exercise and Unit 2 construction personnel were not involved.

The annual drill was conducted on September 27, 1979, with initial notification of the tube leak being made at approximately 1:00 p.m. and the postulated rupture with fuel failure occurring at 3:00 p.m. This drill included evacuation of personnel from the site, still did not include Unit 2 construction personnel, and was coordinated with a State of New Jersey exercise of their communications and resources.

The inspector attended the pre-drill briefings, observed both drills from the control room, and attended the post-drill critique for the first drill.

The inspector's comments on the conduct of the drill were duplicated by the drill referees and were included in the drill evaluation for followup and resolution.

The following comments were made by the inspector:

- Emergency Plan check lists, kept in the control room, for use as working copies, were in some cases, found to be out of date. This was noted by shift personnel during the exercise.
- Notification of off site authorities was unduly delayed. NRC was notified of the incident by means of the "hot line" at approximately 4:00 p.m. The initial off site call was made approximately 35 minutes after indications of a problem had been given to shift operators. The principal cause of the delay appeared to stem from hesitation on the part of station personnel to make notifications before detailed calculations of projected dose had been made. The inspector stated his opinion that, with a known and continuing uncontrolled release, notifications should be made promptly to mobilize off site support. Initial notifications containing dose projections further delayed any notification of agencies further down the call list.

The inspector had no further questions. Review of drill deficiency corrective actions will be conducted during a subsequent inspection.

## Unit 2

### 6. Fuel Receipt and Storage

During the period October 1978 - January 1979, the licensee received shipments of fuel for Salem Unit 2. The fuel was received directly in the Unit 2 Fuel Handling Building, unpackaged, inspected, and placed in new fuel storage racks or spent fuel racks (dry).

Tours of the Fuel Handling Building were made by the inspector. The following aspects of new fuel handling and storage were inspected:

- Building integrity
- Security and access controls
- Security awareness and procedures
- Dust protection of fuel
- Health physics coverage
- Tag board maintenance
- Compliance with license SNM-1831 requirements

The inspector noted that excessive accumulations of debris and packing material have been permitted in the Fuel Handling Building. The integrity and protection afforded the fuel itself was found to be acceptable.

Inspection of installed fire protection equipment identified the following condition. The Unit 2 Fuel Handling Building contains three portable fire extinguishers as the only means of fire suppression. These extinguishers are located in an equipment room on elevation 100', on the operating floor at elevation 130', and on top of the cask handling crane. Inspection of attached tags to determine continuity of periodic inspections identified the following:

<u>Extinguisher No.</u>	<u>Location</u>	<u>Indicated Last Inspection</u>
No number	FHB 100'	5/79
11	FHB 130'	No tag
359	Crane-FHB	8/78

The inspector made these observations on October 4, 1979. The applicant's Construction Fire Protection Manual requires that these inspections be conducted monthly.

This finding contributes to an apparent item of noncompliance.

#### 7. Pre-Operational Fire Protection/Prevention

To verify adequacy of fire protection and prevention measures, the inspector reviewed the findings of independent reviews in the area of fire protection conducted by the site Quality Assurance staff. The inspector had no questions relative to the review, the applicant's response dated August 13, 1979, or the resulting letter to the Electric Production Department dated August 22, 1979.

Inspection of fire extinguishers and detection/suppression equipment in Unit 2 identified an area of concern. In addition to problems found in the Fuel Handling Building which are detailed in this report, the inspector found that the Unit 2 4KV Vital Switchgear Room contained 6 portable fire extinguishers which, based on attached documentation, had not been inspected since April 27, 1979. This observation was made on October 4, 1979. Subsequent review of records maintained by the Electric Production Department, which apparently has jurisdiction over this area, indicated that 3 portable extinguishers in this area were inspected in August 1979. However, the identifying numbers for these three extinguishers (#213, 214, and 215) do not correspond to any of the six found in the field (#227, 813, 180, 723, 789, and 818) on October 4. Lacking relevant evidence to the contrary, it appears valid to conclude that inspection at 30 day intervals, as required by the Construction Fire Protection Manual, had not been conducted on any of the 6 portable extinguishers found in the Switchgear Room.



Failure to conduct monthly fire extinguisher inspections constitutes an apparent item of noncompliance (311/79-34-01).

8. Plant Tour

The inspector conducted periodic tours of accessible areas in the plant. During these tours, the following specific items were evaluated:

- Hot Work. Adequacy of fire prevention/protection measures used.
- Fire Equipment. Operability and evidence of periodic inspection of fire suppression equipment.
- Housekeeping. Minimal accumulations of debris and maintenance of required cleanness levels in systems under or following testing.
- Equipment preservation. Maintenance of special preservative measures for installed equipment as applicable.
- Component Tagging. Implementation and observance of equipment tagging for safety or equipment protection. Nine tagged components were selected for review.
- Maintenance. Corrective maintenance in accordance with established procedures.
- Instrumentation. Adequate protection for installed instrumentation.
- Cable Pulling. Adequate measures taken to protect cable from damage while being pulled.
- Communication. Effectiveness of public address system in all areas of the site.
- Equipment Controls. Effectiveness of jurisdictional controls in precluding unauthorized work on systems in test or which have been tested.
- Logs. Completeness of logs maintained and resolution of identified problems.
- Foreign Material Exclusion. Maintenance of controls to assure systems which have been cleaned and flushed are not reopened to admit foreign material.
- Security. Implementation of security provisions. Particular attention to maintenance of the Unit 1 protected area boundary.
- Testing. Spot-checks of testing in progress are made.

The following specific comments apply to tours made during this inspection period.

- Inspection findings relative to fire protection are included in detail paragraph 7 of this report.
- Inspection of the low-voltage breaker for valve 22BF13 identified a collection of cable insulation, paper, foodstuffs, and other debris inside the breaker enclosure. Subsequent investigation revealed that some Unit 2 areas have become occupied by rodents. Corrective actions to clean up nests, provide rodent screens for switchgear and exterminate have been initiated.

The inspector had no further questions in this area.

9. Pre-Operational Testing Program

- a. The inspector reviewed implementation controls established for the preoperational test program to verify continuity of control over tested equipment to preclude invalidation of completed testing. This review included observations of work in progress to ensure coverage by appropriate documentation to require retest and to limit work scope, observations to ensure that jurisdictional tagging boundaries were complied with, and observations of maintenance in progress.

The inspector expressed concern over the apparent lack of administration over the preventive maintenance program, particularly in view of the increasing interval between testing of various systems and the issuance of an operating license. Preventive maintenance is defined by Startup Manual Implementation Instruction (SMII)-22, Post Pre-operational Testing Turnover System Maintenance. The system established by SMII-22 provides recommended maintenance to be conducted at periodic intervals for Unit 2 equipment. For rotating equipment, this consists of monthly rotation, if not run, and lubrication. Additional recommendations relative to load testing of diesel generators, verification of penetration nitrogen pressure, and similar unique items are also provided.

The inspector noted that responsibility for completion of these items had not been given to any single individual or group, resulting in a number of items not being accomplished at the stated intervals.

In addition, no routine program for verifying water quality in Unit 2 filled fluid systems had been established. A number of these systems have remained filled and idle for several months. Some, notably the reactor coolant system, have been opened during that period.

At the conclusion of this inspection, a comprehensive program to monitor equipment preventive maintenance actions, including fluid system sampling, was instituted. This item is unresolved pending review of these actions to ensure that all aspects of preventive maintenance on Unit 2 systems have been routinely addressed (311/79-34-02).

- b. Supplement 3 to the Salem Nuclear Generating Station Safety Evaluation Report, dated January 12, 1979, in section 8.3.2.(6) states that the applicant will provide a method by which a control room operator can close valves 2SJ67 and 2SJ68 (Safety Injection Pump Recirculation Valves). This method shall not be subject to the single failure of a 28 volt DC bus. The inspector verified through direct inspection and review of documentation associated with ECN 35243, that control switches for both valves have been installed just above the power lockouts in the control room. These switches allow the operator to close either valve using one of two 28 volt power supplies. The modification was completed and tested on April 19, 1979. The inspector had no further questions.

#### 10. Operational Readiness

10 CFR 50.57 states that the issuance of an operating license is, in part, contingent upon a finding that construction of the facility has been substantially completed, in conformity with the construction permit and the application, as amended, the provision of the Act, and the rules and regulations of the Commission.

In order to provide a basis for this finding, the inspector is conducting a continuing review of licensee readiness to operate the facility. This review includes, but is not limited to, the following areas:

- Completion of the NRC inspection program to assess construction, testing and operational preparedness.
- Status of facility operating procedures and personnel training.
- Status of all enforcement items and unresolved matters.
- Status of the preoperational test program.
- Status of construction activities.
- Proposed facility Technical Specifications.
- Review of licensee outstanding items, particularly those identified for completion or resolution after core load.

- Implementation of corrective measures for Unit 2 as a result of items identified in Unit 1 from Reportable Occurrences, inspection findings, and IE Bulletin and Circulars.

Operational safety concerns arising from the above reviews will be promptly identified to facility management for resolution prior to the inspector reaching a finding of operational readiness. No specific safety concerns have been identified to date.

#### 11. IE Bulletin and Circular Followup

- a. The IE Bulletins discussed below were reviewed to verify that:
  - Licensee management forwarded copies of the response to the bulletin to appropriate onsite management representatives.
  - Information discussed in the licensee's reply was supported by facility records or by visual examination of the facility.
  - Corrective action taken was effected as described in the reply.
  - The licensee's reply was prompt and within the time period described in the bulletin.

The review included discussions with licensee personnel and observation and review of items discussed in the details below.

- b. By correspondence dated May 3, 1979, September 21, 1979, and October 11, 1979, the licensee responded to IE Bulletin 79-07, Seismic Stress Analysis of Safety Related Piping. NRC review of the proposed sampling recalculation to validate the stresses concluded in the original calculations is continuing.

By correspondence dated August 16, 1979 and September 14, 1979, the licensee responded to IE Bulletin 79-14, Seismic Analysis for As-Built Safety Related Piping Systems. The licensee outlined a program for verification of stress isometrics used in the seismic analysis.

Resulting from seismic recalculations, the licensee has identified approximately 250 supports requiring repair to meet design criteria to date. Of those, approximately 160 have been completed. Reanalysis of those safety-related systems described in the October 11, 1979 letter is near completion.

Resulting from the system walk-downs conducted pursuant to IE Bulletin 79-14, approximately 40-50 nonconforming conditions have been identified on Unit 1, requiring some type of repair. The inspector reviewed the

conditions found. In most cases, the deficiency consisted of bent rods or potential thermal interference problems, which would not be expected to impact on support operability under design conditions. Approximately ten percent of the problems identified in this program had an impact on operability of the support and these will be repaired prior to Unit 1 Mode change.

Relative to the above conditions, the inspector restated the NRC position that, for those systems required to be operable for a given plant mode, identified support deficiencies must be either repaired to meet design criteria or evaluated in terms of system operability with a safety factor of at least two. Such an evaluation will apply prior to making a mode change and for any nonconforming support identified while the plant is in operation. The time inoperable criteria of the Technical Specifications govern.

The licensee acknowledged the inspector's statement.

- c. By correspondence dated July 6, 1979 and September 24, 1979, the licensee responded to IE Bulletin 79-02, Pipe Support Base Plate Design Using Concrete Expansion Bolts. Salem 1 and 2 employ Hilti "Quik-Bolts" to secure floor mounted base plates and wall and ceiling mounted structural steel which support safety related piping systems. The licensee's response outlines a test program consisting of pull tests on floor mounted base plates and ultrasonic examination of wall and ceiling bolts. In addition, to verify design adequacy of the installation, the licensee has joined an owner's group employing the services of Teledyne Engineering Services.

In the September 24, 1979 letter the licensee outlines a program to verify wedge setting of concrete anchor bolts by means of a sampling test program which will apply torque to the load nut. The inspector observed torque testing in progress in both Units 1 and 2, and reviewed the applicable procedures (Unit 1 - Maintenance Procedure T-16, Verification of Wedge Setting of Concrete Anchor Bolts, with change P-1, Unit 2 - Appendix II, Revision 2 to Design Memorandum SGS/M DM-107, Procedure for Verification of Wedge Setting of Concrete Anchor Bolts).

The realized rejection rate, due to inaccessibility and excess freedom of movement during torquing, raised the sample for torque testing to virtually every concrete anchor bolt in the safety-related systems. As stated in correspondence from NRC Region I dated August 28, 1979, completion and resolution of these problems in the inaccessible areas must be completed prior to going to Mode 4 on Unit 1.

The licensee's test program identified several instances where repair or replacement of concrete anchor installations were required. Over 1600 supports, involving over 3300 anchor bolts in safety related systems were ultrasonically tested. Torque testing of approximately half of the anchor bolts has been completed. As a result of this testing, some corrective action was required in 247 installations to date. 246 have been completed. Licensee Event Report 79-49 identifies this finding.

Evaluation and repair of torque test rejections is continuing.

The inspector's position relative to system operability stated above, applies to deficient anchors identified in this program as well.

The inspector had no further questions in this area at this time.

- d. IE Circular discussed below was reviewed to verify that it had been reviewed for applicability by cognizant management, and appropriate action initiated.

The review included discussions with licensee personnel and observation and review of items discussed in the details below.

- IE Circular 79-17 was transmitted on August 14, 1979 and details a potential problem with contacts in SB-12 switches installed in GE metalclad switchgear shipped between August 1, 1978 and July 1, 1979. The licensee's evaluation of this potential problem concludes that, since all Salem 1 and 2 GE 4KV switchgear was delivered prior to August 1978, no action is required. The inspector verified through field observation, that the manufacture date of 4KV switchgear in both units precedes, by a considerable margin, the dates in question.

The inspector had no further questions on this item.

## 12. Operational Staff Training

On receipt of an operating license for Salem Unit 2, currently assigned operations personnel will assume duties for both units. The inspector's evaluation of preoperational training consists of an on-going review of requalification and replacement training programs on Unit 1. During the course of this inspection, the inspector observed operators undergoing simulator training at the Indian Point simulator, and reviewed personnel training files and simulator evaluation reports. Interviews with operators were also conducted as part of routine control room inspections.

The inspector noted that the currently approved Operator Requalification Program, described in the Final Safety Analysis Report, as amended, makes no provision for the use of a simulator. By correspondence dated June 6, 1977 and response dated June 30, 1977, the licensee outlines plans to use the Indian Point simulator for operator training. While records of reactivity manipulations at the simulator are maintained, the inspector identified no case where simulator manipulations were used to meet requalification program requirements. The inspector stated his opinion that the records were insufficiently detailed to show specific manipulations conducted by specific operators.

Observations of simulator training included various accident transients, demonstrations, and a review of TMI-type events as related to 4-loop Westinghouse plants. The inspector noted that the simulator program for each weekly shift of operators appeared to be ill-defined, with no outline of evolutions to complete, and no method of evaluating the effectiveness of instruction/training received. This area is unresolved pending further review by the inspector and establishment of a simulator program, including evaluation, by the licensee (272/79-27-01).

13. Unresolved Items

Areas for which more information is required to determine acceptability are considered unresolved. Unresolved items are contained in Paragraphs 9 and 12 of this report.

14. Exit Interview

At periodic intervals during the course of this inspection, meetings were held with senior facility management to discuss inspection scope and findings.