U. S. NUCLEAR REGULATORY COMMISSION
REGION I

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Report Nos. 50-272/86-19
50-311/86-19

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: June 17, 1986 - July 21, 1986

Inspectors: T. J. Kenny, Senior Resident Inspector
K. H. Gibson, Resident Inspector

Approved by: _____ 7/25/86
L. J. Norrholm, Chief, Reactor Projects date
Section No. 2B, Projects Branch No. 2, DRP

Inspection Summary:
Inspections on June 17, 1986 - July 21, 1986 (Combined Report Numbers 50-272/86-19 and 50-311/86-19)

Areas Inspected: Routine inspections of plant operations including: followup on outstanding inspection items, operational safety verification, maintenance, surveillance, review of special reports, licensee event followup, containment entry, and Westinghouse Bulletins and NRC IE Information Notices. The inspection involved 89 inspector hours by the resident inspectors.

Results: No violations were identified. One inspector follow item to review the results of heat shrink testing by an independent laboratory was opened. See Section 9 of this report for details.

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DETAILS

1. 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) Violation (272/86-06-01) This involved the failure to comply with Quality Assurance procedures with regard to shelf lives of reagents and chemicals used in the Radiochemistry laboratory. The licensee further defined their chemical shelf life policy, implemented additional controls on chemical use in the lab, and retrained chemistry personnel on the chemical shelf life program, its' importance and use. The inspector observed satisfactory control of chemicals in the Radiochemistry laboratory following implementation of the above stated corrective actions. The inspector considers this item closed.

(Closed) Inspector Follow Item (272/86-15-01) See Section 7, LER 86-013 of this report for details.

(Closed) Inspector Follow Item (272/86-88-01 and 311/86-88-01) This item was left open in Inspection Report 50-272/86-16 and 50-311/86-16 to follow up on the return of ASCO valves serial number 86157N1-20. The resident inspector has confirmed that the valves have been returned to the vendor. This item is closed.

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 inspector 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 inspector 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 inspector:

- 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 inspector selected phases of the units' operation to determine compliance with the NRC's regulations. The inspector 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:

1. Unit 1

a. This report period began with the unit restricted to 90% power due to limited loading of Nos. 11 and 12 Station Service Transformers following the failure of the Auxiliary Power Transformer which was discussed in combined Inspection Report 86-15/86-15.

b. On July 14, 1986, installation of a temporary crosstie between Unit 2 Group bus 2H and Unit 1 No. 11 Condensate Pump was completed, allowing the Unit's third condensate pump to be placed in service and power to be increased to 100%.

c. At 11:15 a.m. on July 21, 1986, the licensee initiated a normal shutdown of the Unit from 100% power to inspect and correct a main generator hydrogen leak into the stator water cooling system. The inspection and repairs are expected to be completed in approximately seven days.

2. Unit 2

a. Unit 2 operated at 100% power from the beginning of the report period to July 14, 1986.

b. At 11:11 a.m. on July 14, 1986, the reactor tripped from 100% power. The trip was caused by failure of the No. 2B inverter, which caused a transfer of No. 2B Vital Instrument Bus. During the transfer, the protection circuits saw an open No. 22 Reactor Coolant Breaker (the reactor coolant pump continued to run). This caused a Reactor Coolant Low Flow/Reactor Coolant Pump Breaker Open and P8 first out alarm and trip. The licensee returned the 2B instrument inverter to service after completing testing and replacing fuses. The procedure then called for an eight hour soak period prior to making final adjustments.

c. At 6:39 a.m. on July 15, during the inverter adjustment phase, an electrician incorrectly reversed the polarity of an oscilloscope causing a voltage spike that tripped the reactor from 4% power. The trip resulted when the voltage spike caused the turbine first stage pressure instrument to go high. This signal will cause a direct reactor trip when the turbine is unlatched. The licensee performed additional testing and calibration of the instrument inverter and recommenced startup.

d. At 6:22 p.m. on July 16, the reactor tripped from 59% power due to turbine trip and No. 23 steam generator Hi Hi level. The licensee was increasing power at 10%/hr with No. 22 Main Feed Pump (MFP) idling to repair a steam leak on the warm up line. No. 21 MFP lost hydraulic control on the governor and the steam generator levels began to decrease. The Main Feed Regulating Valves (MFRV) opened fully on high demand. The operator could not control the speed of the No. 21 MFP and brought No. 22 MFP up to speed. Because the MFRVs were fully open, steam generator levels increased rapidly. The operator took manual control of the MFRVs but could not bring the steam generator levels down and the Unit tripped.

The licensee identified a blockage in the steam return from the gland seal system which would cause gland steam to condense and be drawn into the oil system. The loss of No. 21 MFP was initially attributed to water in the hydraulic control system. However, in addition to the water found in the oil system, a licensee investigation also identified a mispositioned link in the control system for the governor that would not allow the governor to attain full stroke and thereby limited the output of the feed pump. The unit remained in hot standby until completion of repairs to No. 21 MFP. At 3:25 a.m. on July 20, the unit returned to power and remained at 100% power thru the end of the report period.

4. Maintenance Observations

The inspector reviewed the following safety related maintenance activities to verify that repairs were made in accordance with approved procedures and in compliance with NRC regulations and recognized codes and standards. The inspector also verified that the replacement parts and Quality Control utilized on the repairs were in compliance with the licensee's QA program.

Work Order Number	Maintenance Procedure	Description
86-07-02-128-1	Maintenance Procedure M3I	Auxiliary Control Switches Calibration
86-07-02-153-2	"	"
86-07-02-132-0	"	"

These work orders involved calibration of timers and temperature switches on the No. 2A Diesel Generator. The switches calibrated were TD-7322, TD-7332, TD-6441, TD-6442, TD-8320, TD-6470, TD-6471, M-717 Thru M-726, M-747, M-752, AND M-778. The calibration of these switches, in conjunction with additional maintenance and calibrations on the diesel, satisfies the requirements of Technical Specification (T.S.) 4.8.1.1.2.c.1.

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 surveillances were reviewed:

Unit 2

SP(O)4.8.1.1.1.a	Verifies the operability of two physically independent circuits between offsite power and onsite vital buses in accordance with T.S. 4.8.1.1.1.a. The surveillances were performed on 2B and 2C diesels due to the 2A diesel generators being removed from service for maintenance.
SP(O)4.8.1.1.2.a.2	Verifies operability of diesel generator in accordance with T.S. 4.8.1.1.2.a.2. Performed on 2B and 2C diesels due to 2A diesel being out of service for maintenance.

The inspector also followed up on the following events related to surveillance.

- On July 11, 1986, the licensee identified a 2% flow error in the conservative direction (indicated flow 98% when actual flow is 100%) relative to reactor coolant loop flow channels on Unit 2. The error was introduced approximately two years ago when the flow transmitters

were originally calibrated and installed, and is due to the incorrect pressure compensation of test data by the computer which then used the faulty test data to calculate calibration data. This resulted in the calibration data and therefore the calibrations to be incorrect. The licensee is in the process of revising calibration procedures to correct the calibration data and plans to recalibrate the transmitters during the upcoming outage.

- On July 11, 1986 at 8:08 a.m., 2B diesel generator emergency trip pushbutton was bumped by contractor workers erecting scaffolding in the diesel control area causing the diesel to be in an inoperable condition. 2A diesel generator was also out of service at this time for maintenance work. An operator who was in the area when the incident occurred immediately (at 8:09 a.m.) reset the trip, restoring the availability of the 2B diesel. The licensee has investigated the incident and has counseled the workers who caused the tripped condition.

No violations were identified.

6. Review of Periodic and Special Reports

Upon receipt, the inspector 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 - June 1986

- Unit 2 Monthly Operating Report - June 1986

In addition, the inspector reviewed:

- Special Report 86-3 which identifies Service Water leaks inside containment on fan coil unit (FCU) motor coolers. The leaks (2) were non-related with regard to type. The first was on two pipe plugs on No. 11 FCU, attributed to corrosion. The second was a gasket leak on No. 12 FCU. The reason the leaks appeared simultaneously has been attributed to an improper operation of the service water system discharge cross-over valve, which caused a pressure surge on the service water supply to Nos. 11 and 12 FCUs. Repairs were made and the FCUs were tested and returned to service. The licensee has counselled the operator and has apprised the other operators of the event in the Operations Department News Letter. The event has also been incorporated into the training program. The inspector considers the item closed.

- Special Report 86-5 which identifies the circumstances surrounding the degradation of a fire barrier penetration, caused by the inoperability of a fire damper. Fire damper 2CAF207, located in part of the control room ventilation system, failed to close on an automatic trip signal. The licensee took corrective action and identified a faulty trip mechanism that was binding and could not be adjusted. The licensee replaced the mechanism and tested the damper satisfactorily. The inspector considers this item closed.

No violations were identified.

7. 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 1

86-012 Reactor Trip from 100% - Main Generator Protection (Auxiliary Power Transformer Differential Relay Actuation)

This LER identifies a turbine/reactor trip that occurred on June 6, 1986, which was discussed in Inspection Report 50-272/86-15 and 50-311/86-15. The LER stated that unit power is being limited to 90% due to limited loading on the secondary side of the station power transformer. However, the licensee installed a temporary crosstie between Unit 2 Group bus 2H and Unit 1 No. 11 Condensate Pump, allowing the Unit's third condensate pump to be placed in service and power to be increased to 98% on July 11, 1986. The inspector considers this item closed.

86-013 Reactor trip from 90% power. This event was discussed in combined Inspection Report 50-272/86-15 and 50-311/86-15 and one open item remained to be addressed. When the reactor tripped, No. 12 Auxiliary Feed Pump failed to start and the breaker was sent to the vendor for analysis. The Vendor performed repeated closures of the affected breaker and only once reproduced the breaker failure. The Vendor then dismantled the breaker with the following results:

- The center cam was loose enough to allow some free rotation around the cam shaft.

- The dog point was sheared off the bottom set screw in the switch cam.

- The right side of the prop was chipped at the end where it was struck by the prop pin, which indicates that the prop did not have sufficient time to fall into place under the pin when the breaker malfunctioned.

The following is a description of how the breaker could possibly malfunction with the loose center cam:

- With the closing springs charged, the closing latch is rotated from under the closing roller to release the closing springs. The energy in the springs rotates the center cam which raises the prop pin above the prop and allows the prop to move under the pin. During this time, the opening springs are compressed. If the center cam does not arrive at the proper time, the closing springs will have dissipated their energy and the opening springs will force the linkage back to the reset position before the prop has time to move under the pin, as indicated by the chipped prop.

The Vendor further stated that no other failures of a similar nature have been identified. The new assemblies however, have two key ways instead of one on the center cam. The licensee is considering adding additional visual inspections to their preventive maintenance procedure. The inspector considers this item closed.

86-014 Reactor Trip From 15% - Turbine Trip and P-7

The unit tripped while shifting lube oil coolers. This item was discussed in combined Inspection Report 50-272/86-15 and 50-311/86-15. The licensee has identified the following actions to preclude further occurrences.

- Plans to install pressure gauges on both lube oil coolers to provide positive indication that both in-service and out-of-service coolers are equalized.

- Revised OP-III-3.3.1 for both units to insure that the equalizing valve between the lube oil coolers remain in the "open" position. (This measure may be rescinded when the pressure gauges are installed.)

The inspector considers this item closed.

8. Containment Entry

On July 7, 1986 at 6:05 p.m., a containment entry for maintenance purposes was made by an Instrument & Controls (I&C) Technician, an I&C Technician helper and a Health Physics (HP) Technician. The workers were in a 3 mR/hr field for approximately 25 minutes when the HP Technician discovered that the I&C Technician helper was not wearing a thermoluminescent dosimeter (TLD). The workers immediately left containment. The I&C Technician helper had a Self Reading Dosimeter with him, but apparently handed his TLD, clipped to his security badge, to the security guard prior to entering containment. The I&C Technician helper is a relatively new seasonal (temporary) employee and the licensee feels that this may have contributed

to the occurrence. Licensee corrective action included counseling the individuals involved, HP Technicians and I&C seasonal employees to be aware of possession of personnel dosimetry when making containment entries. This information is also being disseminated to plant supervisors for discussion with their employees. The inspector had no further questions concerning this matter.

This violation of the REP requirements was identified by the licensee, immediate and long term corrective actions were taken, and, since the individual wore a Self Reading Dosimeter, dose information was available. Accordingly, under 10 CFR 2 Appendix C, a notice of violation was not issued.

9. Westinghouse Bulletins and NRC IE Information Notices

Westinghouse issues Bulletins to the industry periodically describing concerns and possible malfunctions with Westinghouse related equipment. The following describes the licensee's actions with regard to the Westinghouse Bulletins and IE Information Notices.

1. References:

- Westinghouse Letter DG-151 Dated June 10, 1985, Subject: "Potential Seismic Interaction Associated with the Flux Mapping System in Westinghouse Plants"

- IE Information Notice 85-45. "Potential Seismic Interaction Involving the Movable In-Core Flux Mapping System Used in Westinghouse Designed Plants"

Subject

Potential Movement of the In-Core Flux Mapping System during a Seismic Event

Licensee Actions

The licensee has incorporated a design change that provides clip anchors on the trolley frame and rail beams of the movable flux mapping trolley to prevent movement in the event of a seismic event. This design change has been installed in Unit 1 and has been scheduled to be installed in Unit 2 during the next outage, beginning in October of 1986. The resident inspector considers this item closed.

2. References:

- Westinghouse Letter NS-NRC-86-3108 to NRC James M. Taylor dated February 27, 1986.

- Westinghouse Letter PSE-86-520 to PSE&G dated March 4, 1986.

Subject

Potential Malfunction of Reactor Protection System Permissive P-10.

Licensee Actions

The Westinghouse letter provided the licensee with the following recommendations to correct the possibility of a potential malfunction of Reactor Protection System permissive P-10 to reset during power reduction to below the P-10 setpoint when one channel is in a tripped status and a single failure of one of the three remaining channels.

1. If possible, when a Power Range Flux channel is determined to be inoperable, place the affected P-10 bistable in a non-trip condition when operating at, or following a reduction of power below, 10% power.

2. When reducing power to below the P-10 setpoint, verify by observation of the existing control room bistable status lights, permissive status lights, and associated alarms that the P-10 permissive properly changes state.

3. If permissive P-10 is not, and cannot be, placed in the appropriate status for the existing condition, place the plant in a condition such that the trips made inoperable by P-10 are not required to function. This may require plant shutdown followed by opening the reactor trip breakers and/or boration.

4. Make all reasonable attempts to regain source range instrumentation as quickly as possible if the source range(s) are inoperable.

The inspector reviewed operating procedure IOP-5 "Minimum Load to Hot Standby" which incorporates numbers 2, 3 and 4 above into the procedure. The inspector considers this item closed.

3. References:

Westinghouse Letters NSID-TB-85-13 "Rate Trips on NI's" dated May 28, 1985 and NS-OPLS-OPL-II-86-075 "Salem Units 1 and 2 NIS Rate Trip Alignment Procedure"

Subject

Flux Rate Trip Setpoint

Licensee Actions

When the first Bulletin was issued the licensee questioned the need for the flux rate trip setpoint being lowered from 5%/2 Sec to 2.5%/2 Sec. on the basis that a turbine runback would possibly trip the

unit, which is contrary to design. After meetings and discussions with Westinghouse, the second letter (see above) was received and the licensee has modified their calibration program to conform with the Westinghouse recommendations. No changes to Technical Specifications will be required as a result of the new calibration procedure. The inspector considers this item closed.

4. Reference:

IE Information Notice 86-53

Subject

Improper Installation of Heat Shrinkable tubing

Licensee Actions

After discussion with other utilities, a review of the above Information Notice, and a plant walkdown, the licensee provided the resident inspector with the following information:

- The Information Notice calls for an installation of heat shrink material manufactured by Raychem to be of a certain dimension and configuration. That is, for a 0.7-1.2 inch connection, the length of the heat shrink should be a minimum of 6 inches for the LOCA/HELB accident

- The licensee found that Unit 2 does conform to these specifications but Unit 1 was modified slightly in that splices were covered by 3 inch lengths of heat shrink individually but that the entire connection is covered with another 6 inch length of heat shrink.

- The licensee performed a safety evaluation, based on a calculation which indicates that the connection is conservative. The licensee has also contracted a laboratory to perform testing of the installed configuration on Unit 1. The testing is expected to take approximately 3-4 months. The inspector will review the results of the tests when the results are issued. (50-272/86-19-01)

No violations were identified.

10. 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 2.790 material.