

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

REGION I

Report Nos. 50-272/82-25
50-311/82-24

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 1-27, 1982

Inspectors: *L. J. Norrholm* 10/1/82
L. J. Norrholm, Senior Resident Inspector date

R. Summers 9/30/82
R. Summers, Resident Reactor Inspector date

Approved By: *L. E. Tripp* 10/4/82
L. E. Tripp, Chief, Reactor Projects Section No. 2A, date
Projects Branch No. 2, DPRP

Inspection Summary:

Inspections on September 1-27, 1982 (Combined Report Numbers 50-272/82-25 and 50-311/82-24)

Unit 1 Areas Inspected: Routine inspections of plant operations including tours of the facility; conformance with Technical Specifications and operating parameters; log and record reviews; reviews of licensee events; and followup on previous inspection items. The inspection involved 90 inspector hours by the resident NRC inspectors.

Results: One violation was identified (Closing reactor trip breakers without two operable source range instruments - Paragraph 5b).

Unit 2 Areas Inspected: Routine inspections of plant operations including tours of the facility; conformance with Technical Specifications and operating parameters; log and record reviews; reviews of licensee events; and followup on previous inspection items. The inspection involved 65 inspector hours by the resident NRC inspectors.

Results: One violation was identified (Failure to submit 30 day LER - Paragraph 4).

Report Numbers 50-272/82-25 and 50-311/82-24 DCS Numbers:

050272-820728
050272-820729
050272-820731
050272-820801
050272-820802
050272-820803
050272-820809
050272-820813
050272-820903
050272-820908

050311-820722
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050311-820913
050311-820915
050311-820916
050311-820917
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050311-820919
050311-820923

DETAILS

1. Persons Contacted

J. Driscoll, Assistant General Manager - Salem Operations
L. Fry, Operations Manager
J. Gallagher, Maintenance Manager
B. Leap, Station QA Engineer (Acting)
J. Gueller, Operating Engineer
J. Hagan, Maintenance Engineer
J. Jackson, Technical Engineer
H. Midura, General Manager - Salem Operations
L. Miller, Technical Manager
J. O'Connor, Radiation Protection Engineer

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

2. Status of Previous Inspection Items

- (Closed) Unresolved Item (311/81-29-01) Correction of Licensee Event Report 81-106/03L. On August 25, 1982, the licensee submitted a supplement to LER 81-106 which corrects some erroneous information in the first submittal. Although the Emergency Air Conditioning system dampers have non-lubricated bearings, the licensee has elected to lubricate and inspect the dampers monthly to preclude surveillance testing failures observed. These measures appear to have prevented any subsequent failures and will continue until a permanent engineering solution is achieved. Monthly inspections are scheduled by the Inspection Order System.
- (Open) Unresolved Item (272/82-18-01, 311/82-18-01) Fire protection program. The licensee stated, on September 17, 1982, that new Administrative Procedure AP-25 will be issued by November 1, 1982 and will provide the basic fire protection program plan. As a further step, the licensee stated an intent to completely review the fire hazards analysis and reevaluate the program. The program plan and procedures will be modified based on this evaluation by December 31, 1983. In the interim, AP-25 and new or existing surveillance procedures will form the basis for the program. This item remains open and will be reviewed further when the reevaluation is completed.

3. Review of Plant Operations

A. Daily Inspection

The inspector toured the control room area to verify proper manning, access control, adherence to approved procedures, and compliance with LCOs. Instrumentation and recorder traces were observed. Status of control room annunciators was reviewed. Nuclear instrument panels and other reactor protective systems were examined. Control rod insertion limits were verified. Containment temperature and pressure indications were checked against Technical Specifications. Effluent monitors were reviewed for indications of releases. Panel indications for onsite/offsite emergency power sources were examined for automatic operability. During entry to and egress from the protected area, the inspector observed access control, security boundary integrity, search activities, escorting, badging, and availability of radiation monitoring equipment.

The inspector reviewed shift supervisor, control room, and field operator logs covering the entire inspection period. Sampling reviews were made of tagging requests, night orders, the jumper/bypass log, incident reports, and QA nonconformance reports. The inspector also observed several shift turnovers during the period.

The above daily inspections, which included back shifts, were made on September 1-2, 4, 7-10, 13-17, 20-24, 27.

No unacceptable conditions were identified.

B. Plant Tours

The inspector toured accessible areas of the plant at least once per week. The tours included the control rooms, relay rooms, switchgear rooms, penetration areas, auxiliary building (elevations 122', 100', 84', 64', 55'), fuel handling building, turbine building, service water intake structure, plant perimeter and containment. During these tours, observations were made relative to equipment condition, fire hazards, fire protection, adherence to procedures, radiological controls and conditions, housekeeping, security, tagging of equipment, ongoing maintenance and surveillance, and availability of redundant equipment.

Operability of the following Units 1 and 2 ESF subsystems was verified by confirming flowpath valve positions, breaker alignment, instrumentation and equipment condition: Containment Spray (both trains - Auxiliary Building), Auxiliary Feedwater (3 trains - Auxiliary Building and Penetrations), Safety Injection (both trains - Yard, Auxiliary Building and Penetrations), Service Water (both trains - Yard, Auxiliary Building).

Current tagouts of selected components were verified in effect as specified. Records of current surveillance for tank boron concentrations, shutdown margin and pump testing were reviewed. The inspector conducted a complete walkdown of Units 1 and 2 Diesel Generator Fuel Oil System, to examine conformance with as-built drawings, lineups, supports, instrumentation, electrical and controls cabinets and to confirm availability of the systems.

The following Limiting Conditions for Operation, not directly verifiable in the control room, were confirmed by field inspection or record review: service water availability to Auxiliary Feedwater (3.7.1.3), Fire barriers (3.7.11), Diesel fuel inventory (3.8.1.1), and CARDOX system availability (3.7.10.3).

4. Review of Periodic and Special Reports

Upon receipt, periodic and special reports submitted by the licensee pursuant to Technical Specification 6.9.1 and 6.9.2 were reviewed by the inspector. The reports were reviewed to determine: the reports included the required information; test results and/or supporting information were consistent with design predictions and performance specifications; planned corrective action was adequate for resolution of identified problems; and, whether any information in the report should be classified as an abnormal occurrence.

The following periodic and special reports were reviewed:

- Unit 1 Monthly Operating Report - August 1982
- Unit 2 Monthly Operating Report - August 1982

During review of the Unit 2 report, the inspector noted that repairs had been made to hot shutdown panel wide range level indication for Steam Generator 23 on July 28, 1982. Review of Work Order 902823 revealed that the indication had failed to zero. Repair was accomplished by replacing the power supply and repairing an isolation board. This instrument serves as a required remote shutdown instrument under Technical Specification 3.3.3.5 and inoperability is permitted for seven days under the Action Statement. Operating logs did not acknowledge entry into an Action Statement and the work order designated the failure as not an incident as defined in Administrative Procedure 6. As a result, no 30 day LER was prepared for operation in a degraded mode as required by Technical Specification 6.9.1.9.b. This failure to report constitutes a violation of Technical Specification 6.9.1.9.b (311/82-24-01).

5. Licensee Eventsa. In Office Review of Licensee Event Reports

The inspector reviewed LERs submitted to the NRC:RI office to verify that details of the event were clearly reported, including the accuracy of the description of cause and adequacy of corrective action. The inspector determined whether: further information was required from the licensee; generic implications were involved; or, the event warranted onsite followup. The following LERs were reviewed:

UNIT 1

- * 82-51/03L Auxiliary Feed Storage Tank - Below Minimum Level
- * 82-52/03L Reactor Coolant System Subcooling Margin Monitor - Inoperable
- * 82-53/03L No. 1C Diesel Generator - Inoperable
- 82-54/03L Reactor Coolant System Unidentified Leakage - Out-of-Specification
- 82-55/03L Fire Protection System - No. 1 Fire Pump - Inoperable
- * 82-56/03L Auxiliary Feedwater System - No. 11 Auxiliary Feed Pump - Inoperable
- 82-57/03L Axial Flux Distribution - Out of Specification
- 82-58/03L No. 12 Steam Generator Pressure Remote Shutdown Indication - Inoperable
- * 82-59/03L Source Range Neutron Flux Channel 1N31 - Inoperable
- 82-62/03L Reactor Coolant System Chemistry - Missed Surveillance

UNIT 2

82-68/03L	Containment-Plant Vent Radioactivity Monitor - Inoperable
82-69/03L	No. 23 Reactor Coolant Pump Flow Channel III - Inoperable
* 82-70/01T	Containment Service Water Leak - No. 24 Containment Fan Coil Unit
* 82-71/03L	No. 22 Accumulator Below Minimum Pressure
* 82-72/03L	Reactor Trip System - Reactor Trip Breaker "B" - Inoperable
* 82-73/01T	Containment Service Water Leak - No. 23 Containment Fan Coil Unit
* 82-74/01T	Containment Service Water Leak - No. 25 Containment Fan Coil Unit
* 82-75/01T	Containment Service Water Leak - Nos. 22 and 24 - Containment Fan Coil Units
* 82-76/03L	Containment-Gas Radiation Monitor - Inoperable
* 82-77/01T	Containment Service Water Leak - No. 21 Containment Fan Coil Unit
* 82-78/01T	Containment Service Water Leak - No. 25 Containment Fan Coil Unit
82-79/03L	Unidentified Leakage in Containment Greater than 1 GPM
* 82-80/01T	Containment Service Water Leak - No. 24 Containment Fan Coil Unit
* 82-81/03L	Reactor Coolant System Chemistry - Missed Surveillance
* 82-82/03L	Containment Cooling System - No. 22 Containment Fan Coil Unit - Inoperable
82-83/03L	No. 25 Containment Fan Coil Unit - Inoperable Due to DC Ground
* 82-84/01T	Containment Service Water Leak - No. 23 Containment Fan Coil Unit
82-85/03L	Reactor Coolant Loop Channel II Flow Indication - Inoperable

b. Onsite Licensee Event Followup

For those LERs selected for onsite followup (denoted by asterisks in detail paragraph 5a), the inspector verified: the reporting requirements of Technical Specifications and Regulatory Guide 1.16 had been met; appropriate corrective action had been taken; the event was reviewed by the licensee as required by AP-4 and 6; and, continued operation of the facility was conducted in accordance with Technical Specification limits. The following findings relate to the LERs reviewed on site:

UNIT 1

- 82-51/03L Further investigation of this event revealed that the operator for valve 1DR6 had been left in the manual position by a field operator responding to the initial failure to operate from the control room. The valve was cycled and operated successfully. Auxiliary Feedwater Storage Tank level was restored within the time allowed by Technical Specifications. A corrected LER will be submitted.
- 82-52/03L The inspector confirmed corrective and preventive steps, as outlined in the LER, were taken to prevent further failures to restore the subcooling monitor when returning the computer to service.
- 82-53/03L Diesel Generator 1C was declared inoperable following discovery of a leaking flexible hose in the jacket water cooling system. The hose was original equipment and had apparently reached the end of its useful life. The licensee plans to modify the preventive maintenance program to include total replacement of hoses at intervals suggested by the manufacturer.
- 82-56/03L Following this event, the licensee reiterated existing system tag out procedure which require that all valves be included in the tagging request, regardless of position. This includes positioning of vents, drains, and instrument valves which may be accomplished to facilitate maintenance. Individuals involved in this event were counseled with respect to these tagging rules.

-- 82-59/03L

Following a reactor trip on August 9, 1982, source range channel N31 was determined to be inoperable due to a failed high voltage power supply. Restart was delayed until the channel was repaired and satisfactory surveillance testing completed. However, during the period of inoperability, an additional surveillance test of the P-4 interlock, which requires closing the trip breakers, was conducted. Technical Specification 3.0.4 prohibits entry into an operational mode or other specified condition unless the limiting condition for operation is met without reliance on the provisions of the Action Statements. Technical Specification 3.3.1.1 requires both source range channels be operable to close the trip breakers making the rod control system capable of rod withdrawal. Although actual rod withdrawal did not take place, entering the specified condition defined by closing the trip breakers with only one source range channel operable is a violation of Technical Specification 3.0.4 (272/82-25-01).

UNIT 2

-- 82-70/01T
 -- 82-73/01T
 -- 82-74/01T
 -- 82-75/01T
 -- 82-77/01T
 -- 82-78/01T
 -- 82-80/01T
 -- 82-82/03L
 -- 82-84/01T

These LER's detail service water leaks in containment due to erosion failure of Containment Fan Coil Unit (CFCU) cooling coils or motor coolers. The licensee has replaced these coolers on Unit 1 with coils made of AL6X alloy which should provide better resistance to wear by silt-laden service water. In each of these cases, the containment sump monitoring system proved sufficiently sensitive to detect leaks at 0.2 gpm. Typical leak rates were 1 gpm or less. Repair is accomplished by blanking coils, if heat rejection capability is maintained, or by applying Belzona metal filler to the wear area. Wear locations appear localized to eddy regions near the ends of certain tubes and generalized degradation is not apparent. When leaks are confirmed, the licensee has consistently isolated the unit and applied the Action Statement with respect to inoperable CFCU's. Material replacement for Unit 2 CFCU coils is scheduled for the January 1983 refueling outage. LER 82-82 is unique in this group since the unit was isolated and made inoperable due to a suspected leak which, on further investigation, was found to be condensation. The high number of failures during August suggests a seasonal correlation. This area will be reviewed continually through the remainder of this operating cycle until the coils are replaced (311/82-24-02).

- 82-71/03L Accumulator pressures are recorded on operating logs once every eight hours. In addition, two low pressure alarms, set at the Technical Specification limit, are provided. This event appears to have been caused by the operator failing to anticipate the rate of pressure loss and failing to order repressurization before the low limit was reached. The operator was counseled. Pressure was restored within five minutes.
- 82-72/03L This event is discussed in NRC Inspection Report 50-311/82-19. Discussions with maintenance personnel indicate the "B" trip breaker was repaired by exercising and by replacement of the undervoltage coil. Mechanical binding was given as the initial cause of failure to trip when required. The combination of cleaning and exercising apparently resolved this problem. No further binding was observed on retest or during subsequent periodic surveillance. The licensee stated that a supplemental LER will be submitted to more completely describe the mode of failure.
- 82-76/03L This failure of the 2R12A gaseous radiation monitor was attributed to a test jack. Since the jack failure resulted in the application of line frequency to the instrument, a non-zero reading was obtained. Accordingly, failure logic did not annunciate and no other indication of a problem was evident. The licensee is continuing to review the implications of this failure mode. This item is unresolved pending completion of this evaluation and a review of corrective steps taken (311/82-24-03).
- 82-81/03L Due to an oversight by the assigned chemistry technician, analysis of reactor coolant system oxygen was not completed within the required 72 hour interval on both units. When sampled, the analysis was six hours late but was within specifications. Adequate procedural guidelines and schedules exist to preclude such oversight. The technician was counseled and all technicians reminded of the need to adhere to sampling schedules. No similar failures to meet sampling requirements have been identified.
- 82-62/03L
 (Unit 1)

The inspector had no further questions with respect to LER's reviewed.

6. Operating Events

UNIT 1

- a. On September 3, 1982, at about 1:45 p.m., the licensee notified the NRC Duty Officer of an unplanned gaseous release in accordance with 10 CFR 50.72. The release duration was from approximately 11:00 a.m. to 8:00 p.m., with an initial estimated total release of approximately 19 Ci Xe-133. The release was within allowable limits. At about 10:40 p.m. the licensee declared an Unusual Event and notified the NRC Duty Officer. The licensee had determined the cause of the release; a manual drain valve on the vent line of the Volume Control Tank was open; and suspected tampering. The Senior Resident was dispatched to the site and arrived about 1:00 a.m. on September 4. Subsequent investigation by the licensee determined the cause of the open valve to be accidental rather than intentional because the valve could be opened partially by interference with the opening of a nearby gate-type door.
- b. The reactor tripped at 3:56 a.m. on September 8, 1982, from 100% power due to low low level in Steam Generator No. 12. This was caused by a trip of Steam Generator Feed Pump No. 11 on overspeed during a flow balancing operation by the reactor operator. All systems functioned normally on the trip. The unit was critical at 6:06 a.m. on September 8.

The reactor tripped at 7:25 a.m. on September 8, from 2% power due to low low level in Steam Generator No. 11. The unit was in manual level control and the cause of the trip was due to operator error. All systems functioned normally on the trip. The unit was critical at 10:04 a.m. on September 8.

The reactor tripped again at 9:06 p.m. on September 8, during power ascension from the previous trips while bringing the second feedwater pump on line. When the suction valve for Steam Generator Feedwater Pump 12 was opened, SGFP 11 tripped on indicated overspeed, resulting in a reactor trip due to low level in Steam Generator 12. All control and alarm functions associated with the pump were verified correct; however, a mechanical problem with the SGFP rpm sensing system was found and corrected. The reactor was critical at 10:50 p.m. on September 8, and synchronized at 12:30 a.m. on September 9.

UNIT 2

- a. At about 2:20 p.m. on September 6, 1982, during a containment entry to verify accumulator levels, a service water leak of about 0.25 gpm from a coil of Containment Fan Coil Unit (CFCU) 23 was discovered. The leak was isolated and repaired.

At 6:30 a.m. on September 10, 1982, during containment inspection to determine the cause of increased sump leak rate, a 0.5 gpm leak was discovered from a primary coil of Containment Fan Coil Unit 21. The leak was isolated and repaired.

At 7:30 p.m. on September 15 and 12:33 a.m. on September 16, 1982, during containment inspections to determine the cause of increased leakage to the sump, service water leaks of less than 1 gpm were found in cooling coils of Containment Fan Coil Units 22 and 23 respectively. In each case, the unit was immediately isolated and repaired.

At 2:55 p.m. on September 23, 1982, while conducting containment inspections to determine the cause of increased sump leakage, a 0.6 gpm service water leak from Containment Fan Coil Unit 21 was discovered. The unit was isolated and repaired. Due to continuing problems with service water leakage, all CFCU cooler coils and associated containment piping will be replaced during the Spring 1983 refueling outage.

- b. The unit commenced a shutdown at 5:00 a.m. on September 8, 1982, in accordance with Technical Specification 3.0.3 when it was determined that all three groups of the Containment Fan Coil cooling units were inoperable. The units and reasons were:
- 25 CFCU - Out of service for planned maintenance
 - 22 CFCU - Failed the required minimum service water flow specification at 2:30 a.m. on September 8.
 - 21 CFCU - During a containment inspection to determine cause of increased leakage to the sump, a 0.5 gpm service water leak from the 21 CFCU motor cooler was found at 5:00 a.m. on September 8. The leak was isolated and repaired.

The shutdown was terminated at 7:33 a.m. on September 8 after returning 22 CFCU to service. The unit had reduced load from 82% power to 78% power.

- c. At 10:55 a.m. on September 8, 1982, a turbine trip/reactor trip was caused by high level in Steam Generator 23. A failed sensing line connection to the feedwater pressure transmitter resulted in excessive feedwater flow demand causing the level to increase. The line was repaired. Startup was delayed in order to repair several Containment Fan Coil Units (reference "b" above) and to complete surveillance tests.

Recovering from the reactor trip, the unit was critical at 3:40 p.m. on September 9, 1982. At 4:11 p.m. the reactor tripped due to low steam generator level while adjusting auxiliary feedwater flow. The unit was again critical at 4:45 p.m. and, following delays due to repairs to main steam isolation valves, the unit synchronized to the grid at 5:58 a.m. on September 10.

- d. The unit commenced a shutdown from 54% power at 1:53 p.m. on September 13, 1982, due to indicated high bearing temperatures on Reactor Coolant Pump No. 22. The unit was taken off-line at 2:55 p.m. The cause of the high bearing temperatures was low oil level. The unit was critical at 3:48 p.m. and synchronized at 6:01 p.m. on September 14.
- e. The unit tripped from 53% power at 4:17 p.m. on September 17, 1982, due to low level in Steam Generator 24 caused by loss of both operating feedwater pumps (SGFP). The pumps tripped on indicated low suction pressure. At the time, SGFP 21 was idling, discharging into 21 Condenser Hotwell, and SGFP 22 was carrying feedwater load. In addition, both circulating water pumps for 21 main condenser were out of service. Steam exhaust from both SGFPs discharges to 21 Condenser. Shortly after 22 SGFP tripped, 21 SGFP speed was increased and level control was restored momentarily when 21 SGFP also tripped on low suction pressure. Inspection of instrumentation and process system lineups identified no problems. The licensee concluded that the system lineup to 21 Condenser was such that the hot condensate caused cavitation of the operating condensate pumps and the feedwater pump trips were valid.

The unit was critical at 4:18 p.m. on September 18, following completion of repairs to Containment Fan Coil Unit 21 and two individual rod position channels already in progress at the time of the trip. The unit tripped from about 10% power at 8:17 p.m. due to low level in Steam Generator 23 while controlling feedwater in manual. The unit was again critical at 10:23 p.m. and again tripped at 2:50 a.m. on September 19 due to a turbine trip/reactor trip caused by high steam generator level while controlling feedwater in manual. The unit was critical at 5:51 a.m. and synchronized to the grid at 9:32 a.m. on September 19.

7. Surveillance Testing

The inspector observed the performance of surveillance tests to confirm the following: testing was performed in accordance with adequate procedures; test instrumentation was calibrated; limiting conditions for operations were met; removal and restoration of the affected components were properly accomplished; test results conformed with Technical Specification and procedural requirements and were reviewed by personnel other than the individual performing the test; deficiencies noted were reviewed and appropriately resolved; personnel performing the surveillance activities were knowledgeable of the systems and the test procedures and were qualified to perform the tests.

These observations included:

- 2PD - 18.0.005 Solid State Protection System - Reactor Trip Breaker and Permissive P-4 Test, Revision 1, dated June 25, 1982 (Trains A and B)
- 1PD - 2.6.010 Channel Functional Test - 1FT434 Reactor Coolant Flow, Loop 3 Channel I, Revision 3, dated October 14, 1981
- 1PD - 2.6.046 Channel Functional Test - 1FT530 No. 13 Steam Generator Feedwater Flow Protection Channel I, Revision 3, dated October 5, 1981

8. Maintenance Activities

The inspector observed portions of maintenance activities to determine that the work was conducted in accordance with approved procedures, regulatory guides, Technical Specifications, and industry codes or standards. The following items were considered during this review: limiting conditions for operation were met while components or systems were removed from service; approvals were obtained prior to initiating the work; activities were accomplished using approved procedures and were inspected as applicable; functional testing was performed prior to declaring that particular component as operable; activities were accomplished by qualified personnel; radiological controls were implemented; and fire prevention controls were implemented.

Activities observed included:

- Repair of Valve 1CV332 Leak
- Repair of No. 21 Service Water Pump Motor Cooler Leak

- Troubleshooting 2A Diesel Generator "Crankcase Blower Failure" Alarm Problems
- Troubleshooting and Repairs of Control Rod 1C4 Position Indication Problems
- Instrument Calibration 1.4.03 on No. 13 Waste Gas Decay Tank Pressure Transmitter

No unacceptable conditions were identified.

9. Unresolved Items

Areas for which more information is required to determine acceptability are considered unresolved. Unresolved items are contained in Paragraph 5b.

10. Exit Interview

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