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REGION I

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License Nos. DPR-70
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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: March 24, 1987 - April 20, 1987

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

Reviewed by: R. J. Summers, Project Engineer, Projects Section 2B

4/28/87
date

Approved by: L. J. Norrholm, Chief, Reactor Projects Section 2B

4/28/87
date

Inspection Summary: Inspections on March 24 - April 20, 1987 (Combined Report Numbers 50-272/87-06 and 50-311/87-11)

Areas Inspected: Routine inspections of plant operations including: follow-up on outstanding inspection items, operational safety verification, maintenance, surveillance, review of special reports, licensee event followup, and allegation follow-up. The inspection involved 89 inspector hours, including 6 hours of back-shift inspection by the resident NRC inspectors.

Results: One violation was identified involving two occasions in which a fuel handling crane surveillance test was not performed within the required time. The violation is discussed in Section 7 of this report.

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. Follow-up on Outstanding Inspection Items

(Closed) Unresolved Item (50-272/86-32-02): Failure to conduct a unit specific procedure which resulted in a missed technical specification surveillance test. The work order and surveillance test procedure are now both printed on color coded paper to ensure surveillance tests will be performed on the intended unit. The inspector has no further questions at this time.

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 Work Permits (RWP)
- 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.

3.2.1 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.

3.2.2 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.

3.2.3 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:

3.3.1. Unit 1

Unit 1 began the report period operating at the reduced power level of approximately 70% (790 MWe) due to electrical grid system stability limits as a result of the loss of the No. 5015 Hope Creek - Keeney 500KV line.

The licensee completed the installation of the design change and the 10 CFR 50.59 Safety Evaluation for the Unit 1 trip scheme on the loss of the No. 5021 Salem - Deans 500KV line as discussed in Combined Inspection 87-07/87-08. The NRC reviewed the completed design change package and safety evaluation during an NRC-licensure meeting in NRC headquarters on March 27, 1987 (See Attachment A). The resident inspectors verified that procedures and controls were in place prior to the "trip-a-unit" (TAU) scheme being enabled. Discussions were held with Unit 1 and 2 licensed operators and supervisors and the following documents were reviewed:

- Integrated Operating Procedure-4, Power Operation
- Operating Instruction III, Appendix 2, Generator Operating Guide
- Operating Instruction III, Appendix 3, Generator Capability Curves
- Console Reading Sheets

At 1:20 p.m. on March 28, 1987, TAU was enabled and Unit 1 power was increased to 100%.

The unit operated at 100% power for the remainder of the report period with the exception of several short term load reductions for turbine valve testing, secondary plant repairs and electrical system stability requirements.

No violations were identified.

3.3.2 Unit 2

Unit 2 began the report period operating at the reduced power level of approximately 70% (790 MWe) due to electrical grid system stability limits as a result of the loss of the No. 5015 Hope Creek - Keeney 500KV line.

On March 28, 1987, the Unit 1 TAU scheme was enabled and Unit 2 power level was increased to approximately 90% (1000 MWe).

At 9:37 p.m. on April 7, 1987, while troubleshooting the turbine electro-hydraulic control (EHC) system, a faulty replacement circuit card resulted in a Unit 2 turbine trip and reactor trip from 88% power.

On April 8, 1987, the licensee restored the EHC system to operable status and was preparing for startup of the unit. During a Mode 3 containment inspection, the licensee identified a bonnet leak on valve No. 2CV274. The valve is the first in a series of two check valves on the normal charging line from the regenerative heat exchanger to No. 23 Reactor Coolant System (RCS) cold leg. Upon further investigation the licensee discovered that the valve studs were severely corroded. The unit was cooled down to Mode 5 and the RCS water level lowered to facilitate repairs. (See Section 4.1 of this report for details on the repair of the valve.)

The Unit was returned to service on April 17, 1987 at 12:12 p.m., and operated at approximately 90% power (1000 MWe) for the remainder of the the report period.

On April 10, 1987, a radiation protection technician, upon exiting from the auxiliary building control point after counting Unit 2 pressurizer area swipe samples, alarmed the Betamax whole body personnel radiation monitor. Further monitoring with an RM14-HP210 frisker, which registered offscale on the X100 scale, identified a small area of skin contamination on the right forearm. Counting of the contaminated skin area with a Nuclear Data multichannel analyzer/GeLi crystal identified the contamination as a miniscule fuel particle. The individual's arm was decontaminated by washing with soap and water. The calculated absorbed dose to one square centimeter of the skin resulted in a skin dose of between 222 - 332 mR (20-30 minute exposure time estimated).

Licensee follow-up actions and results included:

- The individual had made one other entry into the auxiliary building earlier in the day, but had subsequently successfully passed through the Betamax.

- The individual who performed the swipe surveys of the pressurizer had no contamination detected on his person or anti-C clothing.
- Surveys of the count room and path to the control point where the individual had been. No abnormal results were identified.
- Increased monitoring of personnel, anti-C clothing and material leaving the Unit 2 auxiliary building. No further problems were identified.
- Swipe surveys and large area masslin surveys of the pressurizer area. No abnormal results or particles were identified.
- A step off pad was placed at the base of the pressurizer.

The licensee concluded that the particle may have been present on one of the pressurizer swipe samples. Isotope ratios indicate that the particle is approximately 225 days old which traces back to around the time of the Unit 2 refueling outage. Three fuel particles were identified in the fuel handling area during the refueling; the licensee surmises that this particle may have been tracked into the pressurizer area during the refueling. The inspector discussed this occurrence with licensee management and reviewed licensee documentation, calculations, and data concerning the contamination and follow-up. The inspector has no further questions at this time.

No violations were identified.

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.

- 4.1 On April 8, 1987 during a Unit 2 Mode 3 containment inspection in preparation for startup, the licensee identified a bonnet leak on valve No. 2CV274. The valve is the first in a series of two check valves on the normal reactor coolant system (RCS) charging line between the regenerative heat exchanger and No. 23 RCS cold leg. The check valve was wrapped in insulation and the leak was identified by boron crystallization on the insulation and on the floor under the valve. Upon removal of the insulation, the licensee observed that the valve body to bonnet nuts and studs were severely corroded. The materials involved are as follows:

- body - No. 316 stainless steel
- nuts - Grade 2H carbon steel
- studs - Grade B7 chrome-moly carbon steel

The unit was cooled down to Mode 5 and the RCS drained to the 98 foot elevation to facilitate valve repair. The nuts, studs, and gasket were replaced. In addition, the licensee inspected the downstream check valve (No. 2CV78), and the two check valves (Nos. 2CV275 and 2CV80) on the alternate charging line to No. 24 RCS cold leg. No problems were observed with these valves. The lagging on the covers of 2CV274 and 2CV78 was not replaced following valve maintenance to facilitate inspections to identify degradation prior to leakage. The covers of 2CV275 and 2CV80 were already exposed.

The inspector reviewed the following documents relative to the valve repair:

- Work Order No. 870408006
- Code Job Package 587-079
- Deficiency Reports Nos. SSP-87-121 and SSP-87-131
- 10 CFR 50.59 Safety Evaluation (to use 3 1/2" bolts instead of studs since a seismic support near the valve does not allow enough clearance to replace with studs)
- Inspection Point Checklist
- Form NR-1 Report of Repair to Nuclear Components and Systems in Nuclear Power Plants
- Code Job Package Approval Cover Sheet
- Procedure No. M14A-3 General Instructions for Check Valve Maintenance
- Procedure M9-IIP-2 ISI Visual Examination of Bolting and Component Internal Surfaces, Nuclear Class 1, 2, and 3
- Visual Examination Data Sheet
- Storeroom Material Issue Records
- Quality Release Tags
- Public Service Blue Print No. 106251

-- Radiation Work Permit Nos. 87-25-203 and 87-25-205

No violations were identified, however an error in the identification of material type classifications on the Visual Examination Data Sheet was brought to the licensee's attention by the inspector.

4.2 The inspector followed the disassembly, inspection, repair and retest of a body to bonnet leak on valve 22AF22 (downstream isolation valve for 22AF21, steam generator No. 22 inlet control valve). The inspector reviewed the following documents relative to this maintenance activity:

- Work Order No. 870304042
- Code Job Package S-87-084
- Deficiency Reports SMD-M87-069, SMD-M87-069A, and SMD-M87-070
- 10 CFR 50.59 Safety Evaluation (to reuse pressure seal gaskets and weld repair the bonnet)
- 10 CFR 50.59 Safety Evaluation (to use Furmanite sheet packing to seal body to bonnet leak until new parts are ordered and installed)
- Code Job Package Approval Cover Sheet
- Welding Procedure Specification NDWP-13
- Weld History Record
- Inspection Point Checklist
- Nondestructive Examination Reports
 - Magnetic Particle Exam of Bonnet Prior to Welding
 - Liquid Penetrant Exam of Welds on Bonnet
- Procedure M14A-1 General Instruction for Bolted Bonnet Gate Valve Maintenance
- Procedure M11D Pressure Test
- Storeroom and Pre-stage Material Issue Records

A hydrostatic test was attempted in accordance with M11D, however since valve 22AF23 (stopcheck valve downstream of 22AF22) does not provide isolation in the direction of normal flow, the test pressure could not

be attained. The licensee requested the Authorized Nuclear Inspector (ASME Code Inspector) to waive the requirement. An inservice leak test was substituted for the hydrotest and was successfully completed.

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 surveillance tests 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 surveillance tests.

The following surveillance tests were reviewed:

Unit 1

<u>Procedure</u>	<u>Description</u>
1PD-4.5.011	Radiation Monitoring System 1R16 Plant Vent Effluent Channel Calibration Check. Low results were obtained so a full calibration was performed in accordance with the following procedure.
1PD-4.1.025	Radiation Monitoring System 1R16 Plant Vent Effluent Channel Calibration
Reactor Engineering Manual, Part 2, Section 2.6	Calorimetric Calculation

Unit 2

<u>Procedure</u>	<u>Description</u>
SP(O)4.1.2.1A	Reactivity Control Systems - Boration Flow Path
SP(O)4.6.1.7	Containment Systems - Purge Supply and Exhaust Isolation Valves
2IC-2.6.027	Reactor Protection System - 2FT-511, No. 21 Steam Generator Feedwater Flow Protection Channel II - Functional Test
SP(O)4.4.7.2d	Reactor Coolant System - Water Inventory Balance
SP(O)4.7.1.5	Main Steam Isolation Valve Emergency Close Time Response

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 - March 1987
- Unit 2 Monthly Operating Report - March 1987

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

- 86-001 Refueling Water Storage Tank (RWST) Boron Concentration Out of Specification Due to Personnel Error

On March 9, 1987 during a review of chemistry logs, the licensee discovered that the boron concentration for the RWST on January 30, 1987 was 5 ppm greater than the 2200 ppm Technical Specification limit. A sample taken on February 4, 1987 was within specification. The out of specification boron result was not initially recognized because the Technical Specification limit listed on the chemistry data sheet as 2000 ppm had not been updated following a Technical Specification amendment changing the limit to 2000 - 2200 ppm. The chemistry log book data sheets have been proceduralized and revised to reflect the correct limits. The inspector discussed this occurrence and corrective actions taken with the licensee and has no further questions.

- 87-002 Loss of Control of a High Radiation Area Locked Door Due to Personnel Error

This event was discussed in Inspection Report 50-272/87-07. The inspector reviewed the LER and has no further questions.

Unit 2

87-003 Fuel Handling Crane Missed Surveillance Due to Personnel Error

On February 26, 1987, fuel handling crane manipulations were done by a licensee vendor prior to performing the crane overload cutoff surveillance test within the specified time as required by Technical Specification 4.9.7 and FP-PNJ-FE-1, "Fuel Inspection Procedure." The surveillance was subsequently performed satisfactorily on the same day.

A previous similar occurrence, involving the same vendor, took place on November 17, 1986 and was discussed in Inspection Report 50-311/86-36. Failure to perform the overload cutoff surveillance test within 7 days (plus 25% extension) prior to use is a violation of Technical Specification 4.9.7. In accordance with 10 CFR 2, Appendix C, a notice of violation was not issued for the November 17, 1986 missed surveillance test.

However, it appears that the licensee's corrective actions for the first occurrence were not effective in preventing the violation from recurring. This is a violation (50-311/87-11-01).

87-004 Generator-Turbine/Reactor Trip Due to Loss of Field on the Main Generator

This event was discussed in Inspection Report 50-311/87-08. The root cause of the loss of generator field is under investigation by the licensee. The inspector will review the licensee's supplemental report when issued.

86-013-01 Turbine/Reactor Trip from 8% Power on P-7 Interlock Due to Personnel Error While Controlling Speed Using Governor Valve Position Limit

This event was discussed in Inspection Reports 50-311/86-36 and 50-311/87-01. This supplemental LER changes the root cause of the occurrence to personnel error, rather than equipment malfunction as reported in LER 86-013. The inspector has no further questions.

One violation was identified.

8. Allegation Followup

The resident inspectors conducted an investigation into allegations made in a letter to Senator Bradley by a concerned citizen. The letter states that a listener to a news station called in and discussed her visit to Salem, New Jersey where she observed workers from the nuclear power plant using drugs.

The results of the inspector's investigation are as follows:

- The licensee has a drug testing program that tests all new employees, both contractor and permanent, prior to allowing access to the facility.
- The licensee has an ongoing system of unannounced physical examinations which includes drug testing for all employees. Several personnel have been dismissed as a result of the drug testing. This program also includes a rehabilitation program for personnel who need and apply for help.
- In accordance with the drug program on site, supervisors are trained in the assessment of employees through the observation of impaired performance or aberrant behavior.
- The resident inspectors deal with many employees on a daily basis and are also alert for impaired performance or aberrant behavior.

The inspectors conclude that programs have been implemented and appear to be effective in restricting site access to personnel who are free from drug and alcohol abuse.

9. 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 10 CFR 2.790 material.