

August 2, 2002

EA 02-042

Mr. Harold W. Keiser
Chief Nuclear Officer and President
PSEG Nuclear LLC - N09
P. O. Box 236
Hancocks Bridge, NJ 08038

SUBJECT: SALEM NUCLEAR GENERATING STATION - NRC INSPECTION REPORT
50-272/02-06, 50-311/02-06

Dear Mr. Keiser:

On June 29, 2002, the NRC completed an inspection of your Salem 1 & 2 reactor facilities. The enclosed report documents the inspection findings which were discussed on July 10, 2002, with Mr. D. Garchow, Mr. J. Carlin and other members of your staff.

The inspection examined activities conducted under your license as they relate to safety and compliance with the Commission's rules and regulations and with the conditions of your license. The inspectors reviewed selected procedures and records, observed activities, and interviewed personnel. Specifically, this inspection involved seven weeks of resident inspection and region-based inspections of problem identification and resolution program implementation, physical security and physical security performance indicator verification.

Based on the results of this inspection, the inspectors identified two issues of very low safety significance (Green). Both of these issues were determined to involve violations of NRC requirements. However, because of their very low safety significance and because they have been entered into your corrective action program, the NRC is treating these issues as non-cited violations, in accordance with Section VI.A.1 of the NRC's Enforcement Policy. If you deny these non-cited violations, you should provide a response with the basis for your denial, within 30 days of the date of this inspection report, to the Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, DC 20555-0001; with copies to the Regional Administrator, Region I; the Director, Office of Enforcement, and the NRC Resident Inspector at the Salem facility.

The NRC has increased security requirements at Salem Nuclear Generating Station in response to terrorist acts on September 11, 2001. Although the NRC is not aware of any specific threat against nuclear facilities, the NRC issued an Order and several threat advisories to commercial power reactors to strengthen licensees' capabilities and readiness to respond to a potential attack. The NRC continues to monitor overall security controls and will issue temporary instructions in the near future to verify by inspection the licensees' compliance with the Order and current security regulations.

Mr. Harold W. Keiser

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Sincerely,

/RA/

Glenn W. Meyer, Chief
Projects Branch 3
Division of Reactor Projects

Enclosure: Inspection Report 50-272/02-06, 50-311/02-06

Attachment: Supplemental Information

Docket No. 50-272; 50-311
License No. DPR-70; DPR-75

cc w/encl:

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U.S. NUCLEAR REGULATORY COMMISSION

REGION I

Docket Nos: 50-272, 50-311
License Nos: DPR-70, DPR-75

Report No: 50-272/2002-06, 50-311/2002-06

Licensee: PSEG Nuclear LLC

Facility: Salem Nuclear Generating Station, Units 1 & 2

Location: P.O. Box 236
Hancocks Bridge, NJ 08038

Dates: May 12 - June 29, 2002

Inspectors: Raymond K. Lorson, Senior Resident Inspector
Fred L. Bower, Resident Inspector
Gregory C. Smith, Sr. Physical Security Inspector
Richard Barkley, Senior Project Engineer
Anthony Dimitriadis, Physical Security Inspector
Gregory V. Cranston, Reactor Inspector
Kevin Mangan, Reactor Inspector

Approved By: Glenn W. Meyer, Chief,
Projects Branch 3
Division of Reactor Projects

Summary of Findings

IR 05000272-02-06, IR 05000311-02-06, Public Service Electric Gas Nuclear LLC, Salem Units 1 and 2 on 5/12 - 6/29/02, Maintenance Rule Implementation, Identification and Resolution of Problems and Performance Indicator Verification.

The inspection was performed by resident inspectors, regional security specialists, a regional problem identification and resolution specialist and a regional projects inspector. This inspection identified two green issues, both of which were non-cited violations. The significance of most findings is indicated by their color (Green, White, Yellow, or Red) using Inspection Manual Chapter 0609, "Significance Determination Process" (SDP). Findings for which the SDP does not apply may be "Green" or be assigned a severity level after NRC management review. The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG-1649, "Reactor Oversight Process", Revision 3, dated July 2000.

A. Inspector Identified Findings

Cornerstone: Mitigating Systems

- Green: The inspectors identified a non-cited violation of 10 CFR 50.65(a)(3), because PSEG Nuclear failed to ensure that the objective of preventing failures through maintenance was appropriately balanced against the objective of minimizing unavailability due to monitoring or preventive maintenance. PSEG Nuclear failed to adequately evaluate PM activities for the 22 charging and volume control (CVC) pump, failed to take into account industry-wide operating experience, and failed to ensure that the objective of preventing failure of the 22 CVC pump through maintenance was appropriately balanced against the goal of minimizing unavailability due to preventive maintenance.

The safety significance associated with the failure of the 22 charging pump was determined to be of very low safety significance, because the mitigating functions that relied upon a high pressure injection pump were not lost since the redundant high pressure injection pump and both safety injection pumps remained operable during the period of time that the 22 CVC pump was unavailable. (Section 1R12.1)

Other

- Green: The inspector identified a non-cited violation of 10 CFR Part 50, Appendix B, Criterion XVI, for inadequate corrective actions to preclude repetition of service water (SW) control valve failures in the containment fan cooler unit (CFCU) system. Specifically, a control valve (IISW223) failed in June 2002 in a similar manner to a previous control valve failure in January 2001 due to corrective actions on air supply tubing not having been applied to all susceptible lines.

Summary of Findings (cont'd)

The safety significance of this finding was very low because the failure of valve 11SW223 did not impact the operability of other mitigating systems supported by SW.

B. Licensee Identified Violations

- No licensee identified findings of significance were identified.

Report Details

SUMMARY OF PLANT STATUS

Unit 1 began the period at full power. On June 1, 2002, power was reduced to 88 percent to support scheduled main turbine valve testing and then returned to full power. On June 10 power was reduced to 75 percent and subsequently returned to full power in response to an unplanned offsite transmission line outage. The unit was at full power for the remainder of the period.

Unit 2 began the period in Mode 3 during a refueling outage. The reactor was taken critical on May 14 and reached full power on May 20. On June 10 power was reduced to 75 percent and subsequently returned to full power following an unplanned offsite transmission line outage. The unit was at full power for the remainder of the period.

1. REACTOR SAFETY

Initiating Events, Mitigating Systems, and Barrier Integrity [Reactor - R]

R04 Equipment Alignment

.1 Partial System Walkdowns

a. Inspection Scope

The inspectors performed partial walkdowns of redundant mitigating systems during equipment maintenance outages to confirm that the redundant systems were available to perform their intended safety functions, in acceptable material condition and protected by administrative controls. The following walkdowns were performed:

- The 1A and 1B emergency diesel generators (EDGs), 11 and 12 chillers, 11 and 12 component cooling water pumps, 11 safety injection pump and 11 charging pump during emergent maintenance and post maintenance testing on the 1C EDG on June 10, 2002.

b. Findings

No findings of significance were identified.

R05 Fire Protection

a. Inspection Scope

NRC Inspection Report 50-272 & 311/1999-10 identified that the initial carbon dioxide (CO₂) concentration tests for the 64 foot 4160 Volt switchgear rooms and the 78 foot electrical penetration areas did not demonstrate that the required concentration of 50 percent was met for the established hold time of 20 minutes for these fire areas. No subsequent test reports were found that demonstrated this ability.

On May 20, 2002, while performing tracer gas testing to determine actual field conditions to include in a reanalysis of the CO₂ fire suppression system, PSEG Nuclear determined that the room leakage was sufficient to prevent the areas from reaching and maintaining the required CO₂ concentration. Based on an extent of condition review, PSEG Nuclear extended their concerns to the 84 foot 460 switchgear rooms. All six (Units 1 & 2 -- 4160 volt switchgear, 460 volt switchgear, and 78 foot electrical penetration) fire areas were considered impaired. This event was reported on May 21, 2002, (Notifications 20100322, 20100533 and 20102773) and a special report was made via Licensee Event Report 50-311-02-003 dated June 3, 2002.

Based on the above, on May 21 and June 6, 2002, the inspectors toured the following six fire areas important to reactor safety to evaluate conditions related to: (1) control of transient combustibles and ignition sources; (2) the material condition, operational status, and operational lineup of fire protection systems, equipment and features; and, (3) the fire barriers used to prevent fire damage or fire propagation. The inspectors referred to administrative procedure NC.NA-AP.ZZ-0025(Q), Operational Fire Protection Program, during this inspection. The tours included reviews of Pre-Fire Preplans to determine: (1) 10 CFR 50, Appendix R, safe shutdown equipment; (2) construction and fire barrier information; (3) fire detection equipment; (4) fire suppression equipment; and, (5) diagrams of the fire area. The inspectors reviewed the following Pre-Fire Preplans and associated fire areas:

- Unit 1 - FRS-II-421, 4160V Switchgear Rooms and Battery Rooms, Elevation: 64'-0"
- Unit 1 - FRS-II-431, 460V Switchgear Rooms and Corridor, Elevation: 84'-0"
- Unit 1 - FRS-II-511, Electrical Penetration Area, Elevation: 78'-0"
- Unit 2 - FRS-II-421, 4160V Switchgear Rooms and Battery Rooms, Elevation: 64'-0"
- Unit 2 - FRS-II-431, 460V Switchgear Rooms and Corridor, Elevation: 84'-0"
- Unit 2 - FRS-II-511, Electrical Penetration Area, Elevation: 78'-0"

On May 21 and June 6, 2002, the inspectors reviewed the following impairment permits and verified that the areas were manned by continuous compensatory firewatches:

- Fire Protection Impairment Permit # 3981, CO₂ Systems for Salem Units 1 and 2 78 Foot Electrical Penetration Areas and 64 and 84 Foot Switchgear Rooms
- Fire Protection Impairment Permit # 3970, CO₂ System Impairment for Tracer Gas Testing

b. Findings

No findings of significance were identified.

R11 Licensed Operator Requalification

a. Inspection Scope

On Friday June 7, 2002, the resident inspectors observed a licensed operator simulator training scenario to assess operators' performance and evaluators' critiques. The scenario observed the implementation of the abnormal procedures for loss of control air (S2.OP-AB.CA-0001) and pressurizer pressure malfunction (S2.OP-AB.PZR-0001). This scenario for pressurizer pressure malfunction was selected for observation because it implemented one of the corrective actions for the December 31, 2001, transient resulting from a pressurizer spray valve failing open at Salem Unit 2. The inspectors observed the operator crew transition from the abnormal procedures to the implementation of emergency operating procedures 2-EOP-TRIP-1, "Reactor Trip or Safety Injection," and 2-EOP-TRIP-2, "Reactor Trip Response." A subsequent loss of heat sink required a transition to functional recovery procedure 2-EOP-FRHS-1, "Response to Loss of Secondary Heat Sink." The inspectors observed the post-scenario critique in the simulator, reviewed the procedures used and reviewed the logs taken. Minor discrepancies were captured in the operator training department critique database.

b. Findings

No findings of significance were identified.

R12 Maintenance Rule Implementation.1 (Closed) URI 50-311/01-12-01 22: Charging Pump Failurea. Inspection Scope

In NRC Inspection Report 50-272&311/01-012, the inspectors reviewed the effectiveness of performance and condition monitoring, and maintenance activities performed to ensure reliable operation of the 22 charging and volume control (CVC) pump. The pump failed during operation on February 1, 2002, due to overheating of the speed increaser. The speed increaser problem was caused by failure of the coupling drive pins on the attached lubricating oil pump. The inspectors determined that PSEG Nuclear failed to adequately evaluate preventive maintenance (PM) activities for the 22 CVC pump, taking into account industry-wide operating experience, to ensure that the objective of preventing failure of the 22 CVC pump through maintenance was appropriately balanced against the objective of minimizing unavailability due to monitoring or preventive maintenance as required by 10 CFR 50.65 (a)(3). This finding remained unresolved pending determination of the fault exposure time and completion of the risk assessment.

b. Findings

The inspectors determined that PSEG Nuclear had failed to adequately evaluate PM activities for the 22 CVC pump, taking into account industry-wide operating experience, to ensure that the objective of preventing failure of the 22 CVC pump through

maintenance was appropriately balanced against the objective of minimizing unavailability due to monitoring or preventive maintenance as required by 10 CFR 50.65 (a)(3). The failure to balance the goal of maximizing reliability through preventive maintenance against the goal of minimizing unavailability due to preventive maintenance constituted a violation of 10 CFR 50.65(a)(3). This issue was determined to be of very low safety significance (Green). This low risk violation was entered into PSEG Nuclear's corrective action program (Notification 20091973) and will be treated as a non-cited violation (**NCV 50-311/02-06-01**) consistent with the NRC's Enforcement Policy.

The preventive maintenance deficiencies that resulted in the failure of the 22 CVC pump in February 2002 and the violation of 10 CFR 50.63 (a)(3) were discussed in NRC Inspection Report 50-272 & 311/2001-012. The subsequent review focused on assessing the risk significance of the 22 CVC pump failure. The inspectors reviewed the 22 CVC operating data prior to the failure and noted that the pump had been started and operated for several days prior to the failure. This exceeded the 24 hour mission time assumed in Salem's Probabilistic Risk Assessment (PRA) and therefore the inspectors considered that it was reasonable to assume that the pump would have been able to meet its PRA mission time up until about 24 hours prior to the pump failure on February 1, 2002. The pump was repaired and returned to service on February 2, 2002. Therefore, the inspectors determined that the pump unavailability time had been less than three days.

The inspectors reviewed this issue using the significance determination process (SDP). The issue was determined to be a credible impact on safety since the performance deficiencies led to the failure of the 22 CVC pump. The inspectors performed a Phase II SDP analysis using the "Salem Risk-Informed Inspection Notebook for Salem Generating Station," Revision 0, dated April 5, 2001, and determined that the finding was of very low risk significance (Green), because the mitigating functions that relied upon a high pressure injection pump were not lost as the redundant high pressure injection pump and both safety injection pumps remained operable during the period of time that the 22 CVC pump was unavailable. The inspectors reviewed the SDP results with the Region I Senior Reactor Analyst who confirmed that the risk assessment appeared reasonable considering the short duration of time that the pump was unavailable.

As described in NRC Inspection Report 50-272 & 311/01-012 PSEG Nuclear failed to adequately balance preventive maintenance and unavailability for the 22 CVC pump through the timely performance of appropriate preventive maintenance. This was considered a violation of 10 CFR 50.65 (a)(3) but was left unresolved pending completion of the risk assessment. The cross-cutting aspects of this issue related to problem identification and resolution contributing causes were discussed in NRC Inspection Report 50-272 & 311-2001-012. The February 2002 failure of the 22 CVC pump was subsequently evaluated using the Phase I and Phase II SDPs and determined to be of very low risk significance (Green). Therefore, unresolved item URI 50-311/01-12-01 will be closed and NCV 50-311/02-06-01 will be issued.

R13 Maintenance Risk Assessments and Emergent Work Controla. Inspection Scope

The inspectors reviewed selected maintenance activities through direct observation, document review (risk assessment reviews, operating logs, industry operating experience and notifications), and personnel interviews. This review was performed to determine whether PSEG Nuclear properly assessed and managed the risk, and performed these activities in accordance with applicable technical specification (TS) and work control requirements. The following activities were reviewed:

- Emergent maintenance performed on June 10 to correct the slow stroke time and binding between the valve and valve actuator for 13SW39, EDG service water inlet cooling valve. The slow inservice testing stroke time placed the valve in the action range and rendered the EDG inoperable. Specific documents reviewed included Notification 20102340, and Order 60029322.
- Inspection of 22 containment fan coil unit (CFCU) low speed (Order 60028956) and high speed (Order 60028958) breakers for non-conformances in response to ABB 10 CFR 21 notification, "K-Line Mechanism Failures to Charge and Close," to the USNRC dated May 6, 2002. Additional documents reviewed included procedure SC.MD-ST.230-0003(Q), "230 and 460 Volt ITE K-Series Breaker Preventive Maintenance." Additional details regarding the Part 21 notification are documented in Report Section R15.2.

b. Findings

No findings of significance were identified.

R15 Operability Evaluations.1 Power Operated Relief Valve (PORV) Block Valve - 2PR6a. Inspection Scope

The inspectors reviewed the engineering evaluation (Order 70025472) for the stroke time of one of the PORV block valves (2PR6) having exceed the inservice testing baseline (reference) value and acceptance range for stroke time. The 2PR6 valve was placed in the evaluation range. The evaluation was reviewed to assess technical adequacy of the evaluation and whether continued system operability was warranted. The inspectors discussed the evaluation with PSEG Nuclear engineering personnel. Based on VOTES® and Motor Power Monitor (MPM™) test data, PSEG Nuclear personnel concluded that the increased stroke time could be explained by the differences between test conditions. The reference value was established post-overhaul under cold and static pressurizer conditions. The increased stroke time occurred during testing at normal operating pressure and temperature for the pressurizer. The inspector noted that PSEG Nuclear personnel plan to monitor future stroke time testing to determine if separate reference values are warranted for cold and hot plant stroke time testing of the pressurizer block valves.

b. Findings

No findings of significance were identified.

.2 ITE K-Line Circuit Breaker Operating Mechanism Deficiencies

a. Inspection Scope

The inspectors reviewed PSEG Nuclear's evaluation and planned corrective actions for a Part 21 report issued by ABB, Inc on May 13, 2002. This report identified potential problems with K-Line circuit breaker operating mechanisms that could result in a failure of the breaker to charge and close, and/or binding of the close latch assembly. These mechanisms are installed on multiple 480V safety-related breakers at Salem. The inspectors reviewed operability determination (OD) 02-005, "Potential 460VAC Breaker Defects per 10CFR21," and attended the Station Operations Review Committee (SORC) meeting in May 2002 to review this issue. PSEG Nuclear determined that the breakers were operable based on the extensive post-bench testing following overhaul and by the performance of frequent breaker overhaul and lubrication activities. Additionally, the inspectors reviewed PSEG Nuclear's proposed corrective actions to provide additional assurance of long term breaker reliability.

b. Findings

No findings of significance were identified.

R16 Operator Workarounds

a. Inspection Scope

The inspectors reviewed procedure SH.OP-AP.ZZ-0030(Q), "Operator Burden Program", governing the process of identifying, tracking and managing plant deficiencies that constitute operator burdens. These burdens include control room indicators, computer points, overhead annunciators, operator workarounds and operator concerns. The inspectors reviewed status and tracking records for operator burdens covering January through June 2002 as well as reviewed the open notifications for each of the Unit 1 and Unit 2 operator burdens, particularly operator workarounds, open as of June 27, 2002 (Notifications: 20053906, 20057455, 20057457, 20057487, 20057562, 20069330, 20092365, 20092366, 20095341, 20101469, 20101541, 20102172, 20102375, 20102891). The majority of the open operator burdens consisted of operator concerns, which are equipment deficiencies that the operations department feels have not been corrected through normal corrective action programs and need to be identified and tracked under this program. The May 2002 assessment of the cumulative impact of the operator workarounds was also reviewed. The inspectors interviewed the Work it Now (WIN) Team Senior Reactor Operator (SRO) to determine what efforts were ongoing to continue to reduce the operator burden backlog.

b. Findings

No findings of significance were identified.

R19 Post Maintenance Testinga. Inspection Scope

The inspectors observed the performance of post maintenance testing and/or reviewed documentation for selected risk-significant systems to assess whether the systems would satisfy TSs, Updated Final Safety Analysis Report and PSEG Nuclear procedural requirements. The inspectors assessed whether the testing appropriately demonstrated that the systems were operationally ready and capable of performing their intended safety functions. The following test activities were reviewed:

- Retest and stroke timing of 13SW39, EDG service water inlet cooling valve, in accordance with S1.OP-ST.DG-0003(Q), 1C Diesel Generator Surveillance Test, following emergent maintenance performed on June 10 to correct the slow stroke time and binding between the valve and the valve actuator.
- Retest of the 22 CFCU for proper operational and indication following inspection of the low speed (Order 60028956) and high speed (Order 60028958) breakers. Retesting for each breaker was performed in accordance with S2.OP-ST.CBV-0003(Q), "Containment Systems - Cooling Systems" and S2.OP-SO.CBV-0001(Q), "Containment Ventilation Operation," respectively.

b. Findings

No findings of significance were identified.

R22 Surveillance Testinga. Inspection Scope

The inspectors observed the performance of surveillance test procedures or reviewed test data of selected risk-significant SSCs to assess whether the SSCs satisfied the Technical Specifications, the Updated Final Safety Analysis Report, and PSEG Nuclear procedure requirements. The inspectors assessed whether the testing appropriately demonstrated that the SSCs were operationally ready and capable of performing their intended safety functions. The following tests and activities were reviewed:

- S2.OP-ST.RHR-0002(Q), "Inservice Testing - 22 Residual Heat Removal Pump"

Operators' observations regarding water hammer experienced during S2.OP-ST.RHR-0002(Q) were documented in Notification 20101499 for disposition by the corrective action process. Additional problem identification and resolution documents reviewed included Notifications 20099566 and 20102647 and Order 70024930.

b. Findings

No findings of significance were identified.

R23 Temporary Plant Modifications**a.** Inspection Scope

The inspectors reviewed the following temporary modification (TM) to assess: (1) the adequacy of the 10 CFR 50.59 screen or evaluation; (2) the installation and removal conditions and instructions; (3) that drawings and procedures were identified for updating as applicable; and, (4) the expected removal date. The following TM was inspected:

- 02-217 Lift Lead on the 63P High Oil Pressure Relief Valve Limit Switch Input to Local Annunciator Panel to Clear Main Control Room Overhead Alarm H-23, B Main Transformer Trouble Alarm

The inspectors selected TM 02-217 (Order 60029163) for review after reviewing the TARP (Notifications 20101561 and 20101618) conducted to investigate a suspected lifted relief valve on the Salem Unit 2 main transformer, Phase 2 (B). PSEG walkdown of the transformer indicated that the relief valve was not lifted and there was no evidence of transformer oil on the ground below the relief valve. The inspectors verified that the lifted lead cleared the hanging nuisance alarm in the control room.

b. Findings

No findings of significance were identified.

3. SAFEGUARDS**Physical Protection [PP]****PP1** Access Authorization**a.** Inspection Scope

The inspectors conducted the below listed activities to determine the effectiveness of the behavior observation portion of PSEG Nuclear's personnel screening and fitness-for-duty programs. The behavior observation program was measured against the requirements of 10 CFR 26.22 and PSEG Nuclear's fitness for duty program documents. Specific documents reviewed are listed with the supplementary information at the end of this inspection report.

- The inspectors interviewed five supervisors representing the fire protection, security, maintenance, operations, and technical support/design engineering departments on June 4, 2002, regarding their understanding of behavior observation responsibilities and the ability to recognize aberrant behavior traits.
- The inspectors interviewed five (5) individuals who perform escort duties on June 4, 2002, to establish their knowledge level of those duties.

- The inspectors reviewed behavior observation training procedures and records on June 4, 2002.
- The inspectors reviewed two access authorization/fitness-for-duty self-assessments, two semi-annual fitness for duty performance data reports and an audit during June 3 - 5, 2002.
- The inspectors reviewed event reports and loggable events for the four previous quarters during June 3 - 5, 2002.

b. Findings

No findings of significance were identified.

PP2 Access Control

a. Inspection Scope

The inspectors performed the below listed activities to verify that PSEG Nuclear had established effective site access controls. The inspectors reviewed the equipment to detect and prevent the introduction of contraband (firearms, explosives, and incendiary devices) into the protected area. The access controls and equipment were measured against 10 CFR 73.55(d), and the Physical Security Plan and procedures.

- On June 4 and 5, 2002, the inspectors observed site access control activities, including personnel and package processing through the search equipment during peak ingress periods.
- On June 4, 2002, the inspectors observed testing of all access control equipment, including metal detectors, explosive material detectors, and X-ray examination equipment.
- The inspectors also reviewed the access control event log, an audit, and three self-assessments.

b. Findings

No findings of significance were identified.

4. OTHER ACTIVITIES [OA]

OA1 Performance Indicator (PI) Verification

.1 Units 1 and 2 -- Reactor Coolant System Leakage

a. Inspection Scope

The inspectors verified the accuracy of and methods used to calculate the PI on Reactor Coolant System Leakage. The inspectors verified the PI data submitted through review of the applicable page in the Units 1 and 2 TS surveillance data sheets for S1.OP-ST.RC-0008(Q) and S2.OP-ST.RC-0008(Q), "Reactor Coolant System Water Inventory Balance." The sample of data reviewed included the months of April 2001, through March 2002. The inspectors also verified that PSEG Nuclear initiated Notification 20101907 to document a minor discrepancy in the PI indicator data reported for June 2001 and place this issue in the corrective action program for disposition.

b. Findings

No findings of significance were identified.

.2 Units 1 and 2 -- Reactor Coolant System Specific Activity

a. Inspection Scope

The inspectors verified the accuracy of and methods used to determine the PI on Reactor Coolant System (RCS) Specific Activity. The inspectors reviewed the database of dose equivalent Iodine analysis results. The database was reviewed and compared against the Units 1 and 2 PI data submitted to the NRC for the months of May 2001 through March 2002. On June 12, 2002, the inspectors also observed the sampling and analysis of reactor coolant for dose equivalent Iodine, in accordance with procedures SC.CH-SA.RC-0222(Q), "Sampling Reactor Coolant and RHR Heat Exchanger Outlet," SC.CH-SA.ZZ-0208(Q), "Radiochemical Sample Preparation," and NC.CH-RC.ZZ-2525(Q), "Gamma Spectroscopy Analysis Using CAS."

b. Findings

No findings of significance were identified.

.3 Physical Protection Performance Indicators

a. Inspection Scope

The inspector reviewed PSEG Nuclear's programs for gathering, processing, evaluating and submitting data for the Fitness-for-Duty, Personnel Screening, and Protected Area Security Equipment PIs. The review included PSEG Nuclear's tracking and trending reports, personnel interviews and security event reports for the PI data collected from the 2nd quarter of 2001 through the 1st quarter of 2002.

b. Findings

No findings of significance were identified.

.4 Safety System Unavailability Performance Indicators

a. Inspection Scope

The inspectors reviewed PSEG's monthly compilation of PI safety system unavailability data from Salem Units 1 & 2 from April 2001 till March 2002 for the following systems:

- EDGs
- HPSI
- AFW
- RHR

b. Findings

While the data for each month was comprehensive and accurately supported the PI information provided to the NRC, the inspectors also noted that PSEG Nuclear failed to report 314.2 Fault Exposure Hours for the 2B EDG in January -February 2002 in the PI comment field as specified effective January 1, 2002, by the most recent revision of NEI 99-02, Revision 2, *Regulatory Performance Indicator Guideline*. PSEG's staff acknowledged the oversight and corrected the error in their July 2002 PI data submittal to the NRC.

While the failure to report these fault exposure hours did not impact the accuracy of the PI unavailability data, under the revised NEI 99-02, Revision 2, guidelines, it is incumbent on the NRC to review the event that caused this fault exposure time via the inspection/SDP process. Preliminary risk estimates by the Region I SRA of the impact of 314.2 fault exposure hours for the 2B EDG, assuming no operator recovery actions and no other risk significant safety equipment being concurrently out-of-service, put the risk of this event above the green/white risk threshold. Pending further review of this event and the possible performance issue(s) which caused this long fault exposure time, this matter is unresolved. **(URI 50-311/02-06-02)**

.5 Safety System Functional Failures PI

a. Inspection Scope

The inspectors reviewed the data supporting the safety system functional failure PI for Salem Units 1 and 2 for the period from May 2001 - April 2002.

b. Findings

No findings of significance were identified.

OA2 Identification and Resolution of Problems

.1 Evaluation and Resolution of Repetitive Service Water Problems

a. Inspection Scope

In January 2001 the service water control valve (14SW223) that controls flow to the 14 containment fan cooler unit (CFCU) failed in the open position. PSEG Nuclear documented this issue in the corrective action program (Order 70013490). The inspectors reviewed Order 70013490 and other related corrective action documents (e.g., work orders and root cause investigation reports) to ascertain the adequacy of PSEG Nuclear's evaluation and corrective actions. The specific design documents and procedures reviewed are listed with the supplementary information at the end of this inspection report. The inspectors reviewed the service water control valve (11SW223) that failed open on June 25, 2002, during testing of the 11 CFCU. The inspectors also walked down plant equipment, reviewed plant procedures, interviewed plant personnel and observed the retest of the 11 CFCU.

b. Findings

The inspectors determined that PSEG Nuclear failed to take adequate corrective actions to preclude repetition of service water control valve failures in the containment fan cooler unit system. Corrective actions for previous service water control valve air line failures did not adequately ensure all susceptible control valve air lines were modified. The subsequent repetitive failure of a control valve (11SW223) in June 2002 was considered a significant condition adverse to quality and constituted a non-cited violation of 10 CFR Part 50, Appendix B, Criterion XVI, "Corrective Actions." This issue was determined to be of very low safety significance (Green).

On January 2, 2001, during surveillance testing of the 14 CFCU, the associated service water control valve (14SW223) failed open. PSEG Nuclear initiated a work order (notification) to repair the valve and entered the issue into the corrective action program. PSEG Nuclear identified that a section of the 1/4" stainless steel tubing that provides control air to the valve had sheared, and determined that the likely cause was fatigue failure due to excessive vibrations. Recommended corrective actions included installing flexible stainless steel tubing on all CFCU control valves to minimize the effects of vibration. Based on the recommendation PSEG Nuclear changed the site's tubing specification to allow for flexible hose installation to reduce thermal stress and/or

vibration stress on air lines. However, there was no engineering design change performed on the SW223 air lines to identify which sections of tubing were to be replaced and how the flexible tube was to be installed. Technicians were to use the tubing manufacturer's recommendations on installation. "Skill of the craft" was to be used to determine where and how flexible tubing should be installed. Flexible tubes were installed on runs spanning from the valves to separately mounted tube trays, but no flexible tubing was installed between the regulators and the separately mounted volume boosters.

On June 25, 2002, during testing of the 11 CFCU, the service water control valve (11SW223) valve failed open. PSEG Nuclear found that a 1/4" stainless steel air supply tubing had sheared in a location similar to failure associated 14SW223 in January 2001. During a walkdown of the CFCU control valves, the inspector identified that sections of tubing had not been replaced with flexible tubing. Several tubing sections were in contact with the valve or support bracket. The tubing on valve 15SW223 showed signs of wear due to rubbing on the valve support bracket. The inspector noted that these sections of tubing were also in similar locations to the section that had failed on 14SW223 in January 2001. The inspector observed that the flexible tubing that was installed did not preclude vibrations and the resulting cyclic stresses from translating through the flex tubing to the unsupported portions of the solid tubing.

This issue is more than minor because the failure mechanism is applicable to all the SW223 control valves and resulted in reduced reliability of the SW system valves. The mitigating system cornerstone is applicable to this issue, because a failure of these valves can cause a degradation of service water flow to several mitigating systems (i.e., emergency diesel generators, CFCUs, component cooling heat exchangers and safety-related room coolers). Calculations showed that adequate cooling would be maintained to other mitigating systems with the failure of one CFCU control valve (SW223). The failure was determined to be of very low safety significance (Green) using Phase I of the Significant Determination Process, because the mitigating system equipment remained operable, there was no loss of safety function, and no technical specification limiting conditions for operation were exceeded.

10 CFR Part 50, Appendix B, Criterion XVI requires that in the case of significant conditions adverse to quality, measures shall assure that corrective action is taken to preclude repetition. Contrary to this requirement, after the failure of a CFCU control valve (14SW223) in January 2001, PSEG Nuclear failed to take adequate corrective actions to preclude the repetition of this significant condition adverse to quality. As a result, another CFCU control valve failed in June 2002. However, because of the very low safety significance and because the issue was entered into PSEG Nuclear's corrective action process (Order 7002551, 60029626), it is being treated as a non-cited violation, consistent with Section VI.A.1 of the NRC Enforcement Policy. **(NCV 50-272/02-06-03)**

OA6 Management Meetings

.1 Exit Meeting Summary

On July 10, 2002, the inspectors presented their overall findings to members of PSEG Nuclear management led by Mr. D. Garchow and Mr. J. Carlin.

SUPPLEMENTARY INFORMATION

a. Key Points of Contact

LICENSEE PERSONNEL

T. Bashore	WIN Team SRO
J. Carlin	VP - Nuclear Reliability
G. Cranfiled	QA / QA Assessor
E. Cummings	Site Access/Processing
C. Fricker	Salem Operations Manager
D. Garchow	VP - Operations
M. Ivanick	Security Technical Analyst
J. Johnson	Security Analyst
J. Nagle	Supervisor Licensing
K. O'Hare	Radiation Protection Manager (Acting)
R. Ritzman	Licensing Engineer
T. Straub	Manager, Nuclear Security
R. Thomas	Security Analyst
L. Waldinger	Director - Site Operations

THE WACKENHUT COMPANY

R. Gaunt	Project Manager
G. Huckabee	Security Supervisor

b. List of Items Opened, Closed, and Discussed

Opened

50-311/02-06-02	URI	PSEG Nuclear failed to report 314.2 fault exposure hours during the 1 ST quarter of 2002 for the 2B EDG as required by NEI 99-02. The risk significance determination (SDP) associated with this fault exposure time is ongoing and incomplete. (Section OA1)
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Opened/Closed

NCV 50-311/02-06-01	NCV	PSEG Nuclear, failed to adequately evaluate preventive maintenance activities and industry-wide operating experience and did not adequately balance the objective of preventing failures of components through maintenance against the objective of minimizing unavailability of the 22 CVC pump as required by 10 CFR 50.65(a)(3). (Section R12)
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NCV 50-272/02-06-03	NCV	PSEG Nuclear, failed to take adequate corrective actions to preclude repetition of control valve failures in the containment fan cooler unit (CFCU) system, a significant condition adverse to quality. Failure to take adequate corrective actions to resolve the vibration-induced air line failure problem was a cross-cutting contributing cause that led to a repetitive control valve failure. (Section OA4)
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Closed

50-311/01-12-01	URI	PSEG Nuclear, failed to adequately evaluate preventive maintenance activities and industry-wide operating experience and did not adequately balance the objective of preventing failures of components through maintenance against the objective of minimizing unavailability of the 22 CVC pump as required by 10 CFR 50.65(a)(3). (Section R12)
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c. **List of Documents Reviewed**

In addition to the documents identified in the body of this report, the inspectors reviewed the following documents and records:

Physical Protection Documents

PSEG Fitness-for-Duty Training Requirements
 Fitness-for-Duty Performance Data Report, January - June 2001
 Fitness-for-Duty Performance Data Report, June - December 2001
 QA Assessment 2002-0034, 3/27/02
 NC-NM-AP.22-0019(Q), Behavior Observation Program

Design Basis Documents

Salem Unit 1&2 FSAR
 Salem Unit 1&2 Technical Specifications

Procedures

S2.OP-SO.CBV-001(Q) Rev 19
 S2.OP-ST.SW-0010(Q) Rev 14
 S2.OP-SO.SW-0005(Q) Rev 24
 S2.OP-SO.CBV-003(Q) Rev 6
 NC.WM-AP.ZZ-0002(Q), Rev 5

Condition Reports

20090336, 20052160, 20052280, 20052278, 20103923, 70009562, 70012441, 70013148, 80032434

Miscellaneous Documents

Service water System Health Report 10/01/01-12/31/01 and 1/01/02-3/30/02
Containment Building Ventilation System Health Report 10/01/01-12/31/01
TARP Team meeting minutes -Feb 21, 2001
CFCU Level 1-2 Action Plan
Salem Generating Station Containment Fan Coil Units Presentation

d. **List of Acronyms**

CFCU	Containment Fan Coil Unit
CO ₂	Carbon Dioxide
CVC	Charging and Volume Control
EDGs	Emergency Diesel Generators
MPM	Motor Power Monitor
NCV	Non-Cited Violation
NRC	Nuclear Regulatory Commission
PARS	Publicly Available Records
PI	Performance Indicator
PM	Preventive Maintenance
PORV	Power Operated Relief Valve
PRA	Probabilistic Risk Assessment
PSEG	Public Service Electric Gas
RCS	Reactor Coolant System
RHR	Residual Heat Removal
SDP	Significance Determination Process
SORC	Station Operations Review Committee
SRO	Senior Reactor Operator
SW	Service Water
TARP	Transient Assessment Response Plan
TM	Temporary Modification
TS	Technical Specification
WIN	Work It Now