



**UNITED STATES  
NUCLEAR REGULATORY COMMISSION**

REGION I  
2100 RENAISSANCE BOULEVARD, SUITE 100  
KING OF PRUSSIA, PENNSYLVANIA 19406-2713

October 18, 2019

Mr. Eric Carr  
President and Chief Nuclear Officer  
PSEG Nuclear, LLC  
P.O. Box 236  
Salem, NJ 08038

SUBJECT: SALEM NUCLEAR GENERATING STATION, UNITS 1 AND 2 – DESIGN BASIS  
ASSURANCE INSPECTION (PROGRAMS) INSPECTION REPORT  
05000272/2019011 AND 05000311/2019011

Dear Mr. Carr:

On September 13, 2019, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at Salem Nuclear Generating Station, Units 1 and 2 and discussed the results of this inspection with Rick DeSanctis, Salem Operations Director and other members of your staff. The results of this inspection are documented in the enclosed report.

One finding of very low safety significance (Green) is documented in this report. This finding involved a violation of NRC requirements. We are treating this violation as a non-cited violation (NCV) consistent with Section 2.3.2 of the Enforcement Policy.

If you contest the violation or significance or severity of the violation documented in this inspection report, you should provide a response within 30 days of the date of this inspection report, with the basis for your denial, to the U.S. 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 Salem.

This letter, its enclosure, and your response (if any) will be made available for public inspection and copying at <http://www.nrc.gov/reading-rm/adams.html> and at the NRC Public Document Room in accordance with 10 CFR 2.390, "Public Inspections, Exemptions, Requests for Withholding."

Sincerely,

**/RA/**

Glenn T. Dentel, Chief  
Engineering Branch 2  
Division of Reactor Safety

Docket Nos. 05000272 and 05000311  
License Nos. DPR-70 and DPR-75

Enclosure:  
As stated

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SUBJECT: SALEM NUCLEAR GENERATING STATION, UNITS 1 AND 2 – DESIGN BASIS  
 ASSURANCE INSPECTION (PROGRAMS) INSPECTION REPORT  
 05000272/2019011 AND 05000311/2019011 DATED OCTOBER 18, 2019

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**U.S. NUCLEAR REGULATORY COMMISSION**  
**Inspection Report**

Docket Numbers: 05000272 and 05000311

License Numbers: DPR-70 and DPR-75

Report Numbers: 05000272/2019011 and 05000311/2019011

Enterprise Identifier: I-2019-011-0018

Licensee: PSEG Nuclear, LLC

Facility: Salem Nuclear Generating Station, Units 1 and 2

Location: Hancocks Bridge, NJ 08038

Inspection Dates: August 19, 2019 to September 13, 2019

Inspectors: A. Patel, Senior Reactor Inspector (Team Lead)  
C. Hobbs, Reactor Inspector  
D. Kern, Senior Reactor Inspector

Approved By: Glenn T. Dentel, Chief  
Engineering Branch 2  
Division of Reactor Safety

Enclosure

## SUMMARY

The U.S. Nuclear Regulatory Commission (NRC) continued monitoring the licensee's performance by conducting a design basis assurance inspection (programs) inspection at Salem Nuclear Generating Station, Units 1 and 2 in accordance with the Reactor Oversight Process. The Reactor Oversight Process is the NRC's program for overseeing the safe operation of commercial nuclear power reactors. Refer to <https://www.nrc.gov/reactors/operating/oversight.html> for more information.

### List of Findings and Violations

Missing Preventive Maintenance for Environmental Qualification Program Components			
Cornerstone	Significance	Cross-Cutting Aspect	Report Section
Mitigating Systems	Green NCV 05000311, 05000272/2019011-01 Open/Closed	None (NPP)	71111.21N
The inspectors identified a Green finding and associated non-cited violation (NCV) of Title 10 of the <i>Code of Federal Regulations</i> (10 CFR) Part 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings," because PSEG did not schedule and perform equipment replacement preventive maintenance (PM) as required by station procedures to maintain qualification components within the Environmental Qualification (EQ) program scope. Specifically, twenty-one components did not have scheduled PMs and three of these had exceeded their qualified life.			

### Additional Tracking Items

None.

## INSPECTION SCOPES

Inspections were conducted using the appropriate portions of the inspection procedures (IPs) in effect at the beginning of the inspection unless otherwise noted. Currently approved IPs with their attached revision histories are located on the public website at <http://www.nrc.gov/reading-rm/doc-collections/insp-manual/inspection-procedure/index.html>. Samples were declared complete when the IP requirements most appropriate to the inspection activity were met consistent with Inspection Manual Chapter (IMC) 2515, "Light-Water Reactor Inspection Program - Operations Phase." The inspectors reviewed selected procedures and records, observed activities, and interviewed personnel to assess licensee performance and compliance with Commission rules and regulations, license conditions, site procedures, and standards.

## REACTOR SAFETY

### 71111.21N - Design Bases Assurance Inspection (Programs)

The inspectors evaluated Environmental Qualification program implementation through the sampling of the following components:

#### Select Sample Components to Review - Risk Significant/Low Design (Inside/Outside Containment) (IP Section 02.01) (6 Samples)

- (1) Unit 1, 12 Main Steam & Turbine Bypass Steam Generator Main Steam Drain Valve Solenoid Valve (S1MS-1SV279) [solenoid operated pilot valve, position indication switch, wire splice, power cable]
- (2) Unit 1, 11 Safety Injection Pump Cross Over Motor Operated Valve Motor (S1SJ-11SJ113-MTRY) [motor operated valve, limit switch, terminal block, wire splice, power cable]
- (3) Unit 1, 13 Auxiliary Feedwater Flow Differential Pressure Transmitter (S1AF-1FA1095) [transmitter, instrument cable]
- (4) Unit 1, 1CC215 Component Cooling Valve Open Limit Switch (S1CC-1CC215-LS1) [solenoid operated valve, limit switch, terminal block, wire splice, power cable]
- (5) Unit 2, 21 Service Water Accumulator Injection Line Isolation Valve (S2SW-2SV1742) [position indication switch, wire splice, power cable]
- (6) Unit 2, 21 Residual Heat Removal Pump Motor (S2RHR-2RHR1-MTRD) [pump motor, wire splice, power cable]

#### Select Sample Components to Review - Primary Containment (Inside Containment) (IP Section 02.01) (2 Samples)

- (1) Unit 1, 1PR3 Reactor Coolant Pressurizer Safety Relief Valve Close Limit Switch (S1RC-1PR3-LS2) [limit switch, terminal block, wire splice, power cable]
- (2) Unit 2, Emergency Core Cooling System Recirculation Sump Level Switch (S2SJ-2LD20255) [level switch, wire splice, power cable]

## INSPECTION RESULTS

Missing Preventive Maintenance for Environmental Qualification Program Components			
Cornerstone	Significance	Cross-Cutting Aspect	Report Section
Mitigating Systems	Green NCV 05000311,05000272/2019011-01 Open/Closed	None (NPP)	71111.21N
<p>The inspectors identified a Green finding and associated non-cited violation (NCV) of Title 10 of the <i>Code of Federal Regulations</i> (10 CFR) Part 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings," because PSEG did not schedule and perform equipment replacement preventive maintenance (PM) as required by station procedures to maintain qualification components within the Environmental Qualification (EQ) program scope. Specifically, twenty-one components did not have scheduled PMs and three of these had exceeded their qualified life.</p> <p><u>Description:</u> 10 CFR 50.49, "Environmental Qualification of Electric Equipment Important to Safety for Nuclear Power Plants," established testing and maintenance requirements to ensure certain equipment was qualified for its application and would meet its specified performance requirements when subjected to design basis event conditions predicted to be present when it must perform its safety function up to the end of its qualified life. Salem EQ Program procedures, including component EQ Binders, established installation and maintenance requirements to ensure equipment covered by 10 CFR 50.49 remains qualified. CC-AA-203, EQ Program, Revision 9, requires station personnel to schedule and perform preventive maintenance activities required by the EQ Program to maintain component environmental qualification.</p> <p>The inspectors requested work history documentation to determine the age of solenoid valve S1MS-1SV279 and to verify PMs were established to replace the solenoid valve prior to the end of its 23.99 year qualified life as specified by EQ-SA-017E, EQ Binder for Automatic Switch Company (ASCO) Solenoid Valve Model NP8321 Series, Revision 3. PSEG found that replacement PMs were not scheduled for S1MS-1SV279 or its two similar valves on Unit 2. However, each valve remained within its qualified life. Valves S1MS-1SV279, S2MS-2SV279, and S2MS-2SV288 would reach the end of qualified life on November 2, 2021, February 9, 2020, and February 2, 2020, respectively. Prior to the inspectors' inquiry, no activity was in place to schedule or perform the required equipment replacements prior to exceeding their qualified life.</p> <p>PSEG entered the issue into their corrective action program as notifications 20830411 and 20832938. PSEG performed an initial extent-of-condition review and identified eighteen additional EQ components whose required replacement PMs had not been generated or scheduled. Three of the affected installed components (Unit 2 hydrogen analyzer sensors S2CBV-2XA3358 &amp; S2CBV-2XA3359, Unit 2 pressurizer pressure transmitter circuit card S2RC-2PT474) were already beyond their qualified life. The Unit 2 hydrogen analyzer sensors were originally qualified to June 2016 and the Unit 2 pressurizer pressure transmitter circuit card were originally qualified to March 2018. PSEG performed detailed engineering analysis and determined qualified life for the three overdue components could be extended until the next opportunity to perform the associated equipment replacement PMs. The inspectors determined the analysis was reasonable.</p>			

PSEG's initial review determined the most likely cause was a work control database conversion that occurred in 1999. PSEG also plans on reviewing other work orders not associated with EQ as a further extent-of-condition review.

**Corrective Actions:**

PSEG entered the issue into their corrective action program, performed detailed engineering analysis, and determined qualified life for the three overdue components could be extended until the next opportunity to perform the associated equipment replacement PMs.

PSEG determined none of the twenty-one components were currently beyond their revised qualified life and all remained qualified. Work control staff initiated action to schedule the twenty-one replacement PMs for performance prior to exceeding their revised qualified life. The inspectors reviewed the three EQ PM deferral evaluations and determined they were reasonable. Additionally, PSEG initiated action to assess the programmatic impact of this issue, verify scheduling of non-EQ PMs, and to assess applicability to Hope Creek Nuclear Generating Station.

**Corrective Action References:** Notifications 20830411 and 20832938

**Performance Assessment:**

**Performance Deficiency:** Preventive maintenance work orders required to maintain equipment qualification were not generated, scheduled, and/or performed for twenty-one EQ components. Three of these components were beyond their qualified life and required engineering evaluations to support extending qualified life and EQ PM deferrals. The remaining eighteen components had not exceeded their qualified life. The deficiency occurred in 1999 when the station converted to a new work control system. The extent-of-condition may also extend to non-EQ components.

**Screening:** The inspectors determined the performance deficiency was more than minor because if left uncorrected, it would have the potential to lead to a more significant safety concern. With no replacement PMs scheduled, twenty-one installed EQ components (serving various systems on both Salem Units 1 and 2) would likely have exceeded their qualified life and may not have reliably performed their designated safety function during and following design basis events. Additionally, the deficiency was similar to NRC IMC 0612, Appendix E, "Examples of Minor Issues" (examples 3.j and 3.k), in that it was programmatic impacting twenty-one EQ components. This could adversely affect the reliability of mitigating systems and complicate operator response to prevent undesirable consequences to a design basis event.

**Significance:** The inspectors assessed the significance of the finding using Appendix A, "The Significance Determination Process (SDP) for Findings At-Power."

The inspectors assessed the significance of the finding using Appendix A, "The Significance Determination Process (SDP) for Findings At-Power." The inspectors assessed the significance of the finding using Appendix A, "Significance Determination of Reactor Inspection Findings for At - Power Situations," Exhibit 2, "Mitigating Systems Screening Questions." The performance deficiency affected the qualification of Mitigating Systems cornerstone components. The inspectors determined that this finding was a deficiency affecting the design or qualification of mitigating structures, systems, or components, where the structures, systems, or components maintained their operability or functionality.



Therefore, the inspectors determined the finding to be of very low safety significance (Green). Specifically, for the twenty-one above mentioned components, operability and qualification was subsequently demonstrated through a technical evaluation which extended the EQ life and/or rescheduling the EQ replacement PM to an earlier date.

Cross-Cutting Aspect: Not Present Performance. No cross-cutting aspect was assigned to this finding because the inspectors determined the finding did not reflect present licensee performance. The inspectors determined the central cause of the issue occurred when the station converted to a new work control system in 1999, and did not represent present licensee performance.

Enforcement:

Violation: 10 CFR Part 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings," requires, in part, that activities affecting quality shall be prescribed by documented procedures and shall be accomplished in accordance with these procedures. Salem EQ Program procedures, including component EQ Binders, established installation and maintenance requirements to ensure equipment covered by 10 CFR 50.49 remains qualified. CC-AA-203, EQ Program, Revision 9, requires station personnel to schedule and perform preventive maintenance activities required by the EQ Program to maintain component environmental qualification. Various component-specific EQ binders identify additional EQ replacement PMs and their required frequency.

Contrary to the above, from approximately June 2016 to September 13, 2019, station personnel did not accomplish procedures to generate, schedule, and perform PM work orders required to maintain equipment qualification for three EQ components (Unit 2 hydrogen analyzer sensors S2CBV-2XA3358 & S2CBV-2XA3359 and Unit 2 pressurizer pressure transmitter circuit card S2RC-2PT474). The components were in service beyond their qualified life and required engineering evaluations to support extending EQ preventive maintenance activities. In addition, eighteen other components including ASCO solenoid valves S1MS-1SV279, S2MS-2SV279, and S2MS-2SV288 were not scheduled for preventive maintenance before their end of qualified life. The deficiency occurred when the station transitioned to a new work control system. PSEG entered the issue into their corrective action program as notifications 20830411 and 20832938.

Enforcement Action: This violation is being treated as a non-cited violation, consistent with Section 2.3.2 of the Enforcement Policy.

## **EXIT MEETINGS AND DEBRIEFS**

The inspectors verified no proprietary information was retained or documented in this report.

- On September 13, 2019, the inspectors presented the design basis assurance inspection (programs) inspection results to Rick DeSanctis, Salem Operations Director and other members of the licensee staff.

## DOCUMENTS REVIEWED

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
71111.21N	Calculations	EQ-SA-008A	Namco Controls, Limit Switch Model EA180 Series	Revision 2
		EQ-SA-013	Crosby Position Indicator Model DSC-C-65628	Revision 1
		EQ-SA-017E	Automatic Switch Company Solenoid Valve Model NP8321 Series	Revision 3
		S-C-SDC-1419	Salem Generating Station Environmental Design Criteria	Revision 5
	Corrective Action Documents Resulting from Inspection	20831352		
		20831354		
		20831549		
		20831550		
		20831552		
		20831553		
		20831555		
		20831561		
		20831564		
		20831591		
		20832007		
		20832461		
		20832525		
		20832547		
		20832938		
		20834011		
	Drawings	231405	Penetration Area No. 12 & 22 Main Steam Panels 683-1B through 689-1B, and 832-1B	Revision 26
	Procedures	EQ-SA-017D	Environmental Qualification Binder For Automatic Switch Company Solenoid Valve Model NP8316 Series	Revision 2
	Work Orders	920717009		
		951021001		
		951021003		