UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

May 31, 2019

Mr. Peter P. Sena, III
President and Chief Nuclear Officer
PSEG Nuclear LLC - N09
Salem Nuclear Generating Station
P.O. Box 236
Hancocks Bridge, NJ 08038

SUBJECT: SALEM NUCLEAR GENERATING STATION, UNIT NOS. 1 AND 2 – ISSUANCE OF AMENDMENT NOS. 329 AND 310 RE: REVISE REACTOR TRIP SYSTEM INSTRUMENTATION, ENGINEERED SAFETY FEATURE ACTUATION SYSTEM INSTRUMENTATION, MAIN STEAM ISOLATION VALVES, AND ADD MAIN FEEDWATER ISOLATION TECHNICAL SPECIFICATION (EPID L-2018-LLA-0189)

Dear Mr. Sena:

The U.S. Nuclear Regulatory Commission (the Commission) has issued the enclosed Amendment Nos. 329 and 310 to Renewed Facility Operating License Nos. DPR-70 and DPR-75 for the Salem Nuclear Generating Station, Unit Nos. 1 and 2, respectively. These amendments consist of changes to the Technical Specifications (TSs) in response to your application dated June 29, 2018, as supplemented by letter dated October 27, 2018.

The amendments revise TS 3/4.3.1, "Reactor Trip System Instrumentation," TS 3/4.3.2, "Engineered Safety Feature Actuation System Instrumentation," and TS 3/4.7.1.5, "Main Steam Isolation Valves," and add a new TS for feedwater isolation to better align the TSs with the design-basis analyses and the design of the instrumentation.

A copy of the related safety evaluation is also enclosed. Notice of Issuance will be included in the Commission's biweekly *Federal Register* notice.

Sincerely,

James S. Kim

James S. Kim, Project Manager
Plant Licensing Branch I
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket Nos. 50-272 and 50-311

Enclosures:
1. Amendment No. 329 to DPR-70
2. Amendment No. 310 to DPR-75
3. Safety Evaluation

cc: Listserv

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

PSEG NUCLEAR LLC

EXELON GENERATION COMPANY, LLC

DOCKET NO. 50-272

SALEM NUCLEAR GENERATING STATION, UNIT NO. 1

AMENDMENT TO RENEWED FACILITY OPERATING LICENSE

Amendment No. 329
Renewed License No. DPR-70

1. The U.S. Nuclear Regulatory Commission (the Commission) has found that:

   A. The application for amendment filed by PSEG Nuclear LLC, acting on behalf of itself and Exelon Generation Company, LLC (the licensees), dated June 29, 2018, as supplemented by letter dated October 27, 2018, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's rules and regulations set forth in 10 CFR Chapter I;

   B. The facility will operate in conformity with the application, the provisions of the Act, and the rules and regulations of the Commission;

   C. There is reasonable assurance: (i) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the Commission's regulations;

   D. The issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public; and

   E. The issuance of this amendment is in accordance with 10 CFR Part 51 of the Commission's regulations and all applicable requirements have been satisfied.

2. Accordingly, the license is amended by changes to the Technical Specifications as indicated in the attachment to this license amendment, and paragraph 2.C.(2) of Renewed Facility Operating License No. DPR-70 is hereby amended to read as follows:

(2) Technical Specifications and Environmental Protection Plan

The Technical Specifications contained in Appendix A, as revised through Amendment No. 329, and the Environmental Protection Plan contained in Appendix B, are hereby incorporated in the renewed license. PSEG Nuclear LLC shall operate the facility in accordance with the Technical Specifications, and the Environmental Protection Plan.

3. This license amendment is effective as of its date of issuance and shall be implemented within 60 days of the date of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

James G. Danna, Chief
Plant Licensing Branch I
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Attachment:
Changes to Renewed Facility Operating
License and Technical Specifications

Date of Issuance: May 31, 2019

ATTACHMENT TO LICENSE AMENDMENT NO. 329

SALEM NUCLEAR GENERATING STATION, UNIT NO. 1

RENEWED FACILITY OPERATING LICENSE NO. DPR-70

DOCKET NO. 50-272

Replace the following page of Renewed Facility Operating License No. DPR-70 with the attached revised page as indicated. The revised page is identified by amendment number and contains a marginal line indicating the area of change.

Remove	Insert
Page 3	Page 3

Replace the following pages of the Appendix A, Technical Specifications, with the attached revised pages as indicated. The revised pages are identified by amendment number and contain marginal lines indicating the areas of change.

Remove	Insert
VII	VII
XIV	XIV
3/4 3-4	3/4 3-4
3/4 3-5	3/4 3-5
3/4 3-12	3/4 3-12
3/4 3-15	3/4 3-15
3/4 3-19	3/4 3-19
3/4 3-20	3/4 3-20
3/4 3-21	3/4 3-21
3/4 3-23	3/4 3-23
3/4 3-26	3/4 3-26
3/4 3-31a	3/4 3-31a
3/4 3-32a	3/4 3-32a
3/4 3-34	3/4 3-34
3/4 7-10	3/4 7-10
---	3/4 7-38
---	3/4 7-39

instrumentation and radiation monitoring equipment calibration, and as fission detectors in amounts as required;

(5) PSEG Nuclear LLC, pursuant to the Act and 10 CFR Parts 30, 40 and 70, to receive, possess and use in amounts as required any byproduct, source or special nuclear material without restriction to chemical or physical form, for sample analysis or instrument calibration or associated with radioactive apparatus or components; and

(6) PSEG Nuclear LLC, pursuant to the Act and 10 CFR Parts 30 and 70, to possess but not separate, such byproduct and special nuclear materials as may be produced by the operation of the facility.

C. This renewed license shall be deemed to contain and is subject to the conditions specified in the following Commission regulations in 10 CFR Chapter I: Part 20, Section 30.34 of Part 30, Section 40.41 of Part 40, Sections 50.54 and 50.59 of Part 50, and Section 70.32 of Part 70; and is subject to all applicable provisions of the Act and to the rules, regulations, and orders of the Commission now or hereafter in effect; and is subject to the additional conditions specified or incorporated below:

(1) Maximum Power Level

PSEG Nuclear LLC is authorized to operate the facility at a steady state reactor core power level not in excess of 3459 megawatts (one hundred percent of rated core power).

(2) Technical Specifications and Environmental Protection Plan

The Technical Specifications contained in Appendix A, as revised through Amendment No. 329, and the Environmental Protection Plan contained in Appendix B, are hereby incorporated in the renewed license. PSEG Nuclear LLC shall operate the facility in accordance with the Technical Specifications, and the Environmental Protection Plan.

(3) Deleted Per Amendment 22, 11-20-79

(4) Less than Four Loop Operation

PSEG Nuclear LLC shall not operate the reactor at power levels above P-7 (as defined in Table 3.3-1 of Specification 3.3.1.1 of Appendix A to this renewed license) with less than four (4) reactor coolant loops in operation until safety analyses for less than four loop operation have been submitted by the licensees and approval for less than four loop operation at power levels above P-7 has been granted by the Commission by Amendment of this renewed license.

(5) PSEG Nuclear LLC shall implement and maintain in effect all provisions of the approved fire protection program as described in the Updated Final Safety

INDEX

LIMITING CONDITIONS FOR OPERATION AND SURVEILLANCE REQUIREMENTS

INDEX

BASES

TABLE 3.3-1 (Continued)

REACTOR TRIP SYSTEM INSTRUMENTATION

FUNCTIONAL UNIT	TOTAL NUMBER OF CHANNELS	CHANNELS TO TRIP	MINIMUM CHANNELS OPERABLE	APPLICABLE MODES	ACTION
18. Turbine Trip					
a. Low Autostop Oil Pressure	3	2	2	1[#]	6
b. Turbine Stop Valve Closure	4	4	3	1[#]	6
19. Safety Injection Input from ESF	2	1	2	1,2	10
20. Reactor Coolant Pump Breaker Position Trip (above P-7)	1/breaker	2	1/breaker per operating loop	1	11
21. Reactor Trip Breakers	2	1	2	1,2 3*,4*,5*	1[###],14 13
22. Automatic Trip Logic	2	1	2	1,2 3*,4*,5*	10 13

TABLE 3.3-1 (Continued)

TABLE NOTATION

* With the reactor trip system breakers in the closed position and the control rod drive system capable of rod withdrawal.

\# Above the P-9 (Power Range Neutron Flux) interlock.

If ACTION Statement 1 is entered as a result of Reactor Trip Breaker (RTB) or Reactor Trip Bypass Breakers (RTBB) maintenance testing results exceeding the following acceptance criteria, NRC reporting shall be made within 30 days in accordance with Specification 6.9.2:

1. A RTB or RTBB trip failure during any surveillance test with less than or equal to 300 grams of weight added to the breaker trip bar.

2. A RTB or RTBB time response failure that results in the overall reactor trip system time response exceeding the Technical Specification limit.

ACTION STATEMENTS

ACTION 1 - With the number of channels OPERABLE one less than required by the Minimum Channels OPERABLE requirement, restore the inoperable channel (RTB) to OPERABLE within 24 hours or be in HOT STANDBY within 6 hours; however, one channel may be bypassed for up to 4 hours for surveillance testing per Specification 4.3.1.1.1 provided the other channel is OPERABLE.

ACTION 2 - With the number of OPERABLE channels one less than the Total Number of Channels, STARTUP and/or POWER OPERATION may proceed provided the following conditions are satisfied:

a. The inoperable channel is placed in the tripped condition within 72 hours.

b. The Minimum Channels OPERABLE requirement is met; however, one channel may be bypassed for up to 12 hours for surveillance testing per Specification 4.3.1.1.1.

c. Either, THERMAL POWER is restricted to ≤ 75% of RATED THERMAL POWER and the Power Range, Neutron Flux trip setpoint is reduced to ≤ 85% of RATED THERMAL POWER within 4 hours; or, the QUADRANT POWER TILT RATIO is monitored at least once per 12 hours.

TABLE 4.3-1 (Continued)

REACTOR TRIP SYSTEM INSTRUMENTATION SURVEILLANCE REQUIREMENTS

FUNCTIONAL UNIT	CHANNEL CHECK(15)	CHANNEL CALIBRATION(15)	CHANNEL FUNCTIONAL TEST(15)	MODES IN WHICH SURVEILLANCE REQUIRED
13. Loss of Flow Two Loops			N.A.	1
14. Steam Generator Water Level--Low-Low				1, 2
15. DELETED				
16. Undervoltage - Reactor Coolant Pumps	N.A.			1
17. Underfrequency - Reactor Coolant Pumps	N.A.			1
18. Turbine Trip				
a. Low Autostop Oil Pressure	N.A.	N.A.	S/U(1)	1#
b. Turbine Stop Valve Closure	N.A.	N.A.	S/U(1)	1#
19. Safety Injection Input from ESF	N.A.	N.A.	(4)(5)	1, 2
20. Reactor Coolant Pump Breaker Position Trip	N.A.	N.A.		1
21. Reactor Trip Breaker	N.A.	N.A.	(5)(11)(13)(14)	1, 2 and *
22. Automatic Trip Logic	N.A.	N.A.	(5)	1, 2 and *

Above the P-9 (Power Range Neutron Flux) Interlock

TABLE 3.3-3

ENGINEERED SAFETY FEATURE ACTUATION SYSTEM INSTRUMENTATION

FUNCTIONAL UNIT	TOTAL NO. OF CHANNELS	CHANNELS TO TRIP	MINIMUM CHANNELS OPERABLE	APPLICABLE MODES	ACTION
1. SAFETY INJECTION					
a. Manual Initiation	2	1	2	1,2,3,4	18
b. Automatic Actuation Logic	2	1	2	1,2,3,4	13
c. Containment Pressure-High	3	2	2	1,2,3	19
d. Pressurizer Pressure-Low	3	2	2	1,2,3#	19
e. Differential Pressure Between Steam Lines - High	3/steam line	2/steam line any steam line	2/steam line	1,2,3##	19
f. Steam Flow in Two Steam Lines-High	2/steam line	1/steam line any 2 steam lines	1/steam line	1,2,3##	19
COINCIDENT WITH EITHER					
Tavg--Low-Low	1 Tavg/loop	1 Tavg in any 2 loops	1 Tavg in any 3 loops	1,2,3##	19
OR, COINCIDENT WITH					
Steam Line Pressure-Low	1 pressure/ loop	1 pressure any 2 loops	1 pressure any 3 loops	1,2,3##	19

TABLE 3.3-3 (Continued)

ENGINEERED SAFETY FEATURE ACTUATION SYSTEM INSTRUMENTATION

FUNCTIONAL UNIT	TOTAL NO. OF CHANNELS	CHANNELS TO TRIP	MINIMUM CHANNELS OPERABLE	APPLICABLE MODES	ACTION
4. STEAM LINE ISOLATION					
a. Manual	2/steam line	1/steam line	1/operating steam line	1, 2[(a)], 3[(a)]	23
b. Automatic Actuation Logic	2***	1	2	1, 2[(a)], 3[(a)]	20
c. Containment Pressure--High-High	4	2	3	1, 2[(a)], 3[(a)]	16
d. Steam Flow in Two Steam Lines--High	2/steam line	1/steam line any 2 steam lines	1/steam line	1, 2[(a)], 3##[(a)]	19
COINCIDENT WITH EITHER					
Tavg--Low-Low	1 Tavg/loop	1 Tavg in any 2 loops	1 Tavg in any 3 loops	1, 2[(a)], 3##[(a)]	19
OR, COINCIDENT WITH					
Steam Line Pressure-Low	1 pressure/ loop	1 pressure any 2 loops	1 pressure any 3 loops	1, 2[(a)], 3##[(a)]	19

[(a)] Except when all MSIVs are closed.

TABLE 3.3-3 (Continued)

ENGINEERED SAFETY FEATURE ACTUATION SYSTEM INSTRUMENTATION

FUNCTIONAL UNIT	TOTAL NO. OF CHANNELS	CHANNELS TO TRIP	MINIMUM CHANNELS OPERABLE	APPLICABLE MODES	ACTION
5. TURBINE TRIP & FEEDWATER ISOLATION					
a. Safety Injection	Refer to Functional Unit 1 for all initiation functions and requirements. The applicability exceptions of footnote (*) also apply to Functional Unit 5.a.				
b. Automatic Actuation Logic	2	1	2	1,2*,3*	20
c. Steam Generator Water level--High-High	3/loop	2/loop in any operating loop	2/loop in each operating loop	1,2*,3*	19
6. SAFEGUARDS EQUIPMENT CONTROL SYSTEM (SEC)	3	2	3	1,2,3,4	13
7. UNDERVOLTAGE, VITAL BUS					
a. Loss of Voltage	1/bus	2	3	1,2,3	14
b. Sustained Degraded Voltage	3/bus	2/bus	3/bus	1,2,3	14

TABLE 3.3-3 (Continued)

TABLE NOTATION

Trip function may be bypassed in this MODE below P-11.

Trip function may be bypassed in this MODE below P-12.

* Except when all main feedwater lines are isolated by (1) a closed and de-activated feedwater isolation valve, or (2) closed and de-activated feedwater regulating valve (FRV) and FRV bypass valves, or (3) a closed manual valve.

** Applies to Functional Unit 8 items c and d.

*** The automatic actuation logic includes two redundant solenoid operated vent valves for each Main Steam Isolation Valve (MSIV). Vent valves associated with an inoperable MSIV may be isolated provided that the MSIV is closed in accordance with actions of TS 3.7.1.5. One vent valve on any one of the remaining OPERABLE or open MSIVs may be isolated without affecting the function of the automatic actuation logic provided the remaining solenoid vent valves remain OPERABLE. The isolated MSIV vent valve shall be returned to OPERABLE status upon the first entry into MODE 5 following determination that the vent valve is inoperable. For any condition where more than one solenoid vent valve is inoperable for the OPERABLE or open MSIVs, entry into ACTION 20 is required.

ACTION STATEMENTS

ACTION 13 - With the number of OPERABLE Channels one less than the Total Number of Channels, restore the inoperable channel to OPERABLE status within 24 hours or, be in HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours; however, one channel may be bypassed for up to 4 hours for surveillance testing per Specification 4.3.2.1.1 provided the other channel is OPERABLE.

ACTION 14 - With the number of OPERABLE Channels one less than the Total Number of Channels, operation may proceed until performance of the next required CHANNEL FUNCTIONAL TEST, provided the inoperable channel is placed in the tripped condition within 72 hours.

ACTION 15 - NOT USED

ACTION 16 - With the number of OPERABLE Channels one less than the Total Number of Channels, operation may proceed provided the inoperable channel is placed in the bypassed condition and the Minimum Channels OPERABLE requirement is demonstrated by CHANNEL CHECK within 72 hours; one additional channel may be bypassed for up to 12 hours for surveillance testing per Specification 4.3.2.1.1.

ACTION 17 - With less than the Minimum Channels OPERABLE, operations may continue provided the containment purge and exhaust valves are maintained closed.

ACTION 18 - With the number of OPERABLE Channels one less than the Total Number of Channels, restore the inoperable channel to OPERABLE status within 48 hours or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

TABLE 3.3-4

ENGINEERED SAFETY FEATURE ACTUATION SYSTEM INSTRUMENTATION TRIP SETPOINTS

FUNCTIONAL UNIT	TRIP SETPOINT	ALLOWABLE VALUES
1. SAFETY INJECTION		
a. Manual Initiation	Not Applicable	Not Applicable
b. Automatic Actuation Logic	Not Applicable	Not Applicable
c. Containment Pressure--High	≤4.0 psig	≤4.5 psig
d. Pressurizer Pressure--Low	≥ 1765 psig	≥ 1755 psig
e. Differential Pressure Between Steam Lines--High	≤100 psi	≤112 psi
f. Steam Flow in Two Steam Lines--High Coincident with Tavg--Low-Low or Steam Line Pressure--Low	≤ A function defined as follows: A Δp corresponding to 40% of full steam flow between 0% and 20% load and then a Δp increasing linearly to a Δp corresponding to 110% of full steam flow at full load Tavg ≥ 543°F ≥ 600 psig steam line pressure	≤ A function defined as follows: A Δp corresponding to 44% of full steam flow between 0% and 20% load and then a Δp increasing linearly to a Δp corresponding to 111.5% of full steam flow at full load Tavg ≥ 541°F ≥ 579 psig steam line pressure

TABLE 3.3-4 (continued)
ENGINEERED SAFETY FEATURE ACTUATION SYSTEM INSTRUMENTATION
TRIP SETPOINTS

FUNCTIONAL UNIT	TRIP SETPOINT	ALLOWABLE VALUES
5. TURBINE TRIP AND FEEDWATER ISOLATION		
a. Safety Injection	Refer to Functional Unit 1 for all initiation functions and requirements.	
b. Automatic Actuation Logic	Not Applicable	Not Applicable
c. Steam Generator Water Level--High-High	≤ 67% of narrow range instrument span each steam generator	≤ 68% of narrow range instrument span each steam generator
6. SAFEGUARDS EQUIPMENT CONTROL SYSTEM (SEC)	Not Applicable	Not Applicable
7. UNDERVOLTAGE, VITAL BUS		
a. Loss of Voltage	≥ 70% of bus voltage	≥ 65% of bus voltage
b. Sustained Degraded Voltage	≥ 94.6% of bus voltage for ≤ 13 seconds	≥ 94% of bus voltage for ≤ 15 seconds
8. AUXILIARY FEEDWATER		
a. Automatic Actuation Logic	Not Applicable	Not Applicable
b. NOT USED		
c. Steam Generator Water Level--Low-Low	≥ 14.0% of narrow range instrument span each steam generator	≥ 13.0% of narrow range instrument span each steam generator
d. Undervoltage - RCP	≥ 70% RCP bus voltage	≥ 65% RCP bus voltage
e. S.I.	See 1 above (All S.I., setpoints)	
f. Trip of Main Feedwater Pumps	Not Applicable	Not Applicable
g. Station Blackout	See 6 and 7 above (SEC and Undervoltage, Vital Bus)	

TABLE 4.3-2

ENGINEERED SAFETY FEATURE ACTUATION SYSTEM INSTRUMENTATION
SURVEILLANCE REQUIREMENTS

FUNCTIONAL UNIT	CHANNEL CHECK(7)	CHANNEL CALIBRATION(7)	CHANNEL FUNCTIONAL TEST(7)	MODES IN WHICH SURVEILLANCE REQUIRED
1. SAFETY INJECTION				
a. Manual Initiation	N.A.	N.A.		1,2,3,4
b. Automatic Actuation Logic	N.A.	N.A.	(2)	1,2,3,4
c. Containment Pressure--High			(3)	1,2,3
d. Pressurizer Pressure--Low				1,2,3
e. Differential Pressure Between Steam Lines--High				1,2,3
f. Steam Flow in Two Steam Lines--High coincident with Tavg--Low-Low or Steam Line Pressure-Low				1,2,3
2. CONTAINMENT SPRAY				
a. Manual Initiation	N.A.	N.A.		1,2,3,4
b. Automatic Actuation Logic	N.A.	N.A.	(2)	1,2,3,4
c. Containment Pressure--High-High			(3)	1,2,3

TABLE 4.3-2 (Continued)

ENGINEERED SAFETY FEATURE ACTUATION SYSTEM INSTRUMENTATION
SURVEILLANCE REQUIREMENTS

FUNCTIONAL UNIT	CHANNEL CHECK(7)	CHANNEL CALIBRATION(7)	CHANNEL FUNCTIONAL TEST(7)	MODES IN WHICH SURVEILLANCE REQUIRED
4. STEAM LINE ISOLATION				
a. Manual	N.A.	N.A.		1,2[a],3**[a]
b. Automatic Actuation Logic	N.A.	N.A.	(2)	1,2[a],3[a]
c. Containment Pressure--High-High			(3)	1,2[a],3[a]
d. Steam Flow in Two Steam Lines--High Coincident with Tavg--Low-Low or Steam Line Pressure—Low				1,2[a],3[a]
5. TURBINE TRIP AND FEEDWATER ISOLATION				
a. Safety Injection	Refer to Functional Unit 1 for all initiation functions and requirements. The applicability exceptions of footnote (b) also apply to Functional Unit 5.a.			
b. Automatic Actuation Logic	N.A.	N.A.	(2)	1,2[b],3[b]
c. Steam Generator Water Level--High-High				1,2[b],3[b]
6. SAFEGUARDS EQUIPMENT CONTROL SYSTEM (SEC) LOGIC				
a. Inputs	N.A.	N.A.	(6)	1,2,3,4
b. Logic, Timing and Outputs *	N.A.	N.A.	(1)	1,2,3,4
7. UNDERVOLTAGE, VITAL BUS				
a. Loss of Voltage				1,2,3
b. Sustained Degraded Voltage				1,2,3

TABLE 4.3-2 (Continued)

TABLE NOTATION

* Outputs are up to, but not including, the output relays.

** The provisions of Specification 4.0.4 are not applicable.

(1) Each logic channel shall be tested in accordance with the Surveillance Frequency Control Program. The CHANNEL FUNCTIONAL TEST of each logic channel shall verify that its associated diesel generator automatic load sequence timer is OPERABLE with the interval between each load block within 1 second of its design interval.

(2) Each train or logic channel shall be tested in accordance with the Surveillance Frequency Control Program.

(3) The CHANNEL FUNCTIONAL TEST shall include exercising the transmitter by applying either a vacuum or pressure to the appropriate side of the transmitter.

(4) NOT USED

(5) NOT USED

(6) Inputs from Undervoltage, Vital Bus, shall be tested in accordance with the Surveillance Frequency Control Program. Inputs from Solid State Protection System shall be tested in accordance with the Surveillance Frequency Control Program.

(7) Frequencies are specified in the Surveillance Frequency Control Program unless otherwise noted in the table.

(a) Except when all MSIVs are closed.

(b) Except when all main feedwater lines are isolated by (1) a closed and de-activated feedwater isolation valve, or (2) closed and de-activated feedwater regulating valve (FRV) and FRV bypass valves, or (3) a closed manual valve.

PLANT SYSTEMS

MAIN STEAM LINE ISOLATION VALVES

LIMITING CONDITION FOR OPERATION

3.7.1.5 Each main steam line isolation valve shall be OPERABLE.

APPLICABILITY: MODE 1
MODES 2 and 3 except when all MSIVs are closed

ACTION:

MODE 1 - With one main steam line isolation valve inoperable, POWER OPERATION may continue provided the inoperable valve is either restored to OPERABLE status or closed within 4 hours;

otherwise, be in MODE 2 within the next 6 hours.

MODES 2 and 3 - With one or more main steam line isolation valve(s) inoperable, subsequent operation in MODES 2 or 3 may proceed provided;

a. The isolation valve(s) is (are) maintained closed, and

b. The isolation valve(s) is (are) verified closed once per 7 days.

Otherwise, be in MODE 3, HOT STANDBY, within the next 6 hours, and MODE 4, HOT SHUTDOWN, within the following 6 hours.

SURVEILLANCE REQUIREMENTS

4.7.1.5 Each main steam line isolation valve shall be demonstrated OPERABLE by verifying full closure within 5 seconds when tested pursuant to the INSERVICE TESTING PROGRAM. The provisions of Specification 4.0.4 are not applicable.

3/4.7.13 MAIN FEEDWATER ISOLATION VALVES (FIVS), MAIN FEEDWATER REGULATING VALVES (FRVS), FRV BYPASS VALVES (FRVBVS), AND STEAM GENERATOR FEEDWATER PUMP (SGFP) TURBINE STEAM STOP VALVES

LIMITING CONDITION FOR OPERATION

3.7.13 Four Main FIVs, four Main FRVs, four Main FRVBV, and four SGFP turbine steam stop valves shall be OPERABLE.

APPLICABILITY:

For the FIV in each main feedwater line:

MODES 1, 2, and 3 except when:

a. The FIV is closed and deactivated; or
b. The associated FRV and FRVBV are closed and deactivated; or
c. The associated main feedwater line is isolated by a closed manual valve

For the FRV in each main feedwater line:

MODES 1, 2, and 3 except when:

a. The FRV is closed and deactivated; or
b. The associated FIV is closed and deactivated; or
c. The associated main feedwater line is isolated by a closed manual valve

For the FRVBV in each main feedwater line:

MODES 1, 2, and 3 except when:

a. The FRVBV is closed and deactivated; or
b. The associated FIV is closed and deactivated; or
c. The associated main feedwater line is isolated by a closed manual valve

For each SGFP Turbine Steam Stop Valve:

MODES 1, 2, and 3 except when:

a. The SGFP Turbine Steam Stop Valve is closed and deactivated; or
b. The associated steam supply to the SGFP turbine is isolated by a closed manual valve; or
c. The SGFP feedwater flow path is isolated

3/4.7.13 MAIN FEEDWATER ISOLATION VALVES (FIVS), MAIN FEEDWATER REGULATING VALVES (FRVS), FRV BYPASS VALVES (FRVBVS), AND STEAM GENERATOR FEEDWATER PUMP (SGFP) TURBINE STEAM STOP VALVES

LIMITING CONDITION FOR OPERATION (continued)

ACTION:

----------NOTE----------
Separate Condition Entry is allowed for each valve
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a. With one or more FIVs inoperable, restore the inoperable FIV(s) to OPERABLE status or close or isolate the inoperable FIV(s) within 72 hours; verify the inoperable FIV(s) is closed or isolated once per 7 days.

b. With one or more FRVs inoperable, restore the inoperable FRV(s) to OPERABLE status or close or isolate the inoperable FRV(s) within 72 hours; verify the inoperable FRV(s) is closed or isolated once per 7 days.

c. With one or more FRVBV(s) inoperable, restore the inoperable FRVBV(s) to OPERABLE status or close or isolate the inoperable FRVBV(s) within 72 hours; verify the inoperable FRVBV(s) is closed or isolated once per 7 days.

d. With one or more SGFP turbine steam stop valves inoperable, restore the inoperable SGFP turbine stop valve(s) to OPERABLE status or isolate the associated steam supply to the SGFP turbine or isolate the SGFP flow path within 72 hours; verify that the inoperable SGFP steam stop valve is isolated or the SGFP flow path is isolated once per 7 days.

e. With two (2) valves in the same feedwater flowpath inoperable resulting in a loss of feedwater isolation capability for a flow path, restore at least one valve to OPERABLE status or isolate the affected flow path within 8 hours.

f. With the required ACTION requirements above not met, be in HOT STANDBY within 6 hours and in HOT SHUTDOWN within the following 6 hours.

SURVEILLANCE REQUIREMENTS

4.7.13.1 Each FIV, FRV, FRVBV and SGFP turbine steam stop valve shall be demonstrated OPERABLE by determining the isolation time of each valve to be within limits when tested pursuant to the INSERVICE TESTING PROGRAM.

4.7.13.2 In accordance with the Surveillance Frequency Control Program, verify each FIV, FRV, FRVBV and SGFP turbine steam stop valve actuates to the isolation position on an actual or simulated actuation signal.

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

PSEG NUCLEAR LLC

EXELON GENERATION COMPANY, LLC

DOCKET NO. 50-311

SALEM NUCLEAR GENERATING STATION, UNIT NO. 2

AMENDMENT TO RENEWED FACILITY OPERATING LICENSE

Amendment No. 310
Renewed License No. DPR-75

1. The U.S. Nuclear Regulatory Commission (the Commission) has found that:

   A. The application for amendment filed by PSEG Nuclear LLC, acting on behalf of itself and Exelon Generation Company, LLC (the licensees), dated June 29, 2018, as supplemented by letter dated October 27, 2018, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's rules and regulations set forth in 10 CFR Chapter I;

   B. The facility will operate in conformity with the application, the provisions of the Act, and the rules and regulations of the Commission;

   C. There is reasonable assurance: (i) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the Commission's regulations;

   D. The issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public; and

   E. The issuance of this amendment is in accordance with 10 CFR Part 51 of the Commission's regulations and all applicable requirements have been satisfied.

2. Accordingly, the license is amended by changes to the Technical Specifications as indicated in the attachment to this license amendment, and paragraph 2.C.(2) of Renewed Facility Operating License No. DPR-75 is hereby amended to read as follows:

(2) Technical Specifications and Environmental Protection Plan

The Technical Specifications contained in Appendix A, as revised through Amendment No. 310, and the Environmental Protection Plan contained in Appendix B, are hereby incorporated in the renewed license. PSEG Nuclear LLC shall operate the facility in accordance with the Technical Specifications and the Environmental Protection Plan.

3. This license amendment is effective as of its date of issuance and shall be implemented within 60 days of the date of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

James G. Danna, Chief
Plant Licensing Branch I
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Attachment:
Changes to Renewed Facility Operating License and Technical Specifications

Date of Issuance: May 31, 2019

ATTACHMENT TO LICENSE AMENDMENT NO. 310

SALEM NUCLEAR GENERATING STATION, UNIT NO. 2

RENEWED FACILITY OPERATING LICENSE NO. DPR-75

DOCKET NO. 50-311

Replace the following page of Renewed Facility Operating License No. DPR-75 with the attached revised page as indicated. The revised page is identified by amendment number and contains a marginal line indicating the area of change.

Remove	Insert
Page 3	Page 3

Replace the following pages of the Appendix A, Technical Specifications, with the attached revised pages as indicated. The revised pages are identified by amendment number and contains marginal lines indicating the areas of change.

Remove	Insert
VII	VII
XIV	XIV
3/4 3-4	3/4 3-4
3/4 3-5	3/4 3-5
3/4 3-12	3/4 3-12
3/4 3-15	3/4 3-15
3/4 3-19	3/4 3-19
3/4 3-20	3/4 3-20
3/4 3-22	3/4 3-22
3/4 3-24	3/4 3-24
3/4 3-26	3/4 3-26
3/4 3-33	3/4 3-33
3/4 3-35	3/4 3-35
3/4 3-37	3/4 3-37
3/4 7-10	3/4 7-10
-	3/4 7-33
-	3/4 7-34

(4) PSEG Nuclear LLC, pursuant to the Act and 10 CFR Parts 30, 40 and 70, to receive, possess and use at any time any byproduct, source or special nuclear material as sealed neutron sources for reactor startup, sealed sources for reactor instrumentation and radiation monitoring equipment calibration and as fission detectors in amounts as required;

(5) PSEG Nuclear LLC, pursuant to the Act and 10 CFR Parts 30, 40 and 70, to receive, possess and use in amounts as required any byproduct, source or special nuclear material without restriction to chemical or physical form, for sample analysis or instrument calibration or associated with radioactive apparatus or components; and

(6) PSEG Nuclear LLC, pursuant to the Act and 10 CFR Parts 30, 40 and 70, to possess but not separate, such byproduct and special nuclear materials as may be produced by the operation of the facility.

C. This renewed license shall be deemed to contain and is subject to the conditions specified in the Commission's regulations set forth in 10 CFR Chapter I and is subject to all applicable provisions of the Act and to the rules, regulations and orders of the Commission now or hereafter in effect; and is subject to the additional conditions specified or incorporated below:

(1) Maximum Power Level

PSEG Nuclear LLC is authorized to operate the facility at steady state reactor core power levels not in excess of 3459 megawatts (thermal).

(2) Technical Specifications and Environmental Protection Plan

The Technical Specifications contained in Appendix A, as revised through Amendment No. 310, and the Environmental Protection Plan contained in Appendix B, are hereby incorporated in the renewed license. PSEG Nuclear LLC shall operate the facility in accordance with the Technical Specifications and the Environmental Protection Plan.

INDEX

LIMITING CONDITIONS FOR OPERATION AND SURVEILLANCE REQUIREMENTS

INDEX

BASES

TABLE 3.3-1 (Continued)

REACTOR TRIP SYSTEM INSTRUMENTATION

FUNCTIONAL UNIT	TOTAL NUMBER OF CHANNELS	CHANNELS TO TRIP	MINIMUM CHANNELS OPERABLE	APPLICABLE MODES	ACTION
18. Turbine Trip					
a. Low Autostop Oil Pressure	3	2	2	1[#]	6
b. Turbine Stop Valve Closure	4	4	3	1[#]	6
19. Safety Injection Input from ESF	2	1	2	1,2	10
20. Reactor Coolant Pump Breaker Position Trip (above P-7)	1/breaker	2	1/breaker per operating loop	1	11
21. Reactor Trip Breakers	2	1	2	1,2 3*,4*,5*	1[###], 14 13
22. Automatic Trip Logic	2	1	2	1,2 3*,4*,5*	10 13

TABLE 3.3-1 (Continued)

TABLE NOTATION

* With the reactor trip system breakers in the closed position and the control rod drive system capable of rod withdrawal.

\# Above the P-9 (Power Range Neutron Flux) interlock.

If ACTION Statement 1 is entered as a result of Reactor Trip Breaker (RTB) or Reactor Trip Bypass Breaker (RTBB) maintenance testing results exceeding the following acceptance criteria, NRC reporting shall be made within 30 days in accordance with Specification 6.9.2:

1. A RTB or RTBB trip failure during any surveillance test with less than or equal to 300 grams of weight added to the breaker trip bar.

2. A RTB or RTBB time response failure that results in the overall reactor trip system time response exceeding the Technical Specification limit.

ACTION STATEMENTS

ACTION 1 - With the number of channels OPERABLE one less than required by the Minimum Channels OPERABLE requirement, restore the inoperable channel (RTB) to OPERABLE within 24 hours or be in HOT STANDBY within the next 6 hours; however, one channel may be bypassed for up to 4 hours for surveillance testing per Specification 4.3.1.1.1 provided the other channel is OPERABLE.

ACTION 2 - With the number of OPERABLE channels one less than the Total Number of Channels, STARTUP and/or POWER OPERATION may proceed provided the following conditions are satisfied:

a. The inoperable channel is placed in the tripped condition within 72 hours.

b. The Minimum Channels OPERABLE requirement is met; however, one channel may be bypassed for up to 12 hours for surveillance testing per Specification 4.3.1.1.1.

c. Either, THERMAL POWER is restricted to ≤ 75% of RATED THERMAL POWER and the Power Range, Neutron Flux trip setpoint is reduced to ≤ 85% of RATED THERMAL POWER within 4 hours; or, the QUADRANT POWER TILT RATIO is monitored at least once per 12 hours.

d. The QUADRANT POWER TILT RATIO, as indicated by the remaining three detectors, is verified consistent with the normalized symmetric power distribution obtained by using either the movable in-core detectors in the four pairs of symmetric thimble locations or the power distribution monitoring system at least once per 12 hours when THERMAL POWER is greater than 75% of RATED THERMAL POWER.

TABLE 4.3-1 (Continued)

REACTOR TRIP SYSTEM INSTRUMENTATION SURVEILLANCE REQUIREMENTS

FUNCTIONAL UNIT	CHANNEL CHECK(15)	CHANNEL CALIBRATION(15)	CHANNEL FUNCTIONAL TEST(15)	MODES IN WHICH SURVEILLANCE REQUIRED
13. Loss of Flow Two Loops			N.A.	1
14. Steam Generator Water Level--Low-Low				1, 2
15. DELETED				
16. Undervoltage - Reactor Coolant Pumps	N.A.			1
17. Underfrequency - Reactor Coolant Pumps	N.A.			1
18. Turbine Trip				
a. Low Autostop Oil Pressure	N.A.	N.A.	S/U(1)	1#
b. Turbine Stop Valve Closure	N.A.	N.A.	S/U(1)	1#
19. Safety Injection Input from ESF	N.A.	N.A.	(4)(5)	1, 2
20. Reactor Coolant Pump Breaker Position Trip	N.A.	N.A.		1
21. Reactor Trip Breaker	N.A.	N.A.	(5)(11)(13)(14)	1, 2 and *
22. Automatic Trip Logic	N.A.	N.A.	(5)	1, 2 and *

Above the P-9 (Power Range Neutron Flux) Interlock

TABLE 3.3-3

ENGINEERED SAFETY FEATURE ACTUATION SYSTEM INSTRUMENTATION

FUNCTIONAL UNIT	TOTAL NO. OF CHANNELS	CHANNELS TO TRIP	MINIMUM CHANNELS OPERABLE	APPLICABLE MODES	ACTION
1. SAFETY INJECTION					
a. Manual Initiation	2	1	2	1,2,3,4	18
b. Automatic Actuation Logic	2	1	2	1,2,3,4	13
c. Containment Pressure-High	3	2	2	1,2,3	19
d. Pressurizer Pressure-Low	3	2	2	1,2,3[#]	19
e. Differential Pressure Between Steam Lines - High	3/steam line	2/steam line any steam lines	2/steam line	1,2,3[##]	19
f. Steam Flow in Two Steam Lines-High	2/steam line	1/steam line any 2 steam lines	1/steam line	1,2,3[##]	19
COINCIDENT WITH EITHER					
T_{avg} --Low-Low	1 T_{avg}/loop	1 T_{avg} in any 2 loops	1 T_{avg} in any 3 loops	1,2,3[##]	19
OR, COINCIDENT WITH					
Steam Line Pressure-Low	1 pressure/ loop	1 pressure any 2 loops	1 pressure any 3 loops	1,2,3[##]	19

TABLE 3.3-3 (Continued)

ENGINEERED SAFETY FEATURE ACTUATION SYSTEM INSTRUMENTATION

FUNCTIONAL UNIT	TOTAL NO. OF CHANNELS	CHANNELS TO TRIP	MINIMUM CHANNELS OPERABLE	APPLICABLE MODES	ACTION
4. STEAM LINE ISOLATION					
a. Manual	2/steam line	1/steam line	1/operating steam line	1, 2[(a)], 3[(a)]	23
b. Automatic Actuation Logic	2***	1	2	1, 2[(a)], 3[(a)]	20
c. Containment Pressure--High-High	4	2	3	1, 2[(a)], 3[(a)]	16
d. Steam Flow in Two Steam Lines--High	2/steam line	1/steam line any 2 steam lines	1/steam line	1, 2[(a)], 3[##(a)]	19
COINCIDENT WITH EITHER					
T_{avg}--Low-Low	1 T_{avg}/loop	1 T_{avg} in any 2 loops	1 T_{avg} in any 3 loops	1, 2[(a)], 3[##(a)]	19
OR, COINCIDENT WITH					
Steam Line Pressure-Low	1 pressure/ loop	1 pressure any 2 loops	1 pressure any 3 loops	1, 2[(a)], 3[##(a)]	19

(a) Except when all MSIVs are closed.

TABLE 3.3-3 (Continued)

ENGINEERED SAFETY FEATURE ACTUATION SYSTEM INSTRUMENTATION

FUNCTIONAL UNIT	TOTAL NO. OF CHANNELS	CHANNELS TO TRIP	MINIMUM CHANNELS OPERABLE	APPLICABLE MODES	ACTION
5. TURBINE TRIP AND FEEDWATER ISOLATION					
a. Safety Injection	Refer to Functional Unit 1 for all initiation functions and requirements. The applicability exceptions of footnote (*) also apply to Functional Unit 5.a.				
b. Automatic Actuation Logic	2	1	2	1,2*,3*	20
c. Steam Generator Water level-- High-High	3/loop	2/loop in any operating loop	2/loop in each operating loop	1,2*,3*	19
6. SAFEGUARDS EQUIPMENT CONTROL SYSTEM (SEC)	3	2	3	1,2,3,4	13
7. UNDERVOLTAGE, VITAL BUS					
a. Loss of Voltage	1/bus	2	3	1,2,3	14
b. Sustained Degraded Voltage	3/bus	2/bus	3/bus	1,2,3	14

TABLE 3.3-3 (Continued)

TABLE NOTATION

Trip function may be bypassed in this MODE below P-11.

Trip function may be bypassed in this MODE below P-12.

* Except when all main feedwater lines are isolated by (1) a closed and de-activated feedwater isolation valve, or (2) closed and de-activated feedwater regulating valve (FRV) and FRV bypass valves, or (3) a closed manual valve.

** Applies to Functional Unit 8 items c and d.

*** The automatic actuation logic includes two redundant solenoid operated vent valves for each Main Steam Isolation Valve (MSIV). Vent valves associated with an inoperable MSIV may be isolated provided that the MSIV is closed in accordance with actions of TS 3.7.1.5. One vent valve on any one of the remaining OPERABLE or open MSIVs may be isolated without affecting the function of the automatic actuation logic provided the remaining solenoid vent valves remain OPERABLE. The isolated MSIV vent valve shall be returned to OPERABLE status upon the first entry into MODE 5 following determination that the vent valve is inoperable. For any condition where more than one solenoid vent valve is inoperable for the OPERABLE or open MSIVs, entry into ACTION 20 is required.

ACTION STATEMENTS

ACTION 13 - With the number of OPERABLE Channels one less than the Total Number of Channels, restore the inoperable channel to OPERABLE status within 24 hours or, be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours; however, one channel may be bypassed for up to 4 hours for surveillance testing per Specification 4.3.2.1.1 provided the other channel is OPERABLE.

ACTION 14 - With the number of OPERABLE Channels one less than the Total Number of Channels, operation may proceed until performance of the next required CHANNEL FUNCTIONAL TEST, provided the inoperable channel is placed in the tripped condition within 72 hours.

ACTION 15 - NOT USED

ACTION 16 - With the number of OPERABLE Channels one less than the Total Number of Channels, operation may proceed provided the inoperable channel is placed in the bypassed condition and the Minimum Channels OPERABLE requirement is demonstrated by CHANNEL CHECK within 72 hours; one additional channel may be bypassed for up to 12 hours for surveillance testing per Specification 4.3.2.1.1.

ACTION 17 - With less than the Minimum Channels OPERABLE, operation may continue provided the containment purge and exhaust valves are maintained closed.

ACTION 18 - With the number of OPERABLE Channels one less than the Total Number of Channels, restore the inoperable channel to OPERABLE status within 48 hours or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

TABLE 3.3-4

ENGINEERED SAFETY FEATURE ACTUATION SYSTEM INSTRUMENTATION TRIP SETPOINTS

FUNCTIONAL UNIT	TRIP SETPOINT	ALLOWABLE VALUES
1. SAFETY INJECTION		
a. Manual Initiation	Not Applicable	Not Applicable
b. Automatic Actuation Logic	Not Applicable	Not Applicable
c. Containment Pressure--High	≤ 4.0 psig	≤ 4.5 psig
d. Pressurizer Pressure--Low	≥ 1765 psig	≥ 1755 psig
e. Differential Pressure Between Steam Lines--High	≤ 100 psi	≤ 112 psi
f. Steam Flow in Two Steam Lines--High Coincident with T_{avg}--Low-Low or Steam Line Pressure--Low	≤ A function defined as follows: A Δp corresponding to 40% of full steam flow between 0% and 20% load and then a Δp increasing linearly to a Δp corresponding to 110% of full steam flow at full load Tavg ≥ 543°F ≥ 600 psig steam line pressure	≤ A function defined as follows: A Δp corresponding to 44% of full steam flow between 0% and 20% load and then a Δp increasing linearly to a Δp corresponding to 111.5% of full steam flow at full load Tavg ≥ 541°F ≥ 579 psig steam line pressure

TABLE 3.3-4 (Continued)

ENGINEERED SAFETY FEATURE ACTUATION SYSTEM INSTRUMENTATION TRIP SETPOINTS

FUNCTIONAL UNIT	TRIP SETPOINT	ALLOWABLE VALUES
3. Containment Atmosphere Gaseous Radioactivity	Per Table 3.3-6	
4. STEAM LINE ISOLATION		
a. Manual	Not Applicable	Not Applicable
b. Automatic Actuation Logic	Not Applicable	Not Applicable
c. Containment Pressure--High-High	≤ 15.0 psig	≤ 16.0 psig
d. Steam Flow in Two Steam Lines--High Coincident with T_{avg} -- Low-Low or Steam Line Pressure--Low	≤ A function defined as follows: A Δp corresponding to 40% of full steam flow between 0% and 20% load and then a Δp increasing linearly to a Δp corresponding to 110% of full steam flow at full load. T_{avg} ≥ 543°F ≥ 600 psig steam line pressure	≤ A function defined as follows: A Δp corresponding to 44% of full steam flow between 0% and 20% load and then a Δp increasing linearly to a Δp corresponding to 111.5% of full steam flow at full load. T_{avg} ≥ 541°F ≥ 579 psig steam line pressure
5. TURBINE TRIP AND FEEDWATER ISOLATION		
a. Safety Injection	Refer to Functional Unit 1 for all initiation functions and requirements.	
b. Automatic Actuation Logic	Not Applicable	Not Applicable
c. Steam Generator Water Level--High-High	≤ 67% of narrow range instrument span each steam generator	≤ 68% of narrow range instrument span each steam generator
6. SAFEGUARDS EQUIPMENT CONTROL SYSTEM (SEC)	Not Applicable	Not Applicable

TABLE 4.3-2

ENGINEERED SAFETY FEATURE ACTUATION SYSTEM INSTRUMENTATION
SURVEILLANCE REQUIREMENTS

FUNCTIONAL UNIT	CHANNEL CHECK(7)	CHANNEL CALIBRATION(7)	CHANNEL FUNCTIONAL TEST(7)	MODES IN WHICH SURVEILLANCE REQUIRED
1. SAFETY INJECTION				
a. Manual Initiation	N.A.	N.A.		1,2,3,4
b. Automatic Actuation Logic	N.A.	N.A.	(2)	1,2,3,4
c. Containment Pressure--High			(3)	1,2,3
d. Pressurizer Pressure--Low				1,2,3
e. Differential Pressure Between Steam Lines--High				1,2,3
f. Steam Flow in Two Steam Lines--High Coincident with Tavg--Low-Low or Steam Line Pressure--Low				1,2,3
2. CONTAINMENT SPRAY				
a. Manual Initiation	N.A.	N.A.		1,2,3,4
b. Automatic Actuation Logic	N.A.	N.A.	(2)	1,2,3,4
c. Containment Pressure--High-High			(3)	1,2,3

TABLE 4.3-2 (Continued)

ENGINEERED SAFETY FEATURE ACTUATION SYSTEM INSTRUMENTATION
SURVEILLANCE REQUIREMENTS

FUNCTIONAL UNIT	CHANNEL CHECK(7)	CHANNEL CALIBRATION(7)	CHANNEL FUNCTIONAL TEST (7)	MODES IN WHICH SURVEILLANCE REQUIRED
4. STEAM LINE ISOLATION				
a. Manual	N.A.	N.A.		1,2[(a)],3**[(a)]
b. Automatic Actuation Logic	N.A.	N.A.	(2)	1,2[(a)],3[(a)]
c. Containment Pressure--High-High			(3)	1,2[(a)],3[(a)]
d. Steam Flow in Two Steam Lines--High Coincident with T_{avg}--Low-Low or Steam Line Pressure--Low				1,2[(a)],3[(a)]
5. TURBINE TRIP AND FEEDWATER ISOLATION				
a. Safety Injection	Refer to Functional Unit 1 for all initiation functions and requirements. The applicability exceptions of footnote (b) also apply to Functional Unit 5.a.			
b. Automatic Actuation Logic	N.A.	N.A.	(2)	1,2[(b)],3[(b)]
c. Steam Generator Water Level--High-High				1,2[(b)],3[(b)]
6. SAFEGUARDS EQUIPMENT CONTROL SYSTEM (SEC) LOGIC				
a. Inputs	N.A.	N.A.	(6)	1,2,3,4
b. Logic, Timing and Outputs *	N.A.	N.A.	(1)	1,2,3,4
7. UNDERVOLTAGE, VITAL BUS				
a. Loss of Voltage				1,2,3
b. Sustained Degraded Voltage				1,2,3

TABLE 4.3-2 (Continued)

TABLE NOTATION

* Outputs are up to, but not including, the Output Relays.

** The provisions of Specification of 4.0.4 are not applicable.

(1) Each logic channel shall be tested in accordance with the Surveillance Frequency Control Program. The CHANNEL FUNCTIONAL TEST of each logic channel shall verify that its associated diesel generator automatic load sequence timer is OPERABLE with the interval between each load block within 1 second of its design interval.

(2) Each train or logic channel shall be tested in accordance with the Surveillance Frequency Control Program.

(3) The CHANNEL FUNCTIONAL TEST shall include exercising the transmitter by applying either a vacuum or pressure to the appropriate side of the transmitter.

(4) If not performed in the previous 92 days.

(5) NOT USED

(6) Inputs from undervoltage, Vital Bus, shall be tested in accordance with the Surveillance Frequency Control Program. Inputs from Solid State Protection System, shall be tested in accordance with the Surveillance Frequency Control Program.

(7) Frequencies are specified in the Surveillance Frequency Control Program unless otherwise noted in the table.

(a) Except when all MSIVs are closed.

(b) Except when all main feedwater lines are isolated by (1) a closed and de-activated feedwater isolation valve, or (2) closed and de-activated feedwater regulating valve (FRV) and FRV bypass valves, or (3) a closed manual valve.

MAIN STEAM LINE ISOLATION VALVES

LIMITING CONDITION FOR OPERATION

3.7.1.5 Each main steam line isolation valve shall be OPERABLE.

APPLICABILITY: MODE 1
MODES 2 and 3 except when all MSIVs are closed.

ACTION:

MODE 1 - With one main steam line isolation valve inoperable, POWER OPERATION may continue provided the inoperable valve is either restored to OPERABLE status or closed within 4 hours;

Otherwise, be in MODE 2 within the next 6 hours.

MODES 2 and 3 - With one or more main steam line isolation valve(s) inoperable, subsequent operation in MODES 2 or 3 may proceed provided;

a. The isolation valve(s) is (are) maintained closed, and

b. The isolation valve(s) is (are) verified closed once per 7 days.

Otherwise, be in MODE 3, HOT STANDBY, within the next 6 hours, and MODE 4, HOT SHUTDOWN, within the following 6 hours.

SURVEILLANCE REQUIREMENTS

4.7.1.5 Each main steam line isolation valve shall be demonstrated OPERABLE by verifying full closure within 5 seconds when tested pursuant to the INSERVICE TESTING PROGRAM. The provisions of Specification 4.0.4 are not applicable.

3/4.7.13 MAIN FEEDWATER ISOLATION VALVES (FIVS), MAIN FEEDWATER REGULATING VALVES (FRVS), FRV BYPASS VALVES (FRVBVS), AND STEAM GENERATOR FEEDWATER PUMP (SGFP) TURBINE STEAM STOP VALVES

LIMITING CONDITION FOR OPERATION

3.7.13 Four Main FIVs, four Main FRVs, four Main FRVBV, and four SGFP turbine steam stop valves shall be OPERABLE.

APPLICABILITY:

For the FIV in each main feedwater line:

MODES 1, 2, and 3 except when:

a. The FIV is closed and deactivated; or
b. The associated FRV and FRVBV are closed and deactivated; or
c. The associated main feedwater line is isolated by a closed manual valve

For the FRV in each main feedwater line:

MODES 1, 2, and 3 except when:

a. The FRV is closed and deactivated; or
b. The associated FIV is closed and deactivated; or
c. The associated main feedwater line is isolated by a closed manual valve

For the FRVBV in each main feedwater line:

MODES 1, 2, and 3 except when:

a. The FRVBV is closed and deactivated; or
b. The associated FIV is closed and deactivated; or
c. The associated main feedwater line is isolated by a closed manual valve

For each SGFP Turbine Steam Stop Valve:

MODES 1, 2, and 3 except when:

a. The SGFP Turbine Steam Stop Valve is closed and deactivated; or
b. The associated steam supply to the SGFP turbine is isolated by a closed manual valve; or
c. The SGFP feedwater flow path is isolated

3/4.7.13 MAIN FEEDWATER ISOLATION VALVES (FIVS), MAIN FEEDWATER REGULATING VALVES (FRVS), FRV BYPASS VALVES (FRVBVS), AND STEAM GENERATOR FEEDWATER PUMP (SGFP) TURBINE STEAM STOP VALVES

LIMITING CONDITION FOR OPERATION (continued)

ACTION:

----------NOTE----------
Separate Condition Entry is allowed for each valve
---

a. With one or more FIVs inoperable, restore the inoperable FIV(s) to OPERABLE status or close or isolate the inoperable FIV(s) within 72 hours; verify the inoperable FIV(s) is closed or isolated once per 7 days.

b. With one or more FRVs inoperable, restore the inoperable FRV(s) to OPERABLE status or close or isolate the inoperable FRV(s) within 72 hours; verify the inoperable FRV(s) is closed or isolated once per 7 days.

c. With one or more FRVBV(s) inoperable, restore the inoperable FRVBV(s) to OPERABLE status or close or isolate the inoperable FRVBV(s) within 72 hours; verify the inoperable FRVBV(s) is closed or isolated once per 7 days.

d. With one or more SGFP turbine steam stop valves inoperable, restore the inoperable SGFP turbine stop valve(s) to OPERABLE status or isolate the associated steam supply to the SGFP turbine or isolate the SGFP flow path within 72 hours; verify that the inoperable SGFP steam stop valve is isolated or the SGFP flow path is isolated once per 7 days.

e. With two (2) valves in the same feedwater flowpath inoperable resulting in a loss of feedwater isolation capability for a flow path, restore at least one valve to OPERABLE status or isolate the affected flow path within 8 hours.

f. With the required ACTION requirements above not met, be in HOT STANDBY within 6 hours and in HOT SHUTDOWN within the following 6 hours.

SURVEILLANCE REQUIREMENTS

4.7.13.1 Each FIV, FRV, FRVBV and SGFP turbine steam stop valve shall be demonstrated OPERABLE by determining the isolation time of each valve to be within limits when tested pursuant to the INSERVICE TESTING PROGRAM.

4.7.13.2 In accordance with the Surveillance Frequency Control Program, verify each FIV, FRV, FRVBV and SGFP turbine steam stop valve actuates to the isolation position on an actual or simulated actuation signal.

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NOS. 329 AND 310 TO

RENEWED FACILITY OPERATING LICENSE NOS. DPR-70 AND DPR-75

PSEG NUCLEAR LLC

EXELON GENERATION COMPANY, LLC

SALEM NUCLEAR GENERATING STATION, UNIT NOS. 1 AND 2

DOCKET NOS. 50-272 AND 50-311

1.0 INTRODUCTION

By letter dated June 29, 2018 (Agencywide Documents Access and Management System Accession No. ML18180A291), as supplemented by letter dated October 27, 2018 (ADAMS Accession No. ML18302A113), PSEG Nuclear LLC (the licensee) submitted a license amendment request (LAR) for the Salem Nuclear Generating Station, Unit Nos. 1 and 2 (Salem). The proposed amendments would revise Technical Specification (TS) 3/4.3.1, "Reactor Trip System Instrumentation," TS 3/4.3.2, "Engineered Safety Feature Actuation System Instrumentation," and TS 3/4.7.1.5, "Main Steam Isolation Valves," and add a new TS for feedwater isolation to better align the TSs with the design-basis analyses and the design of the instrumentation.

The supplement dated October 27, 2018, provided additional information that clarified the application, did not expand the scope of the application as originally noticed, and did not change the U.S. Nuclear Regulatory Commission (NRC or the Commission) staff's original proposed no significant hazards consideration determination as published in the *Federal Register* on August 28, 2018 (83 FR 43907).

2.0 REGULATORY EVALUATION

2.1 System Description

The proposed changes to the Salem TSs are associated with the design and operation of (1) the reactor protection system (RPS) reactor trip function associated with a main turbine trip, (2) the engineered safety features actuation system (ESFAS) function for safety injection (SI), (3) the ESFAS function for main steam line isolation including operation of the main steam isolation valves (MSIVs), and (4) the ESFAS function for turbine trip and feedwater isolation. The following system description was provided by the licensee in Section 2.1 of the LAR to aid the technical evaluation of the requested changes.

The RPS is designed in part to trip the reactor as a result of a trip of the main turbine. This trip function is interlocked with the P-9 permissive that blocks the automatic trip input below 50% rated thermal power. Reactor Trip System Interlock P-9 prevents or defeats the automatic block of reactor trip on turbine trip.

The ESFAS is actuated by redundant logic and coincidence networks. Each network actuates a device that operates the associated ESF equipment. The redundant logic is processed through the solid state protection system (SSPS) trains. The ESFAS instrumentation associated with this proposed TS change is associated with the instrumentation and equipment designed to respond to a main steam line break (SLB), feedwater line break (FLB), and feedwater system malfunction

The SLB is mitigated in part by the generation of a reactor trip, safety injection (SI) signal, main steam line isolation signal and feedwater isolation signal. The FLB is mitigated in part by generation of a reactor trip, SI signal, main steam line isolation signal and feedwater isolation signal. The feedwater system malfunction is mitigated by reactor trip and feedwater line isolation signal.

An SI signal is generated by any of the following:

- Manual Initiation
- 2 out of 3 high containment pressure
- 2 out of 3 pressurizer pressure low
- High differential pressure signals between steam lines
- High steam line flow in two main steam lines in coincidence with either low-low reactor coolant system (RCS) average temperature or low steam line pressure in any two lines

A main steam line isolation signal is generated by any of the following:

- Manual Initiation
- 2 out of 3 high-high containment pressure
- High differential pressure signals between steam lines
- High steam line flow in two main steam lines in coincidence with either low-low reactor coolant system (RCS) average temperature or low steam line pressure in any two lines

A turbine trip and feedwater isolation signal is generated by any of the following:

- Safety Injection
- 2 out of 3 high-high steam generator level in any loop

Salem is a four loop plant with a MSIV (MS167) and a main steam bypass valve (MS18) in parallel to the MSIV in each loop. A main steam line isolation signal will isolate the main steam lines by fast closure of the MSIVs and closure of the air operated bypass valves. The MSIVs are parallel slide gate valves with double discs. They are operated by means of an integral piston and cylinder, utilizing steam within the valve and piping. A vent line from the upper end of the cylinder

branches to two diaphragm-operated dump valves (MSIV vent valves) which are connected in parallel to provide redundant control. Upon receipt of a closure signal, the MSIV vent valves open and release steam from the upper side of the main valve piston, thereby closing the MSIV. The MSIV vent valves are designated as MS169 and MS171. The MS169 vent valves receive the MSI signal from the "A" train of SSPS and the MS171 vent valves receive the MSI signal from the "B" train of SSPS. Only one MSIV vent valve per MSIV is required to open to initiate the fast closure of the MSIV.

Each of the four steam generators is provided main feedwater through lines that contain a motor operated stop check valve (BF22), an air operated FRV (BF19), an air operated FRVBV (BF40) in parallel to the FRV and a motor operated FIV (BF13). Upstream of the main feedwater lines are the two steam driven steam generator feedwater pumps (SGFPs). The SGFPs provide feedwater to all four steam generators and are steam driven pumps. The steam to the SGFP is provided by either the main steam or reheat steam.

A turbine trip and feedwater isolation signal will close the BF13s, BF19s, BF40s, trip the SGFPs by closing turbine steam stop valves (MS43s and RS15s) and trip the main turbine.

2.2 Regulatory Requirements and Guidance

The regulations in Title 10 of the *Code of Federal Regulations* (10 CFR) Section 50.36, "Technical specifications," contain the requirements for the content of TSs.

The regulation in 10 CFR 50.36(a)(1) requires a summary statement of the bases or reasons for such specifications, other than those covering administrative controls, to be included in the application. This regulation further states that the reasons or bases shall not become part of the TSs.

Under 10 CFR 50.36(c), TSs are required to include items in the following categories: (1) safety limits, limiting safety system settings, and limiting control settings; (2) limiting conditions for operation (LCOs); (3) surveillance requirements (SRs); (4) design features; and (5) administrative controls.

The regulation in 10 CFR 50.36(c)(2)(i) states that LCOs are "the lowest functional capability or performance levels of equipment required for safe operation of the facility." The regulation in 10 CFR 50.36(c)(2)(i) requires that, when an LCO of a nuclear reactor plant is not met, the licensee shall shut down the reactor or follow any remedial action permitted by the TS until the condition can be met.

The regulation in 10 CFR 50.36(c)(3) states that SRs are "requirements relating to test, calibration, or inspection to assure that the necessary quality of systems and components is maintained, that facility operation will be within safety limits, and that the LCOs will be met."

The Salem TSs are based on earlier NRC guidance for TS format and content in NUREG-0425, "Standard Technical Specifications for Westinghouse Pressurized Water Reactors." Licensees are not required to adopt the most current guidance. NUREG-1431, Revision 4.0, "Standard Technical Specifications, Westinghouse Plants," Volume 1, "Specifications" (ADAMS Accession No. ML12100A222), and Volume 2, "Bases" (ADAMS Accession No. ML12100A228) (Standard

Technical Specifications), contain the NRC's most current guidance for the format and content of TSs and TS Bases.

According to Section 3.1 of the Salem Updated Final Safety Analysis Report, Salem was designed and constructed in accordance with Atomic Energy Commission (AEC) proposed General Design Criteria (GDC) published in July 1967. In its application dated June 29, 2018, the licensee provided a discussion of Salem's licensing basis design criteria (i.e., the AEC proposed criteria) as compared to 10 CFR Part 50, Appendix A, "General Design Criteria for Nuclear Power Plants," as published in 1971. The NRC staff identified the following GDC in Appendix A to 10 CFR Part 50 as being applicable to this amendment request:

> GDC-13 (similar to AEC Proposed Criterion 12) requires, in part, that "[i]nstrumentation shall be provided to monitor variables and systems over their anticipated ranges for normal operation, for anticipated operational occurrences, and for accident conditions as appropriate to assure adequate safety, including those variables and systems that can affect the fission process, the integrity of the reactor core, the reactor coolant pressure boundary, and the containment and its associated systems."
>
> GDC-16 (similar to AEC Proposed Criterion 10) requires that "[r]eactor containment and associated systems shall be provided to establish an essentially leak-tight barrier against the uncontrolled release of radioactivity to the environment and to assure that the containment design conditions important to safety are not exceeded for as long as postulated accident conditions require."
>
> GDC-20 (similar to AEC Proposed Criteria 14 and 15) requires that "[t]he protection system shall be designed (1) to initiate automatically the operation of appropriate systems including the reactivity control systems, to assure that specified acceptable fuel design limits are not exceeded as a result of anticipated operational occurrences and (2) to sense accident conditions and to initiate the operation of systems and components important to safety."
>
> GDC-21 (similar to AEC Proposed Criteria 19 and 20) requires, in part, that "[t]he protection system shall be designed for high functional reliability and inservice testability commensurate with the safety functions to be performed."

2.3 Proposed TS Changes

2.3.1 TS Table 3.3-1, "Reactor Trip System Instrumentation," and TS Table 4.3-1, "Reactor Trip System Instrumentation Surveillance Requirements"

The current mode applicability for reactor trip from Functional Unit 18, "Turbine Trip," is Mode 1 in TS Table 3.3-1, but the current mode applicability for reactor trip SRs from Function Unit 18 is Modes 1 and 2 in TS Table 4.3-1. The licensee proposed to delete Mode 2 from mode applicability listed in TS Table 4.3-1 for Functional Unit 18.

In addition, the licensee proposed to add a footnote "#" to the mode applicability in TS Tables 3.3-1 and 4.3-1 for Functional Unit 18. The footnote would state, "Above the P-9 (Power Range Neutron Flux) Interlock." This footnote would be added to TS Table 3.3-1, "Table Notation" (page 3/4 3-5 of the TSs) and to TS Table 4.3-1 (page 3/4 3-12 of the TSs).

2.3.2 TS Table 3.3-3, "Engineered Safety Feature Actuation System Instrumentation"; TS Table 3.3-4, "Engineered Safety Feature Actuation System Trip Setpoints"; and Table 4.3-2, "Engineered Safety Feature Actuation System Instrumentation Surveillance Requirements"

The licensee proposed four changes to TS Tables 3.3-3, 3.3-4, and 4.3-2:

1. Revise the Functional Unit 1 description in TS Tables 3.3-3, 3.3-4, and 4.3-2 from "Safety Injection, Turbine Trip and Feedwater Isolation" to "Safety Injection." Existing Functional Unit 5, "Turbine Trip & Feedwater Isolation," in TS Tables 3.3-3, 3.3-4, and 4.3-2, will have new line items introduced for "Safety Injection" and "Automatic Actuation Logic." This is proposed to be accomplished by re-designating existing line item "a. Steam Generator Water Level – High -High" in Functional Unit 5 to line item "c." and introducing new line items "a. Safety Injection" and "b. Automatic Actuation Logic."

2. Revise the mode applicability for ESFAS instrumentation for Functional Unit 4, "Steam Line Isolation," in TS Tables 3.3-3 and 4.3-2 for Modes 2 and 3 to state an exception to the mode applicability when all of the MSIVs are closed. This would be accomplished by adding a footnote "(a)" to Modes 2 and 3 in the mode applicability column in TS Tables 3.3-3 and 4.3-2. The footnote would state: "Except when all MSIVS are closed." The footnote description would be added to TS Table 3.3-3 (page 3/4 3-19 of the TSs) and to TS Table 4.3-2 "Table Notation" (page 3/4 3-34 of the TS).

3. Revise the mode applicability for ESFAS instrumentation for Functional Unit 5, "Turbine Trip and Feedwater Isolation," in TS Tables 3.3-3 and 4.3-2 from Modes 2 and 3 to state an exception to the mode applicability when all main feedwater lines are isolated. This is would be accomplished by adding footnote "*" to Modes 2 and 3 in the mode applicability column for line items b. and c. in TS Table 3.3-3 and footnote "(b)" to Modes 2 and 3 in the mode applicability column for line items b. and c. in TS Table 4.3-2. The footnotes "*" and "(b)" would both state:

   > Except when all main feedwater lines are isolated by (1) a closed and de-activated feedwater isolation valve, or (2) closed and de-activated feedwater regulating valve (FRV) and FRV bypass valve, or (3) a closed manual valve.

   The description of footnote "*" would be added to TS Table 3.3-3 "Table Notation" (page 3/4 3-21 of the TSs) and the description of footnote "(b)" would be added to TS Table 4.3-2 "Table Notation" (page 3/4 3-34 of the TS).

4. Revise footnote "***" associated with TS Table 3.3-3, Functional Unit 4.b, "Automatic Actuation Logic," to clarify when the action statement needs to be entered when MSIV vent valves are isolated. This change will allow the vent valves associated with an inoperable and closed MSIV to be isolated. The revised footnote "***" would state as follows (deletions shown with a strike-through and additions shown in bold and underlined):

   > *** The automatic actuation logic includes two redundant solenoid operated vent valves for each Main Steam Isolation Valve **(MSIV)**. **Vent valves associated with an inoperable MSIV may be isolated provided that the MSIV is closed in accordance with actions of**

TS 3.7.1.5. One vent valve on any one **of the remaining OPERABLE or open** ~~Main Steam Isolation Valve~~ **MSIVs** may be isolated without affecting the function of the automatic actuation logic provided the remaining ~~seven~~ solenoid vent valves remain OPERABLE. The isolated MSIV vent valve shall be returned to OPERABLE status upon the first entry into MODE 5 following determination that the vent valve is inoperable. For any condition where more than one ~~of the eight~~ solenoid vent valve ~~are~~ is inoperable **for the OPERABLE or open MSIVs,** entry into ACTION 20 is required.

2.3.3 Revise Mode Applicability of TS 3.7.1.5, "Main Steam Isolation Valves," from Modes 1, 2, and 3 to State an Exception to Modes 2 and 3 When All of the MSIVs are Closed

The licensee proposed changes to the mode applicability of TS 3.7.1.5 as follows (deletions shown with a strike-through and additions shown in bold and underlined):

3.7.1.5 Each main steam line isolation valve shall be OPERABLE.

APPLICABILITY: MODES 1~~, 2 and 3~~
MODES 2 and 3 except when all MSIVs are closed.

2.3.4 Add a new TS 3/4.7.13

The licensee proposed new TS 3/4.7.13 as follows:

PLANT SYSTEMS

3/4.7.13 Main Feedwater Isolation Valves (FIVs), Main Feedwater Regulating Valves (FRVs), FRV Bypass Valves (FRVBVs), and Steam Generator Feedwater Pump (SGFP) Turbine Steam Stop Valves

LIMITING CONDITION FOR OPERATION

3.7.13 Four Main FIVs, four Main FRVs, four Main FRVBV, and four SGFP turbine steam stop valves shall be OPERABLE.

APPLICABILITY:

For the FIV in each main feedwater line:

MODES 1, 2, and 3 except when:

a. The FIV is closed and deactivated; or
b. The associated FRV and FRVBV are closed and deactivated; or
c. The associated main feedwater line is isolated by a closed manual valve

For the FRV in each main feedwater line:

MODES 1, 2, and 3 except when:

a. The FRV is closed and deactivated; or
b. The associated FIV is closed and deactivated; or
c. The associated main feedwater line is isolated by a closed manual valve

For the FRVBV in each main feedwater line:

MODES 1, 2, and 3 except when:

a. The FRVBV is closed and deactivated; or
b. The associated FIV is closed and deactivated; or
c. The associated main feedwater line is isolated by a closed manual valve

For each SGFP Turbine Steam Stop Valve:

MODES 1, 2, and 3 except when:

a. The SGFP Turbine Steam Stop Valve is closed and deactivated; or
b. The associated steam supply to the SGFP turbine is isolated by a closed manual valve; or
c. The SGFP feedwater flow path is isolated

ACTION:

----------NOTE----------
Separate Condition Entry is allowed for each valve
---

a. With one or more FIVs inoperable, restore the inoperable FIV(s) to OPERABLE status or close or isolate the inoperable FIV(s) within 72 hours; verify the inoperable FIV(s) is closed or isolated once per 7 days.

b. With one or more FRVs inoperable, restore the inoperable FRV(s) to OPERABLE status or close or isolate the inoperable FRV(s) within 72 hours; verify the inoperable FRV(s) is closed or isolated once per 7 days.

c. With one or more FRVBV(s) inoperable, restore the inoperable FRVBV(s) to OPERABLE status or close or isolate the inoperable FRVBV(s) within 72 hours; verify the inoperable FRVBV(s) is closed or isolated once per 7 days.

d. With one or more SGFP turbine steam stop valves inoperable, restore the inoperable SGFP turbine stop valve(s) to OPERABLE status or isolate the associated steam supply to the SGFP turbine or isolate the SGFP flow path within 72 hours; verify that the inoperable SGFP steam stop valve is isolated or the SGFP flow path is isolated once per 7 days.

e. With two (2) valves in the same feedwater flowpath inoperable resulting in a loss of feedwater isolation capability for a flow path, restore at least one valve to OPERABLE status or isolate the affected flow path within 8 hours.

f. With the required ACTION requirements above not met, be in HOT STANDBY within 6 hours and in HOT SHUTDOWN within the following 6 hours.

SURVEILLANCE REQUIREMENTS

4.7.13.1 Each FIV, FRV, FRVBV and SGFP turbine steam stop valve shall be demonstrated OPERABLE by determining the isolation time of each valve to be within limits when tested pursuant to the INSERVICE TESTING PROGRAM.

4.7.13.2 In accordance with the Surveillance Frequency Control Program, verify each FIV, FRV, FRVBV and SGFP turbine steam stop valve actuates to the isolation position on an actual or simulated actuation signal.

3.0 TECHNICAL EVALUATION

3.1 Revision of Mode Applicability of Reactor Trip from Turbine Trip

The current mode applicability for reactor trip from turbine trip (Functional Unit 18) in TS Table 3.3-1, "Reactor Trip System Instrumentation," is Mode 1. The current mode applicability for Functional Unit 18 in TS Table 4.3-1, "Reactor Trip System Instrumentation Surveillance Requirements," is Modes 1 and 2. The licensee proposed changing the mode applicability for Functional Unit 18 in the Tables 3.3-1 and 4.3-2 to Mode 1 above the P-9 interlock by adding a footnote "#" to Mode 1. The footnote would state, "Above the P-9 (Power Range Neutron Flux) interlock."

The proposed change resolves two inconsistencies within the TSs, one being a disagreement in mode applicability for Functional Unit 18, "Turbine Trip," between Tables 3.3-1 and 4.3-1, and the other a clarification to the mode applicability based on the function of the P-9 interlock.

The first change would leave Mode 1 as the applicable mode in Table 3.3-1 but modify the mode applicability in Table 4.3-1 from Modes 1, 2 to Mode 1. The NRC staff accepts the proposed change as there is no potential for turbine trip in Mode 2 because the turbine is not operating. Therefore, the trip functions need not be operable. The proposed change is consistent with the Standard Technical Specifications.

The second change is a clarification that is essentially an exception to Mode 1 based on the function of P-9 interlock. The Salem units are equipped with a system to bypass steam developed in the steam generators directly to the main condenser. The licensee stated that the bypass system is capable of accepting 50-percent load rejection without reactor trip. As stated in "Reactor Trip System Interlocks" in TS Table 3.3-1 for P-9 designation, "P-9 prevents or defeats the automatic block of reactor trip on turbine trip" with reactor power ≥50 percent power." The licensee proposed adding a qualifying footnote "#" to provide an exception to the Mode 1 applicability. The proposed footnote "#" to Mode 1 states "above the P-9 (Power Range Neutron Flux) Interlock."

The NRC staff finds the proposed change is consistent with the corresponding table in NUREG-1431. The NRC staff finds the proposed change acceptable, as Salem is equipped with the design feature to bypass steam directly to the condenser with a capability to

accommodate 50-percent load rejection without reactor trip. Therefore, the trip functions need not be operable.

3.2 Revision of ESFAS Functional Unit 1 and Unit 5

In TS Tables 3.3-3, 3.3-4, and 4.3-2 Functional Unit 1 is currently titled "Safety Injection, Turbine Trip and Feedwater Isolation." The licensee proposed changing the description of Functional Unit 1 in TS Tables 3.3-3, 3.3-4 to "Safety Injection." The licensee also proposed revising Functional Unit 5, "Turbine Trip & Feedwater Isolation," in TS Tables 3.3-3, 3.3-4, and 4.3-2, to add new line items for "Safety Injection" and "Automatic Actuation Logic."

The licensee justified the proposed changes in the LAR, which stated:

> The Salem Unit 1 and 2 Technical Specifications were based on the NUREG-0452, "Standardized Technical Specifications for Westinghouse PWRs." During the conversion from NUREG-0452 to NUREG-1431, the description of Functional Unit 1 was revised to reflect only "Safety Injection" and line items for "Safety Injection" and "Automatic Actuation Logic" were added to Functional Unit 5 for "Turbine Trip and Feedwater Isolation."
>
> Turbine Trip and Feedwater Isolation was removed from the Functional Unit 1 description since the description of the functional unit was determined to be inaccurate. Functional Unit 1 identifies all of the inputs that generate a safety injection signal. The safety injection signal is an input that will generate a turbine trip and feedwater isolation signal.
>
> Since a safety injection signal generates a turbine trip and feedwater isolation signal, a line item is added to Functional Unit 5 for safety injection. Consistent with NUREG-1431, the safety injection line item added to Functional Unit 5 refers to Functional Unit 1 for all of the initiation functions and requirements.
>
> An automatic actuation logic line item is added to Functional Unit 5 consistent with NUREG-1431. The actuation logic for the turbine trip and feedwater isolation is processed through the two redundant logic trains of the solid state protection system. Only one of the two logic trains is required to actuate to complete the turbine trip and feedwater isolation function. TS Table 3.3-3 is revised to require a minimum of two channels with one channel to complete the trip function. The mode applicability is modes 1, 2 and 3 which is consistent with existing mode applicability with the high-high steam generator level actuation in TS Table 3.3-3. Action 20 is added for the automatic actuation logic consistent with other functional units in TS Table 3.3-3 that have a mode applicability of modes 1, 2, and 3.
>
> The surveillance frequencies for TS Table 4.3-2 Functional Unit 5.b will be contained in the Surveillance Frequency Control Program (SFCP) with the exception of the CHANNEL CHECK and CHANNEL CALIBRATION which are not applicable for the automatic actuation logic. Salem has implemented TSTF [Technical Specifications Task Force] Change Traveler TSTF-425, Revision 3 (Reference 4) as approved by the NRC with TS Amendments 299 and 282 (Reference 5) for Units 1 and 2 respectively. The initial surveillance frequency for the CHANNEL FUNCTIONAL TEST of the automatic actuation logic for

Functional Unit 5.b will be consistent with the current frequencies of the automatic actuation logic for Functional Units 1.b, 2.b, 3.a.2, 3.b.2, 3.c.2 and 4.b.

The NRC staff reviewed the changes proposed to ESFAS Functional Units 1 and 5, namely:

- Delete "Turbine trip and Isolation" from Functional Unit 1 description
- Add line items for "Safety Injection" and "Automatic Actuation Logic" from Functional Unit 5
- Refer back to Functional Unit 1 for the initiating functions and requirements for new line item "Safety Injection" in Functional Unit 5
- Add the exception to Mode applicability 2 and 3, denoted by "*" when the feedwater lines are already isolated

The NRC staff concludes that the proposed changes provide additional clarity and are consistent with NUREG-1431. Based on the above information, the staff finds that the proposed changes do not change the accident analysis functions of the ESFAS instrumentation. Further, the proposed design changes will not result in changes to systems design or instrumentation setpoints. Therefore, the staff finds the proposed changes acceptable.

3.3 Addition of Mode Applicability Exception to ESFAS Functional Unit 4

The licensee proposed revising Functional Unit 4, "Steam Line Isolation," of TS Tables 3.3-3 and 4.3-2 to add new footnote "(a)" to Modes 2 and 3. Footnote "(a)" would add an exception to TS applicability in Modes 2 and 3 when all MSIVs are closed. The licensee stated that this change is consistent with the corresponding table in NUREG-1431and that the steam line isolation function has already been completed when all of the MSIVs are in their closed position; therefore, the instrumentation for initiation of steam line isolation is not required when all of the MSIVs are closed in Modes 2 and 3.

The NRC staff finds the proposed change acceptable, as the steam line isolation function is already achieved when all of the MSIVs are closed. Therefore, the instrumentation of the initiation of steam line isolation is not required when all of the MSIVs are closed in Modes 2 and 3. The staff also finds the proposed change is consistent with NUREG-1431.

3.4 Addition of Mode Applicability Exception to ESFAS Functional Unit 5

The licensee proposed to add an exception to the mode applicability to Functional Unit 5, "Turbine Trip and Feedwater Isolation," in TS Tables 3.3-3 and 4.3-2. The current mode applicability for Functional Unit 5 in both the tables is Modes 1, 2, and 3. The proposed change would be accomplished by adding a footnote to Modes 2 and 3 (footnote "*" to Table 3.3-3 and footnote "(b)" to Table 4.3-2) for Functional Unit 5, line items b., "Automatic Actuation Logic," and c., "Steam Generator Water Level High-High." A footnote description will be added to "Table Notation" for Tables 3.3-3 and 4.3.-2, stating, "Except when all main feedwater lines are isolated by (1) a closed and de-activated feedwater isolation valve, or (2) closed and de-activated feedwater regulating valve (FRV) and FRV bypass valves, or (3) a closed manual valve."

Regarding Functional Unit 5.a, "Safety Injection," the mode exception will be stated in Tables 3.3-3 and 4.3-2. The statement in Table 3.3-3 would state, in part, that "[t]he

applicability exceptions of footnote (*) also apply to Functional Unit 5.a." A similar statement is proposed in Table 4.3-2, Functional Unit 5.a, except that "(b)" will replace "(*)."

The NRC staff notes that in Modes 2 and 3, the main turbine is not in service when all of the feedwater lines are isolated and the design-basis function for feedwater isolation is already completed. Therefore, the instrumentation for initiation of the turbine trip and feedwater isolation is not required when the all of the main feedwater lines are isolated. As such, the NRC staff finds that the proposed change is acceptable. This change is consistent with NUREG-1431.

3.5 Revision of Note for ESFAS Functional Unit 4.b

Footnote *** to Functional Unit 4.b, "Automatic Actuation Logic," of TS Table 3.3-3, "Engineered Safety Feature Actuation System Instrumentation," currently states:

> *** The automatic actuation logic includes two redundant solenoid operated vent valves for each Main Steam Isolation Valve. One vent valve on any one Main Steam Isolation Valve may be isolated without affecting the function of the automatic actuation logic provided the remaining seven solenoid vent valves remain OPERABLE. The isolated MSIV vent valve shall be returned to OPERABLE status upon the first entry into MODE 5 following determination that the vent valve is inoperable. For any condition where more than one of the eight vent solenoid vent valves are inoperable, entry into Action 20 is required.

Action 20 states:

> With the number of OPERABLE channels one less than the total Number of Channels, restore the inoperable channel to OPERABLE status within 6 hours or, be in at least HOT STANDBY within the next 6 hours and in at least HOT SHUTDOWN within the following 6 hours; however, one channel may be bypassed for up to 4 hours for surveillance testing per specification 4.3.2.1.1 provided the other channel is OPERABLE.

The licensee stated that the footnote *** was added to Functional Unit 4.b of TS Table 3.3-3 by Amendment No. 57 (Unit No. 1) and No. 26 (Unit No. 2) to add operating restrictions when one MSIV vent valve is isolated. Each MSIV has two solenoid operated vent valves (MS169 and MS171) that open to vent steam from the main valve piston. Venting the steam performs the fast closure function of the MSIV. Only one vent valve is required to open to actuate the closure of the MSIV. Each vent valve can be individually isolated. By Amendment Nos. 57 and 26, restrictions were added to the main steam line isolation automatic actuation logic to allow continued operation with only one of the eight vent valves isolated (the remaining seven vent valves must remain operable). With one MSIV vent valve isolated, a single failure including failure of one train of SSPS to actuate would prevent only a single MSIV from closing, which is consistent with the assumptions in the design basis accidents.

The footnote *** was intended to address isolating a leaking MSIV vent valve at power that could cause unneeded closure of the MSIV. However, the note was added to the automatic actuation logic, which is applicable in Modes 1, 2, and 3. Operation in Mode 1 is not possible with a closed MSIV. However, in Modes 2 and 3, one or more MSIVs could be closed. When closed, the MSIV has completed its credited design function for a design-basis accident. Once

an MSIV is closed, opening of the MSIV vent valves for the MSIV is no longer required. The proposed changes to the footnote *** remove unnecessary restrictions associated with the MSIV vent valves in Modes 2 and 3 while retaining the current provisions of footnote ***. The licensee provided an example of the hardship faced during the return of Unit 2 from service from the Fall 2015 outage.

> MSIV vent valves associated with two different MSIVs were determined to be leaking by and needed to be isolated to perform repairs. The leakage occurred with the unit in Mode 2 while the MSIVs were being returned to service. Isolating both MSIV vent valves to perform the work would have resulted in entry into Action 20 of TS Table 3.3-3 requiring the unit to be returned to Mode 3, although the MSIVs were closed and performing their design basis safety function. The valves were isolated and repaired sequentially to prevent transitioning the unit from Mode 2 to Mode 3, extending the duration of the unit startup.

The licensee proposed to modify the footnote *** in Modes 2 and 3 to allow the vent valves that are associated with an inoperable MSIV that is closed to be isolated in accordance with the actions of TS 3.7.1.5, "Main Steam Isolation Valve," without entering TS Table 3.3-3, Action 20. Further, the footnote *** is proposed to be modified to require that if more than one solenoid vent valve for all operable and inoperable but not closed MSIVs, then Action 20 is required to be entered.

The proposed footnote *** states:

> The automatic actuation logic includes two redundant solenoid operated vent valves for each Main Steam Isolation Valve (MSIV). Vent valves associated with an inoperable MSIV may be isolated provided that the MSIV is closed in accordance with actions of TS 3.7.1.5. One vent valve on any one of the remaining OPERABLE or open MSIVs may be isolated without affecting the function of the automatic actuation logic provided the remaining solenoid vent valves remain OPERABLE. The isolated MSIV vent valve shall be returned to OPERABLE status upon the first entry into MODE 5 following determination that the vent valve is inoperable. For any condition where more than one solenoid vent valves is inoperable for the OPERABLE or open MSIVs, entry into Action 20 is required.

The NRC staff concludes that the proposed revision to footnote *** prevents unnecessary delays during return to operation from an outage or shutdown if more than one MSIV vent valve is found to be leaking. The NRC staff also concludes that the proposed change continues to satisfy the design-basis accident assumption that only one MSIV will fail to close as a result of a single failure because once an MSIV is closed, opening of the MSIV vent valves for the closed MSIV is no longer required. As such, the NRC staff finds the proposed change acceptable. In addition, the proposed change is consistent with NUREG-1431.

3.6 Revise Mode Applicability for TS 3.7.1.5

The mode applicability for TS 3.7.1.5, "Main Steam Isolation Valves," is being revised to add an exception to Modes 2 and 3 when all MSIVs are closed.

The NRC staff finds that continued operation in Modes 2 and 3 with all of the MSIVs inoperable but maintained in their closed position is acceptable since the design-basis accident function for

steam line isolation has already been completed. As such, the NRC staff finds the proposed change acceptable. In addition, this change is consistent with NUREG-1431.

3.7 Addition of TS 3/4.7.13

The Salem TSs do not contain a unique LCO associated with FIV, FRV, FRVBV, or SGFP turbine steam stop valves. As a result, whenever the individual components of the valves are inoperable, the licensee has been conservatively applying automatic actuation logic for LCO 3.3.2.1, "Engineered Safety Feature Actuation System Instrumentation," Functional Unit 1.b, "Automatic Actuation Logic," inoperable. This is so, even though the wording of the LCO action statement is directed to the inoperability of the logic channels of SSPS trains and not the individual components of the valves. The licensee chose the most restrictive instrumentation action statement to individual component inoperability, thus placing the unit in short duration shutdown action statement when diverse means of accomplishing the required feedwater isolation are available. The licensee proposed to add a new TS 3.7.13 for the feedwater isolation valves and the steam generator feed pump turbine steam stop valves. The portion for the feedwater isolation valves is modeled after NUREG-1431, except the Salem TSs are in custom format. The proposed LCO for the SGFP turbine steam stop valves is similar to precedent from Diablo Canyon Nuclear Power Plant TS Amendment No. 140.

The proposed LCO would state that the FIVs, FRVs, and FRVBVs in each of the four main feedwater lines and four SGFP turbine steam stop valves shall be operable. The staff reviewed the proposed LCO, and the licensee's justifications. The safety function of these valves is to rapidly close, following a steam line or feedwater line rupture or a feedwater system malfunction. The staff determined that the LCO statement is acceptable because it is based on the analyses and evaluations provided by the licensee; per 50.36(b)(1); and the LCO will ensure the lowest functional capability or performance level of equipment required for safe operation of the facility will be met, per 50.36(c)(2)(ii). The LCO for the feedwater isolation valves is also consistent with NUREG-1431.

The applicability for the FIVs, FRVs, and FRVBVs, and the SGFP turbine steam stop valves, is Modes 1, 2, and 3, with certain exceptions. The exceptions apply when the valves themselves are closed and deactivated, or other active valves are closed and deactivated, or the feedwater line is isolated by a closed manual valve. The applicability considered single active criterion by requiring valve operability unless the affected valve is closed and deactivated or the line is otherwise isolated. The exceptions stated are consistent with NUREG-1431. The NRC staff also finds that the feedwater arrangement described in the LAR will comply with the exceptions stated in proposed TS 3.7.13.

The TS actions for proposed TS 3/4.7.13 allow for separate entry for each operable valve. The action statements for an inoperable FIV, FRV, or FRVBV require that action must be taken to restore the affected valves to operable status or the inoperable affected valves must be closed or isolated within 72 hours. When the valves are closed and isolated, they are still performing the required safety function. The 72-hour action time takes into account the redundancy afforded by the remaining OPERABLE valves and the low probability of an event occurring during this time period that would require isolation of the feedwater flow paths. The 7-day periodic verification of closure or isolation reasonable and consistent with NUREG-1431.

The action statement for an inoperable SGFP turbine steam stop valve requires that action must be taken to restore the affected valves to operable status or the associated steam supply to the SGFPs must be isolated, or associated SGFP feedwater flow paths must be isolated within

72 hours (Action Statements a-d). When the SGFP steam stop valves are closed and isolated, or the SGFP feedwater flow path is isolated, the required safety function has been completed. The 72-hour action time takes into account the redundancy afforded by the remaining operable valves and the low probability of an event occurring during this time period that would require isolation of the MF flow paths. The 7-day periodic verification of closure or isolation of the flow paths is reasonable and consistent with NUREG-1431.

With either (1) an FRV or FRVBV and FIV inoperable, or (2) SGFP turbine steam stop valve (resulting in a loss of SGFP trip function) and FRV or FRVBV inoperable, there may be no redundant system to operate automatically and perform the required safety function. In such conditions, at least one valve must be restored to operable status, or the affected flow path isolated within 8 hours. This action returns the system to the condition where at least one valve in each flow path is performing the required safety function. The 8-hour completion time is reasonable based on operating experience and is consistent with NUREG-1431.

If the FIV(s), FRV(s), FRVBV(s), and SGFP turbine steam stop valves cannot be restored to operable status, or closed, or the flow path isolated within the associated allowed outage time, the unit must be placed in a mode in which the LCO does not apply. This requires the unit to be placed in at least hot standby (Mode 3) within 6 hours and in hot standby (Mode 4) within the following 6 hours (Action Statement f). The allowed completion times are reasonable to reach the required unit conditions from full power conditions in an orderly manner and without challenging unit systems and are consistent with NUREG-1431.

The NRC staff reviewed the proposed actions. The staff determined that the proposed actions are acceptable because they specify remedial actions to be taken until the LCO can be met per 10 CFR 50.36(c)(2)(i), and they provide reasonable assurance that the that the health and safety of the public will not be endangered.

Proposed SR 4.7.13.1 verifies that the closure time of each FIV, FRV, FRV bypass, and SGFP turbine steam stop valve is within the limit assumed in the accident and containment analyses. This SR also verifies the valve closure time is in accordance with the inservice testing program. The frequency for this SR is in accordance with the inservice testing program. The proposed SR is consistent with NUREG-1431.

Proposed SR 4.7.13.2 verifies that each FIV, FRV, FRV bypass, and SGFP turbine steam stop valve can close on an actual or simulated actuation signal. This surveillance is normally performed upon returning the plant to operation following a refueling outage. The surveillance frequency is controlled under the surveillance frequency control program, starting with an initial frequency of 18 months. The proposed frequency is consistent with NUREG-1431.

The staff reviewed the proposed SRs and the licensee's justifications. The staff determined that the proposed SRs are acceptable because they provide assurance that the necessary quality of systems and components is maintained, that facility operation will be within safety limits, and that the LCO will be met per 10 CFR 50.36(c)(3), and the SRs provide reasonable assurance that the that the health and safety of the public will not be endangered.

3.8 Administrative Changes to the TSs

The NRC staff reviewed the proposed administrative changes that include adding the new TS 3.7.13 to the index sections of both Salem TSs and TS Bases and correcting a typographical

error from a previous amendment in Table 4.3-2, "Table Notation (1)." Specifically, the typographical error proposed to be corrected is to change the word "function" to "functional."

The NRC staff concludes that the changes do not impact the technical evaluation directly related to these amendments. Therefore, the staff finds the administrative changes to be acceptable.

3.9 Technical Evaluation Conclusion

The NRC staff finds that the proposed changes provide operational flexibility without any impact on systems design and plant safety analyses. The mode applicability exceptions to RPS and ESFAS instrumentation apply only when the isolation valves are in their safe position (i.e., closed). There are no changes related to the instrumentation, actuation logics, or their setpoints as a result of the LAR. The inclusion of a new TS 3.7.13 for the feedwater isolation equipment will allow application of action times derived from a separate TSs, in lieu of the current conservative application of action times from the reactor trip system instrumentation and ESFAS instrumentation TSs. Conformance with GDC-13, GDC-16, GDC-20, and GDC-21 will be unaffected, as the proposed changes do not impact design or the accident analysis. Therefore, the NRC staff finds that the revised TSs 3/4.3.1, 3/4.3.2, 3/4.7.1.5, and 3/4.7.13 will provide reasonable assurance the health and safety of the public will not be endangered.

4.0 STATE CONSULTATION

In accordance with the Commission's regulations, the New Jersey State official was notified of the proposed issuance of the amendments on October 23, 2018. The State official had no comments.

5.0 ENVIRONMENTAL CONSIDERATION

The amendments change requirements with respect to the installation or use of facility components located within the restricted area as defined in 10 CFR Part 20 and change SRs. The NRC staff has determined that the amendments involve no significant increase in the amounts, and no significant change in the types, of any effluents that may be released offsite, and that there is no significant increase in individual or cumulative occupational radiation exposure. The Commission has previously issued a proposed finding that the amendments involve no significant hazards consideration, published in the *Federal Register* on August 28, 2018 (83 FR 43907), and there has been no public comment on such finding. Accordingly, the amendments meet the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9). Pursuant to 10 CFR 51.22(b), no environmental impact statement or environmental assessment need be prepared in connection with the issuance of the amendments.

6.0 CONCLUSION

The Commission has concluded, based on the considerations discussed above, that: (1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, (2) there is reasonable assurance that such activities will be conducted

in compliance with the Commission's regulations, and (3) the issuance of the amendments will not be inimical to the common defense and security or to the health and safety of the public.

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Date: May 31, 2019

SUBJECT: SALEM NUCLEAR GENERATING STATION, UNIT NOS. 1 AND 2 – ISSUANCE OF AMENDMENT NOS. 329 AND 310 RE: REVISE REACTOR TRIP SYSTEM INSTRUMENTATION, ENGINEERED SAFETY FEATURE ACTUATION SYSTEM INSTRUMENTATION, MAIN STEAM ISOLATION VALVES, AND ADD MAIN FEEDWATER ISOLATION TECHNICAL SPECIFICATION (EPID L-2018-LLA-0189) DATED MAY 31, 2019

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