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

January 14, 2020

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

SUBJECT: SALEM NUCLEAR GENERATING STATION, UNIT NOS. 1 AND 2 – ISSUANCE OF AMENDMENT NOS. 331 AND 312 RE: REVISE TECHNICAL SPECIFICATIONS TO ADOPT TSTF-563, REVISION 0, "REVISE INSTRUMENT TESTING DEFINITIONS TO INCORPORATE THE SURVEILLANCE FREQUENCY CONTROL PROGRAM" (EPID L-2019-LLA-0074)

Dear Mr. Carr:

The U.S. Nuclear Regulatory Commission (the Commission) has issued the enclosed Amendment Nos. 331 and 312 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 April 8, 2019.

The amendments adopt Technical Specifications Task Force (TSTF) Traveler TSTF-563, Revision 0, "Revise Instrument Testing Definitions to Incorporate the Surveillance Frequency Control Program." TSTF-563 revises the TS definitions of "channel calibration" and "channel functional test."

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,

/RA/

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. 331 to DPR-70
2. Amendment No. 312 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. 331
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 April 8, 2019, 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. 331, 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

/RA/

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: January 14, 2020

ATTACHMENT TO LICENSE AMENDMENT NO. 331

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
3	3

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

Remove	Insert
1-1	1-1

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. 331, 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

DEFINED TERMS

1.1 The DEFINED TERMS of this section appear in capitalized type and are applicable throughout these Technical Specifications.

ACTION

1.2 ACTION shall be that part of a specification which prescribes remedial measures required under designated conditions.

AXIAL FLUX DIFFERENCE

1.3 AXIAL FLUX DIFFERENCE shall be the difference in normalized flux signals between the top and bottom halves of a two section excore neutron detector.

CHANNEL CALIBRATION

1.4 A CHANNEL CALIBRATION shall be the adjustment, as necessary, of the channel output such that it responds within the necessary range and accuracy to known values of the parameter that the channel monitors. The CHANNEL CALIBRATION shall encompass the entire channel, including the required sensor, alarm, display, and trip functions, and shall include the CHANNEL FUNCTIONAL TEST. Calibration of instrument channels with resistance temperature detector (RTD) or thermocouple sensors may consist of an inplace qualitative assessment of sensor behavior and normal calibration of the remaining adjustable devices in the channel. Whenever an RTD or thermocouple sensing element is replaced, the next required CHANNEL CALIBRATION shall include an inplace cross calibration that compares the other sensing elements with the recently installed sensing element. The CHANNEL CALIBRATION may be performed by means of any series of sequential, overlapping, or total channel steps, and each step must be performed within the Frequency in the Surveillance Frequency Control Program for the devices included in the step.

CHANNEL CHECK

1.5 A CHANNEL CHECK shall be the qualitative assessment of channel behavior during operation by observation. This determination shall include, where possible, comparison of the channel indication and/or status with other indications and/or status derived from independent instrument channels measuring the same parameter.

CHANNEL FUNCTIONAL TEST

1.6 A CHANNEL FUNCTIONAL TEST shall be the injection of a simulated signal into the channel as close to the primary sensor as practicable to verify OPERABILITY including alarm and/or trip functions. The CHANNEL FUNCTIONAL TEST may be performed by means of any series of sequential, overlapping, or total channel steps, and each step must be performed within the Frequency in the Surveillance Frequency Control Program for the devices included in the step.

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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. 312
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 April 8, 2019, 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. 312, 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

/RA/

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: January 14, 2020

ATTACHMENT TO LICENSE AMENDMENT NO. 312

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
3	3

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

Remove	Insert
1-1	1-1

(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. 312, 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.

DEFINED TERMS

1.1 The DEFINED TERMS of this section appear in capitalized type and are applicable throughout these Technical Specifications.

ACTION

1.2 ACTION shall be that part of a specification which prescribes remedial measures required under designated conditions.

AXIAL FLUX DIFFERENCE

1.3 AXIAL FLUX DIFFERENCE shall be the difference in normalized flux signals between the top and bottom halves of a two section excore neutron detector.

CHANNEL CALIBRATION

1.4 A CHANNEL CALIBRATION shall be the adjustment, as necessary, of the channel output such that it responds with the necessary range and accuracy to known values of the parameter that the channel monitors. The CHANNEL CALIBRATION shall encompass the entire channel, including the required sensor, alarm, display, and trip functions, and shall include the CHANNEL FUNCTIONAL TEST. Calibration of instrument channels with resistance temperature detector (RTD) or thermocouple sensors may consist of an inplace qualitative assessment of sensor behavior and normal calibration of the remaining adjustable devices in the channel. Whenever an RTD or thermocouple sensing element is replaced, the next required CHANNEL CALIBRATION shall include an inplace cross calibration that compares the other sensing elements with the recently installed sensing element. The CHANNEL CALIBRATION may be performed by means of any series of sequential, overlapping, or total channel steps, and each step must be performed within the Frequency in the Surveillance Frequency Control Program for the devices included in the step.

CHANNEL CHECK

1.5 A CHANNEL CHECK shall be the qualitative assessment of channel behavior during operation by observation. This determination shall include, where possible, comparison of the channel indication and/or status with other indications and/or status derived from independent instrument channels measuring the same parameter.

CHANNEL FUNCTIONAL TEST

1.6 A CHANNEL FUNCTIONAL TEST shall be the injection of a simulated signal into the channel as close to the primary sensor as practicable to verify OPERABILITY including alarm and/or trip functions. The CHANNEL FUNCTIONAL TEST may be performed by means of any series of sequential, overlapping, or total channel steps, and each step must be performed within the Frequency in the Surveillance Frequency Control Program for the devices included in the step.

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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NOS. 331 AND 312 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 April 8, 2019 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML19098B529), PSEG Nuclear LLC (PSEG, the licensee) submitted a license amendment request for the Salem Nuclear Generating Station (Salem), Unit Nos. 1 and 2. The amendments would revise the current instrumentation testing definitions of "channel calibration" and "channel functional test" to permit determination of the appropriate frequency to perform the surveillance requirement (SR) based on the devices being tested in each step.

The proposed changes are based on Technical Specifications Task Force (TSTF) Traveler TSTF-563, Revision 0, "Revise Instrument Testing Definitions to Incorporate the Surveillance Frequency Control Program," dated May 10, 2017 (ADAMS Accession No. ML17130A819). The U.S. Nuclear Regulatory Commission (NRC, the Commission) issued a final safety evaluation (SE) approving TSTF-563, Revision 0, on December 4, 2018 (ADAMS Accession No. ML18333A144).

A Surveillance Frequency Control Program (SFCP) was incorporated into the Salem, Unit Nos. 1 and 2, Technical Specifications (TSs) by Amendment Nos. 299 and 282, respectively, by letter dated March 21, 2011 (ADAMS Accession No. ML110410691).

2.0 REGULATORY EVALUATION

2.1 Description of Rod Surveillance Frequency Control Program and Instrument Testing

The TSs require the surveillances for instrumentation channels to be performed within the specified frequency using any series of sequential, overlapping, or total channel steps. A prior amendment revised the TSs to relocate all periodic surveillance frequencies to licensee control. Changes to the relocated surveillance frequencies are made in accordance with the TS program referred to as the SFCP. The SFCP allows a new surveillance frequency to be determined for

the channel, but that frequency must consider all components in the channel and apply to the entire channel.

A typical instrument channel consists of many different components such as sensors, rack modules, and indicators. These components have different short-term and long-term performance (drift) characteristics, resulting in the potential for different calibration frequency requirements. Under the current TSs, the most limiting component calibration frequency for the channel must be chosen when a revised frequency is considered under the SFCP. As a result, all components that make up a channel must be calibrated at a frequency equal to the channel component with the shortest (i.e., most frequent) surveillance frequency.

Some channel components such as pressure transmitters are very stable with respect to drift and could support a substantially longer calibration frequency than the other components in the channel. Currently, the SRs in many plants are performed in steps (e.g., a pressure sensor or transmitter is calibrated during a refueling outage and the rack signal conditioning modules are calibrated while operating at power). The proposed change would extend this concept to permit the surveillance frequency of each step to be determined under the SFCP based on the component(s) surveilled in the step instead of all components in the channel. This would allow each component to be tested at the appropriate frequency based on the component's long-term performance characteristics.

Allowing an appropriate surveillance frequency for performing a channel calibration on each component or group of components could reduce radiation dose associated with in-place calibration of sensors, reduce wear on equipment, reduce unnecessary burden on plant staff, and reduce opportunities for calibration errors.

2.2 Proposed Changes to the Technical Specifications

Currently, the channel calibration and channel functional test may be performed by any series of sequential, overlapping, or total channel steps. The proposed changes to the TSs would revise the definitions of channel calibration and channel functional test to indicate that the step must be performed within the most limiting frequency for the components included in that step by adding the phrase ", and each step must be performed within the Frequency in the Surveillance Frequency Control Program for the devices included in the step" at the end of the last sentence of each definition.

The following paragraph denotes the proposed revised channel calibration definition. The language proposed to be added is shown in italics and the language proposed to be deleted is shown in strike-through:

> A CHANNEL CALIBRATION shall be the adjustment, as necessary, of the channel output such that it responds within the necessary range and accuracy to known values of the parameter that the channel monitors. The CHANNEL CALIBRATION shall encompass the entire channel, including the required sensor, alarm, display, and trip functions, and shall include the CHANNEL FUNCTIONAL TEST. Calibration of instrument channels with resistance temperature detector (RTD) or thermocouple sensors may consist of an inplace qualitative assessment of sensor behavior and normal calibration of the remaining adjustable devices in the channel. Whenever an RTD or thermocouple sensing element is replaced, the next required CHANNEL CALIBRATION shall include an inplace cross calibration that compares the other

> sensing elements with the recently installed sensing element. The CHANNEL CALIBRATION may be performed by means of any series of sequential, overlapping, or total channel steps ~~so that the entire channel is calibrated.~~, *and each step must be performed within the Frequency in the Surveillance Frequency Control Program for the devices included in the step.*

The following paragraph denotes the revised channel functional test definition. The added language is shown in italics:

> A CHANNEL FUNCTIONAL TEST shall be the injection of a simulated signal into the channel as close to the primary sensor as practicable to verify OPERABILITY including alarm and/or trip functions. *The CHANNEL FUNCTIONAL TEST may be performed by means of any series of sequential, overlapping, or total channel steps, and each step must be performed within the Frequency in the Surveillance Frequency Control Program for the devices included in the step.*

The various instrumentation functions in the TSs require surveillances to verify the correct functioning of the instrument channel. The proposed change would extend the definition of instrumentation channel components to permit the surveillance frequency of each step to be determined under the SFCP based on the component(s) surveilled in the step instead of all components in the channel. This would allow each component to be tested at the appropriate frequency based on the component's long-term performance characteristics.

The proposed changes would allow the licensee to control the frequency of associated components being tested in each step. The SR for the overall instrumentation channel would remain unchanged. The proposed change would have no effect on the design, fabrication, use, or methods of testing the instrumentation channels and would not affect the ability of the instrumentation to perform the functions assumed in the safety analysis.

These instrumentation testing definitions would state that the test "may be performed by means of any series of sequential, overlapping, or total channel steps." The surveillance frequency of these subsets would be established based on the characteristics of the components in the step rather than the most limiting component characteristics in the entire channel. Each of these steps would be evaluated in accordance with the SFCP.

2.2.1 Variations from TSTF-563

The licensee proposed the following variations from the TS changes described in TSTF-563 or the applicable parts of the NRC staff's SE of TSTF-563:

a) The Salem TSs utilize different numbering than the Standard Technical Specifications (STS) on which TSTF-563 is based. Specifically, definitions in the Salem TSs are in Section 1 versus Section 1.1 and the definitions are numbered. These differences are administrative and do not affect the applicability of TSTF-563 or the NRC staff's SE of TSTF-563 to the Salem TSs.

b) The Salem TSs are different than Revision 4 of the Westinghouse STS (NUREG-1431) on which TSTF-563 is based. The Salem definition of Channel Calibration is worded differently than the STS definition, but the intent of the definitions is the same. The Salem Channel Calibration

definition states, in part, “The CHANNEL CALIBRATION may be performed by means of any series of sequential, overlapping, or total channel steps so that the entire channel is calibrated”; whereas, the STS Channel Calibration definition states, in part, “The CHANNEL CALIBRATION may be performed by means of any series of sequential, overlapping, or total channel steps.” The proposed elimination of the phrase “so that the entire channel is calibrated” in the Salem TSs is consistent with the STS and has no effect because the definition previously states that the Channel Calibration must encompass the entire channel.

c) The Salem TSs definition of Channel Functional Test is similar to the Babcock & Wilcox (B&W) and Boiling-Water Reactor (BWR) STS (NUREG-1430, NUREG-1433, and NUREG-1434) definitions. The Salem TSs require performing a Channel Functional Test, which encompasses the Westinghouse STS Channel Operational Test and Trip Actuating Device Operational Test. Therefore, the proposed change would incorporate the Channel Functional Test definition changes in TSTF-563 for B&W and BWR plants.

d) The Salem TSs definition of Channel Functional Test does not include a provision to perform the test by means of any series of sequential, overlapping, or total channel steps. However, the existing Channel Calibration definition explicitly includes the Channel Functional Test and permits performance of the Channel Calibration by means of any series of sequential, overlapping, or total channel steps. As discussed in the TSTF-563 justification, applying the allowance to determine the appropriate frequency for each step based on the components tested in each Channel Functional Test step avoids potential conflicts between the definitions. Further, it is consistent with the STS, which permits performance of the Channel Functional Test by means of any series of sequential, overlapping, or total channel steps.

The provision to perform the Channel Functional Test by means of any series of sequential, overlapping, or total channel steps was added to the STS definitions of Channel Functional Test by TSTF-205, Revision 3, “Revision of Channel Calibration, Channel Functional Test, and Related Definitions,” which was approved by the NRC on January 13, 1999 and incorporated into Revision 2 of NUREG-1431. TSTF-205 described the change as follows:

> Other changes are made for consistency of the definitions between the [STS] NUREGs. The NUREG-1430 Channel Functional Test and NUREG-1431 Channel Operational Test definitions are modified to include the sentence, “The CHANNEL FUNCTIONAL (OPERATIONAL for NUREG-1431) TEST may be performed by means of any series of sequential, overlapping, or total channel steps.” This allowance currently exists in the [Combustion Engineering owners group], BWR/4 and BWR/6 definitions of Channel Functional Test and is understood to apply to the [boiling-water owners group] and [Westinghouse owners group] definitions, although not stated…. The changes proposed increase the

> consistency of the five NUREGs and are not intended to change the meaning or intent of the affected definitions.

The addition of this sentence to the Channel Functional Test definition is necessary to adopt TSTF-563 and, as stated in TSTF-205, is understood to apply to the existing definition, although not explicitly stated. Therefore, the proposed addition of the sentence does not change the intent of the existing definition and permits adoption of TSTF-563.

e) TSTF-563 and the NRC staff's SE of TSTF-563 discuss the applicable regulatory requirements and guidance, including the General Design Criteria (GDC) of Appendix A to Title 10 of the *Code of Federal Regulations* (10 CFR). Salem was designed in accordance with the licensee's understanding of the intent of the Atomic Energy Commission (AEC) proposed General Design Criteria published in July 1967. The applicable AEC proposed criteria, as documented in the Salem Updated Final Safety Analysis Report (UFSAR), Section 3.1, were compared to the 10 CFR Part 50, Appendix A, GDC as discussed below.

TSTF-563 references 10 CFR Part 50, Appendix A, GDC 13, "Instrumentation and control," which states:

> Instrumentation 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. Appropriate controls shall be provided to maintain these variables and systems within prescribed operating ranges.

GDC Criterion 13 is similar to AEC Criterion 12, "Instrumentation and Control Systems," and Criterion 15, "Engineered Safety Features Protection Systems."

TSTF-563 references 10 CFR Part 50, Appendix A, GDC 21, "Protection system reliability and testability," which states:

> The protection system shall be designed for high functional reliability and inservice testability commensurate with the safety functions to be performed. Redundancy and independence designed into the protection system shall be sufficient to assure that (1) no single failure results in loss of the protection function and (2) removal from service of any component or channel does not result in loss of the required minimum redundancy unless the acceptable reliability of operation of the protection system can be otherwise demonstrated. The protection system shall be designed to permit periodic testing of its functioning when the reactor is in operation, including a capability to test channels independently to

> determine failures and losses of redundancy that may have occurred.
>
> GDC Criterion 21 is similar to AEC Criterion 19, "Protection Systems Reliability," Criterion 20, "Protection Systems Redundancy and Independence," Criterion 25, "Demonstration of Functional Operability of Protection Systems," and Criterion 38, "Reliability and Testability of Engineered Safety Features."
>
> Following implementation of the proposed change, Salem Units 1 and 2 will remain in compliance with AEC Criteria 12, 15, 19, 20, 25 and 38. Therefore, this difference does not alter the conclusion that the proposed change is applicable to Salem.

2.3 Applicable Regulatory Requirements and Guidance

The regulation at 10 CFR 50.36(a)(1) requires each applicant for a license authorizing operation of a utilization facility to include the proposed TSs in the application.

The regulation at 10 CFR 50.36(b) states that:

> Each license authorizing operation of a … utilization facility … will include technical specifications. The technical specifications will be derived from the analyses and evaluation included in the safety analysis report, and amendments thereto, submitted pursuant to [10 CFR] 50.34. The Commission may include such additional technical specifications as the Commission finds appropriate.

The categories of items required to be in the TSs are provided in 10 CFR 50.36(c). One such category is SRs. SRs are defined in 10 CFR 50.36(c)(3) as "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 limiting conditions for operation will be met."

The regulation at 10 CFR 50.36(c)(5) requires TSs to include administrative controls, which "are the provisions relating to organization and management, procedures, recordkeeping, review and audit, and reporting necessary to assure operation of the facility in a safe manner."

A prior amendment revised and relocated most Salem periodic surveillance frequencies to licensee control. Changes to the relocated surveillance frequencies are made in accordance with the SFCP. The SFCP requires that changes to the relocated frequencies be made in accordance with topical report Nuclear Energy Institute (NEI) 04-10, Revision 1, "Risk-Informed Technical Specifications Initiative 5b, Risk-Informed Method for Control of Surveillance Frequencies, Industry Guidance Document."

NEI 04-10 describes an evaluation process and a multi-disciplinary plant decisionmaking panel that considers the detailed evaluation of proposed surveillance frequency revisions. The evaluations are based on operating experience, test history, manufacturer recommendations, codes and standards, and other deterministic factors in conjunction with risk insights. The evaluation considers all components being tested by the SR. Process elements are included for determining the cumulative risk impact of the changes, updating the licensee's probabilistic risk

assessment (PRA) models, and imposing corrective actions, if necessary, following implementation of a revised frequency.

The NRC staff's guidance for the review of TSs is in Chapter 16.0, Revision 3, "Technical Specifications," dated March 2010 (ADAMS Accession No. ML100351425), of NUREG-0800, "Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants: LWR [Light-Water Reactor] Edition" (SRP). As described therein, as part of the regulatory standardization effort, the NRC staff has prepared STS for each of the LWR nuclear designs. Accordingly, the NRC staff's review includes consideration of whether the proposed changes are consistent with the applicable referenced STS (i.e., the current STS), as modified by NRC-approved TSTF travelers. In addition, the guidance states that comparing the change to previous STS can help clarify the intent of the TSs.

Regulatory Guide (RG) 1.174, Revision 2, "An Approach for Using Probabilistic Risk Assessment in Risk-Informed Decisions on Plant-Specific Changes to the Licensing Basis" (ADAMS Accession No. ML100910006), describes an acceptable risk-informed approach for assessing the nature and impact of proposed permanent licensing basis changes by considering engineering issues and applying risk insights. This RG also provides risk acceptance guidelines for evaluating the results of such evaluations.

RG 1.177, Revision 1, "An Approach for Plant-Specific, Risk-Informed Decisionmaking: Technical Specifications" (ADAMS Accession No. ML100910008), describes an acceptable risk-informed approach specifically for assessing proposed TS changes.

RG 1.200, Revision 2, "An Approach for Determining the Technical Adequacy of Probabilistic Risk Assessment Results for Risk-Informed Activities" (ADAMS Accession No. ML090410014), describes an acceptable approach for determining the technical adequacy of PRAs.

The NRC staff's guidance for evaluating the technical basis for proposed risk-informed changes is provided in SRP, Section 19.2, "Review of Risk Information Used to Support Permanent Plant-Specific Changes to the Licensing Basis: General Guidance," dated June 2007 (ADAMS Accession No. ML071700658). The NRC staff's guidance for evaluating PRA technical adequacy is provided in SRP, Section 19.1, Revision 3, "Determining the Technical Adequacy of Probabilistic Risk Assessment for Risk-Informed License Amendment Requests After Initial Fuel Load," dated September 2012 (ADAMS Accession No. ML12193A107). More specific guidance related to risk-informed TS changes is provided in SRP, Section 16.1, Revision 1, "Risk-Informed Decision Making: Technical Specifications," dated March 2007 (ADAMS Accession No. ML070380228), which includes changes to surveillance test intervals (STIs) (i.e., surveillance frequencies) as part of risk-informed decisionmaking. Section 19.2 of the SRP references the same criteria as RG 1.177, Revision 1, and RG 1.174, Revision 2, and states that a risk-informed application should be evaluated to ensure that the proposed changes meet the following key principles:

- The proposed change meets the current regulations, unless it is explicitly related to a requested exemption….

- The proposed change is consistent with the defense-in-depth philosophy.

- The proposed change maintains sufficient safety margins.

- When proposed changes result in an increase in core damage frequency or risk, the increases should be small and consistent with the intent of the Commission's Safety Goal Policy Statement….

- The impact of the proposed change should be monitored using performance measurement strategies.

The STS applicable to the proposed changes are provided in NUREG-1431, "Standard Technical Specifications, Westinghouse Plants," Volume 1, Revision 4, "Specifications," and Volume 2, Revision 4, "Bases," dated April 2012 (ADAMS Accession Nos. ML12100A222 and ML12100A228, respectively).

3.0 TECHNICAL EVALUATION

Revising the frequency of a channel calibration, channel operational test, and trip actuating device operational test for an instrument channel under the SFCP requires assurance that component performance characteristics such as drift between each test will not result in undetected instrument errors that exceed the assumptions of the safety analysis and supporting instrument loop uncertainty calculations. These requirements are consistent with the methodology described in NEI 04-10, which is required by the SFCP. The SFCP does not permit changes to the TS allowable values or nominal trip setpoints but allows only the surveillance frequency to be changed when determined to be permissible by NEI 04-10. Therefore, prior to extending the test intervals for an instrument channel component or components associated with a given calibration step, the component performance characteristics must be evaluated to verify that the allowable value or nominal trip setpoint will still be valid and to establish a firm technical basis supporting the extension. In addition, each change must be reviewed by the licensee to ensure that the applicable uncertainty allowances are conservative (bounding) (e.g., sensor drift, rack drift, indicator drift). Documentation to support the changes shall be retained per the guidance in NEI 04-10.

Five key safety principles that must be evaluated before changing any surveillance frequency are identified in Section 3.0 of NEI 04-10. Principle 3 requires confirmation of the maintenance of sufficient safety margins, which, in this case, includes the performance of deterministic evaluations to verify the preservation of instrumentation trip setpoint and indication safety margins. The evaluation methodology specified in NEI 04-10 also requires the consideration of common cause failure effects and the monitoring of the instrument channel component performance following the frequency change to ensure that channel performance is consistent with the analysis to support an extended frequency.

The method of evaluating a proposed surveillance frequency change is not dependent on the number of components in the channel. Each step needs to be evaluated to determine the acceptable surveillance frequency for that step. The proposed change to permit changing the surveillance frequency of channel component(s) does not affect the test method or evaluation method. The requirement to perform a channel calibration, channel functional test, channel operational test, or trip actuating device operational test on the entire channel is not changed.

For example, an evaluation in accordance with NEI 04-10 may determine that a field sensor (e.g., a transmitter) should be calibrated every 48 months, that the rack modules should be calibrated every 30 months, and that the indicators should be calibrated every 24 months. Under the current TS requirements, all devices in the channel must be calibrated every 24 months. However, under the proposed change, sensors, rack modules, and indicators would be

calibrated at the appropriate frequency for the tested devices. As required by the channel calibration definition, the test would still encompass all devices in the channel required for channel operability.

The NEI 04-10 methodology is used to evaluate surveillance frequency changes to determine whether such SR extensions could be applied. Process elements are used to determine the cumulative risk impact of changes, update the PRA, and impose corrective actions, if needed, following implementation. Several steps are required by NEI 04-10, Step 7, to be evaluated prior to determining the acceptability of changes. These steps include history of surveillance tests, industry and plant-specific history, impact on defense-in-depth, vendor recommendations, required test frequencies for the applicable codes and standards, ensuring that the plant licensing basis would not be invalidated, and other factors. The NRC staff finds these measures acceptable in determining the SR extensions, consistent with its approval of the SFCP at Salem based on NEI 04-10.

In addition, Step 16 of Section 4.0 of NEI 04-10 requires an independent decisionmaking panel (IDP) to review the cumulative impact of all STI changes over time. This is also discussed in RGs 1.174 and 1.177. The IDP is composed of the site Maintenance Rule expert panel; surveillance test coordinator; and subject matter expert, who is a cognizant system manager or component engineer. Based on the above information, the NRC staff finds that the setpoint changes will be tracked in an acceptable manner.

Licensees with an SFCP may currently revise the surveillance frequency of instrumentation channels. The testing of these channels may be performed by means of any series of sequential, overlapping, or total channel steps. However, all required components in the instrumentation channel must be tested for the entire channel to be considered operable.

The NRC staff notes that industry practice is to perform instrument channel surveillances such as channel calibrations and channel functional tests using separate procedures based on the location of the components. Each of these procedures may be considered a “step.” The results of all of these procedures are used to satisfy the SRs using the existing allowance to perform it “by means of any series of sequential, overlapping, or total channel steps.” The proposed changes would allow for determining an acceptable surveillance frequency for each step.

The NRC staff notes that the NEI 04-10 methodology includes the determination of whether the structures, systems, and components (SSCs) affected by a proposed change to a surveillance frequency are modeled in the PRA. Where the SSCs are directly or implicitly modeled, a quantitative evaluation of the risk impact may be carried out. The methodology adjusts the failure probability of the impacted SSCs based on the proposed change to the surveillance frequency. Where the SSCs are not modeled in the PRA, bounding analyses are performed to characterize the impact of the proposed change to the surveillance frequency. Potential impacts on the risk analyses due to screening criteria and truncation levels are addressed by the requirements for PRA technical adequacy, consistent with the guidance contained in RG 1.200, and by sensitivity studies identified in NEI 04-10. The licensee is not proposing to change the methodology or the acceptance criteria for extending STIs, and the licensee will need to evaluate changes in the frequency for performing each of the steps in the instrumentation surveillance test per the methodology in NEI 04-10.

Therefore, the NRC staff concludes that the proposed change for the test frequency for individual steps within instrumentation channel surveillance tests is acceptable because any extended STIs will be developed within the established constraints of the SFCP and NEI 04-10.

The regulatory requirements in 10 CFR 50.36 are not specific regarding the frequency of performing surveillance tests. The proposed change only affects the frequency of performance and does not affect the surveillance testing method or acceptance criteria. Therefore, the proposed change is consistent with the surveillance testing requirements of 10 CFR 50.36.

PRA Acceptability

The guidance in RG 1.200 states that the quality of a licensee's PRA should be commensurate with the safety significance of the proposed TS change and the role the PRA plays in justifying the change. That is, the greater the change in risk or the greater the uncertainty in that risk as a result of the requested TS change, or both, the more rigor that should go into ensuring the quality of the PRA.

The NRC staff will perform an assessment of the PRA models used to support the approved SFCP that uses NEI 04-10, using the guidance of RG 1.200 to ensure that the PRA models are capable of determining the change in risk due to changes to surveillance frequencies of SSCs, using plant-specific data and models. Capability Category II of the NRC-endorsed PRA standard is the target capability level for supporting requirements for the internal events PRA for this application. Any identified deficiencies to those requirements are assessed further to determine any impacts to proposed decreases to surveillance frequencies, including the use of sensitivity studies where appropriate, in accordance with NEI 04-10.

The SFCP permits revising the surveillance frequency for instrumentation channels. The NRC staff evaluated whether NEI 04-10 can be applied to subsets in an instrument channel when the SFCP currently specifies a surveillance interval that is applied to the entire channel. The NRC staff notes that the current channel surveillance may be performed by means of any series of sequential, overlapping, or total channel steps. In practice, this means that a channel is divided into subsets and each subset is tested separately. Therefore, the current instrument channel testing is already composed of a sequence of individual tests.

The instrument function may be modeled in the PRA differently depending on the site and the function (e.g., channel may be modeled individually, subsets may be modeled, or the channel function may be modeled as a single entity). There are different steps through the evaluation methodology in NEI 04-10 that could be used based on the different PRA modeling approaches. The appropriate modeling of these different approaches is included in the NRC staff's review of the PRA modeling during its review of the application to implement an SFCP at Salem that uses NEI 04-10.

The licensee is using a PRA that was used to support its application to implement an SFCP at Salem that uses NEI 04-10. The amendments will change the capability of the licensee to change the surveillance frequency of an entire channel to now change the frequency of each subset of the channel. The NRC staff finds that changes to the surveillance frequency caused by defining and using individual, testable component subsets can be appropriately evaluated with the current SFCP and PRAs. The NRC staff finds that the risk-informed methodology review and PRA acceptability review performed during the review of the licensee's application to implement an SFCP at Salem that uses NEI 04-10 is adequate.

The NRC staff determined that the proposed changes to the TSs meet the standards for TSs in 10 CFR 50.36(b). The regulations in 10 CFR 50.36 require that TSs include items in specified categories, including SRs. The proposed changes modify the definitions applicable to

instrumentation channel components but do not alter the technical approach that was approved by the NRC in the licensee's application to implement an SFCP at Salem that uses NEI 04-10, and the TSs, as revised, continue to specify the appropriate SRs for tests and inspections to ensure that the necessary quality of affected SSCs is maintained.

Additionally, the changes to the TSs were reviewed and found to be technically clear and consistent with customary terminology and format in accordance with SRP Chapter 16.0. The NRC staff reviewed the proposed changes against the regulations and concludes that the changes continue to meet the requirements of 10 CFR 50.36(b), 10 CFR 50.36(c)(3), and 10 CFR 50.36(c)(5) for the reasons discussed above and, thus, provide reasonable assurance that the TSs will have the requisite requirements and controls to operate safely. Therefore, the NRC staff concludes that the proposed TS changes are acceptable.

3.1 Variations from TSTF-563

The licensee described variations from TSTF-563 in Section 2.2 of the license amendment request and as discussed in Section 2.2.1 of this safety evaluation. The licensee provided justifications for the proposed variations. The NRC staff reviewed the justifications and concluded that the variations are acceptable for the following reasons.

a) The Salem TSs utilize different numbering than the STS on which TSTF-563 is based. Specifically, definitions in the Salem TSs are in Section 1 versus Section 1.1 and the definitions are numbered. These differences are administrative and do not affect the applicability of TSTF-563 or the NRC staff's SE of TSTF-563 to the Salem TSs.

b) Despite the proposed elimination of the phrase "so that the entire channel is calibrated," the entire channel continues to be required to be calibrated because the original definition contains the phrase: "The CHANNEL CALIBRATION shall encompass the entire channel," which will remain in the proposed definition. This change does not change the applicability of TSTF-563 or the NRC staff's SE of TSTF-563 to the Salem TSs and is, therefore, acceptable.

c) The Salem TSs require performing a Channel Functional Test, which encompasses the Westinghouse STS Channel Operational Test and Trip Actuating Device Operational Test. The Channel Functional Test definition in the Salem TSs is similar to the B&W and BWR STS (NUREG-1430, NUREG-1433, and NUREG-1434) definitions. Adoption of the B&W and BWR STS definition is needed for consistency. This change does not change the applicability of TSTF-563 or the NRC staff's SE of TSTF-563 to the Salem TSs and is, therefore, acceptable.

d) Currently, the Salem TSs definition of Channel Calibration includes the channel functional test and permits performance of the channel calibration by means of any series of sequential, overlapping, or total channel steps. This provision was added to the STS in TSTF-205, "Revision of Channel Calibration, Channel Functional Test, and Related Definitions." The addition of the statement to allow a provision to perform the Channel Functional Test by means of any series of sequential, overlapping, or total channel steps is necessary to maintain consistency between the definitions of Channel Calibration and Channel Functional Test. The addition of this sentence allows the adoption of TSTF-563 and does not change the requirements of the channel calibration and channel functional test. This addition does not change

the applicability of TSTF-563 or the NRC staff's SE of TSTF-563 to the Salem TSs and is, therefore, acceptable.

e) Salem Unit Nos. 1 and 2 were not licensed to the 10 CFR Part 50, Appendix A, GDC but were licensed to the applicable AEC proposed general design criteria. TSTF-563 references 10 CFR Part 50, Appendix A, GDC 13 and 21. The licensee provided a GDC comparison to the AEC proposed criteria as discussed in Section 2.2.1 of this safety evaluation. The licensee stated that Salem will remain in compliance with the applicable AEC proposed criteria. These differences do not affect the applicability of TSTF-563 or the NRC staff's SE of TSTF-563 to the Salem TSs and are, therefore, acceptable.

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 August 13, 2019. 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, as published in the *Federal Register* (84 FR 23078; May 21, 2019), 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.

Principal Contributor: T. Sweat

Date: January 14, 2020

SUBJECT: SALEM NUCLEAR GENERATING STATION, UNIT NOS. 1 AND 2 – ISSUANCE OF AMENDMENT NOS. 331 AND 312 RE: REVISE TECHNICAL SPECIFICATIONS TO ADOPT TSTF-563, REVISION 0, "REVISE INSTRUMENT TESTING DEFINITIONS TO INCORPORATE THE SURVEILLANCE FREQUENCY CONTROL PROGRAM" (EPID L-2019-LLA-0074) DATED JANUARY 14, 2020

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ADAMS Accession No.: ML19330F156 *by memorandum **by e-mail

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