



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

April 21, 2021

Mrs. Maria L. Lacal  
Executive Vice President/  
Chief Nuclear Officer  
Mail Station 7605  
Arizona Public Service Company  
P.O. Box 52034  
Phoenix, AZ 85072-2034

**SUBJECT: PALO VERDE NUCLEAR GENERATING STATION, UNITS 1, 2,  
AND 3 - ISSUANCE OF AMENDMENT NOS. 215, 215, AND 215 REGARDING  
REVISION TO TECHNICAL SPECIFICATIONS TO ADOPT TSTF-563,  
REVISION 0, "REVISE INSTRUMENT TESTING DEFINITIONS TO  
INCORPORATE THE SURVEILLANCE FREQUENCY CONTROL PROGRAM"  
(EPID L-2020-LLA-0144)**

Dear Mrs. Lacal:

The U.S. Nuclear Regulatory Commission (NRC, the Commission) has issued the enclosed Amendment Nos. 215, 215, and 215, to Renewed Facility Operating License Nos. NPF-41, NPF-51, and NPF-74 for the Palo Verde Nuclear Generating Station (Palo Verde), Units 1, 2, and 3, respectively. The amendments consist of changes to the technical specifications (TSs) in response to your application dated July 1, 2020.

The amendments change the TSs to 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 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. The NRC issued a final safety evaluation approving TSTF-563, Revision 0, on December 4, 2018.

A copy of the related Safety Evaluation is also enclosed. Notice of Issuance will be included in the Commission's monthly *Federal Register* notice.

Sincerely,

**/RA/**

Siva P. Lingam, Project Manager  
Plant Licensing Branch IV  
Division of Operating Reactor Licensing  
Office of Nuclear Reactor Regulation

Docket Nos. STN 50-528, STN 50-529,  
and STN 50-530

Enclosures:

1. Amendment No. 215 to NPF-41
2. Amendment No. 215 to NPF-51
3. Amendment No. 215 to NPF-74
4. Safety Evaluation

cc: Listserv



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

ARIZONA PUBLIC SERVICE COMPANY, ET AL.

DOCKET NO. STN 50-528

PALO VERDE NUCLEAR GENERATING STATION, UNIT 1

AMENDMENT TO RENEWED FACILITY OPERATING LICENSE

Amendment No. 215  
License No. NPF-41

1. The Nuclear Regulatory Commission (the Commission) has found that:
  - A. The application for amendment by the Arizona Public Service Company (APS or the licensee) on behalf of itself and the Salt River Project Agricultural Improvement and Power District, El Paso Electric Company, Southern California Edison Company, Public Service Company of New Mexico, Los Angeles Department of Water and Power, and Southern California Public Power Authority dated July 1, 2020, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act) and the Commission's 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. NPF-41 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. 215, and the Environmental Protection Plan contained in Appendix B, are hereby incorporated into this renewed operating license. APS shall operate the facility in accordance with the Technical Specifications and the Environmental Protection Plan, except where otherwise stated in specific license conditions.

3. This license amendment is effective as of the date of issuance and shall be implemented within 90 days of the date of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

Jennifer L. Dixon-Herrity, Chief  
Plant Licensing Branch IV  
Division of Operating Reactor Licensing  
Office of Nuclear Reactor Regulation

Attachment:  
Changes to Renewed Facility  
Operating License No. NPF-41  
and the Technical Specifications

Date of Issuance: April 21, 2021



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

ARIZONA PUBLIC SERVICE COMPANY, ET AL.

DOCKET NO. STN 50-529

PALO VERDE NUCLEAR GENERATING STATION, UNIT 2

AMENDMENT TO RENEWED FACILITY OPERATING LICENSE

Amendment No. 215  
License No. NPF-51

1. The Nuclear Regulatory Commission (the Commission) has found that:
  - A. The application for amendment by the Arizona Public Service Company (APS or the licensee) on behalf of itself and the Salt River Project Agricultural Improvement and Power District, El Paso Electric Company, Southern California Edison Company, Public Service Company of New Mexico, Los Angeles Department of Water and Power, and Southern California Public Power Authority dated July 1, 2020, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act) and the Commission's 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. NPF-51 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. 215, and the Environmental Protection Plan contained in Appendix B, are hereby incorporated into this renewed operating license. APS shall operate the facility in accordance with the Technical Specifications and the Environmental Protection Plan, except where otherwise stated in specific license conditions.

3. This license amendment is effective as of the date of issuance and shall be implemented within 90 days of the date of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

Jennifer L. Dixon-Herrity, Chief  
Plant Licensing Branch IV  
Division of Operating Reactor Licensing  
Office of Nuclear Reactor Regulation

Attachment:  
Changes to Renewed Facility  
Operating License No. NPF-51  
and the Technical Specifications

Date of Issuance: April 21, 2021



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

ARIZONA PUBLIC SERVICE COMPANY, ET AL.

DOCKET NO. STN 50-530

PALO VERDE NUCLEAR GENERATING STATION, UNIT 3

AMENDMENT TO RENEWED FACILITY OPERATING LICENSE

Amendment No. 215  
License No. NPF-74

1. The Nuclear Regulatory Commission (the Commission) has found that:
  - A. The application for amendment by the Arizona Public Service Company (APS or the licensee) on behalf of itself and the Salt River Project Agricultural Improvement and Power District, El Paso Electric Company, Southern California Edison Company, Public Service Company of New Mexico, Los Angeles Department of Water and Power, and Southern California Public Power Authority dated July 1, 2020, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act) and the Commission's 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. NPF-74 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. 215, and the Environmental Protection Plan contained in Appendix B, are hereby incorporated into this renewed operating license. APS shall operate the facility in accordance with the Technical Specifications and the Environmental Protection Plan, except where otherwise stated in specific license conditions.

3. This license amendment is effective as of the date of issuance and shall be implemented within 90 days of the date of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

Jennifer L. Dixon-Herrity, Chief  
Plant Licensing Branch IV  
Division of Operating Reactor Licensing  
Office of Nuclear Reactor Regulation

Attachment:  
Changes to Renewed Facility  
Operating License No. NPF-74  
and the Technical Specifications

Date of Issuance: April 21, 2021



ATTACHMENT TO LICENSE AMENDMENT NOS. 215, 215, AND 215 TO  
RENEWED FACILITY OPERATING LICENSE NOS. NPF-41, NPF-51, AND NPF-74  
PALO VERDE NUCLEAR GENERATING STATION, UNITS 1, 2, AND 3  
DOCKET NOS. STN 50-528, STN 50-529, AND STN 50-530

Replace the following pages of Renewed Facility Operating License Nos. NPF-41, NPF-51, and NPF-74, and the Appendix A Technical Specifications with the attached revised pages. The revised pages are identified by amendment number and contain marginal lines indicating the areas of change.

Renewed Facility Operating License No. NPF-41

REMOVE  
5

INSERT  
5

Renewed Facility Operating License No. NPF-51

REMOVE  
6

INSERT  
6

Renewed Facility Operating License No. NPF-74

REMOVE  
4

INSERT  
4

Technical Specifications

REMOVE  
1.1-2

INSERT  
1.1-2

(1) Maximum Power Level

Arizona Public Service Company (APS) is authorized to operate the facility at reactor core power levels not in excess of 3990 megawatts thermal (100% power), in accordance with the conditions specified herein.

(2) Technical Specifications and Environmental Protection Plan

The Technical Specifications contained in Appendix A, as revised through Amendment No. 215, and the Environmental Protection Plan contained in Appendix B, are hereby incorporated into this renewed operating license. APS shall operate the facility in accordance with the Technical Specifications and the Environmental Protection Plan, except where otherwise stated in specific license conditions.

(3) Antitrust Conditions

This renewed operating license is subject to the antitrust conditions delineated in Appendix C to this renewed license.

(4) Operating Staff Experience Requirements

Deleted

(5) Post-Fuel-Loading Initial Test Program (Section 14, SER and SSER 2)\*

Deleted

(6) Environmental Qualification

Deleted

(7) Fire Protection Program

APS shall implement and maintain in effect all provisions of the approved fire protection program as described in the Final Safety Analysis Report for the facility, as supplemented and amended, and as approved in the SER through Supplement 11, subject to the following provision:

APS may make changes to the approved fire protection program without prior approval of the Commission only if those changes would not adversely affect the ability to achieve and maintain safe shutdown in the event of a fire.

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\* The parenthetical notation following the title of many license conditions denotes the section of the Safety Evaluation Report and/or its supplements wherein the license condition is discussed.

(1) Maximum Power Level

Arizona Public Service Company (APS) is authorized to operate the facility at reactor core power levels not in excess of 3990 megawatts thermal (100% power) in accordance with the conditions specified herein.

(2) Technical Specifications and Environmental Protection Plan

The Technical Specifications contained in Appendix A, as revised through Amendment No. 215, and the Environmental Protection Plan contained in Appendix B, are hereby incorporated into this renewed operating license. APS shall operate the facility in accordance with the Technical Specifications and the Environmental Protection Plan, except where otherwise stated in specific license conditions.

(3) Antitrust Conditions

This renewed operating license is subject to the antitrust conditions delineated in Appendix C to this renewed operating license.

(4) Operating Staff Experience Requirements (Section 13.1.2, SSER 9)\*

Deleted

(5) Initial Test Program (Section 14, SER and SSER 2)

Deleted

(6) Fire Protection Program

APS shall implement and maintain in effect all provisions of the approved fire protection program as described in the Final Safety Analysis Report for the facility, as supplemented and amended, and as approved in the SER through Supplement 11, subject to the following provision:

APS may make changes to the approved fire protection program without prior approval of the Commission only if those changes would not adversely affect the ability to achieve and maintain safe shutdown in the event of a fire.

(7) Inservice Inspection Program (Sections 5.2.4 and 6.6, SER and SSER 9)

Deleted

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\*The parenthetical notation following the title of many license conditions denotes the section of the Safety Evaluation Report and/or its supplements wherein the license condition is discussed.

- (4) Pursuant to the Act and 10 CFR Part 30, 40, and 70, APS to receive, possess, and use in amounts 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
  - (5) Pursuant to the Act and 10 CFR Parts 30, 40, and 70, APS to possess, but not separate, such byproduct and special nuclear materials as may be produced by the operation of the facility.
- C. This renewed operating 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

Arizona Public Service Company (APS) is authorized to operate the facility at reactor core power levels not in excess of 3990 megawatts thermal (100% power), in accordance with the conditions specified herein.
  - (2) Technical Specifications and Environmental Protection Plan

The Technical Specifications contained in Appendix A, as revised through Amendment No. 215, and the Environmental Protection Plan contained in Appendix B, are hereby incorporated into this renewed operating license. APS shall operate the facility in accordance with the Technical Specifications and the Environmental Protection Plan, except where otherwise stated in specific license conditions.
  - (3) Antitrust Conditions

This renewed operating license is subject to the antitrust conditions delineated in Appendix C to this renewed operating license.
  - (4) Initial Test Program (Section 14, SER and SSER 2)

Deleted
  - (5) Additional Conditions

The Additional Conditions contained in Appendix D, as revised through Amendment No. 212, are hereby incorporated into this renewed operating license. The licensee shall operate the facility in accordance with the Additional Conditions.

## 1.1 Definitions

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### CHANNEL CALIBRATION (continued)

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

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

### CHANNEL FUNCTIONAL TEST

A CHANNEL FUNCTIONAL TEST shall be:

- a. Analog and bistable channels – the injection of a simulated or actual signal into the channel as close to the sensor as practicable to verify OPERABILITY, including required alarms, interlocks, display and trip functions;
- b. Digital computer channels – the use of diagnostic programs to test digital computer hardware and the injection of simulated process data into the channel to verify OPERABILITY, including alarm and 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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(continued)



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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NOS. 215, 215, AND 215 TO RENEWED

FACILITY OPERATING LICENSE NOS. NPF-41, NPF-51, AND NPF-74

ARIZONA PUBLIC SERVICE COMPANY, ET AL.

PALO VERDE NUCLEAR GENERATING STATION, UNITS 1, 2, AND 3

DOCKET NOS. STN 50-528, STN 50-529, AND STN 50-530

1.0 INTRODUCTION

By letter dated July 1, 2020 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML20183A460), Arizona Public Service Company (the licensee) submitted a license amendment request (LAR) to revise the technical specifications (TSs) for Palo Verde Nuclear Generating Station (Palo Verde, PVNGS), Units 1, 2 and 3.

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 changes to the TSs 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), for Palo Verde, Units 1, 2, and 3. The U.S. Nuclear Regulatory Commission (NRC) issued a final safety evaluation (SE) approving TSTF-563, Revision 0, on December 4, 2018 (ADAMS Accession No. ML18333A152).

A Surveillance Frequency Control Program (SFCP) was incorporated into the Palo Verde, Units 1, 2, and 3 TSs by Amendment Nos. 188, 188, and 188, respectively, by letter dated December 15, 2011 (ADAMS Accession No. ML112620293).

The licensee has proposed variations from the TS changes described in TSTF-563 in its letter dated July 1, 2020. The variations are described in Section 2.2.1 of this SE and evaluated in Section 3.1 of this SE.

## 2.0 REGULATORY EVALUATION

### 2.1 Description of 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. Prior amendments approved by the NRC on December 15, 2011, revised the Palo Verde, Units 1, 2, and 3 TSs to relocate all periodic surveillance frequencies to a licensee-controlled program. 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 applies 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 makeup 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 extends 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 will 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 changes to the channel calibration definition. Changes are shown in ***bold italics***:

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 in-place qualitative assessment of sensor behavior and normal calibration of the remaining adjustable devices in the channel. Whenever a sensing element is replaced, the next required CHANNEL CALIBRATION shall include an in-place 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.***

The following paragraph denotes the changes to the channel functional test definition. Changes are shown in ***bold italics***:

...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 changes would revise the definitions above 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 will allow each component to be tested at the appropriate frequency based on the component's long-term performance characteristics.

The proposed changes would also allow the licensee to control the frequency of associated components being tested in each step. The SR for the overall instrumentation channel remains unchanged. The proposed change would have no effect on the design, fabrication, use, or methods of testing, of the instrumentation channels, and will 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 type] 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 PVNGS TS are different from Revision 4 of the Combustion Engineering (CE) Plant STS [Standard Technical Specifications] (NUREG-1432 [Revision 4.0, "Standard Technical Specifications,



Combustion Engineering Plants,” Volume 1, “Specifications,” and Volume 2, “Bases,” dated April 2012 (ADAMS Accession Nos. ML12102A165 and ML12102A169, respectively)) on which TSTF-563 is based. The definition of Channel Calibration has wording differences from the STS definition that do not change the intent. The PVNGS TS Channel Calibration definition states, “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.” The STS states, “The CHANNEL CALIBRATION may be performed by means of any series of sequential, overlapping, or total channel steps.” Elimination of the phrase “so that the entire channel is calibrated” has no effect because the definition previously states that the Channel Calibration must encompass the entire channel, including the required sensor, alarm, display, and trip functions.

- b) The PVNGS TS are different from Revision 4 of the CE Plant STS (NUREG-1432) on which TSTF-563 is based. The definition of Channel Functional Test has wording differences from the STS definition that do not change the intent. The PVNGS TS Channel Functional Test definition states, “The CHANNEL FUNCTIONAL TEST may be performed by means of any series of sequential, overlapping or total channel steps so that the entire channel is tested.” The STS states, “The CHANNEL FUNCTIONAL TEST may be performed by means of any series of sequential, overlapping, or total channel steps.” Elimination of the phrase “so that the entire channel is tested” has no effect because the definition of Channel Functional Test requires verification of Operability. The definition of OPERABILITY includes all necessary attendant instrumentation, controls, and other auxiliary equipment that are required for the system, subsystem, train, component, or device to perform its specified safety function(s), which is equivalent to the language, “all devices in the channel.” Therefore, PVNGS will continue to test each of the devices in the channel.

### 2.3 Applicable Regulatory Requirements and Guidance

Title 10 of the *Code of Federal Regulations* (10 CFR) Section 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) requires:

Each license authorizing operation of a production or utilization facility of a type described in § 50.21 or § 50.22 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 § 50.34 [“Contents of applications; technical information”]. 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 [LCOs] will be met.”

Prior Palo Verde amendments approved by the NRC on December 15, 2011, replaced specific surveillance frequencies with references to a SFCP required by TS 5.5.18. TS 5.5.18 requires the licensee to establish, implement, and maintain, an SFCP to ensure that TS SRs are performed at intervals listed in, and controlled by, the SFCP. TS 5.5.18 also requires that changes to the surveillance frequencies listed in the SFCP be made in accordance with 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,” dated April 2007 (ADAMS Accession No. ML071360456).

Topical Report (TR) NEI 04-10, Revision 1, 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, manufacturers’ 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 for 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,” of NUREG-0800, “Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants: LWR [Light-Water Reactor] Edition” (SRP), dated March 2010 (ADAMS Accession No. ML100351425). 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 reference 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,” dated May 2011 (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,” dated May 2011 (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,” dated March 2009 (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 explicitly relates to a requested exemption or rule change.
- 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 risk associated with core damage frequency or large early release frequency, the increase(s) 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-1432.

### 3.0 TECHNICAL EVALUATION

#### 3.1 Review of the Proposed Changes

Revising the frequency of a channel calibration and channel functional test 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 TR 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 permissible by TR 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 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 the applicable uncertainty allowances are conservative (bounding) (e.g., sensor drift, rack drift, indicator drift). Documentation to support the changes can be retained per the guidance in TR NEI 04-10.

Five key safety principles that must be evaluated before changing any surveillance frequency are identified in Section 3.0 of TR NEI 04-10. Principle 3 requires confirmation of the

maintenance of safety margins, which, in this case, includes performance of deterministic evaluations to verify preservation of instrumentation trip setpoint and indication safety margins.

The evaluation methodology specified in TR NEI 04-10 also requires consideration of common-cause failure effects and 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 or channel functional test on the entire channel is not changed.

For example, an evaluation in accordance with TR 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.

Per TS 5.5.18, TR NEI 04-10 methodology must be used to evaluate surveillance frequency changes to determine if 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 TR NEI 04-10, Section 4.0, 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 plant licensing basis would not be invalidated and other factors. The NRC staff finds these measures acceptable in determining the SR extensions.

In addition, TR NEI 04-10, Section 4.0, Step 16, requires an independent decisionmaking panel to review the cumulative impact of all STI changes over a period of time. This is also specified by RGs 1.174 and 1.177. The independent decisionmaking panel 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, 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 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 SSC is 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 SSC is 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 TR NEI 04-10. The licensee is not proposing to change the methodology, or the acceptance criteria for extending STIs, and licensee will need to evaluate changes in the frequency for performing each of the steps in the instrumentation surveillance test per the methodology in TR NEI 04-10.

Therefore, the NRC staff concludes that the proposed change to determine 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 TR 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.

### 3.2 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 has performed an assessment of the PRA models used to support the approved SFCP that uses TR NEI 04-10, using the guidance of RG 1.200 to assure 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 TR NEI 04-10.

The SFCP permits revising of the surveillance frequency for instrumentation channels. The NRC staff evaluated whether TR 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 TR 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 the review of the application to implement an SFCP that uses TR NEI 04-10.

The PRA in use at Palo Verde is the same as that used to support the license amendments that authorized the SFCP and follows TR NEI 04-10. Currently, the TSs allow the licensee to change the surveillance frequency of an entire channel under the SFCP. The proposed amendments would allow the licensee to change the surveillance 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 the current PRAs. The NRC staff also finds that the risk-informed methodology review and the PRA acceptability review that were performed during the review of the application for amendments authorizing the SFCP that uses TR NEI 04-10 are adequate.

The regulations at 10 CFR 50.36(c)(3) 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 previously approved technical approach in TR NEI 04-10. Thus, the TSs, as revised, continue to specify the appropriate SRs for tests and inspections to ensure the necessary quality of affected SSCs is maintained, ensure facility operation within safety limits, and ensure LCOs are met.

Additionally, the NRC staff finds the proposed TS changes 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 Section 50.36(c)(3) of 10 CFR, for the reasons discussed above, and thus provide reasonable assurance that the revised TSs provide the requisite requirements and controls for the facility to operate safely. Therefore, the NRC staff concludes that the proposed TS changes are acceptable.

### 3.3 Variations From TSTF-563

The licensee described variations from TSTF-563 in Section 2.2 of the LAR. The licensee proposed to eliminate the phrase, "so that the entire channel is calibrated," from the CHANNEL CALIBRATION definition. The NRC staff reviewed the variation to the CHANNEL CALIBRATION definition and determined that it is acceptable because the requirement to perform a channel calibration on the entire channel is still maintained. The CHANNEL CALIBRATION definition previously states that the Channel Calibration must encompass the entire channel, including the required sensor, alarm, display, and trip functions. This statement will remain in the definition; therefore, the variation has no effect on the requirement to calibrate the entire channel.

The licensee proposed to eliminate the phrase, "so that the entire channel is tested," from the CHANNEL FUNCTIONAL TEST definition. The NRC staff reviewed the variation to the CHANNEL FUNCTIONAL TEST definition and determined that it is acceptable because the requirement to perform a channel functional test on the entire channel is still maintained. The licensee stated in the LAR that, "Elimination of the phrase "so that the entire channel is tested"

has no effect because the definition of Channel Functional Test requires verification of Operability. The definition of OPERABILITY includes all necessary attendant instrumentation, controls, and other auxiliary equipment that are required for the system, subsystem, train, component, or device to perform its specified safety function(s), which is equivalent to the language, "all devices in the channel." Therefore, Palo Verde will continue to test each of the devices in the channel."

The CHANNEL FUNCTIONAL TEST definition states that the test verifies the OPERABILITY of analog, bistable, and digital computer channels. The definition also states that this includes required alarms, interlocks, and display and trip functions. As stated above, the definition of OPERABILITY includes all necessary instrumentation and controls that are required for the system, subsystem, train, component or device to perform its specified safety function(s). Therefore, the requirement to test the entire channel will be maintained.

#### 4.0 STATE CONSULTATION

In accordance with the Commission's regulations, the Arizona State official was notified of the proposed issuance of the amendments on April 8, 2021. The State official had no comments.

#### 5.0 ENVIRONMENTAL CONSIDERATION

The amendments change requirements with respect to 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 25, 2020 (85 FR 52372), 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, NRR

Date: April 21, 2021

SUBJECT: PALO VERDE NUCLEAR GENERATING STATION, UNITS 1, 2,  
AND 3 - ISSUANCE OF AMENDMENT NOS. 215, 215, AND 215 REGARDING  
REVISION TO TECHNICAL SPECIFICATIONS TO ADOPT TSTF-563,  
REVISION 0, "REVISE INSTRUMENT TESTING DEFINITIONS TO  
INCORPORATE THE SURVEILLANCE FREQUENCY CONTROL PROGRAM"  
(EPID L-2020-LLA-0144) DATED APRIL 21, 2021

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