



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

February 8, 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. 214, 214, and 214 TO MAKE
ADMINISTRATIVE CHANGES TO THE TECHNICAL SPECIFICATIONS
(EPID L-2020-LLA-0189)**

Dear Mrs. Lacal:

The U.S. Nuclear Regulatory Commission (the Commission) has issued the enclosed Amendment Nos. 214, 214, and 214, 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 various changes to the Technical Specifications (TSs) in response to your application dated August 21, 2020.

The amendments modify the TSs by making the following administrative changes:

1. Surveillance Requirement 3.1.5.3: Removal of a one-time use Note for Palo Verde Unit 2 Control Element Assembly Number 88.
2. TS 3.7.17, "Spent Fuel Assembly Storage"; TS 4.3, "Fuel Storage"; and TS 5.5.21, "Spent Fuel Storage Rack Neutron Absorber Monitoring Program": Removal of no longer applicable pages related to the implementation of Amendment No. 203, which addressed a revised spent fuel pool criticality analysis.
3. TS 4.1, "Site Location": Removal of extraneous information from the site location description.
4. TS 5.5.2, "Primary Coolant Sources Outside Containment": Removal of the remaining post-accident sampling subsystem reference.
5. TS 5.7, "High Radiation Area": Modification of radiation protection terminology to match industry standards.

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. 214 to NPF-41
2. Amendment No. 214 to NPF-51
3. Amendment No. 214 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. 214
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 August 21, 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. 214, 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: February 8, 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. 214
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 August 21, 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. 214, 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: February 8, 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. 214
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 August 21, 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. 214, 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: February 8, 2021

ATTACHMENT TO LICENSE AMENDMENT NOS. 214, 214, AND 214 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

<u>REMOVE</u>	<u>INSERT</u>	<u>REMOVE</u>	<u>INSERT</u>
3.1.5-3	3.1.5-3	3.7.17-6a	---
3.7.17-1	3.7.17-1	---	3.7.17-7
3.7.17-1a	---	3.7.17-7a	---
3.7.17-2	3.7.17-2	4.0-1	4.0-1
3.7.17-2a	---	4.0-2	4.0-2
3.7.17-3	3.7.17-3	4.0-2a	---
3.7.17-3a	---	4.0-3	4.0-3
3.7.17-4	3.7.17-4	4.0-3a	---
3.7.17-4a	---	5.5-2	5.5-2
---	3.7.17-5	5.5-22	5.5-22
3.7.17-5a	---	5.7-1	5.7-1
---	3.7.17-6	5.7-2	5.7-2

(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. 214, 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.

* 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. 214, 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

*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. 214, 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.

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.1.5.1	Verify the indicated position of each full strength and part strength CEA is within 6.6 inches of all other CEAs in its group.	In accordance with the Surveillance Frequency Control Program
SR 3.1.5.2	Verify that, for each CEA, its OPERABLE CEA position indicator channels indicate within 5.2 inches of each other.	In accordance with the Surveillance Frequency Control Program
SR 3.1.5.3	Verify full strength CEA freedom of movement (trippability) by moving each individual full strength CEA that is not fully inserted in the core at least 5 inches.	In accordance with the Surveillance Frequency Control Program
SR 3.1.5.4	Perform a CHANNEL FUNCTIONAL TEST of each reed switch position transmitter channel.	In accordance with the Surveillance Frequency Control Program
SR 3.1.5.5	Verify each full strength CEA drop time ≤ 4.0 seconds.	Prior to reactor criticality, after each removal of the reactor head

3.7 PLANT SYSTEMS

3.7.17 Spent Fuel Assembly Storage

LCO 3.7.17 The combination of initial enrichment, burnup, and decay time of each fuel assembly shall be in compliance with the requirements specified in Tables 3.7.17-1 through 3.7.17-5.

APPLICABILITY: Whenever any fuel assembly is stored in the fuel storage pool.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. Requirements of the LCO not met.	<p>A.1</p> <p>-----NOTE----- LCO 3.0.3 is not applicable. -----</p> <p>Initiate action to move the noncomplying fuel assembly into an appropriate region.</p>	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
<p>SR 3.7.17.1</p> <p>Verify by administrative means the initial enrichment, burnup, and decay time of the fuel assembly is in accordance with Tables 3.7.17-1 through 3.7.17-5, Figure 3.7.17-1, and Specification 4.3.1.1.</p>	Prior to storing the fuel assembly in the fuel storage pool.

Table 3.7.17-1

Fuel Regions Ranked by Reactivity	
Fuel Region 1	Highest Reactivity (See Note 2)
Fuel Region 2	
Fuel Region 3	
Fuel Region 4	
Fuel Region 5	
Fuel Region 6	Lowest Reactivity
Notes: <ol style="list-style-type: none">1. Fuel Regions are defined by assembly average burnup, initial enrichment¹ and decay time as provided by Table 3.7.17-2 through Table 3.7.17-5.2. Fuel Regions are ranked in order of decreasing reactivity, e.g., Fuel Region 2 is less reactive than Fuel Region 1, etc.3. Fuel Region 1 contains fuel with an initial maximum radially averaged enrichment up to 4.65 wt% ²³⁵U. No burnup is required.4. Fuel Region 2 contains fuel with an initial maximum radially averaged enrichment up to 4.65 wt% ²³⁵U with at least 16.0 GWd/MTU of burnup.5. Fuel Regions 3 through 6 are determined from the minimum burnup (BU) equation and coefficients provided in Tables 3.7.17-2 through 3.7.17-5.6. Assembly storage is controlled through the storage arrays defined in Figure 3.7.17-1.7. Each storage cell in an array can only be populated with assemblies of the Fuel Region defined in the array definition or a lower reactivity Fuel Region.	

¹Initial Enrichment is the nominal ²³⁵U enrichment of the central zone region of fuel, excluding axial blankets, prior to reduction in ²³⁵U content due to fuel depletion. If the fuel assembly contains axial regions of different ²³⁵U enrichment values, such as axial blankets, the maximum initial enrichment value is to be utilized.

Table 3.7.17-2

Fuel Region 3: Burnup Requirement Coefficients				
Decay Time (yr.)	Coefficients			
	A ₁	A ₂	A ₃	A ₄
0	-0.8100	6.5551	-2.9050	-21.0499
5	-0.9373	7.6381	-6.0246	-18.0299
10	-0.8706	6.8181	-3.1913	-21.0299
15	-0.7646	5.6311	0.7657	-25.1599
20	-0.7233	5.1651	2.3084	-26.7499
<p>Notes:</p> <ol style="list-style-type: none"> 1. Relevant uncertainties are explicitly included in the criticality analysis. For instance, no additional allowance for burnup uncertainty or enrichment uncertainty is required. For a fuel assembly to meet the requirements of a Fuel Region, the assembly burnup must exceed the “minimum burnup” (GWd/MTU) given by the curve fit for the assembly “decay time” and “initial enrichment.” The specific minimum burnup (BU) required for each fuel assembly is calculated from the following equation: $BU = A_1 * En^3 + A_2 * En^2 + A_3 * En + A_4$ <ol style="list-style-type: none"> 2. Initial enrichment, En, is the maximum radial average ²³⁵U enrichment. Any En value between 2.50 wt% ²³⁵U and 4.65 wt% ²³⁵U may be used. Burnup credit is not required for an En below 2.50 wt% ²³⁵U. 3. It is acceptable to linearly interpolate between calculated BU limits based on decay time. 4. The 20-year coefficients must be used to calculate the minimum BU for an assembly with a decay time of greater than 20 years. 				

Table 3.7.17-3

Fuel Region 4: Burnup Requirement Coefficients				
Decay Time (yr.)	Coefficients			
	A ₁	A ₂	A ₃	A ₄
0	0.0333	-2.1141	27.4985	-41.8258
5	-0.2105	0.2472	19.7919	-34.2641
10	0.0542	-2.5298	28.0953	-41.7092
15	0.3010	-5.0718	35.6966	-48.5494
20	0.4829	-6.9436	41.3118	-53.6182
<p>Notes:</p> <ol style="list-style-type: none">1. Relevant uncertainties are explicitly included in the criticality analysis. For instance, no additional allowance for burnup uncertainty or enrichment uncertainty is required. For a fuel assembly to meet the requirements of a Fuel Region, the assembly burnup must exceed the “minimum burnup” (GWd/MTU) given by the curve fit for the assembly “decay time” and “initial enrichment.” The specific minimum burnup (BU) required for each fuel assembly is calculated from the following equation: $BU = A_1 * En^3 + A_2 * En^2 + A_3 * En + A_4$2. Initial enrichment, En, is the maximum radial average ²³⁵U enrichment. Any En value between 1.75 wt% ²³⁵U and 4.65 wt% ²³⁵U may be used. Burnup credit is not required for an En below 1.75 wt% ²³⁵U.3. It is acceptable to linearly interpolate between calculated BU limits based on decay time.4. The 20-year coefficients must be used to calculate the minimum BU for an assembly with a decay time of greater than 20 years.				

Table 3.7.17-4

Fuel Region 5: Burnup Requirement Coefficients				
Decay Time (yr.)	Coefficients			
	A ₁	A ₂	A ₃	A ₄
0	0.1586	-3.0177	28.7074	-39.8636
5	-0.2756	1.3433	14.5578	-26.4388
10	-0.2897	1.3218	14.6176	-26.4160
15	-0.0736	-0.9107	21.2118	-32.1887
20	0.1078	-2.7684	26.6911	-36.9873
<p>Notes:</p> <ol style="list-style-type: none"> 1. Relevant uncertainties are explicitly included in the criticality analysis. For instance, no additional allowance for burnup uncertainty or enrichment uncertainty is required. For a fuel assembly to meet the requirements of a Fuel Region, the assembly burnup must exceed the “minimum burnup” (GWd/MTU) given by the curve fit for the assembly “decay time” and “initial enrichment.” The specific minimum burnup (BU) required for each fuel assembly is calculated from the following equation: $BU = A_1 * En^3 + A_2 * En^2 + A_3 * En + A_4$ <ol style="list-style-type: none"> 2. Initial enrichment, En, is the maximum radial average ²³⁵U enrichment. Any En value between 1.65 wt% ²³⁵U and 4.65 wt% ²³⁵U may be used. Burnup credit is not required for an En below 1.65 wt% ²³⁵U. 3. It is acceptable to linearly interpolate between calculated BU limits based on decay time. 4. The 20-year coefficients must be used to calculate the minimum BU for an assembly with a decay time of greater than 20 years. 				

Table 3.7.17-5

Fuel Region 6: Burnup Requirement Coefficients				
Decay Time (yr.)	Coefficients			
	A₁	A₂	A₃	A₄
0	0.4890	-6.7447	42.7619	-49.3143
5	0.5360	-6.9115	41.1003	-46.6977
10	0.4779	-6.1841	37.6389	-43.0309
15	0.4575	-5.8844	35.8656	-41.0274
20	0.3426	-4.7050	31.8126	-37.2800
<p>Notes:</p> <ol style="list-style-type: none"> 1. Relevant uncertainties are explicitly included in the criticality analysis. For instance, no additional allowance for burnup uncertainty or enrichment uncertainty is required. For a fuel assembly to meet the requirements of a Fuel Region, the assembly burnup must exceed the “minimum burnup” (GWd/MTU) given by the curve fit for the assembly “decay time” and “initial enrichment.” The specific minimum burnup (BU) required for each fuel assembly is calculated from the following equation: $BU = A_1 * En^3 + A_2 * En^2 + A_3 * En + A_4$ 2. Initial enrichment, En, is the maximum radial average ²³⁵U enrichment. Any En value between 1.45 wt% ²³⁵U and 4.65 wt% ²³⁵U may be used. Burnup credit is not required for an En below 1.45 wt% ²³⁵U. 3. It is acceptable to linearly interpolate between calculated BU limits based on decay time. 4. The 20-year coefficients must be used to calculate the minimum BU for an assembly with a decay time of greater than 20 years. 				

Figure 3.7.17-1
Allowable Storage Arrays

Array A Two Region 1 assemblies (1) checkerboarded with two blocked cells (X). The Region 1 assemblies are each in a cell with a stainless steel L-insert. No NETCO-SNAP-IN® inserts are credited.	1	X
	X	1
Array B Two Region 1 assemblies (1) checkerboarded with two cells containing trash cans (TC). The Region 1 assemblies are each in a cell with a stainless steel L-insert. Every cell without a stainless steel L-insert must contain a NETCO-SNAP-IN® insert.	1	TC
	TC	1
Array C Two Region 2 assemblies (2) checkerboarded with one Region 3 assembly (3) and one blocked cell (X). The Region 2 assemblies are each in a cell with a stainless steel L-insert. The Region 3 assembly is in a cell containing a NETCO-SNAP-IN® insert.	2	X
	3	2
Array D One Region 2 assembly (2) checkerboarded with three Region 4 assemblies (4). The Region 2 assembly and the diagonally located Region 4 assembly are each in a storage cell with a stainless steel L-insert. The two storage cells without a stainless steel L-insert contain a NETCO-SNAP-IN® insert.	2	4
	4	4
Array E Four Region 5 assemblies (5). Two storage cells contain a stainless steel L-insert. One cell contains a NETCO-SNAP-IN® insert. One storage cell contains no insert.	5	5
	5	5
Array F Four Region 6 assemblies (6). Two storage cells contain a stainless steel L-insert. The other two cells contain no inserts.	6	6
	6	6

Notes:

1. The shaded locations indicate cells which contain a stainless steel L-insert.
2. A blocked cell (X) contains a blocking device.
3. NETCO-SNAP-IN® inserts must be oriented in the same direction as the stainless steel L-inserts.
4. NETCO-SNAP-IN® inserts are only located in cells without a stainless steel L-insert.
5. Any cell containing a fuel assembly or a TC may instead be an empty (water-filled) cell in all storage arrays.
6. Any storage array location designated for a fuel assembly may be replaced with non-fissile material.
7. Interface requirements: Each cell is part of up to four 2x2 arrays and each cell must simultaneously meet the requirements of all those arrays of which it is a part.

4.0 DESIGN FEATURES

4.1 Site Location

The Palo Verde Nuclear Generating Station is located in Maricopa County, Arizona, approximately 50 miles west of the Phoenix metropolitan area.

4.2 Reactor Core

4.2.1 Fuel Assemblies

The reactor shall contain 241 fuel assemblies.

- a. Each assembly shall consist of a matrix of fuel rods with an NRC approved cladding material with an initial composition of natural or slightly enriched uranium dioxide (UO₂) as fuel material. Limited substitutions of zirconium alloy or stainless steel filler rods for fuel rods, in accordance with approved applications of fuel rod configurations, may be used. Fuel assemblies shall be limited to those fuel designs that have been analyzed with applicable NRC staff approved codes and methods and shown by tests or analyses to comply with all fuel safety design bases. Each unit-specific COLR shall contain an identification of the fuel types and cladding material in the reactor, and the associated COLR methodologies.
- b. A limited number of lead test assemblies not meeting 4.2.1.a may be placed in nonlimiting core regions. Each unit-specific COLR shall contain an identification of any lead test assemblies in the reactor.

4.2.2 Control Element Assemblies

The reactor core shall contain 76 full strength and 13 part strength control element assemblies (CEAs).

The control section for the full strength CEAs shall be either boron carbide with Alloy 625 cladding, or a combination of silver-indium-cadmium and boron carbide with Alloy 625 cladding.

The control section for the part strength CEAs shall be solid Alloy 625 slugs with Alloy 625 cladding.

(continued)

4.0 DESIGN FEATURES (continued)

4.3 Fuel Storage

4.3.1 Criticality

- 4.3.1.1 The spent fuel storage racks are designed and shall be maintained with:
- a. Fuel assemblies having a maximum radially averaged U-235 enrichment of 4.65 weight percent;
 - b. $k_{eff} < 1.0$ if fully flooded with unborated water, which includes an allowance for biases and uncertainties as described in Section 9.1 of the UFSAR;
 - c. $k_{eff} \leq 0.95$ if fully flooded with water borated to 1600 ppm, which includes an allowance for biases and uncertainties as described in Section 9.1 of the UFSAR.
 - d. A nominal 9.5 inch center-to-center distance between adjacent storage cell locations.
 - e. Fuel assemblies are classified in Fuel Regions 1-6 as shown in Tables 3.7.17-1 through 3.7.17-5.

(continued)

4.0 DESIGN FEATURES (continued)

4.3.1.2 The new fuel storage racks are designed and shall be maintained with:

- a. Fuel assemblies having a maximum radially averaged U-235 enrichment of 4.65 weight percent;
- b. $k_{\text{eff}} \leq 0.95$ if fully flooded with unborated water, which includes an allowance for biases and uncertainties as described in Section 9.1 of the UFSAR;
- c. $k_{\text{eff}} \leq 0.98$ if moderated by aqueous foam, which includes an allowance for biases and uncertainties as described in Section 9.1 of the UFSAR; and
- d. A nominal 18 inch (east-west) and 31 inch (north-south) center-to-center distance between fuel assemblies placed in the storage racks.

4.3.2 Drainage

The spent fuel storage pool is designed and shall be maintained to prevent inadvertent draining of the pool below elevation 137 feet - 6 inches.

4.3.3 Capacity

The spent fuel storage pool is designed and shall be maintained with a storage capacity limited to no more than 1329 fuel assemblies.

5.5 Programs and Manuals

5.5.1 Offsite Dose Calculation Manual (ODCM) (continued)

the affected pages, clearly indicating the area of the page that was changed, and shall indicate the date (i.e., month and year) the change was implemented.

5.5.2 Primary Coolant Sources Outside Containment

This program provides controls to minimize leakage from those portions of systems outside containment that could contain highly radioactive fluids during a serious transient or accident to levels as low as practicable. The systems include recirculation portion of the high pressure injection system, the shutdown cooling portion of the low pressure safety injection system, and the containment spray system. The program shall include the following:

- a. Preventive maintenance and periodic visual inspection requirements; and
- b. Integrated leak test requirements for each system at refueling cycle intervals or less.

5.5.3 Deleted

(continued)

5.5 Programs and Manuals (continued)

5.5.21 Spent Fuel Storage Rack Neutron Absorber Monitoring Program

Certain storage cells in the spent fuel storage racks utilize neutron absorbing material that is credited in the spent fuel storage rack criticality safety analysis to ensure the limitations of Technical Specifications 3.7.17 and 4.3.1.1 are maintained.

In order to ensure the reliability of the neutron absorber material, a monitoring program is provided to confirm the assumptions in the spent fuel pool criticality safety analysis.

The Spent Fuel Storage Rack Neutron Absorber Monitoring Program shall require periodic inspection and monitoring of spent fuel pool test coupons and neutron absorber inserts on a performance-based frequency, not to exceed 10 years.

Test coupons shall be inspected as part of the monitoring program. These inspections shall include visual, B-10 areal density and corrosion rate.

Visual in-situ inspections of inserts shall also be part of the program to monitor for signs of degradation. In addition, an insert shall be removed periodically for visual inspection, thickness measurements, and determination of retention force.

5.0 ADMINISTRATIVE CONTROLS

5.7 High Radiation Area

5.7.1 In addition to the provisions of 10 CFR 20.1601, the following controls provide an alternate method for controlling access to high radiation areas as provided by paragraph 20.1601(c) of 10 CFR part 20. High radiation areas, as defined in 10 CFR 20, in which the intensity of radiation is > 100 mrem/hr but ≤ 1000 mrem/hr, shall be barricaded and conspicuously posted as a high radiation area and entrance thereto shall be controlled by requiring issuance of a Radiation Work Permit (RWP). Individuals qualified in radiation protection procedures (e.g., Radiation Protection Technicians) or personnel continuously escorted by such individuals may be exempt from the RWP issuance requirement during the performance of their assigned duties in high radiation areas with exposure rates ≤ 1000 mrem/hr, provided they are otherwise following plant radiation protection procedures for entry into such high radiation areas.

Any individual or group of individuals permitted to enter such areas shall be provided with or accompanied by one or more of the following:

- a. A radiation monitoring device that continuously indicates the radiation dose rate in the area.
- b. A radiation monitoring device that continuously integrates the radiation dose rate in the area and alarms when a preset integrated dose is received. Entry into such areas with this monitoring device may be made after the dose rate levels in the area have been established and personnel are aware of them.
- c. An individual qualified in radiation protection procedures with a radiation dose rate monitoring device, who is responsible for providing positive control over the activities within the area and shall perform periodic radiation surveillance at the frequency specified by radiation protection supervision, or as designated in the RWP.

(continued)

5.7 High Radiation Area

- 5.7.2 In addition to the requirements of Specification 5.7.1, areas accessible to personnel with radiation levels such that an individual could receive in 1 hour a dose greater than 1000 mrem shall be provided with locked or continuously guarded doors to prevent unauthorized entry and the keys shall be maintained under the administrative control of the Shift Manager on duty or radiation protection supervision. Doors shall remain locked except during periods of access by personnel under an approved RWP that shall specify the dose rate levels in the immediate work areas and the maximum allowable stay times for individuals in those areas. In lieu of the stay time specification of the RWP, direct or remote (such as closed circuit TV cameras) continuous surveillance may be made by personnel qualified in radiation protection procedures to provide positive exposure control over the activities being performed within the area.
- 5.7.3 For individual high radiation areas accessible to personnel with radiation levels such that an individual could receive in 1 hour a dose in excess of 1000 mrem (measurement made at 30 cm from source of radioactivity), that are located within large areas such as reactor containment, where no enclosure exists for purposes of locking, and where no enclosure can be reasonably constructed around the individual area, that individual area shall be barricaded and conspicuously posted, and a flashing light shall be activated as a warning device.
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UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION
RELATED TO AMENDMENT NOS. 214, 214, AND 214 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 application dated August 21, 2020 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML20234A737), Arizona Public Service Company (the licensee) requested changes to the Technical Specifications (TSs) for Palo Verde Nuclear Generating Station (Palo Verde), Units 1, 2 and 3.

The proposed amendments would modify the TSs by making the following administrative changes:

1. Surveillance Requirement (SR) 3.1.5.3: Removal of a one-time use Note for Unit 2 Control Element Assembly (CEA) Number 88.
2. TS 3.7.17, "Spent Fuel Assembly Storage"; TS 4.3, "Fuel Storage"; and TS 5.5.21, "Spent Fuel Storage Rack Neutron Absorber Monitoring Program": Removal of no longer applicable pages related to the implementation of Amendment No. 203 (ADAMS Accession No. ML17188A412), which addressed a revised spent fuel pool (SFP) criticality analysis.
3. TS 4.1, "Site Location": Removal of extraneous information from the site location description.
4. TS 5.5.2, "Primary Coolant Sources Outside Containment": Removal of the remaining post-accident sampling subsystem (PASS) reference.
5. TS 5.7, "High Radiation Area": Modification of radiation protection terminology to match industry standards.

2.0 REGULATORY EVALUATION

The regulation in Title 10 of the *Code of Federal Regulations* (10 CFR) Section 50.36(c)(2), “Limiting conditions for operation” (LCOs) states, in part, that TSs include LCOs, which are “the lowest functional capability or performance levels of equipment required for safe operation of the facility.”

The regulation in 10 CFR 50.36(c)(3), “Surveillance requirements” states that TSs include items in the category of SRs, which are “requirements relating to test, calibration, or inspection to assure that the necessary quality of systems and components is maintained, that facility operation will be within safety limits, and that the limiting conditions for operation will be met.”

The regulation in 10 CFR 50.36(c)(4), “Design features” states that TSs include design features, which are “those features of the facility such as materials of construction and geometric arrangements, which if altered or modified, would have a significant effect on safety and are not covered in categories described in paragraphs (c)(1), (2), and (3) of [10 CFR 50.36, “Technical specifications”].”

The regulation in 10 CFR 50.36(c)(5), “Administrative controls” states, in part, that TSs 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.”

The U.S. Nuclear Regulatory Commission (NRC, the Commission) 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,” dated March 2010 (ADAMS Accession No. ML100351425). As described therein, as part of the regulatory standardization effort, the NRC staff has prepared Standard Technical Specifications (STS) for each of the LWR nuclear designs. Accordingly, the NRC staff’s review includes consideration of whether the proposed changes are consistent with NUREG-1432¹, as modified by NRC-approved travelers.

3.0 TECHNICAL EVALUATION

The NRC staff compared the licensee’s proposed changes against the applicable regulation or guidance discussed in Section 2.0 of this safety evaluation (SE). All the proposed changes in the licensee’s application are administrative clarifications and do not substantively change TS requirements. Therefore, the NRC staff finds these changes acceptable for the reasons explained in each section below.

3.1 Proposed Change to SR 3.1.5.3

The licensee proposed to remove a one-time historical Note associated with a Palo Verde Unit 2 CEA from SR 3.1.5.3, which verifies full strength CEA freedom of movement. The Note is no longer relevant to the current TSs because the time limit for the one-time license amendment has expired. In addition, the condition that necessitated the one-time Note has been corrected.

¹ Volumes 1 and 2 of NUREG-1432, Revision 4 (ADAMS Accession Nos. ML12102A165 and ML12102A169, respectively), contain the standard technical specifications and bases for Combustion Engineering Plants

The NRC staff finds that the proposed change is acceptable because it is an administrative clarification that does not substantively change TS requirements. Therefore, SR 3.1.5.3 will continue to meet the requirements of 10 CFR 50.36(c)(3).

3.2 Proposed Change to TSs 3.7.17, 4.3, and 5.5.21

The licensee proposed to remove no longer applicable pages and revise applicable pages related to the implementation of Amendment 203, which addressed a revised SFP criticality analysis and configuration changes. Specifically, the licensee's proposed change would modify Palo Verde TS Sections 3.7.17, 4.3, and 5.5.21 to remove the "Before SFP transition" pages and revise the "After SFP transition" pages.

The transition to the new SFP configuration was completed in all three units in 2019. With all three Palo Verde units' SFPs fully transitioned, the proposed Palo Verde TSs will only retain information related to the applicable SFP criticality analysis and configurations.

The NRC staff finds that the proposed changes are acceptable because they are administrative clarifications that do not substantively change TS requirements. Therefore, TSs 3.7.17, 4.3, and 5.5.21 will continue to meet the requirements of 10 CFR 50.36(c)(2), 10 CFR 50.36(c)(4), and 10 CFR 50.36(c)(5), respectively.

3.3 Proposed Changes to TS 4.1

The licensee proposed to remove the acreage number, site elevation numbers, and the minimum distance from the nearest containment building to the exclusion area boundary contained in TS 4.1.

The NRC STS for Combustion Engineering Plants (NUREG-1432) do not contain specific guidance for what information is to be provided in TS Section 4.1, other than the section heading "Site Location" and the following bracketed information:

[Text description of site location.]

In fact, all NRC STS for operating reactors (i.e., NUREG-1430 through NUREG-1434) identify the same bracketed information without specific guidance.

Section 182a of the Atomic Energy Act of 1954, as amended (the Act) requires the inclusion of TSs in licenses for production and utilization facilities. Section 182a states, in part, that applicants for nuclear power plant operating licenses will provide

[S]uch technical specifications, including information of the amount, kind, and source of special nuclear material required, the place of the use, the specific characteristics of the facility, and such other information as the Commission may, by rule or regulation, deem necessary in order to enable it to find that the utilization... of special nuclear material will be in accord with the common defense and security and will provide adequate protection to the health and safety of the public. Such technical specifications shall be a part of any license issued.

As described above, the Act requires that TSs include information on "the place of the use" for the special nuclear material. The design features section in the STS requires a "text description of site location," which would appear to meet this requirement.

In the LAR, the license's proposed description of the "Site Location" is as follows:

The Palo Verde Nuclear Generating Station is located in Maricopa County, Arizona, approximately 50 miles west of the Phoenix metropolitan area.

Although the licensee's proposed change removes site specific acreage, site elevation details, and exclusion area boundary information from the Palo Verde TSs, the Palo Verde Updated Final Safety Analysis Report Sections 2.1.1.2, "Site Area Maps," and 2.1.1.3, "Boundaries for Establishing Effluent Release Limits" (ADAMS Accession No. ML19205A219), do contain the site specific acreage, site elevation details, and exclusion area boundary information. This information is controlled pursuant to 10 CFR 50.71(e) and 10 CFR 50.59.

For comparative purposes, the NRC staff reviewed a recent licensee's conversion to STS in 2015 (ADAMS Accession No. ML13329A881 (conversion request)) and ADAMS Accession No. ML15238B499 (conversion SE)). The proposed information contained in the design features "Site Location" section provided a text description of the site location (e.g., state, county, and approximate distances, and compass direction to nearby population centers). There was no site acreage, site elevation, or site exclusion area boundary information. The NRC staff found the licensee's "Site Location" information acceptable. The NRC staff recognizes that other statements of location could be acceptable as long as the information would be sufficient to generally identify the site location on a map.

In the LAR, the licensee made administrative changes to obtain consistency with NUREG-1432 Section 4.1, "Site Location," by removing extraneous information and retaining sufficient information to generally identify the site location on a map. The NRC staff finds that the proposed changes are acceptable because they (1) conform to the STSs, (2) are consistent with a recent STS conversion, and (3) are administrative clarifications and do not substantively change TS requirements. Therefore, TS 4.1 will continue to meet the requirements of 10 CFR 50.36(c)(4).

3.4 Proposed Changes to TS 5.5.2

The licensee proposed to remove the reference to the PASS equipment in TS 5.5.2, which provides controls related to primary coolant sources outside containment. The LAR describes that the PASS was approved for abandonment in 2001 (ADAMS Accession No. ML012710441) and was structured to permit removal of the PASS equipment over time.

The provisions in TS 5.5.2 include an administrative requirement for a program to minimize to levels as low as practicable the leakage from those portions of systems outside containment that could contain highly radioactive fluids during a serious transient or accident. The program includes preventive maintenance, periodic inspections, and leak tests for the identified systems. PASS is specifically listed in TS 5.5.2 as falling under the scope of this requirement. The applicability of this specification depends on whether or not PASS is maintained as a system that is a potential leakage path.

The NRC staff reviewed the information in the LAR regarding removal of the reference to the PASS in TS 5.5.2. In the LAR, the licensee indicates that PASS modifications are complete, and the PASS penetration is eliminated as a potential leakage path. Therefore, the references to the PASS in TS 5.5.2 are no longer applicable. Based on the discussion above, the NRC staff finds that the licensee's proposed change is acceptable because it is an administrative

clarification that does not substantively change TS requirements. Therefore, TS 5.5.2 will continue to meet the requirements of 10 CFR 50.36(c)(5).

3.5 Evaluation of Proposed Changes to TS 5.7

The licensee proposed changes to TS 5.7, which provides the administrative controls for high radiation areas. The licensee indicates that the changes are purely administrative in nature and do not affect the controls to high radiation areas and are only being made to use standard industry terminology. Specifically, the licensee proposed to change TSs 5.7.1 and 5.7.2 to replace the term Radiation Exposure Permit with Radiation Work Permit. In addition, the licensee proposed to reword TS 5.7.1, paragraph c, including changing "Radiation Protection Section Leader," to "radiation protection supervision."

The NRC staff finds that the new terminology is more consistent with the terminology used by the industry and in the STS (NUREG-1432). The NRC staff finds the changes are acceptable because they are administrative clarifications and do not substantively change TS requirements. Therefore, TS 5.7 will continue to meet the requirements of 10 CFR 50.36(c)(5).

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 December 3, 2020. 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 surveillance requirements. 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 November 3, 2020 (85 FR 69654), 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: C. Ashley

Date: February 8, 2021

SUBJECT: PALO VERDE NUCLEAR GENERATING STATION, UNITS 1, 2,
AND 3 - ISSUANCE OF AMENDMENT NOS. 214, 214, and 214 TO MAKE
ADMINISTRATIVE CHANGES TO THE TECHNICAL SPECIFICATIONS
(EPID L-2020-LLA-0189) DATED FEBRUARY 8, 2021

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ADAMS Accession No.: ML20350B803***by e-mail**

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