

July 15, 2003

Mr. Gregg R. Overbeck
Senior Vice President, Nuclear
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 AMENDMENTS RE: RECAPTURE LOW-POWER TESTING
TIME (TAC NOS. MB6261, MB6262, AND MB6263)

Dear Mr. Overbeck:

The Commission has issued the enclosed Amendment No. 147 to Facility Operating License No. NPF-41, Amendment No. 147 to Facility Operating License No. NPF-51, and Amendment No. 147 to Facility Operating License No. NPF-74 for the Palo Verde Nuclear Generating Station, Unit 1, Unit 2 and Unit 3, respectively. The amendments consist of changes to the Operating Licenses (OLs) in response to your application dated August 28, 2002 (102-04831).

The amendments extend the expiration date of the OLs from December 31, 2024, to June 1, 2025, for Unit 1; from December 9, 2025, to April 24, 2026, for Unit 2; and from March 25, 2027, to November 25, 2027, for Unit 3. The extended dates are 40 years from when the full power licenses were issued, in accordance with Section 103.c of the Atomic Energy Act of 1954, as amended, and 10 CFR 50.51, 10 CFR 50.56, and 10 CFR 50.57 of Title 10 of the *Code of Federal Regulations* (10 CFR).

A copy of our Safety Evaluation is also enclosed. The Notice of Issuance will be included in the Commission's next biweekly *Federal Register* notice. These proposed amendments are not a request for license renewal under Title 10 of the *Code of Federal Regulations* (10 CFR) Part 54, and the enclosed evaluation would not be sufficient for such a request.

Sincerely,

/RA/

Brian Benney, Project Manager, Section 2
Project Directorate IV
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

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

Enclosures: 1. Amendment No. 147 to NPF-41
2. Amendment No. 147 to NPF-51
3. Amendment No. 147 to NPF-74
4. Safety Evaluation

cc w/encls: See next page

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/RA/

Brian Benney, Project Manager, Section 2
Project Directorate IV
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

DISTRIBUTION

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

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cc w/encls: See next page

Gimbro (NRR/DE/EMEB) JCalvo (NRR/DE/EEIB)
WBateman (NRR/DE/EMCB) JWermiel (NRR/DSSA/SRXB)
JHannon (NRR/DSSA/SPLB) SUttal (OGC)

Package No.: ML031990144

TS Pages No.: ML031990507

ADAMS Accession No.: ML031990086

*See Previous concurrences

NRR-100

NRR-058

OFFICE	PDIV-2/PM	PDIV-2/PM	PDIV-1/LA	EMEB	EEIB	EMCB
NAME	BBenney	JDonohew	MMcAllister	Gimbro *	JCalvo *	WBateman *
DATE	7/14/03	7/14/03	7/14/03	01/14/03	02/10/03	03/17/03
OFFICE	SRXB		SPLB	OGC		PDIV-2/SC
NAME	JWermiel *		JHannon *	SUttal *		SDembek
DATE	04/04/03		04/07/03	06/27/03		7/14/03

Palo Verde Generating Station, Units 1, 2, and 3

cc:

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ARIZONA PUBLIC SERVICE COMPANY, ET AL.

DOCKET NO. STN 50-528

PALO VERDE NUCLEAR GENERATING STATION, UNIT 1

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 147
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 28, 2002, 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, Facility Operating License No. NPF-41 is amended by changes to the Operating License as indicated in the attachment to this license amendment.
3. This license amendment is effective as of the date of issuance and shall be implemented within 60 days of the date of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

/RA/

Stephen Dembek, Chief, Section 2
Project Directorate IV
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Attachment: Changes to the Operating License

Date of Issuance: July 15, 2003

ARIZONA PUBLIC SERVICE COMPANY, ET AL.

DOCKET NO. STN 50-529

PALO VERDE NUCLEAR GENERATING STATION, UNIT 2

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 147
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 28, 2002, 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, Facility Operating License No. NPF-51 is amended by changes to the Operating License as indicated in the attachment to this license amendment.
3. This license amendment is effective as of the date of issuance and shall be implemented within 60 days of the date of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

/RA/

Stephen Dembek, Chief, Section 2
Project Directorate IV
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Attachment: Changes to the Operating License

Date of Issuance: July 15, 2003

ARIZONA PUBLIC SERVICE COMPANY, ET AL.

DOCKET NO. STN 50-530

PALO VERDE NUCLEAR GENERATING STATION, UNIT 3

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 147
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 28, 2002, 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, Facility Operating License No. NPF-74 is amended by changes to the Operating License as indicated in the attachment to this license amendment.
3. This license amendment is effective as of the date of issuance and shall be implemented within 60 days of the date of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

/RA/

Stephen Dembek, Chief, Section 2
Project Directorate IV
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Attachment: Changes to the Operating License

Date of Issuance: July 15, 2003

ATTACHMENT TO LICENSE AMENDMENT NOS. 147, 147 AND 147

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

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

Revise the Facility Operating License Nos. NPF-41, NPF-51, and NPF-74 by removing the pages identified below and inserting the enclosed pages. The revised pages are identified by amendment number and contain marginal lines indicating the areas of change.

REMOVE

NPF-41, page 7

NPF-51, page 8

NPF-74, page 5

INSERT

7

8

5

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION
RELATED TO AMENDMENT NO. 147 TO FACILITY OPERATING LICENSE NO. NPF-41,
AMENDMENT NO. 147 TO FACILITY OPERATING LICENSE NO. NPF-51,
AND AMENDMENT NO. 147 TO FACILITY OPERATING LICENSE NO. 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 August 28, 2002, Arizona Public Service Company (the licensee), submitted a request for changes to the operating licenses for Palo Verde Nuclear Generating Station (PVNGS) Units 1, 2 and 3.

The current operating licensed terms for PVNGS Units 1, 2 and 3 end on December 31, 2024, December 9, 2025, and March 25, 2027, respectively. Each is 40 years from the date of the low-power operating license, which were issued for Units 1, 2, and 3 on December 31, 1984, December 9, 1985, and March 25, 1987, respectively. The amendments would extend the expiration date of the operating licenses from December 31, 2024, to June 1, 2025, for Unit 1; from December 9, 2025, to April 24, 2026, for Unit 2; and from March 25, 2027, to November 25, 2027, for Unit 3. The extended dates for termination of the operating licenses would be 40 years after issuance of the full-power operating licenses which were issued for Units 1, 2, and 3 on June 1, 1985, April 24, 1986, and November 25, 1987, respectively. These proposed amendments are not a request for license renewal under Title 10 of the *Code of Federal Regulations* (10 CFR) Part 54.

2.0 REGULATORY EVALUATION

Section 103.c of the Atomic Energy Act of 1954, as amended, provides that a license is to be issued for a specific period not to exceed 40 years. Section 50.51.(a) of 10 CFR specifies that each license will be issued for a fixed period of time not to exceed 40 years from the date of issuance. Also, 10 CFR 50.56 and 10 CFR 50.57 allow the issuance of an operating license pursuant to 10 CFR 50.51 after the construction of the facility has been substantially completed, in conformity with the construction permit and when other provisions specified in 10 CFR 50.57 are met. Consistent with Section 103.c of the Atomic Energy Act and Sections 50.51, 50.56, and 50.57 of the Commission's regulations, the licensee, by its application of August 28, 2002, seeks an extension that would permit the units to operate for the full 40-year lifetime from the date when the full-power operating license was issued. The proposed extension is consistent with the Commission's policy stated in the Staff Requirements Memorandum (SRM) dated March 30, 1999, from Andrew L. Bates, Acting Secretary, to William D. Travers, Executive

Director for Operations. The SRM was in response to SECY-98-296, "Agency Policy Regarding Licensee Recapture of Low-Power Testing or Shutdown Time for Nuclear Power Plants," and stated "The Commission has approved the staff's plans to grant the Grand Gulf license amendment to amend the expiration date of the license to recover the time spent in low power testing before receiving the Full Power Operating License (FPOL). The Commission also approved the granting of similar requests from other licensees provided that the 40-year license term began with the issuance of a Low Power Operating License (LPOL) and a separate FPOL was issued."

3.0 TECHNICAL EVALUATION

The NRC staff has evaluated the environmental and safety issues associated with the proposed amendments which would allow approximately five months of additional plant operation for Unit 1, four months for Unit 2, and eight months for Unit 3. The major safety issues are the effects of aging and neutron fluence on plant structures and equipment. This is addressed in Section 3.1.

The licensee's request for an extension of the operating license is based on the fact that a 40-year service life was considered during the design and construction of the plant. Although this does not mean that some components will not wear out during the plant's lifetime, design features were incorporated, which provide for inspectability of structures, systems, and components during this lifetime. Surveillance, inspectability, and maintenance practices, which were implemented in accordance with the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code (Code) for inservice inspection and testing of pumps and valves and the plant's Technical Specifications (TSs), provide assurance that any degradation in the plant's safety equipment will be identified and corrected to provide safe operation of the plant's proposed license extension period. The specific provisions and requirements for ASME Code testing are set forth in 10 CFR 50.55a

3.1 Safety Assessment

3.1.1 Neutron Damage of the Reactor Pressure Vessel

The reactor pressure vessel was designed and fabricated in accordance with the requirements of Section III, Class 1, of the ASME Code edition, addenda, and Code Cases applicable at the time of design and construction. Operating limitations of the ASME Code and of Appendix G, "Fracture Toughness Requirements," of 10 CFR Part 50 are also applicable. The reactor pressure vessel (RPV) and the reactor coolant system were designed to allow inspections in accordance with Section XI of the ASME Code. The NRC staff's evaluation approving the programs and their implementation with respect to these structures is contained in NUREG-0857 and its 12 supplements. Industry experience with steel structures confirms a service life in excess of 40 years may be anticipated.

Over the operating life of a reactor vessel, ferritic materials exposed to neutron irradiation will undergo changes in material properties, particularly a decrease in fracture toughness. The decrease in fracture toughness is of particular importance because the ability to resist failure caused by the propagation of a crack decreases with increasing irradiation. The fracture toughness of the vessel is monitored by a surveillance program in accordance with the requirements of Appendix H, "Reactor Vessel Material Surveillance Program Requirements," of

10 CFR Part 50. The purpose of the materials surveillance program is to help ensure vessel integrity by monitoring changes in the fracture toughness properties of the reactor vessel beltline materials. The ferritic materials must meet the fracture toughness properties of Section III of the ASME Code and Appendix G to 10 CFR Part 50. This surveillance program will aid in adjusting the operational conditions in order to maintain sufficient safety margin for the prevention of brittle failure of the reactor vessel.

As discussed in Section 5.3 of the Update Final Safety Analysis Report (UFSAR), the vessel is designed, fabricated, tested, inspected, and stamped in accordance with the ASME Code, Section III, Class 1 including the addenda in effect at the date of the order of the vessel and meets Seismic Category I. Shifts in transition temperature caused by irradiation during the vessel life can be accommodated by raising the minimum pressurization temperature.

3.1.2 Compliance with Appendices G and H of 10 CFR Part 50, and 10 CFR 50.61

Appendix G, 10 CFR Part 50, and 10 CFR 50.61, contains screening criteria for Charpy upper-shelf energy (CUSE) and pressurized thermal shock (PTS), respectively. The screening criteria in Appendix G is that the reactor vessel beltline material have a CUSE of no less than 50 ft-lb. The screening criteria in 10 CFR 50.61 is that the reference temperature (RT)_{PTS} values be less than 270°F for plates, forgings, and axial welds, and 300°F for circumferential welds.

The reactor vessel was also designed to withstand a variety of transient and cyclic loads, which occur throughout the operational life of the plant. Table 3.9.1-1 of UFSAR provides the cyclic or transient limits used in the stress analysis for the nuclear steam supply system.

On May 19, 1995, the NRC issued Generic Letter (GL) 92-01, Revision 1, Supplement 1, "Reactor Vessel Structural Integrity." In this GL, the NRC requested that licensees perform a review of their reactor vessel structural integrity analyses in order to identify, collect, and report any new data pertinent to the analysis of the vessel structural integrity and to assess the impact of that data on the analysis relative to the requirements of 10 CFR 50.60 (Acceptance criteria for fracture prevention measures for normal operation) and 10 CFR 50.61 (Fracture toughness requirements for protection against pressurized thermal shock), and Appendices G and H. The licensee responded in its letters of June 27, 1992, July 26, 1994, August 17, 1995, and June 24, 1998, and indicated that it has performed additional reviews, and the structural integrity analyses remain valid. In its letters of September 11, 1996, and July 12, 1999, the NRC staff considered the licensee's actions complete regarding GL 92-01, Revision 1, Supplement 1.

The data from the licensee's response to GL 92-01, Revision 1, Supplement 1, were evaluated by the staff and the CUSE and RT_{pts} values at the end of the current unit operating licenses were recorded into the Reactor Vessel Integrity Database (RVID). For the units, the lowest CUSE is 65.5 ft-lb and the highest RT_{pts} value is 122.5°F. Based on these values being within the screening criteria given above, and on the rate of reduction in CUSE and rate of increase in RT_{pts} value for the reactor vessels beltline materials, the Palo Verde units would have to operate for many years beyond the proposed licenses' expiration date for the licensee to exceed the CUSE and PTS screening criteria.

Based on the above, there is reasonable assurance that the RPV will be in conformity, for the proposed license term extension requested by the licensee, with the applicable provisions of the rules and regulations of the Commission, and the PVNGS licenses.

3.1.3 Structures

The concrete and steel Category I structures at PVNGS were designed and constructed in accordance with the General Design Criteria of Appendix A, "General Design Criteria for Nuclear Power Plants," to 10 CFR Part 50. This is discussed in Sections 3.1 and 3.2 of the UFSAR. The licensee's design basis, fabrication, construction, and implementation of quality assurance criteria for the plant were reviewed by the NRC staff when the plant was being licensed for low-power operation. The NRC staff's evaluation approving the programs and its implementation with respect to these structures are contained in NUREG-0857 and its 12 supplements. Industrial experience with concrete and steel structures confirms a service life in excess of 40 years may be anticipated.

The major codes and specifications used in the design and construction of the Category I concrete and steel structures were, respectively, American Concrete Institute (ACI) 349, "Criteria for Reinforced Concrete Nuclear Power Containment Structures," and ACI 318-71, "Building Code Requirements for Reinforced Concrete," and the American Institute of Steel Construction Specification, "Specification for the Design, Fabrication, and Erection of Structural Steel for Building." The foundations of the seismic Category I structures are reinforced concrete designed to ACI 318-71. Section 3.8 of NUREG-0857 stated that the criteria that were used in the analysis, design, and construction of seismic Category I structures at PVNGS account for anticipated loadings and postulated conditions that may be imposed on the structures during its service lifetime, which would include approximately five, four, and eight months of additional power operation for Units 1, 2, and 3, respectively. These criteria are in conformance with the established criteria, codes, standards, and specifications acceptable to the NRC staff. The licensee's use of the indicated codes, standards, and specifications in the plant's design, analyses, and construction and the licensee's quality assurance program required by Appendix B, "Quality Assurance Criteria for Nuclear Power Plants and Fuel Reprocessing Plants," to 10 CFR Part 50, as approved by NUREG-0857 and its supplements, provide reasonable assurance that the concrete and steel structures will, for the proposed license term extension requested by the licensee, be in conformity with the applicable provisions of the rules and regulations of the Commission, and the PVNGS licenses.

3.1.4 Mechanical Equipment

With regard to equipment lifetime, PVNGS, Units 1, 2, and 3 were designed, licensed, and constructed for a 40-year service life. The reactor coolant system components and support systems were analyzed for the integrated effects of radiation damage and cyclic loadings (with added margin) that could reasonably be expected to occur in the 40-year lifetime from the FPOL. Surveillance and maintenance practices were implemented in accordance with the ASME Code for Inservice Inspection and Inservice Testing of Pumps and Valves, a maintenance program satisfying 10 CFR 50.65 requirements, and the facilities' TSs. These TSs are part of the plant's operating license and have been approved by the NRC, as are all subsequent changes to the TSs. The specific provisions and requirements for ASME Code testing are set forth in 10 CFR 50.55a.

Surveillance, maintenance, and testing requirements for mechanical equipment are in place at the plant to verify operability or to detect degradation and ensure that the equipment that does degrade is replaced or other corrective actions are taken. In addition, subcomponents such as nonmetallics (e.g., gaskets and O-rings) are inspected and replaced as necessary, as part of routine maintenance in order to ensure the design life of equipment.

From this evaluation, the NRC staff concludes that compliance with the codes, standards, and regulatory requirements to which mechanical equipment were analyzed, constructed, tested, and inspected provide adequate assurance that the structural integrity of equipment important to safety will be maintained during the operating lifetime of the plants and during the additional period authorized by these amendments. Any significant degradation by such equipment would be discovered and the equipment restored to an acceptable and operable condition.

3.1.5 Electrical Equipment

Aging analysis has been performed for all safety-related electrical equipment in accordance with 10 CFR 50.49, "Environmental qualification of electric equipment important to safety for nuclear power plants," identifying qualified lifetimes for this equipment. These lifetimes have been incorporated into plant equipment maintenance and replacement practices to ensure that all important to safety electrical equipment remains qualified and available to perform its safety function regardless of the overall age of the plant. If a component has a qualified life of less than 40 years, when the low power testing time is factored into the qualified life, its replacement is scheduled through the maintenance program and the safety information management system (SIMS) database. Therefore, the environmental qualification program will support the proposed amendments.

3.1.6 Quality Assurance and Maintenance Programs

In licensing PVNGS, the NRC staff reviewed the quality assurance (QA) programs and the conduct of operations, including the maintenance procedures at PVNGS. The QA programs for the plants' operations will assess how the organization is following procedures and meeting requirements for these operations. This would include the maintenance programs at the plants which assure the equipment is operable. In NUREG-0857, the NRC staff concluded that the QA program and maintenance procedures were acceptable. The maintenance programs must operate in conformance with 10 CFR 50.65, "Requirements for monitoring the effectiveness of maintenance at nuclear power plants."

Inspections by the NRC staff of the QA and maintenance programs at PVNGS show that these programs remain acceptable. The QA program meets the requirements of Appendix B to 10 CFR Part 50.

Therefore, the licensee's implementation and use of these programs at PVNGS provides reasonable assurance that equipment important to safety will, for the proposed license term extension requested by the licensee, be in conformity with the applicable provisions of the rules and regulations of the Commission, and the PVNGS licenses.

Based on the discussion above, on the safety and environmental issues involved with granting an extension to the operating licenses, there are no safety issues that would preclude the additional operation for the three units. Based on this, the NRC staff concludes that the proposed amendments are acceptable; however, it should be noted that the above evaluation would not be sufficient for license renewal under 10 CFR Part 54.

4.0 STATE CONSULTATION

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

5.0 ENVIRONMENTAL CONSIDERATION

Pursuant to 10 CFR 51.21, 51.32, and 51.35, an environmental assessment and finding of no significant impact has been prepared for the proposed amendment and published in the *Federal Register* on July 11, 2003 (68 FR 41407). Accordingly, based upon the environmental assessment, the staff has determined that the issuance of the amendment will not have a significant effect on the quality of the human environment.

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) 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: Brian Benney

Date: July 15, 2003