December 2, 2002

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 ON PEAK FUEL CENTERLINE TEMPERATURE SAFETY LIMIT (TAC NOS. MB6328, MB6329, AND MB6330)

Dear Mr. Overbeck:

The Commission has issued the enclosed Amendment No. 145 to Facility Operating License No. NPF-41, Amendment No. 145 to Facility Operating License No. NPF-51, and Amendment No. 145 to Facility Operating License No. NPF-74 for the Palo Verde Nuclear Generating Station, Units 1, 2, and 3, respectively. The amendments consist of changes to the Technical Specifications (TSs) in response to your application dated September 6, 2002 (102-04836).

The amendments replace the peak linear heat rate safety limit, in TS 2.1.1.2, "Reactor Core SLs [Safety Limits]," by a peak fuel centerline temperature safety limit.

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

Sincerely,

/RA/

Jack Donohew, Senior 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. 145 to NPF-41
2. Amendment No. 145 to NPF-51
3. Amendment No. 145 to NPF-74
4. Safety Evaluation

cc w/encls: See next page

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cc w/encls: See next page

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DATE	11/6/2002	11/6/02	11/7/02	18 Nov 2002	11/25/02

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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. 145
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 September 6, 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, 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 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. 145, and the Environmental Protection Plan contained in Appendix B, are hereby incorporated into this 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

/RA/

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

Attachment: Changes to the Technical Specifications

Date of Issuance: December 2, 2002

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. 145
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 September 6, 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, 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 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. 145, and the Environmental Protection Plan contained in Appendix B, are hereby incorporated into this 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

/RA/

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

Attachment: Changes to the Technical Specifications

Date of Issuance: December 2, 2002

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. 145
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 September 6, 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, 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 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. 145, and the Environmental Protection Plan contained in Appendix B, are hereby incorporated into this 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

/RA/

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

Attachment: Changes to the Technical Specifications

Date of Issuance: December 2, 2002

ATTACHMENT TO LICENSE AMENDMENT NOS. 145, 145 AND 145

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

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

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

REMOVE	INSERT
2.0-1	2.0-1

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 145 TO FACILITY OPERATING LICENSE NO. NPF-41,

AMENDMENT NO. 145 TO FACILITY OPERATING LICENSE NO. NPF-51,

AND AMENDMENT NO. 145 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 application dated September 6, 2002, the Arizona Public Service Company (the licensee) requested changes to Section 2.1, "Safety Limits," of the Technical Specifications (TSs) for the Palo Verde Nuclear Generating Station (PVNGS), Units 1, 2, and 3 . The Arizona Public Service Company submitted this request on behalf of itself, the Salt River Project Agricultural Improvement and Power District, Southern California Edison Company, El Paso Electric Company, Public Service Company of New Mexico, Los Angeles Department of Water and Power, and Southern California Public Power Authority.

The proposed changes would replace the peak linear heat rate safety limit (SL), in TS 2.1.1.2, "Reactor Core SLs [Safety Limits]," by a peak fuel centerline temperature SL.

2.0 REGULATORY REQUIREMENTS

Section 50.36, "Technical specifications," of 10 CFR Part 50 specifies the requirements for the plant's TSs. In particular, 10 CFR 50.36(c)(1)(i)(A) requires that TSs include SLs, which are limits upon important process variables that are found to be necessary to reasonably protect the integrity of certain of the physical barriers that guard against the uncontrolled release of radioactivity. If a SL is exceeded, the reactor must be shut down.

In accordance with General Design Criteria (GDC) 10, "Reactor Design," and 20, "Protection System Functions," of Appendix A, "General Design Criteria For Nuclear Power Plants," of 10 CFR Part 50, during normal operation and anticipated operational occurrences (AOOs), the specified acceptable fuel design limits (SAFDLs) must not be exceeded. In the Standard Review Plan (SRP) for the review of Safety Analysis Reports for Nuclear Power Plants, Section 4.2, "Fuel System Design," it is stated that fuel centerline melting is not permitted for normal operation and AOOs to assure that molten fuel would not come into contact with the fuel cladding or produce local hot spots.

3.0 TECHNICAL EVALUATION

The licensee proposed to replace the existing peak linear heat rate SL (adjusted for fuel rod dynamics) of less than or equal to 21 kW/ft with a peak fuel centerline temperature SL of less than 5080°F (decreasing by 58°F per 10, 000 MWD/MTU for burnup and adjusting for burnable poison per CENPD-382-P-A). The adjustments to the design melting point of new fuel of 5080°F for burnup and burnable poisons are based on the following two topical reports: (1) CEN-386-P-A, "Verification of the Acceptability of a 1-Pin Burnup Limit of 60 MWD/kgU for Combustion Engineering 16X16 PWR fuel," dated August 1992, which was approved in an NRC Safety Evaluation dated June 22, 1992, and (2) CENPD-382-P-A, "Methodology for Core Designs Containing Erbium Burnable Absorbers," dated August 1993, which was approved in an NRC Safety Evaluation dated June 29, 1993.

In the application, the licensee stated, in the changes identified for the TS Bases, the following:

> The design melting point of new fuel with no burnable poison is 5080°F. The melting point is adjusted downward from this temperature depending on the amount of burnup and amount and type of burnable poison in the fuel. The 58°F per 10,000 MWD/MTU adjustment for burnup was accepted by the NRC in Topical Report CEN-386-P-A, "Verification of the Acceptability of a 1-Pin Burnup Limit of 60 MWD/kgU for Combustion Engineering 16x16 PWR Fuel," August 1992. Adjustments for burnable poisons are established based on NRC approved Topical Report CENPD-382-P-A, "Methodology for Core Designs Containing Erbium Burnable Absorbers," August 1993.
>
> A steady state peak linear heat rate of 21 kW/ft has been established as the Limiting Safety System Setting to prevent fuel centerline melting during normal steady state operation. Following design basis anticipated operational occurrences, the transient linear heat rate may exceed 21 kW/ft provided the fuel centerline melt temperature is not exceeded. However, if the transient linear heat rate does not exceed 21 kW/ft, then the fuel centerline melt temperature is also not exceeded.

The licensee stated that a review of the PVNGS safety analyses shows that the existing peak linear heat rate SL is momentarily exceeded during AOOs. Therefore, according to the licensee, the existing peak linear heat rate SL does not meet 10 CFR 50.36(c)(1)(i)(A).

The licensee further stated that the peak linear heat rate SL is to prevent the fuel centerline temperature from reaching the melting point of the fuel in the fuel assemblies comprising the reactor core. The 21 kW/ft in TS 2.1.1.2 was chosen because it was the highest steady state linear heat rate at which the fuel centerline temperature did not reach the fuel melting temperature; however, during two short duration AOOs, the licensee explained that this linear heat rate may be exceeded without the fuel centerline temperature exceeding the fuel melting point. Therefore, the licensee proposed to replace the existing peak linear heat rate SL by a peak fuel centerline temperature SL for the same purpose of preventing the fuel centerline temperature from reaching the fuel melting point. The licensee concluded that the proposed peak centerline temperature SL would not be exceeded in the two AOOs and, thus, would be a more appropriate SL in the TSs because it would be in accordance with 10 CFR 50.36(c)(1)(ii)(A).

The NRC staff has reviewed the licensee's proposed amendments. The NRC staff agrees that the peak linear heat rate and peak fuel centerline temperature SLs are to prevent the fuel centerline from reaching the fuel melting point. The staff also agrees that the existing peak fuel heat rate SL is momentarily exceeded in two AOOs; however, exceeding the current peak linear heat rate SL in such instances will not cause fuel centerline melting. Therefore, the existing peak linear heat rate SL, while assuring the integrity of the fuel cladding, is not necessary to do so under 10 CFR 50.36(c)(i)(A). Because the proposed peak fuel centerline temperature SL will prevent fuel melting during normal operation and AOOs, the NRC staff concludes that this SL should be in the TSs, and is in conformance with GDC 10 and 20, and SRP Section 4.2. Therefore, the NRC staff concludes that the peak fuel centerline temperature is a proper reactor fuel SL.

In terms of the proposed amendment, the licensee explained that the 5080^{o}F design melting point of new fuel with no burnup and no burnable poison is adjusted downward for the amount of burnup and the amount and type of burnable poisons in the fuel. The adjustment for burnup is 58^{o}F per 10,000 MWD/MTU in accordance with NRC-approved Topical Report CEN-386-P-A, and the adjustment for burnable poisons is in accordance with NRC-approved Topical Report CENPD-382-P-A. The licensee has the 58^{o}F per 10,000 MWD/MTU and a reference to the topical report in the proposed amendments. The licensee explained that the amendments make a reference to CENPD-382-P-A because the burnable poison information in the report is proprietary and cannot be placed in the TSs.

The NRC staff agrees with the design melting temperature for new fuel and the adjustments for burnup and burnable poisons provided by the licensee in the proposed amendments. The staff also agrees that the reference to CENPD-382-P-A for the adjustment for burnable poisons is sufficient for the TSs, because NRC has approved the report for use for this purpose, and the licensee has stated that text discussing the topical report will be added to the TS Bases. Based on this and the proposed amendments meeting 10 CFR 50.36(c)(1)(i)(A) and GDC 10 and 20, the NRC staff concludes that the proposed SL for the peak fuel centerline temperature is acceptable, and, therefore, the proposed amendments are acceptable.

The licensee also stated that text will be added to the TS Bases for SLs 2.1.1.1 and 2.1.1.2. The text includes a reference to the NRC-approved topical reports CEN-386-P-A and CENPD-382-P-A in the discussion on the melting point of the fuel being dependent on the amount of burnup and the amount and type of burnable poison. The NRC staff has reviewed the text that the licensee will be adding to the TS Bases and does not object to it.

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

The amendments change a requirement with respect to the installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20. 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, and there has been no public comment on such finding (67 FR 66007 dated October 29, 2002). 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) 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: Jack Donohew

Date: December 2, 2002

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

cc:

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