

July 20, 1992

Docket No. 50-530

Mr. William F. Conway  
Executive Vice President, Nuclear  
Arizona Public Service Company  
Post Office Box 53999  
Phoenix, Arizona 85072-3999

Dear Mr. Conway:

SUBJECT: ISSUANCE OF AMENDMENT FOR PALO VERDE NUCLEAR GENERATING STATION,  
UNIT NO. 3 (TAC NO. M82544)

The Commission has issued the enclosed Amendment No. 35 to the Facility Operating License No. NPF-74 for Palo Verde Nuclear Generating Station, Unit No. 3. The amendment consists of changes to the Technical Specifications (TS) in response to your application dated December 20, 1991.

The amendment allows the use of 80 fuel rods clad with advanced zirconium - based alloys other than Zircaloy-4 in two fuel assemblies during Cycles 4, 5, and 6 for in-reactor performance evaluation.

A copy of the related Safety Evaluation is also enclosed. A notice of issuance will be included in the Commission's next regular biweekly Federal Register notice.

Sincerely,

Original signed by:  
Catherine M. Thompson, Project Manager  
Project Directorate V  
Division of Reactor Projects III/IV/V  
Office of Nuclear Reactor Regulation

Enclosures:

- 1. Amendment No. 35 to NPF-74
- 2. Safety Evaluation

cc w/enclosures:  
See next page

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

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Sincerely,

A handwritten signature in cursive script that reads "Catherine M. Thompson".

Catherine M. Thompson, Project Manager  
Project Directorate V  
Division of Reactor Projects III/IV/V  
Office of Nuclear Reactor Regulation

Enclosures:

1. Amendment No.<sup>35</sup> to NPF-74
2. Safety Evaluation

cc w/enclosures:  
See next page

Mr. William F. Conway  
Arizona Public Service Company

Palo Verde

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

ARIZONA PUBLIC SERVICE COMPANY, ET AL.

DOCKET NO. STN 50-530

PALO VERDE NUCLEAR GENERATING STATION, UNIT NO. 3

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 35  
License No. NPF-74

1. The Nuclear Regulatory Commission (the Commission) has found that:
  - A. The application for amendment by 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 December 20, 1991, 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 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. 35, 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 must be fully implemented no later than 45 days from the date of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

*for*   
Theodore R. Quay, Director  
Project Directorate V  
Division of Reactor Projects III/IV/V  
Office of Nuclear Reactor Regulation

Attachment:  
Changes to the Technical  
Specifications

Date of Issuance: July 20, 1992

ATTACHMENT TO LICENSE AMENDMENT

AMENDMENT NO. 35 FACILITY OPERATING LICENSE NO. NPF-74

DOCKET NO. STN 50-530

Replace the following pages of the Appendix A Technical Specifications with the enclosed pages. The revised pages are identified by amendment number and contain vertical lines indicating the areas of change.

REMOVE

5-5

INSERT

5-5

## DESIGN FEATURES

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### 5.3 REACTOR CORE

#### FUEL ASSEMBLIES

5.3.1 The reactor core shall contain 241 fuel assemblies with each fuel assembly normally containing 236 fuel rods or burnable poison rods clad with Zircaloy-4 except that limited substitution of fuel rods by filler rods consisting of Zircaloy-4 or stainless steel or by vacancies may be made if justified by a cycle specific reload analysis. Substitution of up to a total of 80 fuel rods clad with zirconium-based alloys other than Zircaloy-4 may also be made in two fuel assemblies for in-reactor performance evaluation purposes during Cycles 4, 5 and 6. Each fuel rod shall have a nominal active fuel length of 150 inches and contain a maximum total weight of approximately 1950 grams uranium. Each burnable poison rod shall have a nominal active poison length of 136 inches. The initial core loading shall have a maximum enrichment of 3.35 weight percent U-235. Reload fuel shall be similar in physical design to the initial core loading and shall have a maximum enrichment of 4.05 weight percent U-235.\*

#### CONTROL ELEMENT ASSEMBLIES

5.3.2 The reactor core shall contain 76 full-length and 13 part-length control element assemblies.

### 5.4 REACTOR COOLANT SYSTEM

#### DESIGN PRESSURE AND TEMPERATURE

5.4.1 The Reactor Coolant System is designed and shall be maintained:

- a. In accordance with the code requirements specified in Section 5.2 of the FSAR with allowance for normal degradation pursuant of the applicable surveillance requirements,
- b. For a pressure of 2500 psia, and
- c. For a temperature of 650°F, except for the pressurizer which is 700°F.

#### VOLUME

5.4.2 The total water and steam volume of the Reactor Coolant System is 13,900 + 300/-0 cubic feet at a nominal  $T_{avg}$  of 593°F.

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\*No fuel with an enrichment greater than 4.0 weight percent U-235 shall be stored in a high density mode in the spent fuel storage facility.

## DESIGN FEATURES

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### 5.5 METEOROLOGICAL TOWER LOCATION

5.5.1 The meteorological tower shall be located as shown on Figure 5.1-1.

### 5.6 FUEL STORAGE

#### 5.6.1 CRITICALITY

5.6.1.1 The spent fuel storage racks are designed and shall be maintained with:

- a. A  $k_{eff}$  equivalent to less than or equal to 0.95 when flooded with unborated water, which includes a conservative allowance of 2.6% delta  $k/k$  for uncertainties as described in Section 9.1 of the FSAR.
- b. A nominal 9.5 inch center-to-center distance between fuel assemblies placed in the storage racks in a high density configuration.

5.6.1.2 The  $k_{eff}$  for new fuel for the first core loading stored dry in the spent fuel storage racks shall not exceed 0.98 when aqueous foam moderation is assumed.

#### DRAINAGE

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

#### CAPACITY

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

### 5.7 COMPONENT CYCLIC OR TRANSIENT LIMITS

5.7.1 The components identified in Table 5.7-1 are designed and shall be maintained within the cyclic or transient limits of Tables 5.7-1 and 5.7-2.



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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION  
RELATED TO AMENDMENT NO. 35 TO FACILITY OPERATING LICENSE NO. NPF-74

ARIZONA PUBLIC SERVICE COMPANY, ET AL.

PALO VERDE NUCLEAR GENERATING STATION, UNIT NO. 3

DOCKET NO. STN 50-530

1.0 INTRODUCTION

By letter dated December 20, 1991, Arizona Public Service Company (APS or the licensee) submitted a request for changes to the Palo Verde Nuclear Generating Station, Unit No. 3 Technical Specifications (TS). The Arizona Public Service Company submitted this request on behalf of itself and 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 allow two demonstration assemblies to be loaded into Palo Verde Unit 3, Cycles 4, 5, and 6. The demonstration assemblies contain up to 80 fuel rods with zirconium based advanced alloy manufactured by ABB Combustion Engineering Nuclear Power Company. The purpose of the demonstration program is to explore new clad compositions that may be more cladding corrosion resistant, and improve cladding performance in high burnups.

2.0 EVALUATION

The licensee analyzed the advanced alloy cladding material properties and performance. The licensee confirmed that there was a 5% safety margin to power peaking for each assembly. The licensee concluded that the results of testing and evaluations support the safety of the planned irradiations of the two demonstration assemblies in reactor service. Inasmuch as these two assemblies are test assemblies, the data from these assemblies will be used to achieve improved performance for future fuel rod material and there are only 80 fuel rods with advanced alloy involved in the two assemblies, we conclude that the licensee has provided adequate assurance of safety for the proposed use of these two assemblies in Palo Verde Unit 3, Cycles 4, 5, and 6.

The staff considers these two demonstration assemblies as lead test assemblies (LTAs). In general, there are two criteria governing the use of LTAs: (1) the total number of demonstration assemblies in one core should be limited, and (2) the demonstration assemblies should not be loaded in limiting positions. The licensee's demonstration program conforms to these criteria. We thus conclude that these two demonstration assemblies are acceptable for

Palo Verde Unit 3 Cycles 4, 5, and 6.

The licensee requested an exemption from the requirements of 10 CFR 50.46, 10 CFR 50.44, and Appendix K on the basis that there is no clear indication in the regulations that the use of cladding material deviating from zircaloy is permissible. The staff determined that the use of advanced alloy on fuel rods involves the requirements of 10 CFR 50.44, 50.46, and Appendix K and has separately granted a related exemption from the requirements of 10 CFR 50.44, 50.46, and Appendix K for Palo Verde Unit 3, Cycles 4, 5, and 6.

The fuel rods clad with the advanced zirconium-based alloys will be identical in design and dimension to the fuel rods clad with conventional Zircaloy-4. The advanced cladding materials used in the demonstration fuel assemblies were chosen based on the improved corrosion resistance exhibited in ex-reactor autoclave corrosion tests in both high-temperature water and steam environments. Fuel rods clad with similar types of advanced zirconium-based alloys have been successfully irradiated in high-temperature PWRs in Europe.

The mechanical properties of the clad made from the advanced zirconium-based alloys meet all the mechanical requirements of the conventional Zircaloy-4 procurement specifications. Thus, the cladding and structural integrity of the fuel rods and fuel assemblies that have the advanced zirconium-based alloys will be maintained. Therefore, due to these similarities between advanced zirconium-based alloys and Zircaloy-4, the advanced alloys are expected to result in clad and fuel performance similar to Zircaloy-4.

We have reviewed the licensee submittal of the Technical Specification change for Palo Verde Unit 3, Cycles 4, 5, and 6. Based on the staff evaluation of the advanced alloy requirements, we find that the use of two demonstration assemblies and the Technical Specification change to be acceptable.

### 3.0 STATE CONSULTATION

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

### 4.0 ENVIRONMENTAL CONSIDERATION

The amendment changes 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 amendment involves 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

amendment involves no significant hazards consideration, and there has been no public comment on such finding (57 FR 6034). Accordingly, the amendment meets 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 amendment.

#### 5.0 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 amendment will not be inimical to the common defense and security or to the health and safety of the public.

Principal Contributor: S. Wu

Date: July 20, 1992