



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

9209210078 920908
PDR ADDCK 05000528
P PDR

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION
RELATED TO AMENDMENT NO. 64 TO FACILITY OPERATING LICENSE NO. NPF-41,
AMENDMENT NO. 50 TO FACILITY OPERATING LICENSE NO. NPF-51,
AND AMENDMENT NO. 37 TO FACILITY OPERATING LICENSE NO. NPF-74
ARIZONA PUBLIC SERVICE COMPANY, ET AL.
PALO VERDE NUCLEAR GENERATING STATION, UNIT NOS. 1, 2, AND 3
DOCKET NOS. STN 50-528, STN 50-529, AND STN 50-530

1.0 INTRODUCTION

By letter dated June 25, 1991, the Arizona Public Service Company (APS or the licensee) submitted a request for changes to the Technical Specifications (TS) for the Palo Verde Nuclear Generating Station, Units 1, 2, and 3 (Appendix A to Facility Operating License Nos. NPF-41, NPF-51, and NPF-74, respectively). 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 eliminate the hydrazine additive in the containment spray system at the Palo Verde Nuclear Generating Station Units 1, 2, and 3, by deleting Section 3/4.6.2.2 "Iodine Removal System" from the Technical Specifications (TS).

The existing TS for the Palo Verde nuclear units requires use of the containment spray system in conjunction with the iodine removal system for removal of iodine from a post-accident containment atmosphere. The iodine removal system adds hydrazine to the containment spray solution. The licensee has pointed out in the submittal that the revised Standard Review Plan (SRP) Section 6.5.2, "Containment Spray as a Fission Product Cleanup System," issued in December 1988, no longer requires chemical additive injection into the containment spray solution so long as the containment sump solution pH is maintained basic. The licensee also stated in the submittal that at Palo Verde, the containment sump solution pH will be maintained above 7.0 using trisodium phosphate which is contained in baskets located on the containment floor.

The licensee has, therefore, proposed elimination of the hydrazine addition to the containment spray solution and has requested deletion of TS Section 3/4.6.2.2 from the Technical Specifications for the Palo Verde nuclear units and has provided justification for its removal. In its technical justification, the licensee recalculated the offsite and control room operator

doses in accordance with the revised SRP Section 6.5.2 to show its compliance with the acceptable criteria stated in the section. The licensee stated in the submittal that the removal of the hydrazine additive will reduce equipment maintenance and surveillance efforts, and it will also reduce the potential hazards (caustic effect) to personnel and property from leaking seals, pumps, and valves.

2.0 EVALUATION

2.1 Radiological Issues

The as-built and operational Palo Verde containment spray system consists of two independent 100%-capacity loops each containing a containment spray pump, a shutdown cooling heat exchanger, a spray header, and associated valves, piping, and instrumentation. Each of the two containment spray pumps is rated at 3650 gpm. Containment spray is automatically initiated by a containment spray actuation signal (CSAS), which occurs on high-high containment pressure. Upon receipt of a CSAS the containment spray pumps are started, the spray header isolation valves are opened and spray water from the Refueling Water Tank is delivered to the containment spray headers. Positive displacement pumps will also automatically start and add hydrazine from the hydrazine tank to the containment spray lines. When the water level in the RWT reaches a specified low setpoint, a recirculation actuation signal (RAS) will automatically align the containment spray pump suctions to the containment sumps by opening the containment sump isolation valves.

The staff evaluated iodine removal effectiveness of the containment spray system with the hydrazine addition in accordance with Revision 1 (July 1981) of the SRP Section 6.5.2 and has accepted the design in Supplement No. 5 to the Palo Verde Safety Evaluation Report (NUREG-0857) dated November 1983. Subsequently, the staff issued a revision of the SRP Section 6.5.2 in December 1988. The revision acknowledged that a chemical additive is not necessarily required during spray injection so long as pH control is maintained for the sump water during post-accident conditions. The revision also provided a revised methodology for calculation of iodine removal efficiencies for the containment spray system.

Using the revised methodology, the licensee calculated the offsite and control room operator doses following a postulated LOCA. This calculation demonstrated that the requested removal of the chemical additive to the containment spray lines will not result in a significant increase in the offsite and control room operator doses and that these doses still meet the guidelines set forth in 10 CFR 100 and GDC-19.

The staff has verified the licensee's dose calculation by performing an independent radiological consequence analysis using the new iodine removal coefficients calculated in accordance with the methodology provided in the revised SRP Section 6.5.2 and using the same assumptions previously used for LOCA dose calculation in Supplement No. 5 (Table 15-1) of the Palo Verde SER. The revised iodine removal coefficients and associated radiological

consequences of a LOCA are listed in Tables 1 and 2. As shown in the Table 2, the staff finds that the offsite and control room operator doses are still within the dose guidelines set forth in 10 CFR 100 and GDC-19, thus verifying the licensee's calculation.

The staff concludes that, with respect to radiological issues, the proposed changes to the Palo Verde TS concerning elimination of the hydrazine additive to the containment spray lines are acceptable. This conclusion is based on (1) the staff review of the licensee's analysis and (2) the independent analysis by the staff which confirms that the distances to the exclusion area boundary and to the low population zone of the Palo Verde site are still sufficient to provide reasonable assurance that the radiological consequences of a LOCA will be within the dose guidelines set forth in 10 CFR 100 and that control room operator doses following a LOCA will be within the dose guidelines set forth in GDC-19. Therefore, the staff finds the conclusions stated in Supplement No. 5 of the Palo Verde SER Section 6.4, "Control Room Habitability," and Section 15.4, "Radiological Consequences of Design Basis Accidents" are not affected and still remain the same.

2.2 Materials and Chemistry Issues

During the injection phase, the licensee proposes to operate the containment sprays with borated water without the hydrazine additive. The pH of this water could be well below 7. Using the information currently available on iodine removal and the guidance provided in Section 6.5.2 of the Standard Review Plan, the licensee has demonstrated that, even at a relatively low pH, elemental iodine could be efficiently removed from the post accident containment atmosphere without the presence of hydrazine, provided the spray solution was free from previously dissolved iodine. This occurs because the rates of removal of elemental iodine are determined by the first-order removal coefficients which are independent of pH and chemical nature of the spray solution. The same applies to the removal coefficients for particulates iodine which is controlled only by hydrodynamical characteristics of the sprays. The licensee calculated these coefficients using the methods given in Section 6.5.2 of the Standard Review Plan and found them to be conservative relative to the coefficients determined in the original evaluation which was approved by the staff. Similar conservatism existed in the evaluation of decontamination factors.

During the recirculation phase, spray water will come from the sump and will contain dissolved iodine, removed from the containment atmosphere during the injection phase. In radiation environment this iodine could be revolatilized and released back to the containment if pH of the solution is too low. In order to prevent it from happening, the pH of the sump solution should be kept above 7. Currently, the licensee has a provision for maintaining pH higher than 7 by means of trisodium phosphate kept in the basket located in the sump. During an accident this chemical will dissolve in the sump water and will buffer its pH at the above 7 value. Because hydrazine is a very weak base, its removal from the sprays will not change this pH control mechanism.

There is also another reason for maintaining solution in the sump alkaline. Higher pH minimizes corrosion of metallic surfaces. Chloride induced stress corrosion cracking of austenitic stainless steel components is considerably reduced if pH of the solution is maintained above 7. Short exposure to low pH water during the injection phase will not cause significant stress corrosion cracking, but more extended exposure during the recirculation phase may result in a significant damage. Section 6.1.1. of the Standard Review Plan (Branch Technical Position MTEB 6-1) recommends pH in the 7 to 9.5 range. The current plant design ensures that alkaline pH is maintained in the sump and removal of hydrazine additive would not significantly affect this condition.

Control of sump pH is also required to minimize hydrogen generation by corrosion of aluminum and zinc on galvanized surfaces and in organic coatings on the containment surfaces. The licensee has shown that the proposed deletion of hydrazine from the spray solution will not affect its chemical nature sufficiently to make it more a corrosive medium for aluminum and zinc. Previously approved analyses for hydrogen generation remains, therefore, applicable.

For the same reason deletion of hydrazine will not significantly change the effect spray solution has on the equipment located in the containment and the previously approved environmental qualification will remain valid. Finally, the proposed elimination of hydrazine will not compromise the containment spray system's operational capability.

We have reviewed the licensee's analyses and performed our independent verifications and concur with the licensee's justifications for elimination of the hydrazine additive. Based on the above evaluation, the staff concludes that, with respect to materials and chemistry issues, the proposed modification to Palo Verde Nuclear Generating Station's containment spray system is 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 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 and changes 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, and there has been no public comment on such finding (56 FR 43803). 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.

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 Contributors: J. Lee
K. Parczewski
T. Chandra

Date: September 8, 1992

TABLE 1

Containment Spray Iodine Removal Efficiencies (hour⁻¹)

	<u>Current (1)</u>	<u>New</u>
Elemental iodine	21	20
Organic iodine	0	0
Particulate iodine	0.41	0.34
Decontamination Factor	200	6.51

(1) Table 15-1 of Supplement No. 5 to Palo Verde SER (NUREG-0857)

TABLE 2

Radiological Consequences (rem)

	<u>EAB (2)</u>		<u>LPZ (3)</u>		<u>Control Room</u>	
	Thyroid	Whole Body	Thyroid	Whole Body	Thyroid	Whole Body
Containment Leakage	94	2.5	83	1.1	9.5	<1
ESF Leakage	14	<0.1	43	<0.1	<0.5	<1
Total	108	<2.6	126	<1.2	<10.0	<1

(2) Exclusion Area Boundary

(3) Low Population Zone Outer Boundary

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 AMENDMENTS FOR THE PALO VERDE NUCLEAR GENERATING
STATION UNIT NO. 1 (TAC NO. M80905), UNIT NO. 2 (TAC NO. M80906),
AND UNIT NO. 3 (TAC NO. M80907)

The Commission has issued the enclosed Amendment No. 64 to Facility Operating License No. NPF-41, Amendment No. 50 to Facility Operating License No. NPF-51, and Amendment No. 37 to Facility Operating License No. NPF-74 for the Palo Verde Nuclear Generating Station, Unit Nos. 1, 2, and 3, respectively. The amendments consist of changes to the Technical Specifications in response to your application dated June 25, 1991.

These amendments delete the Iodine Removal System from Technical Specifications 3/4 3.6.2.2 for Units 1, 2, and 3. The Iodine Removal System uses hydrazine as an additive to the containment spray system at Palo Verde. The removal of the hydrazine additive from the containment spray system will not result in a significant increase in post-Loss of Coolant Accident (LOCA) doses outside of containment.

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. 64 to NPF-41
2. Amendment No. 50 to NPF-51
3. Amendment No. 37 to NPF-74
4. Safety Evaluation

cc w/enclosures:
See next page

DISTRIBUTION:
See next page

OFC	LA:PDV DRPW	PM:PDV:DRPW	PM:PDV:DRPW	OGC	D:PDV:DRPW
NAME	DFoster	CThompson:mc	CTramme11	DPW	TQuay
DATE	8/27/92	8/24/92	9/8/92	8/26/92	9/8/92

September 8, 1992

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 AMENDMENTS FOR THE PALO VERDE NUCLEAR GENERATING
STATION UNIT NO. 1 (TAC NO. M80905), UNIT NO. 2 (TAC NO.-M80906),
AND UNIT NO. 3 (TAC NO. M80907)

The Commission has issued the enclosed Amendment No. 64 to Facility Operating License No. NPF-41, Amendment No. 50 to Facility Operating License No. NPF-51, and Amendment No. 37 to Facility Operating License No. NPF-74 for the Palo Verde Nuclear Generating Station, Unit Nos. 1, 2, and 3, respectively. The amendments consist of changes to the Technical Specifications in response to your application dated June 25, 1991.

These amendments delete the Iodine Removal System from Technical Specifications 3/4 3.6.2.2 for Units 1, 2, and 3. The Iodine Removal System uses hydrazine as an additive to the containment spray system at Palo Verde. The removal of the hydrazine additive from the containment spray system will not result in a significant increase in post-Loss of Coolant Accident (LOCA) doses outside of containment.

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. 64 to NPF-41
2. Amendment No. 50 to NPF-51
3. Amendment No. 37 to NPF-74
4. Safety Evaluation

cc w/enclosures:
See next page

DISTRIBUTION:
See next page

NRC FILE CENTER COPY

OFC	LA:PDV DRPW	PM:PDV:DRPW	PM:PDV:DRPW	OGC	D:PDV:DRPW
NAME	D Foster	C Thompson:mc	C Trammell	DPW	TQuay
DATE	8/24/92	8/24/92	9/8/92	8/26/92	9/8/92

OFFICIAL RECORD COPY

DOCUMENT NAME: PV80905.AMD

150079
ML021700326

DF01



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

September 8, 1992

Docket Nos. 50-528, 50-529
and 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 AMENDMENTS FOR THE PALO VERDE NUCLEAR GENERATING
STATION UNIT NO. 1 (TAC NO. M80905), UNIT NO. 2 (TAC NO. M80906),
AND UNIT NO. 3 (TAC NO. M80907)

The Commission has issued the enclosed Amendment No. 64 to Facility Operating License No. NPF-41, Amendment No. 50 to Facility Operating License No. NPF-51, and Amendment No. 37 to Facility Operating License No. NPF-74 for the Palo Verde Nuclear Generating Station, Unit Nos. 1, 2, and 3, respectively. The amendments consist of changes to the Technical Specifications in response to your application dated June 25, 1991.

These amendments delete the Iodine Removal System from Technical Specifications 3/4 3.6.2.2 for Units 1, 2, and 3. The Iodine Removal System uses hydrazine as an additive to the containment spray system at Palo Verde. The removal of the hydrazine additive from the containment spray system will not result in a significant increase in post-Loss of Coolant Accident (LOCA) doses outside of containment.

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,

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

Enclosures:

1. Amendment No. 64 to NPF-41
2. Amendment No. 50 to NPF-51
3. Amendment No. 37 to NPF-74
4. Safety Evaluation

cc w/enclosures:
See next page

Mr. William F. Conway
Arizona Public Service Company

Palo Verde

cc:

Nancy C. Loftin, Esq.
Corporate Secretary & Counsel
Arizona Public Service Company
P. O. Box 53999, Mail Station 9068
Phoenix, Arizona 85072-3999

Jack R. Newman, Esq.
Newman & Holtzinger, P.C.
1615 L Street, N.W., Suite 1000
Washington, D.C. 20036

James A. Beoletto, Esq.
Southern California Edison Company
P. O. Box 800
Rosemead, California 91770

Curtis Hoskins
Executive Vice President and
Chief Operating Officer
Palo Verde Services
2025 N. 3rd Street, Suite 220
Phoenix, Arizona 85004

Senior Resident Inspector
U.S. Nuclear Regulatory Commission
HC-03 Box 293-NR
Buckeye, Arizona 85326

Roy P. Lessey, Jr., Esq.
Bradley W. Jones, Esq.
Arkin, Gump, Strauss, Hauer and Feld
El Paso Electric Company
1333 New Hampshire Ave., Suite 400
Washington, D.C. 20036

Regional Administrator, Region V
U. S. Nuclear Regulatory Commission
1450 Maria Lane
Suite 210
Walnut Creek, California 94596

Mr. Charles B. Brinkman, Manager
Washington Nuclear Operations
ABB Combustion Engineering Nuclear Power
12300 Twinbrook Parkway, Suite 330
Rockville, Maryland 20852

Mr. William A. Wright, Acting Director
Arizona Radiation Regulatory Agency
4814 South 40 Street
Phoenix, Arizona 85040

Chairman
Maricopa County Board of Supervisors
111 South Third Avenue
Phoenix, Arizona 85003

September 8, 1992

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

SUBJECT: ISSUANCE OF AMENDMENTS FOR THE PALO VERDE NUCLEAR GENERATING STATION
UNIT NO. 1 (TAC NO. M80905), UNIT NO. 2 (TAC NO. M80906), AND UNIT
NO. 3 (TAC NO. M80907)

DISTRIBUTION:

Docket Files
NRC & Local PDRs
PDV r/f
PDV p/f
BBoger
MVirgilio
DFoster
CThompson
CTrammell
TQuay
OGC, 15B18
DHagan, MNBB3206
GHill (12), P1-37
WJones, P-370
CGrimes, 11E22
ACRS (10), P-315
OPA, 2G5
OC/LFMB, MNBB4503
KPerkins, RV
Region V (12)