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SUBJECT: Application for amends to licenses NPF-41,NPF-51 & NPF-74, re TS 3/4.5.2,changing SRs 4.5.5.d.2 & 4.5.2.d.3 to reflect design basis requirements for anhydrous TSP utilized in containment following LOCA.

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AA2

10 CFR 50.90

Arizona Public Service

PALO VERDE NUCLEAR GENERATING STATION
P.O. BOX 52034 PHOENIX, ARIZONA 85072-2034

WILLIAM L. STEWART
EXECUTIVE VICE PRESIDENT
NUCLEAR

102-03727-WLS/AKK/NLT
June 28, 1996

U. S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Mail Station P1-37
Washington, DC 20555-0001

Dear Sirs:

Subject: Palo Verde Nuclear Generating Station (PVNGS)
Units 1, 2, and 3
Docket Nos. STN 50-528/529/530
Proposed Amendment to Technical Specification (TS)
Section 3/4.5.2, "ECCS Subsystems-Operating" and the Associated Bases

Pursuant to 10 CFR 50.90, Arizona Public Service Company (APS) submits herewith a proposed amendment to Technical Specification (TS) Section 3/4.5.2, "ECCS Subsystems-Operating," and the associated bases. The proposed amendment to TS 3/4.5.2 would change the Surveillance Requirements (SR) 4.5.2.d.2 and 4.5.2.d.3 to reflect the design basis requirements for anhydrous trisodium phosphate (TSP) which is utilized in containment following a loss-of-coolant accident (LOCA) to ensure the borated water is adjusted to a pH of $\geq$ 7.

Provided in the enclosure to this letter are the following:

A. Description of the Proposed Amendment
B. Purpose of the Technical Specification
C. Need for the Technical Specification Amendment
D. Safety Analysis of the Proposed Technical Specification Amendment
E. No Significant Hazards Consideration Determination
F. Environmental Consideration
G. Marked-up Technical Specification Change Pages

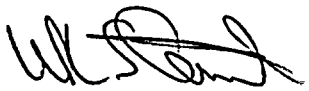
In accordance with TS Section 6.5, the Plant Review Board and Offsite Safety Review Committee have reviewed and concur with this proposed amendment. Pursuant to 10 CFR 50.91(b)(1), a copy of this request has been forwarded to the Arizona Radiation Regulatory Agency.

A001

Approval of this proposed amendment is requested by November 1, 1996, in order to support the performance of the surveillance test prior to the startup of PVNGS Unit 1 Cycle 7 from refueling outage 6. It is requested that this proposed amendment become effective within 45 days of issuance by the NRC for PVNGS Units 1, 2, and 3.

Should you have any questions, please contact Scott A. Bauer at (602) 393-5978.

Sincerely,



WLS/AKK/NLT/pv

Enclosure

cc: L. J. Callan
K. E. Perkins
J. W. Clifford
K. E. Johnston
A. V. Godwin (ARRA)

STATE OF ARIZONA)
) ss.
COUNTY OF MARICOPA)

I, W. L. Stewart, represent that I am Executive Vice President - Nuclear, Arizona Public Service Company (APS), that the foregoing document has been signed by me on behalf of APS with full authority to do so, and that to the best of my knowledge and belief, the statements made therein are true and correct.

W. L. Stewart

Sworn To Before Me This 28 Day Of June, 1996.

Roxanna VanDillen
Notary Public

My Commission Expires

My Commission Expires June 12, 1997

ENCLOSURE

PROPOSED AMENDMENT TO

TECHNICAL SPECIFICATION SECTION 3/4.5.2,

"ECCS SUBSYSTEMS-OPERATING,"

AND THE ASSOCIATED BASES

A. DESCRIPTION OF THE PROPOSED AMENDMENT

The proposed amendment to Technical Specification (TS) 3/4.5.2, "ECCS Subsystems-Operating," Surveillance Requirements (SR) 4.5.2.d.2 and 4.5.2.d.3 would change the specifications associated with trisodium phosphate (TSP) to reflect that which is actually loaded and required in containment to ensure that borated water is adjusted to a pH of ≥ 7 during post-loss-of-coolant accident (LOCA) conditions. Additionally, a clarification to the associated bases is proposed.

Design basis calculations have been re-performed to determine the actual anhydrous TSP volume and surveillance concentration required, based on maximum post-LOCA containment water volumes and the actual density of anhydrous TSP installed in the units, to ensure post-LOCA containment solution pH ≥ 7. Specifically, SR 4.5.2.d.2 would change to increase the minimum required amount of solid granular anhydrous TSP in the TSP storage baskets from "464" to "524" ft^3 to meet the new design basis requirement.

SR 4.5.2.d.3 would change from "0.055 ± 0.001 lb. of TSP submerged in 1.0 ± 0.05 gallons of 77 ± 9°F borated water" to "3.5 ± 0.005 grams of anhydrous TSP (corrected for moisture content) submerged in 1.0 ± 0.005 liter of 2.5 wt% boric acid solution (nominally 4400 ppm boron) at 135 ± 9°F." The SR would still specify that the pH of the solution as measured at 77 ± 9°F is raised to ≥ 7 within 4 hours.

Bases Section 4.5.2 and 4.5.3 would be reworded to remove reference to the term "dissolving baskets" and replace it with verbiage which clearly states how the TSP is stored and utilized. Specifically, it is proposed that the fourth paragraph of the bases be deleted and replaced with the following:

> "Anhydrous TSP is stored in baskets in containment that allow the TSP to dissolve into containment water following a large break LOCA. Once dissolved in the containment sump water, the TSP will increase the water pH to ≥ 7. Maintaining the pH at ≥ 7 prevents a significant fraction of dissolved iodine from converting to a volatile form and minimizes the potential of stress corrosion cracking of austenitic stainless steel components in containment following a LOCA."

Additionally, a revision to the bases is proposed to clarify that the TSP sample will be dissolved in a borated water source as opposed to specifying the Refueling Water Tank (RWT) as the borated water source.

B. PURPOSE OF THE TECHNICAL SPECIFICATION

TS SR 4.5.2.d.2 requires that a specified volume of solid granular TSP be contained in the storage baskets in order to condition the sump water following a LOCA. The required pH of the sump solution is based on the long-term retention of iodine and is sufficient to avoid stress corrosion cracking of austenitic stainless steel and excessive generation of hydrogen by the corrosion of containment metals.

The dissolution rate of the solid form of TSP is demonstrated by the acceptable performance of the 18-month surveillance test conducted in accordance with TS SR 4.5.2.d.3. This surveillance test verifies dissolution characteristics by demonstrating that a representative sample of the anhydrous material dissolves in borated water without agitation and raises the pH of the water to $\geq$ 7 within a 4-hour period.

C. NEED FOR THE TECHNICAL SPECIFICATION AMENDMENT

Palo Verde Nuclear Generating Station (PVNGS) is in the process of converting the TS for all three units to Revision 1 of NUREG-1432, "Standard Technical Specifications, Combustion Engineering Plants." As part of this conversion process, information contained in the current TS was validated and it was previously identified that the form of the TSP in the containment baskets is the anhydrous form rather than the dodecahydrate form. As a result of this discovery a TS change was requested under emergency circumstances and granted by the NRC in Amendments 107, 99, and 79 for Units 1, 2, and 3, respectively.

Subsequently, the engineering review continued, and the design basis calculation was revised which resulted in a higher required concentration of TSP than currently required by TS to ensure the pH requirements of the TS are met. The maximum water volume utilized in the new calculation assumes a volume of water due to flooding from credible water sources. The actual bulk density of the anhydrous TSP installed was determined to be lower than that which was assumed in the original design basis calculation and Updated Final Safety Analysis Report (UFSAR) Section 6.1.1.2. Additionally, actual laboratory testing on the installed anhydrous TSP indicated that more TSP is required to neutralize the borated water than determined by the original design basis calculation.

The current TS requires a minimum of 464 ft^3. This equates to approximately 22,450 pounds of anhydrous TSP at a bulk density of 48.4 pounds per cubic foot. The bulk density of 48.4 pounds per cubic foot has been verified by sampling and laboratory analysis. The total mass of 22,450 pounds, divided by the total post-LOCA sump water inventory of 867,124 gallons, yields an anhydrous TSP concentration of 3.1 grams per liter of containment sump water. Using this analytically defined concentration of 3.1 grams TSP per liter of containment sump water results in a pH less than the required minimum pH of 7. It was determined by laboratory analysis that a sample of 3.5 grams per liter is required to ensure a minimum pH of 7 for the above design conditions and TSP specifications. A concentration of 3.5 grams per liter and a post-LOCA water volume of 867,124 gallons translates to 25,325 pounds or 524 ft^3 of anhydrous TSP. Incorporating a volume of 524 ft^3 of anhydrous TSP in TS SR 4.5.d.2 will ensure that the pH of the post-LOCA solution is $\geq$ 7. Proposed surveillance test tolerances are based on standard chemistry laboratory practices and quality control measures. Sufficient margin exists in design basis calculations to account for these tolerances.

A change to 4.5.2.d.3 is proposed to clarify how the surveillance test is to be performed. The proposed change specifies that the TSP will be dissolved in 2.5 wt% boric acid solution (nominally 4400 ppm) at 135 ± 9°F (the shutdown cooling heat exchanger outlet temperature). The requirement to dissolve the TSP sample at 135 ± 9°F provides assurance that the stored TSP will dissolve in borated water at postulated post-LOCA temperatures. Specifying the concentration of boron will ensure that the surveillance test is conservatively performed at the highest possible concentration of available borated water. The determination of pH remains at a temperature of 77 ± 9°F.

Bases Section 4.5.2 and 4.5.3 would be reworded to remove reference to the term "dissolving baskets" and replace it with verbiage which clearly states how the TSP is stored and utilized. Additionally, a revision to the bases is proposed to clarify that the TSP sample will be dissolved in a borated water source as opposed to specifying the RWT as the borated water source. This change, coupled with the proposed change to specify the concentration of the boric acid solution in TS SR 4.5.2.d.3, is conservative since RWT boron concentration can vary between 4000 and 4400 ppm in accordance with TS.

D. SAFETY ANALYSIS OF THE PROPOSED TECHNICAL SPECIFICATION AMENDMENT

TSP is installed in baskets in the containment building to ensure that iodine, which may be dissolved in the recirculated reactor cooling water following a LOCA,

remains in solution. The TSP acts as a passive form of pH control for post-LOCA containment spray and core cooling water. The dissolution of the TSP in the baskets results in a neutral to slightly alkaline solution which precludes release of volatile iodine into the containment atmosphere during recirculation following a LOCA. Buffering of the borated LOCA inventory also minimizes the effects of chloride and caustic stress corrosion on mechanical systems and components.

The LOCA radiological consequences analysis takes credit for iodine retention in the sump solution based on the recirculation water pH being ≥ 7. The radionuclide releases from the containment atmosphere and the consequences of a LOCA would be increased if the pH of the recirculation water was not adjusted to 7 or above. The proposed TS amendment would revise TS SRs 4.5.2.d.2 and 4.5.2.d.3 to increase the required volume and surveillance test concentration of anhydrous TSP to ensure that the pH requirements of the TS are met.

The amount of TSP required is based on the quantities of borated water that accumulate in the sump and containment floor following a LOCA. The analyses specific to PVNGS conservatively assume a total flood volume equal to the complete depletion of the Reactor Coolant System, Refueling Water Tank, and Safety Injection Tank inventories and assume a concentration of 4400 ppm boron in the sump solution. This assumption is conservative based on actual flooding analyses and yields greater requirements in terms of required amounts of equivalent TSP. Based on this conservative assessment of the total containment post-LOCA inventory and boron concentration, the required amount of anhydrous TSP is 524 ft^3. Surveillance tests have been performed which demonstrate that each PVNGS unit currently has in excess of 550 ft^3 installed and the new design basis requirements are currently being met.

The dissolution rate of the anhydrous TSP is demonstrated by the acceptable performance of the 18-month surveillance tests conducted in accordance with TS 4.5.2.d.2 and 4.5.2.d.3. These surveillance tests verify dissolution characteristics by demonstrating that a representative sample of the anhydrous material dissolves in water without agitation and raises the pH of the water to ≥ 7 within a 4-hour period. Dissolving the TSP at a temperature of 135 ± 9°F is conservative in that sufficient margin exists since minimum post-LOCA temperatures are assumed to be 300 °F. Additionally, sufficient margin exists in design basis calculations to account for tolerances used when performing surveillance testing.

E. NO SIGNIFICANT HAZARDS CONSIDERATION DETERMINATION

The Commission has provided standards for determining whether a significant hazards consideration exists as stated in 10 CFR 50.92. A proposed amendment to an operating license for a facility involves a no significant hazards consideration if operation of the facility in accordance with a proposed amendment would not: (1) involve a significant increase in the probability or consequences of an accident previously evaluated; (2) create the possibility of a new or different kind of accident from any accident previously evaluated; or (3) involve a significant reduction in a margin of safety. A discussion of these standards as they relate to this amendment request follows:

Standard 1 -- Does the proposed amendment involve a significant increase in the probability or consequences of an accident previously evaluated?

No. The proposed amendment does not involve any change to the method of operation of any plant equipment or modify any plant equipment. The proposed amendment is associated with a passive component that mitigates the consequences of a LOCA, and does not contribute to increasing the probability of an accident. The proposed amendment ensures that the correct volumes and mass of anhydrous TSP are utilized such that the post-LOCA ECCS solution is maintained at a pH above 7. This ensures that radiological consequences are minimized by preventing significant amounts of iodine released from fuel failures and dissolved in the recirculating water from converting to a volatile form and evolving into the containment atmosphere. Therefore, the proposed amendment does not involve a significant increase in the probability or consequences of an accident.

Standard 2 -- Does the proposed amendment create the possibility of a new or different kind of accident from any accident previously evaluated?

No. The proposed amendment does not modify the configuration of the units, involve any change to plant equipment, or change the method of plant operation other than increase the amount of TSP required to ensure sufficient amounts of anhydrous TSP is available to minimize post-LOCA radiological consequences. The proposed amendment is associated with a passive component that mitigates the consequences of a LOCA, and no new failure modes have been defined for any plant system or component important to safety. Additionally, no new limiting failures have been identified as a result of the proposed changes. Current structural and seismic design basis calculations bound this change. Maintaining the solution pH $\geq$ 7 also reduces the occurrence of stress corrosion cracking (SCC)

of austenitic stainless steel components in containment. Reducing SCC reduces the probability of failure of components. Therefore, the amendment does not create the possibility of a new or different kind of accident from any accident previously evaluated.

Standard 3 -- Does the proposed amendment involve a significant reduction in a margin of safety?

No. The margin of safety is maintained by the use of sufficient amounts of anhydrous TSP to provide the necessary pH control following a LOCA such that iodine, washed to the containment sump by containment spray action, remains in solution and is not released due to acidic conditions. Consequently, iodine concentrations in the containment atmosphere are maintained low and within the concentrations assumed for calculations of off-site dose. Therefore, the amendment does not involve a significant reduction in the margin of safety.

F. ENVIRONMENTAL DETERMINATION

APS has determined that the proposed amendment involves no change in the amount or type of effluent that may be released offsite, and that there is no increase in individual or cumulative occupational radiation exposure. As such, operation of PVNGS Units 1, 2, and 3 in accordance with the proposed amendment does not involve an unreviewed environmental safety question.

G. MARKED-UP TECHNICAL SPECIFICATION PAGES

UNIT 1	UNIT 2	UNIT 3
3/4 5-5	3/4 5-5	3/4 5-5
B 3/4 5-2	B 3/4 5-2	B 3/4 5-2
B 3/4 5-3	B 3/4 5-3	B 3/4 5-3

The following inserts are provided to be incorporated as delineated in the attached marked-up Technical Specification pages:

INSERT A

Verifying that when a representative sample of 3.5 ± 0.005 grams of anhydrous TSP (corrected for moisture content) from a TSP storage basket is submerged, without agitation, in 1.0 ± 0.005 liter of 2.5 wt% boric acid solution (nominally 4400

ppm boron) at 135 ± 9°F, the pH of the solution as measured at 77 ± 9°F is raised to greater than or equal to 7 within 4 hours.

INSERT B

Anhydrous TSP is stored in baskets in containment that allow the TSP to dissolve into containment sump water following a large break LOCA. Once dissolved in the containment sump water, the TSP will increase the water pH to greater than or equal to 7. Maintaining the pH at greater than or equal to 7 prevents a significant fraction of dissolved iodine from converting to a volatile form and minimizes the potential of stress corrosion cracking of austenitic stainless steel components in containment following a LOCA.