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SUBJECT: Application for amends to licenses NPF-41,NPF-51 & NPF-74, clarifying basis & applicability of LCO 3.4.8.1 during time reactor vessel head is fully detensioned & also add maximum allowable heatup & cooldown rate figures.

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WILLIAM F. CONWAY
EXECUTIVE VICE PRESIDENT
NUCLEAR

161-03955-WFC/DAF

May 17, 1991

Docket Nos. STN 50-528/529/530

U. S. Nuclear Regulatory Commission
Attn: Document Control Desk
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References:

1. Letter from W. F. Conway (APS) to U. S. Nuclear Regulatory Commission, 161-03837-WFC/JST, dated March 26, 1991. Subject: "Request for a Temporary Waiver of Compliance for Table 3.4-3 of Limiting Condition for Operation 3.4.8.1"

2. Letter from W. F. Conway (APS) to U. S. Nuclear Regulatory Commission, 161-02990-WFC/JST, dated March 13, 1990. Subject: "Proposed Technical Specification Amendment to Incorporate the Requirements of Generic Letter 88-11, NRC Position on Radiation Embrittlement of Reactor Vessel Materials and its Impact on Plant Operations"

Dear Sirs:

Subject: Palo Verde Nuclear Generating Station (PVNGS)
Units 1, 2, and 3
Proposed Technical Specification Change to
Section 3.4.8.1, Pressure/Temperature Limits
(Reactor Coolant System)
File: 91-056-026; 91-005-419.05

In accordance with 10 CFR 50.90, Arizona Public Service Company (APS) submits herewith a request to amend Facility Operating Licenses NPF-41, NPF-51, and NPF-74, for PVNGS Units 1, 2, and 3 respectively. The proposed amendments clarify the basis and applicability of Limiting Condition for Operation (LCO) 3.4.8.1 during the time the reactor vessel head is fully detensioned and also add maximum allowable heatup and cooldown rate figures, to supplement the existing pressure/temperature limit figures. The proposed amendments are being sent in accordance with the schedule committed to in Reference 1.

This Technical Specification amendment request is necessary so that normal outage activities may be conducted which require the temperature of the reactor coolant system (RCS) to be below 93°F, currently prohibited within Technical Specification Table 3.4-3. This condition is overly restrictive and requires clarification of its origin.

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APS previously identified the need for a waiver of compliance from this condition on March 26, 1991 (Reference 1). The cooldown rate of 0°F/hr below 93°F prohibits any action by APS other than to submit this Technical Specification amendment request. In order to preclude the need for an additional Waiver of Compliance from this condition, APS requests NRC approval of these amendments before October 17, 1991, which is the currently scheduled start of the Unit 2 refueling outage.

The enclosures to this letter include:

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

Pursuant to 10 CFR 50.91(b)(1), a copy of the proposed amendments are being forwarded to the Arizona Radiation Regulatory Agency.

If you should have additional questions, please contact Michael E. Powell of my staff at (602) 340-4981.

Sincerely,

WFC/DAF/pmm

Enclosure

cc: J. B. Martin
D. H. Coe
A. C. Gehr
A. H. Gutterman
C. F. Tedford

STATE OF ARIZONA)
) ss.
COUNTY OF MARICOPA)

I, W. F. Conway, represent that I am Executive Vice President - Nuclear, that the foregoing document has been signed by me on behalf of Arizona Public Service Company with full authority to do so, that I have read such document and know its contents, and that to the best of my knowledge and belief, the statements made therein are true and correct.

W. F. Conway

Sworn To Before Me This 17 Day Of May, 1991.

Linda B. Spell
Notary Public

My Commission Expires

June 5, 1992

ENCLOSURE

A. DESCRIPTION OF PROPOSED TECHNICAL SPECIFICATION AMENDMENT REQUEST

The proposed amendment revises Limiting Condition for Operation (LCO) 3.4.8.1 to clarify the fact that during the time the reactor vessel head is fully detensioned, the maximum allowable heatup and cooldown rates (Table 3.4-3) do not apply. This is due to the fact that when the vessel head is fully detensioned, the reactor coolant system (RCS) cannot be pressurized. This is further discussed in Section D of this enclosure. In addition, Figures 3.4-2c and 3.4-2d, "Maximum Allowable Heatup and Cooldown Rates" (for less than 8 effective full power years (EFPY) and from 8 to 32 EFPY, respectively), are proposed to supplement the current Technical Specification Table 3.4-3," Maximum Allowable Heatup and Cooldown Rates". The justification for this amendment is proposed to be included in the Bases, Section B3/4.4.8, Pressure Temperature Limits, as well. This addition to the Bases discusses the LCO applicability as well as the relationship between Technical Specification Table 3.4-3 and proposed Figures 3.4-2c and 3.4-2d.

B. PURPOSE OF THE TECHNICAL SPECIFICATION

During startup and shutdown, the rates of temperature and pressure changes are limited so as not to exceed the limit lines of Technical Specification Figures 3.4-2a and 3.4-2b. This ensures that the maximum specified heatup and cooldown rates are consistent with the design assumptions and satisfy the stress limits for cyclic operation.

Reactor vessel pressure-temperature (P-T) limitations and Low Temperature Overpressure Protection (LTOP) requirements for PVNGS are calculated to meet the regulations of 10 CFR Part 50 Appendix A, Design Criterion 14 and Design Criteria 31 as discussed in PVNGS UFSAR, Section 3.1. These design criteria require that the reactor coolant pressure boundary be designed, fabricated, erected, and tested in order to have an extremely low probability of abnormal leakage, rapid failure, or gross rupture. The criteria also require that the reactor coolant pressure boundary be designed with sufficient margin to assure that when stressed under operation, maintenance, and testing the boundary, it will behave in a non-brittle manner and the probability of a rapidly propagating fracture is minimized.

The P-T limits are developed using the requirements of 10 CFR 50 Appendix G. 10 CFR Appendix G describes the requirements for developing the P-T limits and provides the general basis for these limitations. The margins of safety against fracture provided by the P-T limits using the requirements of 10 CFR Part 50 Appendix G are equivalent to those recommended in the ASME Boiler and Pressure Vessel Code Section III, Appendix G, "Protection Against Nonductile Failure," as discussed in PVNGS UFSAR, Section 5.3.2. The general guidance provided in those procedures has been utilized to develop the Palo Verde P-T limits with the requisite margins of safety for heatup and cooldown conditions.

The P-T limits account for the temperature differential between the reactor vessel base metal and the reactor coolant bulk fluid temperature. Correction for elevation and RCS flow induced pressure differences between the reactor vessel beltline and the pressurizer are included in the development of the P-T limits as are instrumentation uncertainties for pressure and temperature measurement. Consequently, the P-T limits are provided on coordinates of indicated pressurizer pressure versus indicated RCS temperature.

The limitations imposed on the RCS heatup and cooldown rates (Technical Specification Table 3.4-3) are provided to assure LTOP with the two shutdown cooling suction line relief valves operable. At low temperatures with the relief valves aligned to the RCS, it is necessary to restrict heatup and cooldown rates to assure that P-T limits are not exceeded. The primary objective of the LTOP system is to preclude violation of applicable Technical Specification P-T limits during startup and shutdown conditions. These P-T limits are usually applicable to a finite time period such as one cycle, 5 EFPY, etc. and are based upon the irradiation damage prediction by the end of the period. The heatup and cooldown rate limitations assure the limits of 10 CFR 50 Appendix G will not be exceeded with overpressure protection provided by the primary safety valves.

C. NEED FOR THE TECHNICAL SPECIFICATION AMENDMENT

This proposed amendment is needed so that PVNGS may be allowed to cooldown below 93°F. The current cooldown rate in Technical Specification Table 3.4-3 is 0°F per hour and prohibits cooldown below 93°F. The RCS temperature will be below 93°F as a result of filling the refueling cavity after vessel head removal and whenever the reactor vessel has been defueled. Since the refueling cavity is filled from the Refueling Water Tank, which cannot be heated to 93°F, and since there is no decay heat available after removing the fuel, the RCS cannot be maintained above 93°F. These amendments are, therefore, needed in order to conduct normal plant evolutions at temperatures below 93°F which are necessary to assure the safe refueling and operation of PVNGS. The supplemental information provided in proposed Technical Specification Figures 3.4-2c and 3.4-2d provides the graphical representation and origin for Technical Specification Table 3.4-3.

D. SAFETY ANALYSIS OF THE PROPOSED AMENDMENT

The purpose of the maximum cooldown rates specified in Technical Specification 3/4.4.8 is to prevent the RCS pressure from exceeding the corresponding normal operation P-T limit, assuming a concurrent overpressurization due to the limiting LTOP transient. Consequently, the cooldown rate limits are only valid if the RCS is capable of being pressurized.

Therefore, with the vessel head fully detensioned, the Technical Specification cooldown limits are not applicable. The clarification sought within LCO 3.4.8.1 is only valid for the period of time that the vessel head is fully detensioned and thus the RCS cannot be pressurized above the static head of water over the vessel in the refueling pit which is negligible compared to the ASME Code Appendix G, P-T limit.

The requirements of Technical Specification Table 3.4-3 were introduced in Amendments 52, 38, and 24 for Unit 1, 2, and 3 Technical Specifications, respectively, and were the result of a reanalysis of the P-T limits using the more restrictive requirements of Regulatory Guide 1.99, Revision 2, as promulgated by Generic Letter 88-11. The supplemental information provided in proposed Technical Specification Figures 3.4-2c and 3.4-2d is a graphical representation of Table 3.4-3 as created by ABB Combustion Engineering, Inc. for APS upon adopting the requirements of Generic Letter 88-11 (Reference 2). The proposed figure references within Technical Specification Table 3.4-3 will reflect the actual cooldown and heatup rate limits, which are currently overly restrictive in Technical Specification Table 3.4-3 for cooldown rate limits below 93°F and 108°F for less than 8 and from 8 to 32 EFPY, respectively.

The proposed changes do not introduce new areas of concern within the LCO since, as discussed above, cooldown rate limits are not applicable with the reactor vessel head fully detensioned. Therefore, the proposed changes will not increase the probability or consequences of an accident previously evaluated.

In addition, no new or different methodology regarding heatup/cooldown rates are being proposed by the change. The proposed LCO applicability clarification and supplemental information on the heatup and cooldown rates do not change the assumptions or methodologies previously adopted in PVNGS Technical Specifications nor do these amendments alter the design or operation of PVNGS. For these reasons, the proposed amendments will not create the possibility of a new or different kind of accident from any accident previously evaluated.

The APS license amendments that initially incorporated the revised heatup/cooldown rates utilized a conservative methodology, maintaining the safety margins recommended in ASME Section III, Appendix G and 10 CFR 50 Appendix G. The proposed clarification and supplemental information make no changes to these methodologies, and do not make changes to safety limits, setpoints, or design margins at PVNGS. As such, the proposed amendments do not involve a reduction in a margin of safety.

E. NO SIGNIFICANT HAZARDS CONSIDERATION

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; or (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 the amendment request follows:

Standard 1 -- Involve a significant increase in the probability or consequences of an accident previously evaluated.

The Technical Specification for low temperature overpressure protection is based on the RCS heatup and cooldown rates of Technical Specification Table 3.4-3, as well as the operability of one of the two low temperature overpressure protection shutdown cooling relief valves. Meeting both of these requirements ensures that the RCS will be protected from pressure transients which could exceed the limits of 10 CFR 50 Appendix G when one or more of the RCS cold legs are less than or equal to 214°F during cooldown and 291°F during heatup. Either one of the two shutdown cooling system (SCS) suction line relief valves provides relieving capacity to protect the RCS from overpressurization when the transient is limited to either (1) the start of an idle reactor coolant pump (RCP) with the secondary water temperature of the steam generator less than or equal to 100°F above the RCS cold leg temperatures or (2) the inadvertent safety injection actuation with two high pressure safety injection (HPSI) pumps injecting into a water solid RCS with full charging capacity and with letdown isolated. These events are the most limiting energy and mass addition transients, respectively, when the RCS is at low temperatures.

Clarifying the non-applicability of LCO 3.4.8.1 when the vessel head is fully detensioned and the RCS cannot be pressurized does not affect either the probability or consequences of the limiting events. This is so, because without the concurrent pressure stress, the thermal stress associated with normal refueling evolutions cannot exceed 10 CFR 50 Appendix G limits and therefore no structural integrity issues would exist.

The addition of and reference to Figures 3.4-2c and 3.4-2d allows a graphical representation of the actual cooldown rates. As such, the figure references (in Table 3.4-3) for cooldown rates at less than 93°F and less than 108°F are necessary as the present rates at these temperatures are overly restrictive (i.e., 0°F/hr) and do not reflect Figures 3.4-2c and 3.4-2d from which the table cooldown rates were derived.

Revising the present cooldown rates (0°F/hr) by referencing the values in Figures 3.4-2c and 3.4-2d does not change the assumptions or methodologies in Generic Letter 88-11 as previously adopted in PVNGS Technical Specifications. These proposed amendments, therefore, do not involve a significant increase in the probability or consequences of an accident previously evaluated.

Standard 2 -- Create the possibility of a new or different kind of accident from any accident previously evaluated.

The proposed amendments, clarifying the applicability of LCO 3.4.8.1 when the reactor vessel head is fully detensioned and supplementing Technical Specification Table 3.4-3 with Figures 3.4-2c and 3.4-2d, change none of the methodologies for calculating or evaluating P-T limits. This changes do not alter the design of the facility nor the operation of the plant, as heatup and cooldown limits are unnecessary whenever the reactor vessel cannot be pressurized. No other elements are introduced by these amendments regarding accident scenarios. Therefore, the proposed amendments do not create the possibility of a new or different kind of accident from any accident previously evaluated.

Standard 3 -- Involve a significant reduction in a margin of safety.

The safety function of the heatup and cooldown limitations are to ensure that the RCS pressure does not exceed the corresponding normal P-T limits, assuming a concurrent pressurization due to the limiting low temperature overpressurization transients described in Standard 1. The non-applicability of these limitations during the time period the RCS cannot be pressurized, along with the addition of the supplemental information in Technical Specification Figures 3.4-2c and 3.4-2d, does not change safety limits, setpoints, or design margins at PVNGS. As such, the proposed amendments do not involve a significant reduction in a margin of safety.

F. ENVIRONMENTAL IMPACT CONSIDERATION DETERMINATION

APS has determined that the proposed amendments involve no change in the amount or type of any 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 amendments, do not involve an unreviewed environmental safety question.

G. MARKED-UP TECHNICAL SPECIFICATION CHANGE PAGES

See attached pages XIX, 3/4 4-28, 3/4 4-28A, 3/4 4-29B, 3/4 4-29C and B3/4 4-6 for Units 1, 2, and 3.