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SUBJECT: Forwards application for amends to licenses NPF-41,NPF-51 & NPF-65,proposing changes to surveillance frequency from monthly to quarterly for channel functional tests for RPS & ESFAS instrumentation.

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102-02605-WFC/TRB/JRP
August 5, 1993

WILLIAM F. CONWAY
EXECUTIVE VICE PRESIDENT
NUCLEAR

U. S. Nuclear Regulatory Commission
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Reference: Letter 102-02381, dated December 28, 1992, from J. M. Levine, Vice President, Nuclear Production, APS, to USNRC

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
Section 2.2.1, 3.3.1 and 3.3.2
File: 93-056-026; 93-005-419.05

On December 28, 1992, Arizona Public Service Company (APS), submitted the referenced letter to amend Sections 2.2.1, 3.3.1, and 3.3.2 of the PVNGS Technical Specifications (TS) for Units 1, 2, and 3. The purpose of this letter is to supersede the referenced letter to include additional information. Therefore, APS is requesting an amendment to TS 3/4.3.1, Table 4.3-1 and TS 3/4.3.2, Table 4.3-2 and their respective Bases. The proposed amendment changes the surveillance frequency from monthly to quarterly for the channel functional tests for the Reactor Protective System (RPS) and Engineered Safety Feature Actuation System (ESFAS) Instrumentation.

The additional information being provided would extend the surveillance frequencies for the automatic actuation logic for safety injection, containment isolation, containment spray, main steam line isolation, and recirculation from monthly to quarterly. The bases for the change is CEN-327-A and CEN-327-A, Supplement 1, "RPS/ESFAS Extended Test Interval Evaluation," submitted by the Combustion Engineering Owners Group and PVNGS calculation 13-JC-SB-200, Revision 01. APS is also requesting an amendment to TS 2.2.1, Table 2.2-1 to change reactor trip setpoints and allowable values. The setpoints are changed to ensure that instrument drift, at the requested surveillance frequencies, will not cause setpoint values to exceed allowable values.

A001

Provided in the enclosure to this letter are the following:

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 of the Proposed Technical Specification Amendment
E. No Significant Hazards Consideration Determination
F. Environmental Impact Consideration Determination
G. Marked-up Technical Specification Pages

Pursuant to 10 CFR 50.91(b)(1), a copy of this request has been forwarded to the Arizona Radiation Regulatory Agency.

Should you have any questions, please contact Thomas R. Bradish at (602) 393-5421.

Sincerely,

WFC/TRB/JRP/rv
Enclosure

cc: B. H. Faulkenberry
J. A. Sloan
A. V. Godwin

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 5 Day Of August, 1993.

Notary Public

My Commission Expires

March 31, 1996

ENCLOSURE

PROPOSED AMENDMENT TO TECHNICAL SPECIFICATION

SECTION 2.2.1, 3.3.1 AND 3.3.2

A. DESCRIPTION OF THE PROPOSED AMENDMENT REQUEST

Technical Specification 3/4.3.1, Table 4.3-1, "Reactor Protective Instrumentation Surveillance Requirement," and Technical Specification 3/4.3.2, Table 4.3-2, "Engineered Safety Features Actuation System Instrumentation Surveillance Requirement," list instrumentation channel functional test frequencies. Selected functional test frequencies are changed from monthly to quarterly.

Technical Specification 3/4.3.2, Table 3.3-4, "Engineered Safety Features Actuation System Instrumentation Trip Values," lists trip setpoints and allowable values. Three allowable values are changed.

Technical Specification 3/4.3 Bases "Instrumentation," provides the bases for Technical Specifications 3/4.3.1 and 3/4.3.2. The Bases are amended to support the changed instrumentation channel functional test frequency.

Technical Specification 2.2.1, Table 2.2-1, "Reactor Protective Instrumentation Trip Setpoint Limits," lists trip setpoints and allowable values. One trip setpoint and three allowable values are changed.

B. PURPOSE OF THE TECHNICAL SPECIFICATION

The purpose of the Technical Specification 3/4.3.1 is to ensure that the minimum number of Reactor Protective System (RPS) instrumentation channels and bypasses listed in Table 3.3-1, and their response times listed in Table 3.3-2, are operable. The instrumentation channels and bypasses are demonstrated OPERABLE by performance of tests at the frequencies shown in Table 4.3-1.

The purpose of Technical Specification 3/4.3.2 is to ensure that Engineering Safety Features Actuation System (ESFAS) instrumentation channels and bypasses are operable. The instrumentation channels and bypasses are listed in Table 3.3-3 and their setpoints are listed in Table 3.3-4. Instrumentation response times are listed in Table 3.3-5. Channels and bypasses are demonstrated OPERABLE by performance of tests at the frequencies shown in Table 4.3-2.

The OPERABILITY of the RPS and ESFAS instrumentation channels and bypasses ensures that 1) the associated reactor trip and/or ESFAS action will be initiated when the parameter monitored by each channel or combination thereof, reaches its setpoint, 2) the specified coincidence logic is maintained, 3) sufficient redundancy is maintained to permit a channel to be out of service for testing or maintenance, and 4) sufficient system functional capability is available from diverse parameters.

The OPERABILITY of these systems is required to provide the overall reliability, redundancy, and diversity assumed available in the facility design for the protection and mitigation of accident and transient conditions. The integrated operation of each of these systems is consistent with the assumptions used in the safety analyses.

The Bases for Technical Specification 2.2.1 indicates that the Trip Setpoints have been selected to ensure that the reactor core and reactor coolant system are prevented from exceeding their safety limits during normal operation and design basis Anticipated Operational Occurrences and to assist the ESFAS in mitigating the consequences of accidents.

C. NEED FOR THE TECHNICAL SPECIFICATION AMENDMENT

RPS and ESFAS surveillance testing collectively throughout the nuclear industry has caused many inadvertent reactor trips and ESFAS actuations challenging safety systems. The current test frequency adversely impacts equipment life and unit availability. Increasing the surveillance test interval minimizes the opportunity for inadvertent ESFAS actuations and reactor trips during surveillance testing. Currently, RPS and ESFAS instrumentation functional tests are performed monthly.

D. SAFETY ANALYSIS OF THE PROPOSED TECHNICAL SPECIFICATION AMENDMENT

Westinghouse Corporation and the Westinghouse Owners Group submitted a generic topical report requesting that the test intervals for selected components in the RPS and the ESFAS be extended in 1982. This request was supported through the use of probabilistic risk assessment methodologies. As a result, the NRC initiated a research project to determine how to evaluate requests for Technical Specification relief based on probabilistic risk analyses as long as the analyses demonstrated that the requested changes resulted in no increase in the risk to the public.

Following the Salem low power Anticipated Transient Without Scram event in 1983, the NRC issued Generic Letter 83-28 specifying a number of actions to be taken by licensees and applicants. One of these required actions was to review the Reactor Trip System (RTS) test intervals to determine if they were consistent with achieving high RTS availability. Combustion Engineering (CE), under contract to the CE Owners Group (CEOG), performed an analysis to evaluate the availability of the RTS given the 30-day test interval required by Technical Specifications. Sensitivity analyses performed as part of this evaluation indicated that the unavailability of the RTS was relatively insensitive to changes in the failure rates of certain components. CE, under contract to the CEOG, evaluated the impact of

extending the surveillance test intervals for selected components in the RPS and ESFAS. This analysis is documented in CEN-327-A, "RPS/ESFAS Extended Test Interval Evaluation."

In CEN-327-A, four RPS fault tree models developed previously for the CEOG were expanded to cover all RPS electronic trip parameters. The models represent the four basic RPS designs supplied by CE. The Palo Verde RPS design was one of the models. The new models were then used to determine the RPS reliability for the current and proposed test interval. The model took into account: common mode failures, operator errors, reduced redundancy, and random component failures. The study results show that for the RPS, the decrease in core melt frequency attributable to the reduced exposure to test induced transients is 2.76×10^{-7} per year for a 90-day test interval for all parameters and approximately 2.6×10^{-7} per year for a combination of 60 and 90 day test intervals. The increase in core melt frequency due to the increase in system unavailability is less than 2.6×10^{-7} per year.

Fault tree models were also constructed for each of the ESFAS signals for the different plant classes used for the RPS analysis. Each ESFAS fault tree model specifically addressed common mode failures, operator error, reduced redundancy, and random component failures. The study found that the decrease in core melt frequency due to the reduced exposure to test-induced transients is 8.78×10^{-8} per year while the increase in core melt frequency due to the increase in the system unavailability is less than 6.3×10^{-8} per year.

For both the RPS and ESFAS, the net impact of extending the test interval is a slight decrease in the core melt frequency.

CEN-327-A was submitted to the NRC for review in June 1986. The NRC contracted with EG&G Idaho to perform the technical evaluation. The NRC performed additional reviews and prepared a draft Safety Evaluation Report (SER). The basic conclusion of the draft SER was that extension of the RPS and ESFAS test intervals as described in CEN-327-A was acceptable. The NRC felt that changes in the RPS reliability that result from extending the test interval from 30 days to 90 days were acceptable, and the NRC was inclined to approve a 90-day test interval with sequential testing for all RPS trip parameters. During subsequent discussion, the NRC Staff indicated that while it was inclined to find that extension of RPS test intervals from 30 to 90 days with sequential testing was acceptable for all trip parameters, the Staff could not include this in the SER for CEN-327-A because CEN-327-A had recommended more restrictive test intervals for certain trip parameters. CE issued a Supplement to CEN-327-A, in March 1989, which presented changes in RPS reliability which resulted from extending the test intervals from 30 days to 90 days for all RPS trip parameters and recommend a 90-day test interval with sequential testing.

CEN-327-A, Supplement 1 reevaluated 19 RPS trip parameters which in CEN-327-A resulted in a slight increase in overall core damage frequency. The results of the reanalysis demonstrated that the surveillance test intervals could be increased to 90 days with no significant increase in RPS unavailability.

The analysis results presented in CEN-327-A and CEN-327-A, Supplement 1 demonstrate that the surveillance test intervals for RPS and ESFAS components can be increased without increasing public risk. In fact, for the test intervals proposed, the overall impact is a slight decrease in public risk as measured by a net decrease in core melt frequency. Extending the test interval does not change the trip per test frequency, but it does reduce the trip per year frequency.

SER, "RPS/ESFAS Extended Test Interval Evaluation" was issued by the NRC in November 1989. The NRC found that CEN-327-A and its Supplement were acceptable for justifying the proposed extensions in surveillance test intervals for the RPS and the ESFAS. The NRC agreed that surveillance test intervals for the RPS and for the ESFAS could be extended for all CE plants (except Maine Yankee) to the requested interval contingent on the licensee in each case confirming that instrument drift occurring over the proposed surveillance test intervals would not cause the setpoint values to exceed those assumed in the safety analysis and specified in the Technical Specifications. The NRC stated that licensees must confirm that they have reviewed instrument drift information for each instrument channel involved and have determined that drift occurring in that channel over the period of extended surveillance test intervals would not cause the setpoint value to exceed the allowable value as calculated for that channel by the licensee's methodology. Each licensee should have onsite, records of the as-found and as-left values showing actual calculations and supporting data for planned future staff audits. The records should consist of monthly data over a period of the last 2 to 3 years with the current plant-specific setpoint methodology used to derive the safety margins.

APS has performed the required drift setpoint analysis. Calculation 13-JC-SB-200, Rev. 01, "Plant Protection System Bistable Drift Analysis" was issued in April 1992. The calculation evaluated the effects of an extended surveillance test interval on the setpoint drift of the Plant Protection System (PPS). The PPS consists of the RPS and the ESFAS. The analysis was performed to identify the components subject to drift which are affected by the proposed increase in the surveillance test intervals. The analysis was performed to determine the drift for 120-day intervals. The 120-day interval can be used as a conservative 90-day interval with a tolerance greater than or equal to 1.25 times the time period per setpoint methodology (90 x 1.25=112.5) or a 120-day interval with no tolerance.

The specific channels to be analyzed were defined in CEN-327-A Supplement 1. Marked-up copies of PVNGS Technical Specification Tables 4.3.1 and 4.3.2 were

reviewed by the NRC. The only RPS equipment that will remain on a monthly testing schedule is the Reactor Trip Switchgear. The ESFAS Automatic Actuation Logic (the subgroup relays in the ESFAS Auxiliary Cabinet) and the Loss of Power ESFAS functions were also not in the scope of the analysis. The as-found and as-left data was extracted from surveillance tests performed from 1987 through 1990. Instrument channels were reviewed and APS determined that the only components that needed to be analyzed were the RPS, ESFAS, and Supplementary Protection System bistable trip units.

The instrument drift values were used to re-calculate PPS uncertainties and error values. The new uncertainties and error values were then used to calculate new PPS setpoints. The setpoint calculations were performed using CEN-286 (v), "Calculation of Trip Setpoint Values-Plant Protection System," an approved setpoint methodology. Calculation 13-JC-SB-200 and CEN-286 (v) are available for NRC review.

As a result of the recalculations, the following RPS setpoints and allowable values are changed:

1. The Variable Overpower Trip (VOPT) band trip setpoint is changed from ≤9.8% of rated thermal power to ≤9.7% of rated thermal power.

2. The VOPT band allowable value is changed from ≤10% of rated thermal power to ≤9.9% of rated thermal power.

3. The Pressurizer Pressure - Low allowable value is changed from ≥1822 psia to ≥1821 psia.

4. The Steam Generator Pressure - Low allowable value is changed from ≥912 psia to ≥911 psia.

As a result of the recalculations, the following ESFAS allowable values are changed:

1. The Pressurizer Pressure - Low allowable value for the Safety Injection Actuation Signal (SIAS) is changed from ≥1822 psia to ≥1821 psia.

2. The Steam Generator Pressure - Low allowable value for the Main Steam Line Isolation Signal (MSIS) is changed from ≥912 psia to ≥911 psia.

3. The Pressurizer Pressure - Low allowable value for the Containment Isolation Actuation Signal (CIAS) is changed from ≥1822 psia to ≥1821 psia.

The changes to the RPS setpoint and the allowable value for VOPT band are conservative. There is no reduction in safety margins.

The changes to the RPS allowable values for Pressurizer Pressure - Low and Steam Generator Pressure - Low are non-conservative but not significant. The changes to the ESFAS allowable values for Pressurizer Pressure - Low (SIAS and CIAS) and Steam Generator Pressure - Low (MSLIS) are also non-conservative but also not significant. The allowable values are changed to accommodate a small increase in RPS and ESFAS periodic test error. The increase in test error is due to an increase in bistable drift allowance for an extended surveillance test interval up to 120 days. The increase in RPS and ESFAS periodic test error, however, is insignificant compared to the process equipment error in the instrument channel. This results in no change to the total channel error when the errors are combined using the root sum square method as outlined in CEN-286. Because the total channel error does not change, the setpoints for RPS and ESFAS Pressurizer Pressure - Low and Steam Generator Pressure - Low do not change. Therefore, there is no reduction in the safety margins due to a slight change in allowable values.

E. NO SIGNIFICANT HAZARDS CONSIDERATION DETERMINATION

The Commission has provided standards for determining whether a no 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.

Increasing the surveillance interval for RPS and ESFAS instrumentation has two principle effects with opposing impacts on core melt risk. The first impact is a slight increase in core melt frequency that results from the increased unavailability of the instrumentation in question. The unavailability of the tested instrumentation components is translated to result in a failure of the reactor to trip, an Anticipated Transient Without Scram, or a failure of the appropriate engineered safety features to actuate when required. The opposing impact is the corresponding reduction

in core melt frequency that would result due to the reduced exposure of the plant to test induced transients.

Representative fault tree models were developed for Palo Verde and the corresponding core melt frequency increases and decreases were quantified in CEN-327-A and CEN-327-A, Supplement 1. The NRC Staff found that changes in the RPS unavailabilities that result from extending the surveillance test intervals from 30 days to 90 days were not considered to be significant. Estimates of the reduction in scram frequency from the reduction in test-induced scrams and the corresponding reduction in core melt frequency were found acceptable. Extended surveillance intervals were found to result in a net reduction in core melt risk. Operation of the facility in accordance with this proposed amendment, therefore, will not involve a significant increase in the probability or consequence of an accident previously evaluated.

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

This amendment request does not involve any changes in equipment and will not alter the manner in which the plant will be operated. For this reason, this amendment will not create the possibility of a new or different kind of accident from any previously evaluated.

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

The margin of safety is not significantly reduced. There are no changes to the equipment or plant operations. The changes to PPS setpoints and allowable values, while non-conservative, are not significant. The only impact of this change is the development of a more appropriate balance between increased core melt risk due to slightly increased equipment unavailability and reduced core melt risk due to a reduction in plant exposure to test-induced transients. Implementation of the proposed change is expected to result in an overall improvement in safety due to the fact that reduced testing intervals will result in fewer inadvertent reactor trips and less frequent actuation of ESFAS components. The conclusions of the accident analyses in the PVNGS UFSAR remain valid and the safety limits continue to be met.

F. ENVIRONMENTAL IMPACT CONSIDERATION DETERMINATION

The proposed amendment changes the frequencies of testing of RPS and ESFAS instrumentation and changes the RPS trip setpoint, three RPS allowable values and three ESFAS allowable values.

APS has determined that the proposed amendment involves 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 amendment, does not involve an environmental impact.

G. MARK-UP TECHNICAL SPECIFICATION CHANGE PAGES

PVNGS Unit 1	PVNGS Unit 2	PVNGS Unit 3
2-3	2-3	2-3
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B 3/4 3-1	B 3/4 3-1	B 3/4 3-1