



10 CFR 50.90

Palo Verde Nuclear  
Generating Station

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Washington, DC 20555-0001

102-05351-CDM/TNW/RAB  
September 29, 2005

- Reference:
1. Letter 102-05306-CDM/TNW/RAB, dated July 9, 2005, from C. D. Mauldin, APS to U. S. Nuclear Regulatory Commission, "Request for a License Amendment to Modify Reactor Protective and Engineered Safety Features Actuation Systems Instrumentation Technical Specification Tables"
  2. Letter 102-05116-CDM/TNW/RAB, Dated July 9, 2004, from C. D. Mauldin, APS, to U. S. Nuclear Regulatory Commission, "Request for a License Amendment to Support Replacement of Steam Generators and Upgraded Power Operations in Units 1 and 3, and Associated Administrative Changes for Unit 2"
  3. Letter 102-05315-CDM/TNW/RAB, dated August 3, 2005, from C. D. Mauldin, APS to U.S. Nuclear Regulatory Commission, "Supplement to Amendment Requests Associated with Power Uprate – New Retyped Technical Specification Page"

Dear Sirs:

**Subject: Palo Verde Nuclear Generating Station (PVNGS)  
Units 1, 2 and 3, Docket Nos. STN 50-528/529/530  
Request to Supersede a License Amendment Request Associated  
With Steam Generator Replacement and Power Uprate**

Arizona Public Service Company (APS) is requesting to supersede the amendment requested in Reference 1 with the request being made in this letter. The previous request was made using the guidance that existed at the time of the request. The Nuclear Regulatory Commission (NRC) has subsequently revised its guidance and has requested that APS upgrade its previous request.

The amendment request would ensure that if the as-found setpoint was outside of its predetermined as-found acceptance criteria band, the channel would be evaluated to verify that it is functioning as required before it is returned to service. Additionally, if the as-found setpoint is not conservative with respect to the Allowable Value, the channel will be declared inoperable. The proposed amendment would apply to the safety-related instrument setpoint changes requested in Reference 2.

A member of the **STARS** (Strategic Teaming and Resource Sharing) Alliance

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Request to Supersede a License Amendment Request Associated  
With Steam Generator Replacement and Power Uprate  
Page 2

One of the changes requested in Reference 1 would have also added a footnote to Table 3.7.1-1, on Page 3.7.1-4. This change was requested based on APS' understanding of the guidance provided at that time. Since there is no specific surveillance requirement associated with the setpoints being changed in Table 3.7.1-1, APS is not requesting that any footnotes be added to TS 3.7.1. In Reference 3, APS provided a revision of Table 3.7.1-1, based on Amendment 155, to replace the version in Reference 1. A revised, retyped page 3.7.1-4, based on Amendment 155, is included in Attachment 2.

Based on the responses to the three criteria provided for determining whether a significant hazard consideration exists as stated in 10 CFR 50.92, APS has concluded that the proposed amendment involves no significant hazard considerations.

APS requests approval of this amendment concurrent with the approval of the amendment requested in Reference 2. Once approved, the amendment will be implemented within 120 days.

As a result of continuing discussions with the NRC staff concerning the implementation of the proposed PUR amendment and an implementation schedule for changes to the station blackout coping time, APS has agreed to a delay to the NRC review of the proposed PUR amendment. APS requests approval of the proposed PUR amendment by November 18, 2005, instead of September 30, 2005 as requested in APS letter no. 102-05283, dated June 2, 2005.

In accordance with the PVNGS Quality Assurance Program, the Plant Review Board and the Offsite Safety Review Committee have reviewed and concurred with this proposed amendment. By copy of this letter, this submittal is being forwarded to the Arizona Radiation Regulatory Agency (ARRA) pursuant to 10 CFR 50.91(b) (1).

No commitments are being made to the NRC in this letter:

Should you have any questions, please call Mr. Thomas N. Weber at (623) 393-5764.

Sincerely,

A handwritten signature in black ink, appearing to read "David Mauldin". The signature is fluid and cursive, with the first name "David" and last name "Mauldin" clearly distinguishable.

CDM/TNW/RAB

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U. S. Nuclear Regulatory Commission  
Request to Supersede a License Amendment Request Associated  
With Steam Generator Replacement and Power Upgrade  
Page 3**

**Enclosures:**

- 1. Notarized Affidavit**
- 2. Arizona Public Service Company's Evaluation of the Proposed Change**

**Attachments:**

- 1. Proposed Technical Specification Changes (marked-up)**
- 2. Proposed Technical Specification Changes (re-typed)**
- 3. Changes to TS Bases (for information only)**

**cc: B. S. Mallett NRC Region IV Regional Administrator  
M. B. Fields NRC NRR Project Manager  
G. G. Warnick NRC Senior Resident Inspector  
A. V. Godwin Arizona Radiation Regulatory Agency (ARRA)**

ENCLOSURE 1

NOTARIZED AFFIDAVIT

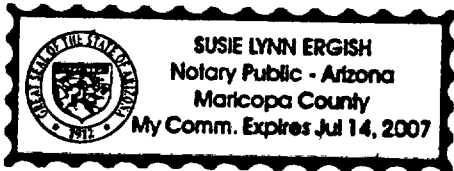
STATE OF ARIZONA       )  
                                  ) ss.  
COUNTY OF MARICOPA )

I, David Mauldin, represent that I am Vice President Nuclear Engineering and Support, 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.

David Mauldin  
David Mauldin

Sworn To Before Me This 29<sup>th</sup> Day Of September, 2005.

Susie Lynn Ergish  
Notary Public



Notary Commission Stamp

## **ENCLOSURE 2**

### **ARIZONA PUBLIC SERVICE COMPANY'S EVALUATION OF THE PROPOSED CHANGE**

**Proposed Change to Technical Specifications 3.3.1, 3.3.2, and 3.3.5**

- 1.0 Description**
- 2.0 Proposed Change**
- 3.0 Background**
- 4.0 Technical Analysis**
- 5.0 Regulatory Safety Analysis**
  - 5.1 No Significant Hazards Consideration**
  - 5.2 Applicable Regulatory Requirements**
- 6.0 Environmental Consideration**
- 7.0 Precedent**

## **1.0 DESCRIPTION**

This letter is a request to amend Operating Licenses NPF-41, NPF-51, and NPF-74 for the Palo Verde Nuclear Generating Station Units 1, 2 and 3.

The proposed changes supplement the changes requested in the letter from APS to USNRC dated July 9, 2004. The changes requested in this letter would add a footnote in Tables 3.3.1-1 (Before CPC Upgrade), 3.3.1-1 (After CPC Upgrade), 3.3.2-1, and 3.3.5-1 specifying action to ensure operability of the channel. These supplemental changes are requested in accordance with a request from the NRC staff.

## **2.0 PROPOSED CHANGE**

The proposed amendment would make the following changes.

- A. Revise Table 3.3.1-1 (Before CPC Upgrade) to add a footnote to function 6, Steam generator #1 Pressure – Low and function 7, Steam Generator #2 Pressure – Low.
- B. Revise Table 3.3.1-1 (After CPC Upgrade) to add a footnote to function 6, Steam generator #1 Pressure – Low and function 7, Steam Generator #2 Pressure – Low.
- C. Revise Table 3.3.2-1 to add a footnote to function 2, Steam Generator #1 Pressure – Low and function 3, Steam Generator #2 Pressure – low.
- D. Revise Table 3.3.5-1 to add a footnote to function 4a, Steam Generator #1 Pressure – Low and function 4b, Steam Generator #2 Pressure – Low.

The same two-part footnote would be added to the four Tables:

1. If the as-found channel setpoint is conservative with respect to the Allowable Value but outside its predetermined as-found acceptance criteria band, then the channel shall be evaluated to verify that it is functioning as required before returning the channel to service. If the as-found instrument channel setpoint is not conservative with respect to the Allowable Value, the channel shall be declared inoperable.

2. The instrument channel setpoint shall be reset to a value that is within the as-left tolerance of the UFSAR Trip Setpoint, or within the as left tolerance of a setpoint that is more conservative than the UFSAR Trip Set Point; otherwise the channel shall be declared inoperable. The UFSAR Trip Setpoint and the methodology used to determine 1) the UFSAR Trip Setpoint, 2) the predetermined as found acceptance criteria band, and 3) the as-left setpoint tolerance band are specified in the UFSAR.

### **3.0 BACKGROUND**

On July 9, 2004, Arizona Public Service Company (APS) submitted an amendment request to support replacement of steam generators and uprated power operation in Units 1 and 3. During the review of the requested amendment, the NRC staff requested additional information concerning calculation of uncertainties for the reactor protection and engineered safety features actuation system setpoints that would change as a result of the requested amendment. On March 31, 2005 the NRC staff, in a letter to Mr. Alex Marion, NEI, established a process that utilities could use to respond to RAIs that have been issued for similar licensing action requests (LARs). In a letter dated July 9, 2005, APS requested a license amendment request to comply with guidance of the letter to NEI. In a letter to NEI, dated September 7, 2005, the Nuclear Regulatory Commission has subsequently revised its guidance and has requested that APS upgrade its previous request.

This amendment is requested to add the footnote described above to ensure that if the as-found setpoint was outside of its predetermined as-found acceptance criteria band, the channel would be evaluated to verify that it is functioning as required before it is returned to service. Additionally, if the as-found setpoint is not conservative with respect to the Allowable Value, the channel will be declared inoperable. The footnote would apply to the technical specifications for the Limiting Safety System Settings (LSSS) to be changed by the request made on July 9, 2004.

### **3.1 System Description**

LCO 3.3.1, Reactor Protective System Instrumentation - Operating and Table 3.3.1-1, which it references, specify the required number of channels operable for each reactor trip function, the applicable modes for each function, the surveillance requirements, and the allowable value for the setpoint to ensure that the purpose of the function is satisfied. The Steam Generator Pressure - Low trip function (items 6 and 7 in Table 3.3.1-1) provides protection against an excessive rate of heat extraction from the steam generators and the resulting rapid, uncontrolled cooldown of the Reactor Coolant System (RCS). This trip is needed to shut down the reactor and assist the Engineered Safety Features (ESF) system in the event of a Main Steam Line Break (MSLB) or Main Feedwater Line Break (MFWLB) accident. A Main Steam Isolation Signal (MSIS) is initiated simultaneously.<sup>1</sup>

LCO 3.3.2, Reactor Protective System Instrumentation - Shutdown and Table 3.3.2-1, which it references, specify the required number of channels operable for each reactor trip function, the applicable modes for each function, the surveillance requirements, and the allowable value for the setpoint to ensure that the purpose of the function is satisfied. The Steam Generator Pressure - Low trip function (items 2 and 3 in Table 3.3.2-1) provides shutdown margin to prevent or minimize the return to power following a large MSLB in Mode 3.<sup>2</sup>

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<sup>1</sup> TS Bases B.3.3.1, Applicable Safety Analysis

<sup>2</sup> TS Bases B3.3.2, Applicable Safety Analysis

LCO 3.3.5, Engineered Safety Features Actuation System Instrumentation and Table 3.3.5-1, which it references specify the required number of channels operable for each reactor trip function, the applicable modes for each function, and the allowable value for the setpoint to ensure that the purpose of the function is satisfied. The Steam Generator Pressure - Low signal actuates a MSIS to prevent an excessive rate of heat extraction and subsequent cooldown of the RCS in the event of a MSLB or MFWLB.<sup>3</sup>

### **3.2 Need for the Proposed Change**

The amendment request would ensure that if the as-found setpoint was outside of its predetermined as-found acceptance criteria band, the channel would be evaluated to verify that it is functioning as required before it is returned to service. Additionally, if the as-found setpoint is not conservative with respect to the Allowable Value, the channel will be declared inoperable.

## **4.0 TECHNICAL ANALYSIS**

Ensuring that the as-left instrument setting is within the as-left tolerance band of the field installed trip setpoint is a technical requirement established in the associated Design Instrumentation & Controls Uncertainty and Setpoint Calculation. In order to keep the results of these calculations associated with establishing trip setpoints valid, as-found and as-left instrument setting tolerances have been developed in the calculations. The as-found and as-left instrument setting tolerances are currently documented in the Plant Protective System (PPS) Bistable Trip Units Functional Test used to fulfill the surveillance requirements associated with the Steam Generator Low Pressure trip setpoint and others listed in Technical Specification Tables 3.3.1-1, 3.3.2-1 and 3.3.5-1.

The requirement to ensure the as-left instrument setting is within the as-left tolerance band of the trip setpoint already exists at Palo Verde and is procedurally controlled.

## **5.0 REGULATORY ANALYSIS**

### **5.1 No Significant Hazards Consideration**

APS has evaluated whether or not a significant hazards consideration is involved with the proposed amendment by focusing on the three standards set forth in 10 CFR 50.92, "Issuance of amendment," as discussed below:

1. Do the proposed changes involve a significant increase in the probability or consequences of an accident previously evaluated?

Response: No.

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<sup>3</sup> TS Bases B3.3.5, Applicable Safety Analysis

The proposed change does not result in any change to safety analysis methods or results, and the proposed change is not the result of a new or changed analysis. The changes to add footnotes in Technical Specification (TS) Tables 3.3.1-1, 3.3.2-1, and 3.3.5-1 ensure that the low steam generator pressure setpoints and the variable overpower trip setpoints, under specified conditions, associated with the Plant Protective System (PPS) are set to protect the safety limit.

The proposed change only ensures that if the as-found setpoint was outside of its predetermined as-found acceptance criteria band, the channel would be evaluated to verify that it is functioning as required before it is returned to service. Additionally, if the as-found setpoint is not conservative with respect to the Allowable Value, the channel will be declared inoperable. Therefore, the proposed change does not involve a significant increase in the probability or consequences of an accident previously evaluated.

2. Do the proposed changes create the possibility of a new or different kind of accident from any accident previously evaluated?

Response: No.

Adding footnotes to TS Tables 3.3.1-1, 3.3.2-1, and 3.3.5-1 is not a change to the setpoints, operation or accident response of the Palo Verde Nuclear Generating Station (PVNGS) Units 1, 2 and 3 structures, systems, and components. The changes ensure that certain setpoints associated with the PPS are set to protect the safety limit.

The only changes being proposed will ensure that PPS as left set points for low steam generator pressure, under specified conditions, are set to protect safety limits. Therefore, the proposed change does not create the possibility of a new or different kind of accident from any previously evaluated.

3. Does the proposed change involve a significant reduction in a margin of safety?

Response: No.

The proposed change does not result in any change to safety analysis methods or results. Therefore, by adding the footnotes to TS Tables 3.3.1-1, 3.3.2-1, and 3.3.5-1, the margins as established in the PVNGS Units 1, 2 and 3 Technical Specifications and Updated Final Safety Analysis Report (UFSAR) are unchanged.

The proposed change only involves the addition of footnotes to ensure that as left setpoints for low steam generator pressure, under specified conditions, are

set to protect safety limits. Margin of safety is associated with confidence in the ability of the fission product barriers (i.e., fuel and fuel cladding, reactor coolant system pressure boundary, and containment structure) to limit the level of radiation dose to the public. No actual plant equipment or accident analysis will be affected by the proposed changes. Additionally, the proposed changes will not relax any criteria used to establish safety limits, will not relax any safety system settings, or will not relax the bases for any limiting conditions for operation.

Therefore, the proposed change does not involve a significant reduction in a margin of safety.

Based upon the above, APS concludes that the proposed amendments present no significant hazards consideration under the standards set forth in 10 CFR 50.92 (c), and, accordingly, a finding of "no significant hazards consideration" is justified.

## **5.2 Applicable Regulatory Requirements/Criteria**

The footnote ensures compliance with 10 CFR 50.36, Technical Specifications, by requiring that as-left instrument settings would be returned to a conservative value, or to declare the instrument channel inoperable.

## **6.0 ENVIRONMENTAL CONSIDERATION**

Arizona Public Service Company has evaluated the proposed changes and has determined that the changes do not involve (i) a significant hazards consideration, (ii) a significant change in the types or significant increase in the amount of effluent that may be released offsite, or (iii) a significant increase in the individual or cumulative occupational radiation exposure. Accordingly, the proposed change meets the eligibility criterion for categorical exclusion set forth in 10 CFR 51.22(c)(9). Therefore, pursuant to 10 CFR 51.22(b), an environmental assessment of the proposed change is not required.

## **7.0 PRECEDENT**

This licensing action request is being submitted in accordance with guidance provided by the NRC.

**ATTACHMENT 1**

**PROPOSED TECHNICAL SPECIFICATION CHANGES (marked-up)**

# RPS Instrumentation - Operating (Before CPC Upgrade) 3.3.1

Table 3.3.1-1 (page 1 of 3)  
Reactor Protective System Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE
1. Variable Over Power	1.2	SR 3.3.1.1 SR 3.3.1.4 SR 3.3.1.6 SR 3.3.1.7 SR 3.3.1.8 SR 3.3.1.9 SR 3.3.1.13	Ceiling $\leq$ 111.0% RTP Band $\leq$ 9.9% RTP Incr. Rate $\leq$ 11.0%/min RTP Decr. Rate $>$ 5%/sec RTP
2. Logarithmic Power Level - High(a)	2	SR 3.3.1.1 SR 3.3.1.7 SR 3.3.1.9 SR 3.3.1.12 SR 3.3.1.13	$\leq$ 0.011% NRTP
3. Pressurizer Pressure - High	1.2	SR 3.3.1.1 SR 3.3.1.7 SR 3.3.1.9 SR 3.3.1.13	$\leq$ 2388 psia
4. Pressurizer Pressure - Low	1.2	SR 3.3.1.1 SR 3.3.1.7 SR 3.3.1.9 SR 3.3.1.12 SR 3.3.1.13	$\geq$ 1821 psia
5. Containment Pressure - High	1.2	SR 3.3.1.1 SR 3.3.1.7 SR 3.3.1.9 SR 3.3.1.13	$\leq$ 3.2 psig
6. Steam Generator #1 Pressure - Low	1.2	SR 3.3.1.1 SR 3.3.1.7 SR 3.3.1.9 SR 3.3.1.13	Units 1 and 3 3876 MWT RTP: $\geq$ 890 psia Unit 2 3990 MWT RTP: $\geq$ 955 psia (qu)
7. Steam Generator #2 Pressure - Low	1.2	SR 3.3.1.1 SR 3.3.1.7 SR 3.3.1.9 SR 3.3.1.13	Units 1 and 3 3876 MWT RTP: $\geq$ 890 psia Unit 2 3990 MWT RTP: $\geq$ 955 psia (qu)

(continued)

(a) Trip may be bypassed when logarithmic power is  $>$  1E-4% NRTP. Bypass shall be automatically removed when logarithmic power is  $\leq$  1E-4% NRTP.

(qu) INSERT A

PALO VERDE UNITS 1 AND 3  
PALO VERDE UNIT 2

3.3.1-8

AMENDMENT NO. 119, 150  
AMENDMENT NO. 149, 150

## INSERT A

1. If the as-found channel setpoint is conservative with respect to the Allowable Value but outside its predetermined as-found acceptance criteria band, then the channel shall be evaluated to verify that it is functioning as required before returning the channel to service. If the as-found instrument channel setpoint is not conservative with respect to the Allowable Value, the channel shall be declared inoperable.

2. The instrument channel setpoint shall be reset to a value that is within the as-left tolerance of the UFSAR Trip Setpoint, or within the as left tolerance of a setpoint that is more conservative than the UFSAR Trip Set Point; otherwise the channel shall be declared inoperable. The UFSAR Trip Setpoint and the methodology used to determine 1) the UFSAR Trip Setpoint, 2) the predetermined as found acceptance criteria band, and 3) the as-left setpoint tolerance band are specified in the UFSAR.

# RPS Instrumentation - Operating (After CPC Upgrade) 3.3.1

Table 3.3.1-1 (page 1 of 3)  
Reactor Protective System Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE
1. Variable Over Power	1,2	SR 3.3.1.1 SR 3.3.1.4 SR 3.3.1.6 SR 3.3.1.7 SR 3.3.1.8 SR 3.3.1.9 SR 3.3.1.13	Ceiling $\leq$ 111.0% RTP Band $\leq$ 9.9% RTP Incr. Rate $\leq$ 11.0%/min RTP Decr. Rate $>$ 5%/sec RTP
2. Logarithmic Power Level - High(a)	2	SR 3.3.1.1 SR 3.3.1.7 SR 3.3.1.9 SR 3.3.1.12 SR 3.3.1.13	$\leq$ 0.011% NRTP
3. Pressurizer Pressure - High	1,2	SR 3.3.1.1 SR 3.3.1.7 SR 3.3.1.9 SR 3.3.1.13	$\leq$ 2388 psia
4. Pressurizer Pressure - Low	1,2	SR 3.3.1.1 SR 3.3.1.7 SR 3.3.1.9 SR 3.3.1.12 SR 3.3.1.13	$\geq$ 1821 psia
5. Containment Pressure - High	1,2	SR 3.3.1.1 SR 3.3.1.7 SR 3.3.1.9 SR 3.3.1.13	$\leq$ 3.2 psig
6. Steam Generator #1 Pressure - Low	1,2	SR 3.3.1.1 SR 3.3.1.7 SR 3.3.1.9 SR 3.3.1.13	Units 1 and 3 3876 MMt RTP: $\geq$ 890 psia Unit 2 3990 MMt RTP: $\geq$ 955 psia
7. Steam Generator #2 Pressure - Low	1,2	SR 3.3.1.1 SR 3.3.1.7 SR 3.3.1.9 SR 3.3.1.13	Units 1 and 3 3876 MMt RTP: $\geq$ 890 psia Unit 2 3990 MMt RTP: $\geq$ 955 psia

(continued)

(a) Trip may be bypassed when logarithmic power is  $>$  1E-4% NRTP. Bypass shall be automatically removed when logarithmic power is  $\leq$  1E-4% NRTP.

(a) INSERT A

## INSERT A

1. If the as-found channel setpoint is conservative with respect to the Allowable Value but outside its predetermined as-found acceptance criteria band, then the channel shall be evaluated to verify that it is functioning as required before returning the channel to service. If the as-found instrument channel setpoint is not conservative with respect to the Allowable Value, the channel shall be declared inoperable.

2. The instrument channel setpoint shall be reset to a value that is within the as-left tolerance of the UFSAR Trip Setpoint, or within the as left tolerance of a setpoint that is more conservative than the UFSAR Trip Set Point; otherwise the channel shall be declared inoperable. The UFSAR Trip Setpoint and the methodology used to determine 1) the UFSAR Trip Setpoint, 2) the predetermined as found acceptance criteria band, and 3) the as-left setpoint tolerance band are specified in the UFSAR.

# RPS Instrumentation - Shutdown 3.3.2

Table 3.3.2-1  
Reactor Protective System Instrumentation - Shutdown

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALVE
1. Logarithmic Power Level-High <sup>(d)</sup>	3 <sup>(a)</sup> , 4 <sup>(a)</sup> , 5 <sup>(a)</sup>	SR 3.3.2.1 SR 3.3.2.2 SR 3.3.2.3 SR 3.3.2.4 SR 3.3.2.5	≤ 0.011% NRTP <sup>(c)</sup>
2. Steam Generator #1 Pressure-Low <sup>(b)</sup>	3 <sup>(a)</sup>	SR 3.3.2.1 SR 3.3.2.2 SR 3.3.2.4 SR 3.3.2.5	Units 1 and 3 3876 MMt RTP: ≥ 890 psia Unit 2 3990 MMt RTP: ≥ 955 psia (c)
3. Steam Generator #2 Pressure-Low <sup>(b)</sup>	3 <sup>(a)</sup>	SR 3.3.2.1 SR 3.3.2.2 SR 3.3.2.4 SR 3.3.2.5	Units 1 and 3 3876 MMt RTP: ≥ 890 psia Unit 2 3990 MMt RTP: ≥ 955 psia (c)

- (a) With any Reactor Trip Circuit Breakers (RTCBs) closed and any control element assembly capable of being withdrawn.
- (b) The setpoint may be decreased as steam pressure is reduced, provided the margin between steam pressure and the setpoint is maintained ≤ 200 psig. The setpoint shall be automatically increased to the normal setpoint as steam pressure is increased.
- (c) The setpoint must be reduced to ≤ 1E-4% NRTP when less than 4 RCPs are running.
- (d) Trip may be bypassed when logarithmic power is > 1E-4% NRTP. Bypass shall be automatically removed when logarithmic power is ≤ 1E-4% NRTP.

(c) INSERT A

## INSERT A

1. If the as-found channel setpoint is conservative with respect to the Allowable Value but outside its predetermined as-found acceptance criteria band, then the channel shall be evaluated to verify that it is functioning as required before returning the channel to service. If the as-found instrument channel setpoint is not conservative with respect to the Allowable Value, the channel shall be declared inoperable.

2. The instrument channel setpoint shall be reset to a value that is within the as-left tolerance of the UFSAR Trip Setpoint, or within the as left tolerance of a setpoint that is more conservative than the UFSAR Trip Set Point; otherwise the channel shall be declared inoperable. The UFSAR Trip Setpoint and the methodology used to determine 1) the UFSAR Trip Setpoint, 2) the predetermined as found acceptance criteria band, and 3) the as-left setpoint tolerance band are specified in the UFSAR.

Table 3.3.5-1 (page 1 of 1)  
Engineered Safety Features Actuation System Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	ALLOWABLE VALUE
1. Safety Injection Actuation Signal		
a. Containment Pressure - High	1.2.3	$\leq 3.2$ psig
b. Pressurizer Pressure - Low(a)		$\geq 1821$ psia
2. Containment Spray Actuation Signal		
a. Containment Pressure - High High	1.2.3	$\leq 8.9$ psig
3. Containment Isolation Actuation Signal		
a. Containment Pressure - High	1.2.3	$\leq 3.2$ psig
b. Pressurizer Pressure - Low(a)		$\geq 1821$ psia
4. Main Steam Isolation Signal(c)		
a. Steam Generator #1 Pressure-Low(b)	1.2.3	Units 1 and 3 3876 MMt RTP: $\geq 890$ psia
b. Steam Generator #2 Pressure-Low(b)		Unit 2 3990 MMt RTP: $\geq 955$ psia
c. Steam Generator #1 Level-High		Units 1 and 3 3876 MMt RTP: $\geq 890$ psia
d. Steam Generator #2 Level-High		Unit 2 3990 MMt RTP: $\geq 955$ psia
e. Containment Pressure-High		$\leq 91.5\%$ $\leq 91.5\%$ $\leq 3.2$ psig
5. Recirculation Actuation Signal		
a. Refueling Water Storage Tank Level-Low	1.2.3	$\geq 6.9$ and $\leq 7.9\%$
6. Auxiliary Feedwater Actuation Signal SG #1 (AFAS-1)		
a. Steam Generator #1 Level-Low	1.2.3	$\geq 25.3\%$
b. SG Pressure Difference-High		$\leq 192$ psid
7. Auxiliary Feedwater Actuation Signal SG #2 (AFAS-2)		
a. Steam Generator #2 Level-Low	1.2.3	$\geq 25.3\%$
b. SG Pressure Difference-High		$\leq 192$ psid

- (a) The setpoint may be decreased to a minimum value of 100 psia, as pressurizer pressure is reduced, provided the margin between pressurizer pressure and the setpoint is maintained  $\leq 400$  psia or  $\geq 140$  psia greater than the saturation pressure of the RCS cold leg when the RCS cold leg temperature is  $\geq 485^\circ\text{F}$ . Trips may be bypassed when pressurizer pressure is  $< 400$  psia. Bypass shall be automatically removed when pressurizer pressure is  $\geq 500$  psia. The setpoint shall be automatically increased to the normal setpoint as pressurizer pressure is increased.
- (b) The setpoint may be decreased as steam pressure is reduced, provided the margin between steam pressure and the setpoint is maintained  $\leq 200$  psig. The setpoint shall be automatically increased to the normal setpoint as steam pressure is increased.

PALO VERDE UNITS 1 AND 3

PALO VERDE UNIT 2

3.3.5-4

AMENDMENT NO. 117

AMENDMENT NO. 117 149

ESFAS Instrumentation  
3.3.5

- (c) The Main Steam Isolation Signal (MSIS) Function (Steam Generator Pressure - Low, Steam Generator Level-High and Containment Pressure - High signals) is not required to be OPERABLE when all associated valves isolated by the MSIS Function are closed.

(d) INSERT A

## INSERT A

1. If the as-found channel setpoint is conservative with respect to the Allowable Value but outside its predetermined as-found acceptance criteria band, then the channel shall be evaluated to verify that it is functioning as required before returning the channel to service. If the as-found instrument channel setpoint is not conservative with respect to the Allowable Value, the channel shall be declared inoperable.

2. The instrument channel setpoint shall be reset to a value that is within the as-left tolerance of the UFSAR Trip Setpoint, or within the as left tolerance of a setpoint that is more conservative than the UFSAR Trip Set Point; otherwise the channel shall be declared inoperable. The UFSAR Trip Setpoint and the methodology used to determine 1) the UFSAR Trip Setpoint, 2) the predetermined as found acceptance criteria band, and 3) the as-left setpoint tolerance band are specified in the UFSAR.

**ATTACHMENT 2**

**PROPOSED TECHNICAL SPECIFICATION CHANGES (retyped)**

RPS Instrumentation – Operating (Before CPC Upgrade)  
3.3.1

Table 3.3.1-1 (page 1 of 3)  
Reactor Protective System Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE
1. Variable Over Power	1.2	SR 3.3.1.1 SR 3.3.1.4 SR 3.3.1.6 SR 3.3.1.7 SR 3.3.1.8 SR 3.3.1.9 SR 3.3.1.13	Ceiling $\leq$ 111.0% RTP Band $\leq$ 9.9% RTP Incr. Rate $\leq$ 11.0%/min RTP Decr. Rate $>$ 5%/sec RTP
2. Logarithmic Power Level – High(a)	2	SR 3.3.1.1 SR 3.3.1.7 SR 3.3.1.9 SR 3.3.1.12 SR 3.3.1.13	$\leq$ 0.011% NRTP
3. Pressurizer Pressure – High	1.2	SR 3.3.1.1 SR 3.3.1.7 SR 3.3.1.9 SR 3.3.1.13	$\leq$ 2388 psia
4. Pressurizer Pressure – Low	1.2	SR 3.3.1.1 SR 3.3.1.7 SR 3.3.1.9 SR 3.3.1.12 SR 3.3.1.13	$\geq$ 1821 psia
5. Containment Pressure – High	1.2	SR 3.3.1.1 SR 3.3.1.7 SR 3.3.1.9 SR 3.3.1.13	$\leq$ 3.2 psig
6. Steam Generator #1 Pressure – Low	1.2	SR 3.3.1.1 SR 3.3.1.7 SR 3.3.1.9 SR 3.3.1.13	3876 Mwt RTP: $\geq$ 890 psia 3990 Mwt RTP: $\geq$ 955 psia <sup>(aa)</sup>
7. Steam Generator #2 Pressure – Low	1.2	SR 3.3.1.1 SR 3.3.1.7 SR 3.3.1.9 SR 3.3.1.13	3876 Mwt RTP: $\geq$ 890 psia 3990 Mwt RTP: $\geq$ 955 psia <sup>(aa)</sup>

(continued)

(a) Trip may be bypassed when logarithmic power is  $>$  1E-4% NRTP. Bypass shall be automatically removed when logarithmic power is  $\leq$  1E-4% NRTP.

(aa) 1. If the as-found channel setpoint is conservative with respect to the Allowable Value but outside its predetermined as-found acceptance criteria band, then the channel shall be evaluated to verify that it is functioning as required before returning the channel to service. If the as-found instrument channel setpoint is not conservative with respect to the Allowable Value, the channel shall be declared inoperable.

2. The instrument channel setpoint shall be reset to a value that is within the as-left tolerance of the UFSAR Trip Setpoint, or within the as left tolerance of a setpoint that is more conservative than the UFSAR Trip Set Point; otherwise the channel shall be declared inoperable. The UFSAR Trip Setpoint and the methodology used to determine 1) the UFSAR Trip Setpoint, 2) the predetermined as found acceptance criteria band, and 3) the as-left setpoint tolerance band are specified in the UFSAR.

RPS Instrumentation – Operating (After CPC Upgrade)  
3.3.1

Table 3.3.1-1 (page 1 of 3)  
Reactor Protective System Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE
1. Variable Over Power	1,2	SR 3.3.1.1 SR 3.3.1.4 SR 3.3.1.6 SR 3.3.1.7 SR 3.3.1.8 SR 3.3.1.9 SR 3.3.1.13	Ceiling $\leq$ 111.0% RTP Band $\leq$ 9.9% RTP Incr. Rate $\leq$ 11.0%/min RTP Decr. Rate $>$ 5%/sec RTP
2. Logarithmic Power Level – High(a)	2	SR 3.3.1.1 SR 3.3.1.7 SR 3.3.1.9 SR 3.3.1.12 SR 3.3.1.13	$\leq$ 0.011% NRTP
3. Pressurizer Pressure – High	1,2	SR 3.3.1.1 SR 3.3.1.7 SR 3.3.1.9 SR 3.3.1.13	$\leq$ 2388 psia
4. Pressurizer Pressure – Low	1,2	SR 3.3.1.1 SR 3.3.1.7 SR 3.3.1.9 SR 3.3.1.12 SR 3.3.1.13	$\geq$ 1821 psia
5. Containment Pressure – High	1,2	SR 3.3.1.1 SR 3.3.1.7 SR 3.3.1.9 SR 3.3.1.13	$\leq$ 3.2 psig
6. Steam Generator #1 Pressure – Low	1,2	SR 3.3.1.1 SR 3.3.1.7 SR 3.3.1.9 SR 3.3.1.13	3876 Mwt RTP: $\geq$ 890 psia 3990 Mwt RTP: $\geq$ 955 psia <sup>(aa)</sup>
7. Steam Generator #2 Pressure – Low	1,2	SR 3.3.1.1 SR 3.3.1.7 SR 3.3.1.9 SR 3.3.1.13	3876 Mwt RTP: $\geq$ 890 psia 3990 Mwt RTP: $\geq$ 955 psia <sup>(aa)</sup>

(continued)

- (a) Trip may be bypassed when logarithmic power is  $>$  1E-4% NRTP. Bypass shall be automatically removed when logarithmic power is  $\leq$  1E-4% NRTP.
- (aa) 1. If the as-found channel setpoint is conservative with respect to the Allowable Value but outside its predetermined as-found acceptance criteria band, then the channel shall be evaluated to verify that it is functioning as required before returning the channel to service. If the as-found instrument channel setpoint is not conservative with respect to the Allowable Value, the channel shall be declared inoperable.
2. The instrument channel setpoint shall be reset to a value that is within the as-left tolerance of the UFSAR Trip Setpoint, or within the as left tolerance of a setpoint that is more conservative than the UFSAR Trip Set Point; otherwise the channel shall be declared inoperable. The UFSAR Trip Setpoint and the methodology used to determine 1) the UFSAR Trip Setpoint, 2) the predetermined as found acceptance criteria band, and 3) the as-left setpoint tolerance band are specified in the UFSAR.

RPS Instrumentation – Shutdown  
3.3.2

Table 3.3.2-1  
Reactor Protective System Instrumentation - Shutdown

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALVE
1. Logarithmic Power Level-High <sup>(d)</sup>	3 <sup>(a)</sup> , 4 <sup>(a)</sup> , 5 <sup>(a)</sup>	SR 3.3.2.1 SR 3.3.2.2 SR 3.3.2.3 SR 3.3.2.4 SR 3.3.2.5	≤ 0.011% NRTP <sup>(c)</sup>
2. Steam Generator #1 Pressure-Low <sup>(b)</sup>	3 <sup>(a)</sup>	SR 3.3.2.1 SR 3.3.2.2 SR 3.3.2.4 SR 3.3.2.5	3876 Mwt RTP: ≥ 890 psia 3990 Mwt RTP: ≥ 955 psia <sup>(e)</sup>
3. Steam Generator #2 Pressure-Low <sup>(b)</sup>	3 <sup>(a)</sup>	SR 3.3.2.1 SR 3.3.2.2 SR 3.3.2.4 SR 3.3.2.5	3876 Mwt RTP: ≥ 890 psia 3990 Mwt RTP: ≥ 955 psia <sup>(e)</sup>

- (a) With any Reactor Trip Circuit Breakers (RTCBs) closed and any control element assembly capable of being withdrawn.
- (b) The setpoint may be decreased as steam pressure is reduced, provided the margin between steam pressure and the setpoint is maintained ≤ 200 psig. The setpoint shall be automatically increased to the normal setpoint as steam pressure is increased.
- (c) The setpoint must be reduced to ≤ 1E-4% NRTP when less than 4 RCPs are running.
- (d) Trip may be bypassed when logarithmic power is > 1E-4% NRTP. Bypass shall be automatically removed when logarithmic power is ≤ 1E-4% NRTP.
- (e) 1. If the as-found channel setpoint is conservative with respect to the Allowable Value but outside its predetermined as-found acceptance criteria band, then the channel shall be evaluated to verify that it is functioning as required before returning the channel to service. If the as-found instrument channel setpoint is not conservative with respect to the Allowable Value, the channel shall be declared inoperable.
2. The instrument channel setpoint shall be reset to a value that is within the as-left tolerance of the UFSAR Trip Setpoint, or within the as left tolerance of a setpoint that is more conservative than the UFSAR Trip Set Point; otherwise the channel shall be declared inoperable. The UFSAR Trip Setpoint and the methodology used to determine 1) the UFSAR Trip Setpoint, 2) the predetermined as found acceptance criteria band, and 3) the as-left setpoint tolerance band are specified in the UFSAR.

Table 3.3.5-1 (page 1 of 1)  
Engineered Safety Features Actuation System Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	ALLOWABLE VALUE
1. Safety Injection Actuation Signal		
a. Containment Pressure – High	1.2,3	≤ 3.2 psig
b. Pressurizer Pressure – Low(a)		≥ 1821 psia
2. Containment Spray Actuation Signal		
a. Containment Pressure – High High	1.2,3	≤ 8.9 psig
3. Containment Isolation Actuation Signal		
a. Containment Pressure – High	1.2,3	≤ 3.2 psig
b. Pressurizer Pressure – Low(a)		≥ 1821 psia
4. Main Steam Isolation Signal(c)		
a. Steam Generator #1 Pressure–Low(b)	1.2,3	3876 Mwt RTP: ≥ 890 psia
b. Steam Generator #2 Pressure–Low(b)		3990 Mwt RTP: ≥ 955 psia <sup>(d)</sup>
c. Steam Generator #1 Level–High		3876 Mwt RTP: ≥ 890 psia
d. Steam Generator #2 Level–High		3990 Mwt RTP: ≥ 955 psia <sup>(d)</sup>
e. Containment Pressure–High		≤ 91.5%
		≤ 91.5%
		≤ 3.2 psig
5. Recirculation Actuation Signal		
a. Refueling Water Storage Tank Level–Low	1.2,3	≥ 6.9 and ≤ 7.9%
6. Auxiliary Feedwater Actuation Signal SG #1 (AFAS-1)		
a. Steam Generator #1 Level–Low	1.2,3	≥ 25.3%
b. SG Pressure Difference–High		≤ 192 psid
7. Auxiliary Feedwater Actuation Signal SG #2 (AFAS-2)		
a. Steam Generator #2 Level–Low	1.2,3	≥ 25.3%
b. SG Pressure Difference–High		≤ 192 psid
<p>(a) The setpoint may be decreased to a minimum value of 100 psia, as pressurizer pressure is reduced, provided the margin between pressurizer pressure and the setpoint is maintained ≤ 400 psia or ≥ 140 psia greater than the saturation pressure of the RCS cold leg when the RCS cold leg temperature is ≥ 485°F. Trips may be bypassed when pressurizer pressure is &lt; 400 psia. Bypass shall be automatically removed when pressurizer pressure is ≥ 500 psia. The setpoint shall be automatically increased to the normal setpoint as pressurizer pressure is increased.</p> <p>(b) The setpoint may be decreased as steam pressure is reduced, provided the margin between steam pressure and the setpoint is maintained ≤ 200 psig. The setpoint shall be automatically increased to the normal setpoint as steam pressure is increased.</p> <p>(c) The Main Steam Isolation Signal (MSIS) Function (Steam Generator Pressure – Low, Steam Generator Level–High and Containment Pressure – High signals) is not required to be OPERABLE when all associated valves isolated by the MSIS Function are closed.</p> <p>(d) 1. If the as-found channel setpoint is conservative with respect to the Allowable Value but outside its predetermined as-found acceptance criteria band, then the channel shall be evaluated to verify that it is functioning as required before returning the channel to service. If the as-found instrument channel setpoint is not conservative with respect to the Allowable Value, the channel shall be declared inoperable.</p> <p>2. The instrument channel setpoint shall be reset to a value that is within the as-left tolerance of the UFSAR Trip Setpoint, or within the as left tolerance of a setpoint that is more conservative than the UFSAR Trip Set Point; otherwise the channel shall be declared inoperable. The UFSAR Trip Setpoint and the methodology used to determine 1) the UFSAR Trip Setpoint, 2) the predetermined as found acceptance criteria band, and 3) the as-left setpoint tolerance band are specified in the UFSAR.</p>		

Table 3.7.1-1 (page 1 of 1)  
Variable Overpower Trip Setpoint versus  
OPERABLE Main Steam Safety Valves

MINIMUM NUMBER OF MSSVs PER STEAM GENERATOR REQUIRED OPERABLE	NUMBER OF INOPERABLE MSSVs PER STEAM GENERATOR	MAXIMUM POWER (% RTP) or HIGHEST MODE		MAXIMUM ALLOWABLE VARIABLE OVERPOWER TRIP SETPOINT <sup>(a)</sup> (% RTP)	
		3876 Mwt RTP	3990 Mwt RTP	3876 Mwt RTP	3990 Mwt RTP
10	0	100.0	100.0	111.0	111.0
9	1	98.2	90.0	108.0	99.7
8	2	87.3	80.0	97.1	89.7
7	3	76.4	68.0	86.2	77.7
6	4	65.5	56.0	75.3	65.7
5	5	MODE 3	MODE 3	NA	NA
4	6	MODE 3	MODE 3	NA	NA
3	7	MODE 3	MODE 3	NA	NA
2	8	MODE 3	MODE 3	NA	NA

(a) The VOPT setpoint is not required to be reset in MODE 3.

**ATTACHMENT 3**  
**CHANGES TO TS BASES (for information only)**

## B 3.3 INSTRUMENTATION

### B 3.3.1 Reactor Protective System (RPS) Instrumentation – Operating

#### BASES

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#### BACKGROUND

The RPS initiates a reactor trip to protect against violating the core specified acceptable fuel design limits and breaching the reactor coolant pressure boundary (RCPB) during anticipated operational occurrences (AOOs). By tripping the reactor, the RPS also assists the Engineered Safety Features (ESF) systems in mitigating accidents.

The protection and monitoring systems have been designed to ensure safe operation of the reactor. This is achieved by specifying limiting safety system settings (LSSS) in terms of parameters directly monitored by the RPS, as well as LCOs on other reactor system parameters and equipment performance.

Except for Trip Functions 6 and 7, the LSSS, defined in this Specification as the Allowable Value, in conjunction with the LCOs, establish the threshold for protective system action to prevent exceeding acceptable limits during Design Basis Accidents (DBAs). For Trip Functions 6 and 7, the UFSAR Trip Setpoint is the LSSS.

During AOOs, which are those events expected to occur one or more times during the plant life, the acceptable limits are:

- The departure from nucleate boiling ratio (DNBR) shall be maintained above the Safety Limit (SL) value to prevent departure from nucleate boiling (DNB);
- Fuel centerline melting shall not occur; and
- The Reactor Coolant System (RCS) pressure SL of 2750 psia shall not be exceeded.

Maintaining the parameters within the above values ensures that the offsite dose will be within the 10 CFR 50 (Ref. 1) and 10 CFR 100 (Ref. 2) criteria during AOOs.

Accidents are events that are analyzed even though they are not expected to occur during the plant life. The acceptable limit during accidents is that the offsite dose shall be maintained within an acceptable fraction of 10 CFR 100

(continued)

## BASES

### BACKGROUND

#### Bistable Trip Units (Before CPC Upgrade) (continued)

Some measurement channels provide contact outputs to the PPS. In these cases, there is no bistable card, and opening the contact input directly de-energizes the associated bistable relays. These include the CPC generated DNBR - Low and LPD - High trips. The CPC auxiliary trip functions (e.g., CPC VOPT algorithm) do not have any direct contact outputs to the PPS. The auxiliary trip functions act through the DNBR - Low and LPD - High trip contacts to de-energize the associated CPC initiation relays that provide a channel trip signal to the PPS parameters 3 and 4 bistable relays. Other CPC trip functions may also apply a penalty factor to cause a DNBR or LPD trip.

The trip setpoints used in the bistables are based on analytical limits derived from safety analyses (Ref. 5 and 8). The selection of these trip setpoints is such that adequate protection is provided when all sensor and processing time delays are taken into account. To allow for calibration tolerances, instrumentation uncertainties, instrument drift, and severe environment errors for those RPS channels that must function in harsh environments as defined by 10 CFR 50.49 (Ref. 6), Except for Trip Functions 6 and 7, Allowable Values specified in Table 3.3.1-1, in the accompanying LCO, and the UFSAR Trip Setpoints specified in Table 7.2-1 of the UFSAR (Ref. 8) for Trip Functions 6 and 7 are conservatively adjusted with respect to the analytical limits. A detailed description of the methodology used to calculate the trip setpoints, including their explicit uncertainties, is provided in "Calculation of Trip Setpoint Values" (Ref. 7). The UFSAR Trip Setpoints are based on the calculated total loop uncertainty consistent with the methodology as documented in the UFSAR (RG 1.105, Revision 1, November 1976) (Ref. 14). The general relationship among the PVNGS trip setpoint terms is as follows: The calculated Limiting Setpoint (LSp) is determined within the plant specific setpoint analysis and is based on the Analytical Limit and the Total Loop Uncertainty. The UFSAR Trip Setpoint is equal to or more conservative than the LSp and is specified in the UFSAR. The UFSAR Trip setpoint is the total limiting set point which preserves the safety limit and is therefore the LSSS required by 10 CFR 50.36. The Design Setpoint (DSp) is the field installed setting and can be even more conservative than the UFSAR Trip Setpoint. This relationship ensures that sufficient margin to the safety limit is maintained. The nominal trip setpoint DSp

(continued)

entered into the bistable is normally still more conservative than that specified by the Allowable Value to account for changes in random measurement errors detectable by a CHANNEL FUNCTIONAL TEST. One example of such a change in measurement error is drift during the interval between surveillances. A channel is inoperable if its actual setpoint is not within its Allowable Value.

To maintain the margins of safety assumed in the safety analyses, the calculations of the trip variables for the DNBR - Low and Local Power Density - High trips include the measurement, calculational, and processor uncertainties and dynamic allowances as defined in the latest applicable revision of CEN-305-P, "Functional Design Requirements for a Core Protection Calculator" (Ref. 10) and CEN-304-P, "Functional Design Requirements for a Control Element Assembly Calculator," (Ref. 11). The safety

(continued)

BASES

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BACKGROUND

Bistable Trip Units (Before CPC Upgrade) (continued)

analyses also credit the CPC auxiliary trip functions (VOPT, T-hot Saturation, ASGT, and Low RCS Pressure), which act through the DNBR - Low and LPD - High trip contacts, to provide core protection during Anticipated Operational Occurrences and Design Basis Accidents (Ref. 5 and 8).

Setpoints in accordance with the Allowable Value will ensure that SLs of Chapter 2.0, "SAFETY LIMITS (SLs)," are not violated during AOOs, and the consequences of DBAs will be acceptable, providing the plant is operated from within the LCOs at the onset of the AOO or DBA and the equipment functions as designed.

Note that in LCO 3.3.1, the Allowable Values of Table 3.3.1-1 are the LSSS, except for Trip Functions 6 and 7. For Trip Functions 6 and 7, the UFSAR Trip Setpoint is the LSSS.

Functional testing of the entire RPS, from bistable input through the opening of individual RTCBs, can be performed either at power or shutdown and is normally performed on a quarterly basis. Nuclear instrumentation, the CPCs, and the CEACs can be similarly tested. UFSAR, Section 7.2 (Ref. 8), provides more detail on RPS testing. Processing transmitter calibration is normally performed on a refueling basis.

Bistable Trip Units (After CPC Upgrade)

Bistable trip units, mounted in the Plant Protection System (PPS) cabinet, receive an analog input from the measurement channels. They compare the analog input to trip setpoints and provide contact output to the Matrix Logic. They also provide local trip indication and remote annunciation.

There are four channels of bistables, designated A, B, C, and D, for each RPS parameter, one for each measurement channel. Bistables de-energize when a trip occurs, in turn de-energizing bistable relays mounted in the PPS relay card racks.

The contacts from these bistable relays are arranged into six coincidence matrices, comprising and Matrix Logic. If bistables monitoring the same parameter in at least two

(continued)

BASES

BACKGROUND

Bistable Trip Units (After CPC Upgrade) (continued)

Some measurement channels provide contact outputs to the PPS. In these cases, there is no bistable card, and opening the contact input directly de-energizes the associated bistable relays. These include the CPC generated DNBR - Low and LPD - High trips. The CPC auxiliary trip functions (e.g., CPC VOPT algorithm) do not have any direct contact outputs to the PPS. The auxiliary trip functions act through the DNBR - Low and LPD - High trip contacts to de-energize the associated CPC initiation relays that provide a channel trip signal to the PPS parameters 3 and 4 bistable relays. Other CPC trip functions may also apply a penalty factor to cause a DNBR or LPD trip.

The trip setpoints used in the bistables are based on the analytical limits derived from the accident analysis (Ref. 5). The selection of these trip setpoints is such that adequate protection is provided when all sensor and processing time delays are taken into account. To allow for calibration tolerances, instrumentation uncertainties, instrument drift, and severe environment errors for those RPS channels that must function in harsh environments as defined by 10 CFR 50.49 (Ref. 6). Except for Trip Functions 6 and 7, Allowable Values specified in Table 3.3.1-1, in the accompanying LCO, and the UFSAR Trip Setpoints specified in Table 7.2-1 of the UFSAR (Ref. 8) for Trip Functions 6 and 7 are conservatively adjusted with respect to the analytical limits. A detailed description of the methodology used to calculate the trip setpoints, including their explicit uncertainties, is provided in "Calculation of Trip Setpoint Values" (Ref. 7). The UFSAR Trip Setpoints are based on the calculated total loop uncertainty consistent with the methodology as documented in the UFSAR (RG 1.105, Revision 1, November 1976) (Ref. 14). The general relationship among the PVNGS trip setpoint terms is as follows: The calculated Limiting Setpoint (LSp) is determined within the plant specific setpoint analysis and is based on the Analytical Limit and the Total Loop Uncertainty. The UFSAR Trip Setpoint is equal to or more conservative than the LSp and is specified in the UFSAR. The UFSAR Trip setpoint is the legal limiting set point which preserves the safety limit and is therefore the LSSS required by 10 CFR 50.36. The Design Setpoint (DSp) is the field installed setting and can be even more conservative than the UFSAR Trip Setpoint. This relationship ensures that sufficient margin to the safety limit is maintained. The nominal trip setpoint DSp  
(continued)

entered into the bistable is normally still more conservative than that specified by the Allowable Value to account for changes in random measurement errors detectable by a CHANNEL FUNCTIONAL TEST. One example of such a change in measurement error is drift during the interval between surveillances. A channel is inoperable if its actual setpoint is not within its Allowable Value.

To maintain the margins of safety assumed in the safety analyses, the calculations of the trip variables for the DNBR - Low and Local Power Density - High trips include the measurement, calculational, and processor uncertainties and dynamic allowances as defined in the latest applicable revision of CEN-305-P, "Functional Design Requirements for a Core Protection Calculator" (Ref. 10) and CEN-304-P, "Functional Design Requirements for a Control Element Assembly Calculator," (Ref. 11). The safety analyses

(continued)

## BASES

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### BACKGROUND

#### Bistable Trip Units (After CPC Upgrade) (continued)

also credit the CPC auxiliary trip functions (VOPT, T-hot Saturation, ASGT, and Low RCS Pressure), which act through the DNBR - Low and LPD - High trip contacts, to provide core protection during Anticipated Operational Occurrences and Design Basis Accidents (Ref. 5 and 8).

Setpoints in accordance with the Allowable Value will ensure that SLs of Chapter 2.0, "SAFETY LIMITS (SLs)," are not violated during AOOs, and the consequences of DBAs will be acceptable, providing the plant is operated from within the LCOs at the onset of the AOO or DBA and the equipment functions as designed.

Note that in LCO 3.3.1, the Allowable Values of Table 3.3.1-1 are the LSSS, except for Trip Functions 6 and 7. For Trip Functions 6 and 7, the UFSAR Trip Setpoint is the LSSS.

Functional testing of the entire RPS, from bistable input through the opening of individual RTCBs, can be performed either at power or shutdown and is normally performed on a quarterly basis. Nuclear instrumentation, the CPCs, and the CEACs can be similarly tested. CPC and CEAC functional testing is performed quarterly and during refueling. UFSAR, Section 7.2 (Ref. 8), provides more detail on RPS testing. Processing transmitter calibration is normally performed on refueling basis.

#### RPS Logic

The RPS Logic, addressed in LCO 3.3.4, consists of both Matrix and Initiation Logic and employs a scheme that provides a reactor trip when bistables in any two of the four channels sense the same input parameter trip. This is called a two-out-of-four trip logic.

Bistable relay contact outputs from the four channels are configured into six logic matrices. Each logic matrix checks for a coincident trip in the same parameter in two bistable channels. The matrices are designated the AB, AC, AD, BC, BD, and CD matrices to reflect the bistable channels being monitored. Each logic matrix contains four normally energized matrix relays. When a coincidence is detected, consisting of a trip in the same Function in the two

(continued)

## BASES

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### LCO

The LCO requires all instrumentation performing an RPS Function to be OPERABLE. Failure of any required portion of the instrument channel renders the affected channel(s) inoperable and reduces the reliability of the affected Functions.

Actions allow maintenance (trip channel) bypass of individual channels, but the bypass activates interlocks that prevent operation with a second channel in the same Function bypassed. With one channel in each Function trip channel bypassed, this effectively places the plant in a two-out-of-three logic configuration in those Functions.

The general relationship among the PVNGS trip setpoint terms is as follows: The calculated limiting setpoint (LSp) is determined within the plant specific setpoint analysis and is based on the Analytical Limit and the Total Loop Uncertainty. The UFSAR Trip Setpoint is equal to or more conservative than the LSp and is specified in the UFSAR (Ref. 8). The UFSAR Trip Setpoint is the legal limiting setpoint which preserves the safety limit and is therefore the LSSS required by 10 CFR 50.36. The Design Setpoint (DSp) is the field installed setting and can be even more conservative than the UFSAR Trip Setpoint. This relationship will ensure that sufficient margin to the safety and/or analytical limit is maintained.

Only the Allowable Values (AVs) are specified for each RPS trip Function in the LCO. The AV is considered an operability limit for the channel. Nominal trip setpoints are specified in the plant specific setpoint calculations. The nominal setpoints are selected to ensure the setpoints measured by CHANNEL FUNCTIONAL TESTS do not exceed the Allowable Value if the bistable is performing as required. Operation with a trip setpoint less conservative than the nominal trip setpoint, but within its Allowable Value, is acceptable, provided that operation and testing are consistent with the assumptions of the plant specific setpoint calculations. If the as-found instrument setting is found to be non-conservative with respect to the AV, or the as-left instrument setting cannot be returned to a setting within As-Left Tolerance (ALT), or the instrument is not functioning as required, then the instrument channel shall be declared inoperable. A channel is inoperable if its actual trip setpoint is not within its required Allowable Value. Each Allowable Value specified is more conservative

(continued)

BASES

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LCO  
(continued)

5. Containment Pressure - High

The LCO requires four channels of Containment Pressure - High to be OPERABLE in MODES 1 and 2.

The Allowable Value is set high enough to allow for small pressure increases in containment expected during normal operation (i.e., plant heatup) and is not indicative of an abnormal condition. It is set low enough to initiate a reactor trip when an abnormal condition is indicated.

6. 7. Steam Generator Pressure - Low

This LCO requires four channels of Steam Generator #1 Pressure - Low and Steam Generator #2 Pressure - Low to be OPERABLE in MODES 1 and 2.

This ~~Allowable Value~~ UFSAR Trip Setpoint is sufficiently below the full load operating value for steam pressure so as not to interfere with normal plant operation, but still high enough to provide the required protection in the event of excessive steam demand. Since excessive steam demand causes the RCS to cool down, resulting in positive reactivity addition to the core. If the moderator temperature coefficient is negative a reactor trip is required to offset that effect.

The trip setpoint may be manually decreased as steam generator pressure is reduced during controlled plant cooldown, provided the margin between steam generator pressure and the setpoint is maintained  $\leq 200$  psia. This allows for controlled depressurization of the secondary system while still maintaining an active reactor trip setpoint and MSIS setpoint, until the time is reached when the setpoints are no longer needed to protect the plant. The setpoint increases automatically as steam generator pressure increases until the specified trip setpoint is reached.

Footnote (aa), which is divided into two parts, will ensure compliance with 10 CFR 50.36 in the event that the instrument set points are found not to be conservative with respect to the Allowable Value. Part 1 requires evaluation of instrument performance for the condition where the as-found setting for these instruments is outside its As-Found Tolerance (AFT)

(continued)

but conservative with respect to the Allowable Value. Evaluation of instrument performance will verify that the instrument will continue to behave in accordance with design-basis assumptions. The purpose of the assessment is to ensure confidence in the instrument performance prior to returning the instrument to service. Initial evaluation will be performed by the technician performing the surveillance who will evaluate the instrument's ability to maintain a stable trip setpoint within the As-Left Tolerance (ALT). The technician's evaluation will be reviewed by on shift personnel both during the approval of the surveillance data and as a result of entry of the deviation in the site's corrective action program. In accordance with procedures, entry into the corrective action program will require review and documentation of the condition for operability. Additional evaluation and potential corrective actions as necessary will ensure that any as-found setting found outside the ALT is evaluated for long-term operability trends.

Part 2 requires that the as-left setting for the instrument be returned to within the ALT of the specified trip setpoint. The specified field installed trip setpoint is termed as the Design Setpoint (DSP) and is equal to or more conservative than the UFSAR Trip Setpoint. The general relationship among the PVNGS trip setpoint terms is as follows: The calculated limiting setpoint (LSP) is determined within the plant specific setpoint analysis and is based on the Analytical Limit and Total Loop Uncertainty. The UFSAR Trip Setpoint is equal to or more conservative than the LSP and is specified in the UFSAR. The UFSAR Trip Setpoint is the legal limiting setpoint which preserves the safety limit and is therefore the LSSS required by 10 CFR 50.36. The DSP is the field installed setting and can be even more conservative than the UFSAR Trip Setpoint. This relationship ensures that sufficient margin to the safety and/or analytical limit is maintained. If the as-found instrument setting is found to be non-conservative with respect to the AV specified in the technical specifications, or the as-left instrument setting cannot be returned to a setting within the ALT, or the instrument is not functioning as required, then the instrument channel shall be declared inoperable.

#### 8. 9. Steam Generator Level - Low

(continued)

BASES

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SURVEILLANCE  
REQUIREMENTS

SR 3.3.1.13 (continued)

Response time may be verified by any series of sequential, overlapping or total channel measurements, including allocated sensor response time, such that the response time is verified. Allocations for sensor response times may be obtained from the records of test results, vendor test data, or vendor engineering specifications. Topical Report CE NPSD-1167-A, "Elimination of Pressure Sensor Response Time Testing Requirements." (Ref. 12) provides the basis and methodology for using allocated sensor response times in the overall verification of the channel response time for specific sensors identified in the Topical Report. Response time verification for other sensor types must be demonstrated by test. The allocation of sensor response times must be verified prior to placing a new component in operation and reverified after maintenance that may adversely affect the sensor response time.

A Note is added to indicate that the neutron detectors are excluded from RPS RESPONSE TIME testing because they are passive devices with minimal drift and because of the difficulty of simulating a meaningful signal. Slow changes in detector sensitivity are compensated for by performing the daily calorimetric calibration (SR 3.3.1.4)

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REFERENCES

1. 10 CFR 50, Appendix A, GDC 21
2. 10 CFR 100.
3. NRC Safety Evaluation Report, July 15, 1994.
4. UFSAR, Chapter 7
5. UFSAR, Chapters 6 and 15.
6. 10 CFR 50.49.
7. "Calculation of Trip Setpoint Values, Plant Protection System". CEN-286(v), or Calculation 13-JC-SG-203 for the Low Steam Generator Pressure Trip function.
8. UFSAR, Section 7.2, Tables 7.2-1 and 7.3-11A

(continued)

## BASES

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### REFERENCES (continued)

9. CEN-327. June 2, 1986, including Supplement 1, March 3, 1989, and Calculation 13-JC-SB-200.
  10. CEN-305-P, "Functional Design Requirements for a Core Protection Calculator."
  11. CEN-304-P, "Functional Design Requirements for a Control Element Assembly Calculator."
  12. CEOG Topical Report CE NPSD-1167-A, "Elimination of Pressure Sensor Response Time Testing Requirements."
  13. CEN-323-P-A, "Reload Data Block Constant Installation Guidelines", Combustion Engineering, Inc., September, 1986.
  14. UFSAR Section 1.8, "Regulatory Guide 1.105, Instrument Setpoints (Revision 1, November 1976)".
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### B 3.3 INSTRUMENTATION

#### B 3.3.2 Reactor Protective System (RPS) Instrumentation – Shutdown

##### BASES

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##### BACKGROUND

The RPS initiates a reactor trip to protect against violating the core fuel design limits and reactor coolant pressure boundary (RCPB) integrity during anticipated operational occurrences (AOOs). By tripping the reactor, the RPS also assists the Engineered Safety Features systems in mitigating accidents.

The protection and monitoring systems have been designed to ensure safe operation of the reactor. This is achieved by specifying limiting safety system settings (LSSS) in terms of parameters directly monitored by the RPS, as well as LCOs on other reactor system parameters and equipment performance.

Except for trip Functions 2 and 3, the LSSS, defined in this Specification as the Allowable Value, in conjunction with the LCOs, establish the threshold for protective system action to prevent exceeding acceptable limits during Design Basis Accidents (DBAs). For Trip Functions 2 and 3, The UFSAR Trip Setpoint is the LSSS.

During AOOs, which are those events expected to occur one or more times during the plant life, the acceptable limits are:

- The departure from nucleate boiling ratio shall be maintained above the Safety Limit (SL) value to prevent departure from nucleate boiling;
- Fuel centerline melting shall not occur; and
- The Reactor Coolant System pressure SL of 2750 psia shall not be exceeded.

Maintaining the parameters within the above values ensures that the offsite dose will be within the 10 CFR 50 (Ref. 1) and 10 CFR 100 (Ref. 2) criteria during AOOs.

Accidents are events that are analyzed even though they are not expected to occur during the plant life. The acceptable limit during accidents is that the offsite dose shall be maintained within an acceptable fraction of 10 CFR 100 (Ref. 2) limits. Different accident categories allow a different fraction of these limits based on probability of occurrence. Meeting the acceptable dose limit for an (continued) accident category is considered having acceptable consequences for that event.

(continued)

BASES

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LCO

The LCO requires the Logarithmic Power Level - High, the Steam Generator #1 Pressure-Low, and the Steam Generator #2 Pressure-Low, RPS Functions to be OPERABLE. Failure of any required portion of the instrument channel renders the affected channel(s) inoperable and reduces the reliability of the affected Function.

Actions allow maintenance (trip channel) bypass of individual channels, but the bypass activates interlocks that prevent operation with a second channel in the same Function bypassed. With one channel in each Function trip channel bypassed, this effectively places the plant in a two-out-of-three logic configuration in those Functions.

Only the Allowable Values (AVs) are specified for this RPS trip Function in the LCO. The AV is considered an operability limit for the channel. If the as-found instrument setting is found to be non-conservative with respect to the AV, or the as-left instrument setting cannot be returned to a setting within As-Left Tolerance (ALT), or the instrument is not functioning as required, then the instrument channel shall be declared inoperable. Nominal trip setpoints are specified in the plant specific setpoint calculations. The nominal setpoint is selected to ensure the setpoint measured by CHANNEL FUNCTIONAL TESTS does not exceed the Allowable Value if the bistable is performing as required. Operation with a trip setpoint less conservative than the nominal trip setpoint, but within its Allowable Value, is acceptable provided that operation and testing are consistent with the assumptions of the plant specific setpoint calculations. Each Allowable Value specified is more conservative than the analytical limit assumed in the safety analysis in order to account for instrument uncertainties appropriate to the trip Function.

These uncertainties are defined in the "Plant Protection System Selection of Trip Setpoint Values" (Ref. 4). A channel is inoperable if its actual trip setpoint is not within its required Allowable Value.

This LCO requires all four channels of the Logarithmic Power Level - High to be OPERABLE MODES in 3, 4, or 5 when the RTCBs are closed and the CEA Drive System is capable of CEA withdrawal.

A CEA is considered capable of withdrawal when power is applied to the Control Element Drive Mechanisms (CEDMs).

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BASES

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LCO  
(continued)

that removes power from the CEDMs may be used. The CEAs are still capable of withdrawal if the CEDMCS withdrawal circuits are disabled with power applied to the CEDMs because failures in the CEDMCS could result in CEA withdrawal.

This LCO requires all four channels of Steam Generator #1 Pressure-Low, and Steam Generator #2 Pressure-Low, to be OPERABLE in MODE 3, when the RTCBs are closed and the CEA Drive System is capable of CEA withdrawal. These RPS functions are not required in MODES 4 and 5 because the Steam Generator temperature is low, therefore the energy release and resulting cooldown following a large MSLB in MODES 4 and 5 is not significant.

Footnote (e), which is divided into two parts, will ensure compliance with 10 CFR 50.36 in the event that the instrument set points are found not to be conservative with respect to the Allowable Value. Part 1 requires evaluation of instrument performance for the condition where the as-found setting for these instruments is outside its As-Found Tolerance (AFT) but conservative with respect to the Allowable Value. Evaluation of instrument performance will verify that the instrument will continue to behave in accordance with design-basis assumptions. The purpose of the assessment is to ensure confidence in the instrument performance prior to returning the instrument to service. Initial evaluation will be performed by the technician performing the surveillance who will evaluate the instrument's ability to maintain a stable trip setpoint within the As-Left Tolerance (ALT). The technician's evaluation will be reviewed by on shift personnel both during the approval of the surveillance data and as a result of entry of the deviation in the site's corrective action program. In accordance with procedures, entry into the corrective action program will require review and documentation of the condition for operability. Additional evaluation and potential corrective actions as necessary will ensure that any as-found setting found outside the AFT is evaluated for long-term operability trends.

Part 2 requires that the as-left setting for the instrument be returned to within the ALT of the specified trip setpoint. The specified field installed trip setpoint is termed as the Design Setpoint (DSp) and is equal to or more conservative than the UFSAR Trip Setpoint. The general relationship among the PVNGS trip setpoint terms is as follows: The calculated limiting setpoint (LSP) is determined within the plant specific setpoint analysis and is based on the Analytical Limit and Total Loop

(continued)

BASES

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Uncertainty. The UFSAR Trip Setpoint is equal to or more conservative than the LSp and is specified in the UFSAR. The UFSAR Trip Setpoint is the legal limiting setpoint which preserves the safety limit and is therefore the LSSS required by 10 CFR 50.36. The DSp is the field installed setting and can be even more conservative than the UFSAR Trip Setpoint. This relationship ensures that sufficient margin to the safety and/or analytical limit is maintained. If the as-found instrument setting is found to be non-conservative with respect to the AV specified in the technical specifications, or the as-left instrument setting cannot be returned to a setting within the ALT, or the instrument is not functioning as required, then the instrument channel shall be declared inoperable.

The Allowable Values are high enough to provide an operating envelope that prevents unnecessary Logarithmic Power Level – High reactor trips during normal plant operations. The Allowable Values are low enough for the system to maintain a safety margin for unacceptable fuel cladding damage should a CEA withdrawal or MSLB event occur.

The Logarithmic Power Level – High trip may be bypassed when logarithmic power is above 1E-4% NRTP to allow the reactor to be brought to power during a reactor startup. This bypass is automatically removed when logarithmic power decreases below 1E-4% NRTP. Above 1E-4% NRTP, the Variable Over Power – High and Pressurizer Pressure – High trips provide protection for reactivity transients.

The automatic bypass removal channel is INOPERABLE when the associated Log power channel has failed. The bypass function is manually controlled via station operating procedures and the bypass removal circuitry itself is fully capable of responding to a change in the associated input bistable. Footnotes (a) and (b) in Table 3.3.1-1 and (d) in Table 3.3.2-1 clearly require an "automatic" removal of trip bypasses. A failed Log channel may prevent, depending on the failure mode, the associated input bistable from changing state as power transitions through the automatic bypass removal setpoint. Specifically, when the indicated Log power channel is failed high (above 1E-4%), the automatic Hi-Log power trip bypass removal feature in that channel cannot function. Similarly, when the indicated Log power channel is failed low (below 1E-4%), the automatic DNBR-LPD trip bypass removal feature in that channel cannot function. Although one bypass removal feature is applicable above 1E-4% NRTP and  
(continued)

BASES

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A Note is added to indicate that the neutron detectors are excluded from RPS RESPONSE TIME testing because they are passive devices with minimal drift and because of the difficulty of simulating a meaningful signal. Slow changes in detector sensitivity are compensated for by performing the daily calorimetric calibration (SR 3.3.1.4).

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REFERENCES

1. 10 CFR 50.
  2. 10 CFR 100.
  3. UFSAR, Section 7.2., Tables 7.2-1 and 7.3-11A
  4. "Calculation of Trip Setpoint Values Plant Protection System, CEN-286(v)", or Calculation 13-JC-SG-203 for the Low Steam Generator Pressure Trip Function.
  5. NRC Safety Evaluation Report, July 15, 1994.
  6. CEN-327, June 2, 1986, including Supplement 1, March 3, 1989, and Calculation 13-JC-SB-200.
  7. CEOG Topical Report CE NPSD-1167-A, "Elimination of Pressure Sensor Response Time Testing Requirements."
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BASES

BACKGROUND

Bistable Trip Units (continued)

The trip setpoints and Allowable Values used in the bistables are based on the analytical limits stated in Reference 5. The selection of these trip setpoints is such that adequate protection is provided when all sensor and processing time delays are taken into account. To allow for calibration tolerances, instrumentation uncertainties, instrument drift, and severe environment effects, for those ESFAS channels that must function in harsh environments as defined by 10 CFR 50.49 (Ref. 6), Except for Trip Functions 4a and 4b Allowable Values specified in Table 3.3.5-1, in the accompanying LCO, and UFSAR Trip Setpoints specified in Table 7.3-11A of the UFSAR (Ref. 8), for Trip Functions 4a and 4b are conservatively adjusted with respect to the analytical limits. The UFSAR Trip Setpoints are based on the calculated total loop uncertainty consistent with the methodology as documented in the UFSAR (RG 1.105, Revision 1, November 1976) (Ref. 11). The general relationship among the PVNGS trip setpoint terms is as follows: The calculated Limiting Setpoint (LSp) is determined within the plant specific setpoint analysis and is based on the Analytical Limit and the Total Loop Uncertainty. The UFSAR Trip Setpoint is equal to or more conservative than the LSp and is specified in the UFSAR. The UFSAR Trip setpoint is the legal limiting set point which preserves the safety limit and is therefore the LSSS required by 10 CFR 50.36. The Design Setpoint (DSP) is the field installed setting and can be even more conservative than the UFSAR Trip Setpoint. This relationship ensures that sufficient margin to the safety limit is maintained. A detailed description of the methodology used to calculate the trip setpoints, including their explicit uncertainties, is provided in the "Plant Protection System Selection of Trip Setpoint Values" (Ref. 7). The actual nominal trip setpoint Design Setpoint (DSP) entered into the bistable is normally still more conservative than that specified by the Allowable Value to account for changes in random measurement errors detectable by a CHANNEL FUNCTIONAL TEST. A channel is inoperable if its actual trip setpoint is not within its required Allowable Value.

Setpoints in accordance with the Allowable Value will ensure that Safety Limits of LCO Section 2.0, "Safety Limits," are not violated during AOOs and the consequences of Design Basis Accidents (DBAs) will be acceptable, providing the

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BASES

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LCO

Bypass Removal (continued)

This LCO applies to the operating bypass removal feature only. If the operating bypass enable function is failed so as to prevent entering a operating bypass condition, operation may continue. Because the trip setpoint has a floor value of 100 psia, a channel trip will result if pressure is decreased below this setpoint without bypassing.

The operating bypass removal Allowable Value was chosen because MSLB events originating from below this setpoint add less positive reactivity than that which can be compensated for by required SDM.

4. Main Steam Isolation Signal

The LCO is applicable to the MSIS in MODES 1, 2 and 3 except when all associated valves are closed.

a. Steam Generator Pressure - Low

This LCO requires four channels of Steam Generator Pressure - Low to be OPERABLE in MODES 1, 2 and 3.

The ~~Allowable Value~~UFSAR Trip Setpoint for this trip is set below the full load operating value for steam pressure so as not to interfere with normal plant operation. However, the setting is high enough to provide an MSIS (Function 4) during an excessive steam demand event. An excessive steam demand event causes the RCS to cool down, resulting in a positive reactivity addition to the core.

MSIS limits this cooldown by isolating both steam generators if the pressure in either drops below the trip setpoint. An RPS trip on Steam Generator Pressure - Low is initiated simultaneously, using the same bistable.

(continued)

BASES

LCO

a. Steam Generator Pressure – Low (continued)

The Steam Generator Pressure – Low trip setpoint may be manually decreased as steam generator pressure is reduced. This prevents an RPS trip or MSIS actuation during controlled plant cooldown. The margin between actual steam generator pressure and the trip setpoint must be maintained less than or equal to the specified value of 200 psia to ensure a reactor trip and MSIS will occur when required.

Footnote (d), which is divided into two parts, will ensure compliance with 10 CFR 50.36 in the event that the instrument set points are found not to be conservative with respect to the Allowable Value. Part 1 requires evaluation of instrument performance for the condition where the as-found setting for these instruments is outside its As-Found Tolerance (AFT) but conservative with respect to the Allowable Value. Evaluation of instrument performance will verify that the instrument will continue to behave in accordance with design-basis assumptions. The purpose of the assessment is to ensure confidence in the instrument performance prior to returning the instrument to service. Initial evaluation will be performed by the technician performing the surveillance who will evaluate the instrument's ability to maintain a stable trip setpoint within the As-Left Tolerance (ALT). The technician's evaluation will be reviewed by on shift personnel both during the approval of the surveillance data and as a result of entry of the deviation in the site's corrective action program. In accordance with procedures, entry into the corrective action program will require review and documentation of the condition for operability. Additional evaluation and potential corrective actions as necessary will ensure that any as-found setting found outside the AFT is evaluated for long-term operability trends.

Part 2 requires that the as-left setting for the instrument be returned to within the ALT of the specified trip setpoint. The specified field installed trip setpoint is termed as the Design

(continued)

BASES

Setpoint (DSp) and is equal to or more conservative than the UFSAR Trip Setpoint. The general relationship among the PVNGS trip setpoint terms is as follows: The calculated limiting setpoint (LSP) is determined within the plant specific setpoint analysis and is based on the Analytical Limit and Total Loop Uncertainty. The UFSAR Trip Setpoint is equal to or more conservative than the LSP and is specified in the UFSAR. The UFSAR Trip Setpoint is the legal limiting setpoint which preserves the safety limit and is therefore the LSSS required by 10 CFR 50.36. The DSp is the field installed setting and can be even more conservative than the UFSAR Trip Setpoint. This relationship ensures that sufficient margin to the safety and/or analytical limit is maintained. If the as-found instrument setting is found to be non-conservative with respect to the AV specified in the technical specifications, or the as-left instrument setting cannot be returned to a setting within the ALT, or the instrument is not functioning as required, then the instrument channel shall be declared inoperable.

b. Containment Pressure - High

This LCO requires four channels of Containment Pressure - High to be OPERABLE in MODES 1, 2 and 3. The Containment Pressure - High signal is shared among the SIAS (Function 1), CIAS (Function 3), and MSIS (Function 4).

The Allowable Value for this trip is set high enough to allow for small pressure increases in containment expected during normal operation (i.e., plant heatup) and is not indicative of an abnormal condition. The setting is low enough to initiate the ESF Functions when an abnormal condition is indicated. This allows the ESF systems to perform as expected in the accident analyses to mitigate the consequences of the analyzed accidents.

c. Steam Generator Level-High

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BASES

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REFERENCES

1. UFSAR, Section 7.3.
  2. 10 CFR 50, Appendix A.
  3. NRC Safety Evaluation Report, July 15, 1994
  4. IEEE Standard 279-1971.
  5. UFSAR, Chapter 15.
  6. 10 CFR 50.49.
  7. "Calculation of Trip Setpoint Valves Plant Protection System", CEN-286(v), or Calculation 13-JC-SG-203 for the Low Steam Generator Pressure Trip Function.
  8. UFSAR, Section 7.2. Tables 7.2-1 and 7.3-11A
  9. CEN-327, May 1986, including Supplement 1, March 1989, and Calculation 13-JC-SB-200.
  10. CEOG Topical Report CE NPSD-1167-A, "Elimination of Pressure Sensor Response Time Testing Requirements."
  11. UFSAR Section 1.8, "Regulatory Guide 1.105, Instrument Setpoints (Revision 1, November 1976)."
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