AmerenUE
Callaway Plant

PO Box 620
Fulton, MO 65251

September 6, 2005

U.S. Nuclear Regulatory Commission
Attn: Document Control Desk
Mail Station P1-137
Washington, D.C. 20555

ULNRC-05192

Ladies and Gentlemen:

DOCKET NUMBER 50-483
UNION ELECTRIC COMPANY
CALLAWAY PLANT
SUPPLEMENTAL TECHNICAL SPECIFICATION REVISIONS FOR THE
STEAM GENERATOR REPLACEMENT PROJECT

References:
1. ULNRC-05056 dated September 17, 2004
2. ULNRC-05117 dated February 11, 2005
3. ULNRC-05145 dated May 26, 2005
4. ULNRC-05157 dated June 17, 2005
5. ULNRC-05159 dated June 17, 2005
6. ULNRC-05169 dated July 15, 2005
7. ULNRC-05178 dated July 29, 2005
8. ULNRC-05188 dated August 16, 2005

AmerenUE herewith transmits a supplement to the application for amendment to Facility Operating License Number NPF-30 for the Callaway Plant that was originally submitted via Reference 1 above, and supplemented in Reference 4, in support of the replacement steam generators to be installed during Refuel 14 (fall 2005). The required supplement to the Technical Specification (TS) changes requested in References 1 and 4 involves TS Tables 3.3.1-1 and 3.3.2-1. Footnotes had previously been added to those TS tables in Reference 4 to reflect the RTS and ESFAS setpoint restoration commitments submitted in Reference 3. Based on several discussions with NRC staff between July 27 and September 1, 2005, this supplement revises those same footnotes to include additional requirements deemed necessary by the NRC.

In addition, INSERT B 3.3.1.C in Attachment 4 of Reference 1 on the low RCS flow reactor trip Bases has been revised to read as follows:

"At the beginning of each cycle the plant will normalize the RCS flow transmitters during zero power, normal operating pressure, normal operating temperature (NOP/NOT) conditions such that they indicate at 100% flow in each respective loop. This normalization is then verified prior to exceeding 75% of RATED THERMAL POWER and again after reaching full power following a refueling outage when suitable plant conditions are established. The bistables for the low RCS flow trip function are

A001

calibrated separately to verify that they are set at the nominal trip setpoint of 90% of indicated loop flow. The nominal trip setpoint is based on the loop-specific normalized flow input (i.e., the indicated loop flow) from each of the three RCS flow transmitters per RCS loop."

There are no new changes to the revised Evaluation provided in Reference 4 which had previously submitted changes to the Reference 1 Evaluation. Attachments 1 through 3 provide the Markup of Technical Specifications, Retyped Technical Specifications, and Proposed Technical Specification Bases Changes, respectively, in support of this supplemented amendment request. Attachment 3 is provided for information only. Final Bases changes will be implemented pursuant to TS 5.5.14, Technical Specifications Bases Control Program, at the time the amendment is implemented. There are no new commitments contained herein.

It has been determined that the nature of the TS changes contained in this supplement does not invalidate the findings of the licensing evaluations contained in Attachment 1 of Reference 1. The amendment application, as supplemented, does not involve a significant hazard consideration as determined per 10CFR50.92 nor is there a requirement to prepare an environmental impact statement or environmental assessment. The Callaway Onsite Review Committee and Nuclear Safety Review Board have reviewed and approved the submittal of this supplement. The implementation plans for this amendment application remain unchanged from Reference 1. In accordance with 10CFR50.91, a copy of this amendment application supplement is being provided to the designated Missouri State official.

If you have any questions on this amendment application, please contact me at (573) 676-8659, or Mr. Dave Shafer at (314) 554-3104.

I declare under penalty of perjury that the foregoing is true and correct.

Very truly yours,

Executed on: September 6, 2005

Keith D. Young
Manager-Regulatory Affairs

GGY/
Attachments:

1 Markup of Technical Specifications
2 Retyped Technical Specifications
3 Proposed Technical Specification Bases Changes (for information only)

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ATTACHMENT 1

MARKUP OF TECHNICAL SPECIFICATIONS

Table 3.3.1-1 (page 1 of 8)
Reactor Trip System Instrumentation

	FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	CONDITIONS	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE[a]
1.	Manual Reactor Trip	1,2	2	B	SR 3.3.1.14	NA
		3[b], 4[b], 5[b]	2	C	SR 3.3.1.14	NA
2.	Power Range Neutron Flux					
	a. High	1,2	4	D	SR 3.3.1.1 SR 3.3.1.2 SR 3.3.1.7 SR 3.3.1.11 SR 3.3.1.16	≤ 112.3% RTP
	b. Low	1[c],2	4	E	SR 3.3.1.1 SR 3.3.1.8 SR 3.3.1.11 SR 3.3.1.16	≤ 28.3% RTP
3.	Power Range Neutron Flux Rate - High Positive Rate	1,2	4	E	SR 3.3.1.7 SR 3.3.1.11 SR 3.3.1.16	≤ 6.3 % RTP with time constant ≥ 2 sec
4.	Intermediate Range Neutron Flux	1[c], 2[d]	2	F, G	SR 3.3.1.1 SR 3.3.1.8 SR 3.3.1.11	≤ 35.3% RTP

(continued)

INSERT 2

(a) The Allowable Value defines the limiting safety system setting. See the Bases for the Trip Setpoints.
(b) With Rod Control System capable of rod withdrawal or one or more rods not fully inserted.
(c) Below the P-10 (Power Range Neutron Flux) interlock.
(d) Above the P-6 (Intermediate Range Neutron Flux) interlock.

Nominal

INSERT 2

except for Trip Functions 14.a and 14.b (the Nominal Trip Setpoint defines the limiting safety system setting for these Trip Functions).

Table 3.3.1-1 (page 2 of 8)
Reactor Trip System Instrumentation

	FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	CONDITIONS	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE[a]
5.	Source Range Neutron Flux	2[e]	2	I, J	SR 3.3.1.1 SR 3.3.1.8 SR 3.3.1.11	≤ 1.6 E5 cps
		3[b], 4[b], 5[b]	2	J, K	SR 3.3.1.1 SR 3.3.1.7 SR 3.3.1.11	≤ 1.6 E5 cps
6.	Overtemperature ΔT	1,2	4	E	SR 3.3.1.1 SR 3.3.1.3 SR 3.3.1.6 SR 3.3.1.7 SR 3.3.1.10 SR 3.3.1.16	Refer to Note 1 (Page 3.3-23)
7.	Overpower ΔT	1,2	4	E	SR 3.3.1.1 SR 3.3.1.7 SR 3.3.1.10 SR 3.3.1.16	Refer to Note 2 (Page 3.3-24)
8.	Pressurizer Pressure					
	a. Low	1[g]	4	M	SR 3.3.1.1 SR 3.3.1.7 SR 3.3.1.10 SR 3.3.1.16	≥ 1874 psig
	b. High	1,2	4	E	SR 3.3.1.1 SR 3.3.1.7 SR 3.3.1.10 SR 3.3.1.16	≤ 2393 psig

INSERT 2

(continued)

(a) The Allowable Value defines the limiting safety system setting. See the Bases for the Trip Setpoints.
(b) With Rod Control System capable of rod withdrawal or one or more rods not fully inserted.
(e) Below the P-6 (Intermediate Range Neutron Flux) interlock.
(g) Above the P-7 (Low Power Reactor Trips Block) interlock.

Nominal

INSERT 2

except for Trip Functions 14.a and 14.b (the Nominal Trip Setpoint defines the limiting safety system setting for these Trip Functions).

Table 3.3.1-1 (page 3 of 8)
Reactor Trip System Instrumentation

	FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	CONDITIONS	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE[a]
9.	Pressurizer Water Level - High	1[g]	3	M	SR 3.3.1.1 SR 3.3.1.7 SR 3.3.1.10	≤ 93.8% of instrument span
10.	Reactor Coolant Flow - Low	1[g]	3 per loop	M	SR 3.3.1.1 SR 3.3.1.7 SR 3.3.1.10 SR 3.3.1.16	≥ 88.8% of indicated loop flow
11.	Not Used					
12.	Undervoltage RCPs	1[g]	2/bus	M	SR 3.3.1.9 SR 3.3.1.10 SR 3.3.1.16	≥ 10105 Vac
13.	Underfrequency RCPs	1[g]	2/bus	M	SR 3.3.1.9 SR 3.3.1.10 SR 3.3.1.16	≥ 57.1 Hz
14.	Steam Generator (SG) Water Level Low-Low[l]					
	a. Steam Generator Water Level Low-Low (Adverse Containment Environment)	1, 2	4 per SG	E	SR 3.3.1.1 SR 3.3.1.7 SR 3.3.1.10 SR 3.3.1.16	≥ 20.6%[q] of Narrow Range Instrument Span
	b. Steam Generator Water Level Low-Low (Normal Containment Environment)	1[p],2[p]	4 per SG	E	SR 3.3.1.1 SR 3.3.1.7 SR 3.3.1.10 SR 3.3.1.16	≥ 16.6%[q] of Narrow Range Instrument Span

(continued)

INSERT 2

(a) The Allowable Value defines the limiting safety system setting. See the Bases for the Trip Setpoints.
(g) Above the P-7 (Low Power Reactor Trips Block) interlock.
(l) The applicable MODES for these channels in Table 3.3.2-1 are more restrictive.
(m) Not used.
(p) Except when the Containment Pressure – Environmental Allowance Modifier channels in the same protection sets are tripped.
(q) ~~If a channel is found with an actual trip setpoint value outside its two-sided calibration tolerance band, the channel's trip setpoint shall be restored to within the as-left calibration tolerance band on either side of the Nominal Trip Setpoint established in accordance with the plant setpoint methodology to protect the safety analysis limit.~~

Nominal

INSERT 1

INSERT 1

1. If the as-found instrument channel setpoint is conservative with respect to the Allowable Value, but outside its as-found test 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 setpoint tolerance band on either side of the Nominal Trip Setpoint, or to a value that is more conservative than the Nominal Trip Setpoint; otherwise, the channel shall be declared inoperable. The Nominal Trip Setpoints and the methodology used to determine the as-found test acceptance criteria band and the as-left setpoint tolerance band shall be specified in the Bases.

INSERT 2

except for Trip Functions 14.a and 14.b (the Nominal Trip Setpoint defines the limiting safety system setting for these Trip Functions).

Table 3.3.1-1 (page 4 of 8)
Reactor Trip System Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	CONDITIONS	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE[a]
14. Steam Generator (SG) Water Level Low-Low[l] (continued)					
c. ~~Vessel ΔT Equivalent including delay timers Trip Time Delay~~ Not used.					
~~(1) Vessel ΔT (Power 1)~~	~~1,2~~	~~4~~	~~W~~	~~SR 3.3.1.1 SR 3.3.1.7 SR 3.3.1.10 SR 3.3.1.16~~	~~≤ Vessel ΔT Equivalent to 13.9% RTP[n]~~
~~(2) Vessel ΔT (Power 2)~~	~~1,2~~	~~4~~	~~W~~	~~SR 3.3.1.1 SR 3.3.1.7 SR 3.3.1.10 SR 3.3.1.16~~	~~≤ Vessel ΔT Equivalent to 23.9% RTP[o]~~
d. Containment Pressure - Environmental Allowance Modifier	1,2	4	X	SR 3.3.1.1 SR 3.3.1.7 SR 3.3.1.10 SR 3.3.1.16	≤ 2.0 psig
15. Not Used					

INSERT 2

(continued)

(a) The Allowable Value defines the limiting safety system setting. See the Bases for the Trip Setpoints.
(l) The applicable MODES for these channels in Table 3.3.2-1 are more restrictive.
(n) ~~With a time delay ≤ 240 seconds.~~ Not used.
(o) ~~With a time delay ≤ 130 seconds.~~ Not used.

Nominal

INSERT 2

except for Trip Functions 14.a and 14.b (the Nominal Trip Setpoint defines the limiting safety system setting for these Trip Functions).

Table 3.3.1-1 (page 5 of 8)
Reactor Trip System Instrumentation

	FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	CONDITIONS	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE[a]
16.	Turbine Trip					
	a. Low Fluid Oil Pressure	1[(i)]	3	O	SR 3.3.1.10 SR 3.3.1.15	≥ 539.42 psig
	b. Turbine Stop Valve Closure	1[(i)]	4	P	SR 3.3.1.10 SR 3.3.1.15	≥ 1% open
17.	Safety Injection (SI) Input from Engineered Safety Feature Actuation System (ESFAS)	1,2	2 trains	Q	SR 3.3.1.14	NA
18.	Reactor Trip System Interlocks					
	a. Intermediate Range Neutron Flux, P-6	2[(e)]	2	S	SR 3.3.1.11 SR 3.3.1.13	≥ 6E-11 amp
	b. Low Power Reactor Trips Block, P-7	1	1 per train	T	SR 3.3.1.5	NA
	c. Power Range Neutron Flux, P-8	1	4	T	SR 3.3.1.11 SR 3.3.1.13	≤ 51.3% RTP
	d. Power Range Neutron Flux, P-9	1	4	T	SR 3.3.1.11 SR 3.3.1.13	≤ 53.3% RTP

(continued)

INSERT 2

(a) The Allowable Value defines the limiting safety system setting. See the Bases for the Trip Setpoints.
(e) Below the P-6 (Intermediate Range Neutron Flux) interlock.
(j) Above the P-9 (Power Range Neutron Flux) interlock.

Nominal

INSERT 2

except for Trip Functions 14.a and 14.b (the Nominal Trip Setpoint defines the limiting safety system setting for these Trip Functions).

Table 3.3.1-1 (page 6 of 8)
Reactor Trip System Instrumentation

	FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	CONDITIONS	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE[a]
18.	Reactor Trip System Interlocks (continued)					
	e. Power Range Neutron Flux, P-10	1,2	4	S	SR 3.3.1.11 SR 3.3.1.13	≥ 6.7% RTP and ≤ 12.4% RTP
	f. Turbine Impulse Pressure, P-13	1	2	T	SR 3.3.1.10 SR 3.3.1.13	≤ 12.4% turbine power
19.	Reactor Trip Breakers (RTBs)[k]	1,2	2 trains	R	SR 3.3.1.4	NA
		3[b], 4[b], 5[b]	2 trains	C	SR 3.3.1.4	NA
20.	Reactor Trip Breaker Undervoltage and Shunt Trip Mechanisms[k]	1,2	1 each per RTB	U	SR 3.3.1.4	NA
		3[b], 4[b], 5[b]	1 each per RTB	C	SR 3.3.1.4	NA
21.	Automatic Trip Logic	1,2	2 trains	Q	SR 3.3.1.5	NA
		3[b], 4[b], 5[b]	2 trains	C	SR 3.3.1.5	NA

(a) The Allowable Value defines the limiting safety system setting. See the Bases for the Trip Setpoints.
(b) With Rod Control System capable of rod withdrawal or one or more rods not fully inserted.
(k) Including any reactor trip bypass breakers that are racked in and closed for bypassing an RTB.

INSERT 2

Nominal

INSERT 2

except for Trip Functions 14.a and 14.b (the Nominal Trip Setpoint defines the limiting safety system setting for these Trip Functions).

Table 3.3.2-1 (page 1 of 8)
Engineered Safety Feature Actuation System Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	CONDITIONS	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE[a]
1. Safety Injection					
a. Manual Initiation	1,2,3,4	2	B	SR 3.3.2.8	NA
b. Automatic Actuation Logic and Actuation Relays (SSPS)	1,2,3,4	2 trains	C	SR 3.3.2.2 SR 3.3.2.4 SR 3.3.2.6 SR 3.3.2.13	NA
c. Containment Pressure - High 1	1,2,3	3	D	SR 3.3.2.1 SR 3.3.2.5 SR 3.3.2.9 SR 3.3.2.10	≤ 4.5 psig
d. Pressurizer Pressure - Low	1,2,3[b]	4	D	SR 3.3.2.1 SR 3.3.2.5 SR 3.3.2.9 SR 3.3.2.10	≥ 1834 psig
e. Steam Line Pressure - Low	1,2,3[b]	3 per steam line	D	SR 3.3.2.1 SR 3.3.2.5 SR 3.3.2.9 SR 3.3.2.10	≥ 610 psig[c] [s]
2. Containment Spray					
a. Manual Initiation	1,2,3,4	2 per train, 2 trains	B	SR 3.3.2.8	NA
b. Automatic Actuation Logic and Actuation Relays (SSPS)	1,2,3,4	2 trains	C	SR 3.3.2.2 SR 3.3.2.4 SR 3.3.2.6	NA
c. Containment Pressure High - 3	1,2,3	4	E	SR 3.3.2.1 SR 3.3.2.5 SR 3.3.2.9 SR 3.3.2.10	≤ 28.3 psig

(continued)

INSERT 3 Nominal

(a) The Allowable Value defines the limiting safety system setting. See the Bases for the Trip Setpoints.
(b) Above the P-11 (Pressurizer Pressure) interlock and below P-11 unless the Function is blocked.
(c) Time constants used in the lead/lag controller are $\tau_1 \geq 50$ seconds and $\tau_2 \leq 5$ seconds.
(s) If a channel is found with an actual trip setpoint value outside its two-sided calibration tolerance band, the channel's trip setpoint shall be restored to within the as-left calibration tolerance band on either side of the Nominal Trip Setpoint established in accordance with the plant setpoint methodology to protect the safety analysis limit.

INSERT 1

INSERT 1

1. If the as-found instrument channel setpoint is conservative with respect to the Allowable Value, but outside its as-found test 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 setpoint tolerance band on either side of the Nominal Trip Setpoint, or to a value that is more conservative than the Nominal Trip Setpoint; otherwise, the channel shall be declared inoperable. The Nominal Trip Setpoints and the methodology used to determine the as-found test acceptance criteria band and the as-left setpoint tolerance band shall be specified in the Bases.

INSERT 3

except for Functions 1.e, 4.e.(1), 5.c, 5.e.(1), 5.e.(2), 6.d.(1), and 6.d.(2) (the Nominal Trip Setpoint defines the limiting safety system setting for these Functions).

Table 3.3.2-1 (page 2 of 8)
Engineered Safety Feature Actuation System Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	CONDITIONS	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE[a]
3. Containment Isolation					
a. Phase A Isolation					
(1) Manual Initiation	1,2,3,4	2	B	SR 3.3.2.8	NA
(2) Automatic Actuation Logic and Actuation Relays (SSPS)	1,2,3,4	2 trains	C	SR 3.3.2.2 SR 3.3.2.4 SR 3.3.2.6 SR 3.3.2.13	NA
(3) Safety Injection	Refer to Function 1 (Safety Injection) for all initiation functions and requirements.				
b. Phase B Isolation					
(1) Manual Initiation	1,2,3,4	2 per train, 2 trains	B	SR 3.3.2.8	NA
(2) Automatic Actuation Logic and Actuation Relays (SSPS)	1,2,3,4	2 trains	C	SR 3.3.2.2 SR 3.3.2.4 SR 3.3.2.6	NA
(3) Contain-ment Pressure High - 3	1,2,3	4	E	SR 3.3.2.1 SR 3.3.2.5 SR 3.3.2.9 SR 3.3.2.10	≤ 28.3 psig

(continued)

INSERT 3

(a) The Allowable Value defines the limiting safety system setting. See the Bases for the Trip Setpoints.

Nominal

INSERT 3

except for Functions 1.e, 4.e.(1), 5.c, 5.e.(1), 5.e.(2), 6.d.(1), and 6.d.(2) (the Nominal Trip Setpoint defines the limiting safety system setting for these Functions).

Table 3.3.2-1 (page 3 of 8)
Engineered Safety Feature Actuation System Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	CONDITIONS	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE[a]
4. Steam Line Isolation					
a. Manual Initiation	1,2[i], 3[i]	2	F	SR 3.3.2.8	NA
b. Automatic Actuation Logic and Actuation Relays (SSPS)	1,2[i], 3[i]	2 trains	G	SR 3.3.2.2 SR 3.3.2.4 SR 3.3.2.6	NA
c. Automatic Actuation Logic and Actuation Relays (MSFIS)	1, 2[i],3[i]	2 trains[o]	S	SR 3.3.2.3	NA
d. Containment Pressure - High 2	1,2[i], 3[i]	3	D	SR 3.3.2.1 SR 3.3.2.5 SR 3.3.2.9 SR 3.3.2.10	≤ 18.3 psig
e. Steam Line Pressure					
(1) Low	1,2 [i], 3[b][i]	3 per steam line	D	SR 3.3.2.1 SR 3.3.2.5 SR 3.3.2.9 SR 3.3.2.10	≥ 610 psig[c] [s]
(2) Negative Rate - High	3[g][i]	3 per steam line	D	SR 3.3.2.1 SR 3.3.2.5 SR 3.3.2.9 SR 3.3.2.10	≤ 124 psi[h]

(continued)

INSERT 3 Nominal

(a) The Allowable Value defines the limiting safety system setting. See the Bases for the Trip Setpoints.
(b) Above the P-11 (Pressurizer Pressure) Interlock and below P-11 unless the Function is blocked.
(c) Time constants used in the lead/lag controller are $\tau_1 \geq 50$ seconds and $\tau_2 \leq 5$ seconds.
(g) Below the P-11 (Pressurizer Pressure) Interlock; however, may be blocked below P-11 when safety injection on low steam line pressure is not blocked.
(h) Time constant utilized in the rate/lag controller is ≥ 50 seconds.
(i) Except when all MSIVs are closed.
(o) Each train requires a minimum of two programmable logic controllers to be OPERABLE.
(s) If a channel is found with an actual trip setpoint value outside its two-sided calibration tolerance band, the channel's trip setpoint shall be restored to within the as-left calibration tolerance band on either side of the Nominal Trip Setpoint established in accordance with the plant setpoint methodology to protect the safety analysis limit.

→ INSERT 1

INSERT 1

1. If the as-found instrument channel setpoint is conservative with respect to the Allowable Value, but outside its as-found test 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 setpoint tolerance band on either side of the Nominal Trip Setpoint, or to a value that is more conservative than the Nominal Trip Setpoint; otherwise, the channel shall be declared inoperable. The Nominal Trip Setpoints and the methodology used to determine the as-found test acceptance criteria band and the as-left setpoint tolerance band shall be specified in the Bases.

INSERT 3

except for Functions 1.e, 4.e.(1), 5.c, 5.e.(1), 5.e.(2), 6.d.(1), and 6.d.(2) (the Nominal Trip Setpoint defines the limiting safety system setting for these Functions).

Table 3.3.2-1 (page 4 of 8)
Engineered Safety Feature Actuation System Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	CONDITIONS	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE[a]
5. Turbine Trip and Feedwater Isolation					
a. Automatic Actuation Logic and Actuation Relays (SSPS)	1,2[j], 3[j]	2 trains	G	SR 3.3.2.2 SR 3.3.2.4 SR 3.3.2.6 SR 3.3.2.14	NA
b. Automatic Actuation Logic and Actuation Relays (MSFIS)	1, 2[j], 3[j]	2 trains[o]	S	SR 3.3.2.3	NA
c. SG Water Level - High High (P-14)	1,2[j]	4 per SG	I	SR 3.3.2.1 SR 3.3.2.5 SR 3.3.2.9 SR 3.3.2.10	≤ 91.4%[s] of Narrow Range Instrument Span
d. Safety Injection	Refer to Function 1 (Safety Injection) for all initiation functions and requirements.				
e. Steam Generator Water Level Low-Low[q]					
(1) Steam Generator Water Level Low-Low (Adverse Containment Environment)	1, 2[j], 3[j]	4 per SG	D	SR 3.3.2.1 SR 3.3.2.5 SR 3.3.2.9 SR 3.3.2.10	≥ 20.6%[s] of Narrow Range Instrument Span

(continued)

INSERT 3 Nominal

(a) The Allowable Value defines the limiting safety system setting. See the Bases for the Trip Setpoints.
(j) Except when all MFIVs are closed.
(o) Each train requires a minimum of two programmable logic controllers to be OPERABLE.
(q) Feedwater isolation only.
(s) ~~If a channel is found with an actual trip setpoint value outside its two-sided calibration tolerance band, the channel's trip setpoint shall be restored to within the as-left calibration tolerance band on either side of the Nominal Trip Setpoint established in accordance with the plant setpoint methodology to protect the safety analysis limit.~~

→ INSERT 1

INSERT 1

1. If the as-found instrument channel setpoint is conservative with respect to the Allowable Value, but outside its as-found test 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 setpoint tolerance band on either side of the Nominal Trip Setpoint, or to a value that is more conservative than the Nominal Trip Setpoint; otherwise, the channel shall be declared inoperable. The Nominal Trip Setpoints and the methodology used to determine the as-found test acceptance criteria band and the as-left setpoint tolerance band shall be specified in the Bases.

INSERT 3

except for Functions 1.e, 4.e.(1), 5.c, 5.e.(1), 5.e.(2), 6.d.(1), and 6.d.(2) (the Nominal Trip Setpoint defines the limiting safety system setting for these Functions).

Table 3.3.2-1 (page 5 of 8)
Engineered Safety Feature Actuation System Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	CONDITIONS	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE[a]
5. Turbine Trip and Feedwater Isolation					
e. Steam Generator Water Level Low-Low[q] (continued)					
(2) Steam Generator Water Level Low-Low (Normal Containment Environment)	1[r], 2[j,r], 3[j,r]	4 per SG	D	SR 3.3.2.1 SR 3.3.2.5 SR 3.3.2.9 SR 3.3.2.10	≥ 16.6%[s] of Narrow Range Instrument Span
(3) Not used.					
(4) Containment Pressure - Environmental Allowance Modifier	1, 2[j], 3[j]	4	N	SR 3.3.2.1 SR 3.3.2.5 SR 3.3.2.9 SR 3.3.2.10	≤ 2.0 psig

(continued)

INSERT 3

(a) The Allowable Value defines the limiting safety system setting. See the Bases for the Trip Setpoints.
(j) Except when all MFIVs are closed.
(k) Not used.
(l) Not used.
(q) Feedwater isolation only.
(r) Except when the Containment Pressure – Environmental Allowance Modifier channels in the same protection sets are tripped.
(s) If a channel is found with an actual trip setpoint value outside its two-sided calibration tolerance band, the channel's trip setpoint shall be restored to within the as-left calibration tolerance band on either side of the Nominal Trip Setpoint established in accordance with the plant setpoint methodology to protect the safety analysis limit.

Nominal

INSERT 1

INSERT 1

1. If the as-found instrument channel setpoint is conservative with respect to the Allowable Value, but outside its as-found test 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 setpoint tolerance band on either side of the Nominal Trip Setpoint, or to a value that is more conservative than the Nominal Trip Setpoint; otherwise, the channel shall be declared inoperable. The Nominal Trip Setpoints and the methodology used to determine the as-found test acceptance criteria band and the as-left setpoint tolerance band shall be specified in the Bases.

INSERT 3

except for Functions 1.e, 4.e.(1), 5.c, 5.e.(1), 5.e.(2), 6.d.(1), and 6.d.(2) (the Nominal Trip Setpoint defines the limiting safety system setting for these Functions).

Table 3.3.2-1 (page 6 of 8)
Engineered Safety Feature Actuation System Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	CONDITIONS	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE[a]
6. Auxiliary Feedwater					
a. Manual Initiation	1, 2, 3	1/pump	P	SR 3.3.2.8	NA
b. Automatic Actuation Logic and Actuation Relays (SSPS)	1,2,3	2 trains	G	SR 3.3.2.2 SR 3.3.2.4 SR 3.3.2.6	NA
c. Automatic Actuation Logic and Actuation Relays (BOP ESFAS)	1,2,3	2 trains	Q	SR 3.3.2.3	NA
d. SG Water Level Low-Low					
(1) Steam Generator Water Level Low-Low (Adverse Containment Environment)	1, 2, 3	4 per SG	D	SR 3.3.2.1 SR 3.3.2.5 SR 3.3.2.9 SR 3.3.2.10	≥ 20.6%[s] of Narrow Range Instrument Span
(2) Steam Generator Water Level Low-Low (Normal Containment Environment)	1[r], 2[r], 3[r]	4 per SG	D	SR 3.3.2.1 SR 3.3.2.5 SR 3.3.2.9 SR 3.3.2.10	≥ 16.6%[s] of Narrow Range Instrument Span

(continued)

INSERT 3 Nominal

(a) The Allowable Value defines the limiting safety system setting. See the Bases for the Trip Setpoints.
(r) Except when the Containment Pressure – Environmental Allowance Modifier channels in the same protection sets are tripped.
(s) If a channel is found with an actual trip setpoint value outside its two-sided calibration tolerance band, the channel's trip setpoint shall be restored to within the as-left calibration tolerance band on either side of the Nominal Trip Setpoint established in accordance with the plant setpoint methodology to protect the safety analysis limit.

→ INSERT 1

INSERT 1

1. If the as-found instrument channel setpoint is conservative with respect to the Allowable Value, but outside its as-found test 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 setpoint tolerance band on either side of the Nominal Trip Setpoint, or to a value that is more conservative than the Nominal Trip Setpoint; otherwise, the channel shall be declared inoperable. The Nominal Trip Setpoints and the methodology used to determine the as-found test acceptance criteria band and the as-left setpoint tolerance band shall be specified in the Bases.

INSERT 3

except for Functions 1.e, 4.e.(1), 5.c, 5.e.(1), 5.e.(2), 6.d.(1), and 6.d.(2) (the Nominal Trip Setpoint defines the limiting safety system setting for these Functions).

Table 3.3.2-1 (page 7 of 8)
Engineered Safety Feature Actuation System Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	CONDITIONS	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE[a]
6. Auxiliary Feedwater					
d. SG Water Level Low-Low (continued)					
(3) ~~Vessel ΔT Equivalent including delay timers - Trip Time Delay.~~ Not used.					
~~(a) Vessel ΔT (Power 1)~~	~~1,2~~	~~4~~	~~M~~	~~SR 3.3.2.1 SR 3.3.2.5 SR 3.3.2.9 SR 3.3.2.10~~	~~≤ Vessel ΔT Equivalent to 13.9% RTP[k]~~
~~(b) Vessel ΔT (Power 2)~~	~~1,2~~	~~4~~	~~M~~	~~SR 3.3.2.1 SR 3.3.2.5 SR 3.3.2.9 SR 3.3.2.10~~	~~≤ Vessel ΔT Equivalent to 23.9% RTP[l]~~
(4) Containment Pressure - Environmental Allowance Modifier	1, 2, 3	4	N	SR 3.3.2.1 SR 3.3.2.5 SR 3.3.2.9 SR 3.3.2.10	≤ 2.0 psig
e. Safety Injection	Refer to Function 1 (Safety Injection) for all initiation functions and requirements.				
f. Loss of Offsite Power	1,2,3	2 trains	R	SR 3.3.2.7 SR 3.3.2.10	NA
g. Trip of all Main Feedwater Pumps	1,2[n]	2 per pump	J	SR 3.3.2.8	NA

(continued)

INSERT 3

(a) The Allowable Value defines the limiting safety system setting. See the Bases for the Trip Setpoints.
(k) ~~With a time delay ≤ 240 seconds.~~ Not used.
(l) ~~With a time delay ≤ 130 seconds.~~ Not used.
(n) Trip function may be blocked just before shutdown of the last operating main feedwater pump and restored just after the first main feedwater pump is put into service following performance of its startup trip test.

Nominal

INSERT 3

except for Functions 1.e, 4.e.(1), 5.c, 5.e.(1), 5.e.(2), 6.d.(1), and 6.d.(2) (the Nominal Trip Setpoint defines the limiting safety system setting for these Functions).

Table 3.3.2-1 (page 8 of 8)
Engineered Safety Feature Actuation System Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	CONDITIONS	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE[a]
6. Auxiliary Feedwater (continued)					
h. Auxiliary Feedwater Pump Suction Transfer on Suction Pressure - Low	1,2,3	3	O	SR 3.3.2.1 SR 3.3.2.9 SR 3.3.2.10 SR 3.3.2.12	≥ 20.64 psia
7. Automatic Switchover to Containment Sump					
a. Automatic Actuation Logic and Actuation Relays (SSPS)	1,2,3,4	2 trains	C	SR 3.3.2.2 SR 3.3.2.4 SR 3.3.2.13	NA
b. Refueling Water Storage Tank (RWST) Level - Low Low	1,2,3,4	4	K	SR 3.3.2.1 SR 3.3.2.5 SR 3.3.2.9 SR 3.3.2.10	≥ 35.2%
Coincident with Safety Injection	Refer to Function 1 (Safety Injection) for all initiation functions and requirements.				
8. ESFAS Interlocks					
a. Reactor Trip, P-4	1,2,3	2 per train, 2 trains	F	SR 3.3.2.11	NA
b. Pressurizer Pressure, P-11	1,2,3	3	L	SR 3.3.2.5 SR 3.3.2.9	≤ 1981 psig
9. Automatic Pressurizer PORV Actuation					
a. Automatic Actuation Logic and Actuation Relays (SSPS)	1,2,3	2 trains	H	SR 3.3.2.2 SR 3.3.2.4 SR 3.3.2.14	NA
b. Pressurizer Pressure – High	1,2,3	4	D	SR 3.3.2.1 SR 3.3.2.5 SR 3.3.2.9	≤2350 psig

INSERT 3

(a) The Allowable Value defines the limiting safety system setting. See the Bases for the Trip Setpoints.

Nominal

INSERT 3

except for Functions 1.e, 4.e.(1), 5.c, 5.e.(1), 5.e.(2), 6.d.(1), and 6.d.(2) (the Nominal Trip Setpoint defines the limiting safety system setting for these Functions).

ATTACHMENT 2

RETYPED TECHNICAL SPECIFICATIONS

Table 3.3.1-1 (page 1 of 8)
Reactor Trip System Instrumentation

	FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	CONDITIONS	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE[a]
1.	Manual Reactor Trip	1,2	2	B	SR 3.3.1.14	NA
		3[b], 4[b], 5[b]	2	C	SR 3.3.1.14	NA
2.	Power Range Neutron Flux					
	a. High	1,2	4	D	SR 3.3.1.1 SR 3.3.1.2 SR 3.3.1.7 SR 3.3.1.11 SR 3.3.1.16	≤ 112.3% RTP
	b. Low	1[c],2	4	E	SR 3.3.1.1 SR 3.3.1.8 SR 3.3.1.11 SR 3.3.1.16	≤ 28.3% RTP
3.	Power Range Neutron Flux Rate - High Positive Rate	1,2	4	E	SR 3.3.1.7 SR 3.3.1.11 SR 3.3.1.16	≤ 6.3 % RTP with time constant ≥ 2 sec
4.	Intermediate Range Neutron Flux	1[c], 2[d]	2	F, G	SR 3.3.1.1 SR 3.3.1.8 SR 3.3.1.11	≤ 35.3% RTP

(a) The Allowable Value defines the limiting safety system setting except for Trip Functions 14.a and 14.b (the Nominal Trip Setpoint defines the limiting safety system setting for these Trip Functions). See the Bases for the Nominal Trip Setpoints.
(b) With Rod Control System capable of rod withdrawal or one or more rods not fully inserted.
(c) Below the P-10 (Power Range Neutron Flux) interlock.
(d) Above the P-6 (Intermediate Range Neutron Flux) interlock.

Table 3.3.1-1 (page 2 of 8)
Reactor Trip System Instrumentation

	FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	CONDITIONS	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE[a]
5.	Source Range Neutron Flux	2[e]	2	I, J	SR 3.3.1.1 SR 3.3.1.8 SR 3.3.1.11	≤ 1.6 E5 cps
		3[b], 4[b], 5[b]	2	J, K	SR 3.3.1.1 SR 3.3.1.7 SR 3.3.1.11	≤ 1.6 E5 cps
6.	Overtemperature ΔT	1,2	4	E	SR 3.3.1.1 SR 3.3.1.3 SR 3.3.1.6 SR 3.3.1.7 SR 3.3.1.10 SR 3.3.1.16	Refer to Note 1 (Page 3.3-23)
7.	Overpower ΔT	1,2	4	E	SR 3.3.1.1 SR 3.3.1.7 SR 3.3.1.10 SR 3.3.1.16	Refer to Note 2 (Page 3.3-24)
8.	Pressurizer Pressure					
	a. Low	1[g]	4	M	SR 3.3.1.1 SR 3.3.1.7 SR 3.3.1.10 SR 3.3.1.16	≥ 1874 psig
	b. High	1,2	4	E	SR 3.3.1.1 SR 3.3.1.7 SR 3.3.1.10 SR 3.3.1.16	≤ 2393 psig

(a) The Allowable Value defines the limiting safety system setting except for Trip Functions 14.a and 14.b (the Nominal Trip Setpoint defines the limiting safety system setting for these Trip Functions). See the Bases for the Nominal Trip Setpoints.
(b) With Rod Control System capable of rod withdrawal or one or more rods not fully inserted.
(e) Below the P-6 (Intermediate Range Neutron Flux) interlock.
(g) Above the P-7 (Low Power Reactor Trips Block) interlock.

Table 3.3.1-1 (page 3 of 8)
Reactor Trip System Instrumentation

	FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	CONDITIONS	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE[a]
9.	Pressurizer Water Level - High	1[g]	3	M	SR 3.3.1.1 SR 3.3.1.7 SR 3.3.1.10	≤ 93.8% of instrument span
10.	Reactor Coolant Flow - Low	1[g]	3 per loop	M	SR 3.3.1.1 SR 3.3.1.7 SR 3.3.1.10 SR 3.3.1.16	≥ 88.8% of indicated loop flow
11.	Not Used					
12.	Undervoltage RCPs	1[g]	2/bus	M	SR 3.3.1.9 SR 3.3.1.10 SR 3.3.1.16	≥ 10105 Vac
13.	Underfrequency RCPs	1[g]	2/bus	M	SR 3.3.1.9 SR 3.3.1.10 SR 3.3.1.16	≥ 57.1 Hz
14.	Steam Generator (SG) Water Level Low-Low[l]					
	a. Steam Generator Water Level Low-Low (Adverse Containment Environment)	1, 2	4 per SG	E	SR 3.3.1.1 SR 3.3.1.7 SR 3.3.1.10 SR 3.3.1.16	≥ 20.6%[q] of Narrow Range Instrument Span

(a) The Allowable Value defines the limiting safety system setting except for Trip Functions 14.a and 14.b (the Nominal Trip Setpoint defines the limiting safety system setting for these Trip Functions). See the Bases for the Nominal Trip Setpoints.
(g) Above the P-7 (Low Power Reactor Trips Block) interlock.
(l) The applicable MODES for these channels in Table 3.3.2-1 are more restrictive.
(m) Not used.
(q) 1. If the as-found instrument channel setpoint is conservative with respect to the Allowable Value, but outside its as-found test 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 setpoint tolerance band on either side of the Nominal Trip Setpoint, or to a value that is more conservative than the Nominal Trip Setpoint; otherwise, the channel shall be declared inoperable. The Nominal Trip Setpoints and the methodology used to determine the as-found test acceptance criteria band and the as-left setpoint tolerance band shall be specified in the Bases.

Table 3.3.1-1 (page 4 of 8)
Reactor Trip System Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	CONDITIONS	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE[a]
14. Steam Generator (SG) Water Level Low-Low[l]					
b. Steam Generator Water Level Low-Low (Normal Containment Environment)	1[p],2[p]	4 per SG	E	SR 3.3.1.1 SR 3.3.1.7 SR 3.3.1.10 SR 3.3.1.16	≥ 16.6%[q] of Narrow Range Instrument Span
c. Not used.					
d. Containment Pressure - Environmental Allowance Modifier	1,2	4	X	SR 3.3.1.1 SR 3.3.1.7 SR 3.3.1.10 SR 3.3.1.16	≤ 2.0 psig
15. Not Used					

(a) The Allowable Value defines the limiting safety system setting except for Trip Functions 14.a and 14.b (the Nominal Trip Setpoint defines the limiting safety system setting for these Trip Functions). See the Bases for the Nominal Trip Setpoints.
(l) The applicable MODES for these channels in Table 3.3.2-1 are more restrictive.
(n) Not used.
(o) Not used.
(p) Except when the Containment Pressure – Environmental Allowance Modifier channels in the same protection sets are tripped.
(q) 1. If the as-found instrument channel setpoint is conservative with respect to the Allowable Value, but outside its as-found test 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 setpoint tolerance band on either side of the Nominal Trip Setpoint, or to a value that is more conservative than the Nominal Trip Setpoint; otherwise, the channel shall be declared inoperable. The Nominal Trip Setpoints and the methodology used to determine the as-found test acceptance criteria band and the as-left setpoint tolerance band shall be specified in the Bases.

Table 3.3.1-1 (page 5 of 8)
Reactor Trip System Instrumentation

	FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	CONDITIONS	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE[a]
16.	Turbine Trip					
	a. Low Fluid Oil Pressure	1[(j)]	3	O	SR 3.3.1.10 SR 3.3.1.15	≥ 539.42 psig
	b. Turbine Stop Valve Closure	1[(j)]	4	P	SR 3.3.1.10 SR 3.3.1.15	≥ 1% open
17.	Safety Injection (SI) Input from Engineered Safety Feature Actuation System (ESFAS)	1,2	2 trains	Q	SR 3.3.1.14	NA
18.	Reactor Trip System Interlocks					
	a. Intermediate Range Neutron Flux, P-6	2[(e)]	2	S	SR 3.3.1.11 SR 3.3.1.13	≥ 6E-11 amp
	b. Low Power Reactor Trips Block, P-7	1	1 per train	T	SR 3.3.1.5	NA
	c. Power Range Neutron Flux, P-8	1	4	T	SR 3.3.1.11 SR 3.3.1.13	≤ 51.3% RTP
	d. Power Range Neutron Flux, P-9	1	4	T	SR 3.3.1.11 SR 3.3.1.13	≤ 53.3% RTP

(a) The Allowable Value defines the limiting safety system setting except for Trip Functions 14.a and 14.b (the Nominal Trip Setpoint defines the limiting safety system setting for these Trip Functions). See the Bases for the Nominal Trip Setpoints.
(e) Below the P-6 (Intermediate Range Neutron Flux) interlock.
(j) Above the P-9 (Power Range Neutron Flux) interlock.

Table 3.3.1-1 (page 6 of 8)
Reactor Trip System Instrumentation

	FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	CONDITIONS	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE[a]
18.	Reactor Trip System Interlocks					
	e. Power Range Neutron Flux, P-10	1,2	4	S	SR 3.3.1.11 SR 3.3.1.13	≥ 6.7% RTP and ≤ 12.4% RTP
	f. Turbine Impulse Pressure, P-13	1	2	T	SR 3.3.1.10 SR 3.3.1.13	≤ 12.4% turbine power
19.	Reactor Trip Breakers (RTBs)[k]	1,2	2 trains	R	SR 3.3.1.4	NA
		3[b], 4[b], 5[b]	2 trains	C	SR 3.3.1.4	NA
20.	Reactor Trip Breaker Undervoltage and Shunt Trip Mechanisms[k]	1,2	1 each per RTB	U	SR 3.3.1.4	NA
		3[b], 4[b], 5[b]	1 each per RTB	C	SR 3.3.1.4	NA
21.	Automatic Trip Logic	1,2	2 trains	Q	SR 3.3.1.5	NA
		3[b], 4[b], 5[b]	2 trains	C	SR 3.3.1.5	NA

(a) The Allowable Value defines the limiting safety system setting except for Trip Functions 14.a and 14.b (the Nominal Trip Setpoint defines the limiting safety system setting for these Trip Functions). See the Bases for the Nominal Trip Setpoints.
(b) With Rod Control System capable of rod withdrawal or one or more rods not fully inserted.
(k) Including any reactor trip bypass breakers that are racked in and closed for bypassing an RTB.

Table 3.3.2-1 (page 1 of 8)
Engineered Safety Feature Actuation System Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	CONDITIONS	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE[a]
1. Safety Injection					
a. Manual Initiation	1,2,3,4	2	B	SR 3.3.2.8	NA
b. Automatic Actuation Logic and Actuation Relays (SSPS)	1,2,3,4	2 trains	C	SR 3.3.2.2 SR 3.3.2.4 SR 3.3.2.6 SR 3.3.2.13	NA
c. Containment Pressure - High 1	1,2,3	3	D	SR 3.3.2.1 SR 3.3.2.5 SR 3.3.2.9 SR 3.3.2.10	≤ 4.5 psig
d. Pressurizer Pressure - Low	1,2,3[b]	4	D	SR 3.3.2.1 SR 3.3.2.5 SR 3.3.2.9 SR 3.3.2.10	≥ 1834 psig
e. Steam Line Pressure - Low	1,2,3[b]	3 per steam line	D	SR 3.3.2.1 SR 3.3.2.5 SR 3.3.2.9 SR 3.3.2.10	≥ 610 psig[c] [s]
2. Containment Spray					
a. Manual Initiation	1,2,3,4	2 per train, 2 trains	B	SR 3.3.2.8	NA
b. Automatic Actuation Logic and Actuation Relays (SSPS)	1,2,3,4	2 trains	C	SR 3.3.2.2 SR 3.3.2.4 SR 3.3.2.6	NA

(a) The Allowable Value defines the limiting safety system setting except for Functions 1.e, 4.e.(1), 5.c, 5.e.(1), 5.e.(2), 6.d.(1), and 6.d.(2) (the Nominal Trip Setpoint defines the limiting safety system setting for these Functions). See the Bases for the Nominal Trip Setpoints.
(b) Above the P-11 (Pressurizer Pressure) interlock and below P-11 unless the Function is blocked.
(c) Time constants used in the lead/lag controller are $\tau_1 \geq 50$ seconds and $\tau_2 \leq 5$ seconds.
(s) 1. If the as-found instrument channel setpoint is conservative with respect to the Allowable Value, but outside its as-found test 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 setpoint tolerance band on either side of the Nominal Trip Setpoint, or to a value that is more conservative than the Nominal Trip Setpoint; otherwise, the channel shall be declared inoperable. The Nominal Trip Setpoints and the methodology used to determine the as-found test acceptance criteria band and the as-left setpoint tolerance band shall be specified in the Bases.

Table 3.3.2-1 (page 2 of 8)
Engineered Safety Feature Actuation System Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	CONDITIONS	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE[a]
2. Containment Spray					
c. Containment Pressure High - 3	1,2,3	4	E	SR 3.3.2.1 SR 3.3.2.5 SR 3.3.2.9 SR 3.3.2.10	≤ 28.3 psig
3. Containment Isolation					
a. Phase A Isolation					
(1) Manual Initiation	1,2,3,4	2	B	SR 3.3.2.8	NA
(2) Automatic Actuation Logic and Actuation Relays (SSPS)	1,2,3,4	2 trains	C	SR 3.3.2.2 SR 3.3.2.4 SR 3.3.2.6 SR 3.3.2.13	NA
(3) Safety Injection	Refer to Function 1 (Safety Injection) for all initiation functions and requirements.				
b. Phase B Isolation					
(1) Manual Initiation	1,2,3,4	2 per train, 2 trains	B	SR 3.3.2.8	NA
(2) Automatic Actuation Logic and Actuation Relays (SSPS)	1,2,3,4	2 trains	C	SR 3.3.2.2 SR 3.3.2.4 SR 3.3.2.6	NA
(3) Containment Pressure High - 3	1,2,3	4	E	SR 3.3.2.1 SR 3.3.2.5 SR 3.3.2.9 SR 3.3.2.10	≤ 28.3 psig

(a) The Allowable Value defines the limiting safety system setting except for Functions 1.e, 4.e.(1), 5.c, 5.e.(1), 5.e.(2), 6.d.(1), and 6.d.(2) (the Nominal Trip Setpoint defines the limiting safety system setting for these Functions). See the Bases for the Nominal Trip Setpoints.

Table 3.3.2-1 (page 3 of 8)
Engineered Safety Feature Actuation System Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	CONDITIONS	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE[a]
4. Steam Line Isolation					
a. Manual Initiation	1,2[i], 3[i]	2	F	SR 3.3.2.8	NA
b. Automatic Actuation Logic and Actuation Relays (SSPS)	1,2[i], 3[i]	2 trains	G	SR 3.3.2.2 SR 3.3.2.4 SR 3.3.2.6	NA
c. Automatic Actuation Logic and Actuation Relays (MSFIS)	1, 2[i],3[i]	2 trains[o]	S	SR 3.3.2.3	NA
d. Containment Pressure - High 2	1,2[i], 3[i]	3	D	SR 3.3.2.1 SR 3.3.2.5 SR 3.3.2.9 SR 3.3.2.10	≤ 18.3 psig
e. Steam Line Pressure					
(1) Low	1,2 [i], 3[b][i]	3 per steam line	D	SR 3.3.2.1 SR 3.3.2.5 SR 3.3.2.9 SR 3.3.2.10	≥ 610 psig[c][s]
(2) Negative Rate - High	3[g][i]	3 per steam line	D	SR 3.3.2.1 SR 3.3.2.5 SR 3.3.2.9 SR 3.3.2.10	≤ 124 psi[h]

(a) The Allowable Value defines the limiting safety system setting except for Functions 1.e, 4.e.(1), 5.c, 5.e.(1), 5.e.(2), 6.d.(1), and 6.d.(2) (the Nominal Trip Setpoint defines the limiting safety system setting for these Functions). See the Bases for the Nominal Trip Setpoints.
(b) Above the P-11 (Pressurizer Pressure) Interlock and below P-11 unless the Function is blocked.
(c) Time constants used in the lead/lag controller are $\tau_1 \geq 50$ seconds and $\tau_2 \leq 5$ seconds.
(g) Below the P-11 (Pressurizer Pressure) Interlock; however, may be blocked below P-11 when safety injection on low steam line pressure is not blocked.
(h) Time constant utilized in the rate/lag controller is ≥ 50 seconds.
(i) Except when all MSIVs are closed.
(o) Each train requires a minimum of two programmable logic controllers to be OPERABLE.
(s) 1. If the as-found instrument channel setpoint is conservative with respect to the Allowable Value, but outside its as-found test 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 setpoint tolerance band on either side of the Nominal Trip Setpoint, or to a value that is more conservative than the Nominal Trip Setpoint; otherwise, the channel shall be declared inoperable. The Nominal Trip Setpoints and the methodology used to determine the as-found test acceptance criteria band and the as-left setpoint tolerance band shall be specified in the Bases.

Table 3.3.2-1 (page 4 of 8)
Engineered Safety Feature Actuation System Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	CONDITIONS	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE[a]
5. Turbine Trip and Feedwater Isolation					
a. Automatic Actuation Logic and Actuation Relays (SSPS)	1,2[(j)], 3[(j)]	2 trains	G	SR 3.3.2.2 SR 3.3.2.4 SR 3.3.2.6 SR 3.3.2.14	NA
b. Automatic Actuation Logic and Actuation Relays (MSFIS)	1, 2[(j)], 3[(j)]	2 trains[(o)]	S	SR 3.3.2.3	NA
c. SG Water Level - High High (P-14)	1,2[(j)]	4 per SG	I	SR 3.3.2.1 SR 3.3.2.5 SR 3.3.2.9 SR 3.3.2.10	≤ 91.4%[(s)] of Narrow Range Instrument Span
d. Safety Injection	Refer to Function 1 (Safety Injection) for all initiation functions and requirements.				

(a) The Allowable Value defines the limiting safety system setting except for Functions 1.e, 4.e.(1), 5.c, 5.e.(1), 5.e.(2), 6.d.(1), and 6.d.(2) (the Nominal Trip Setpoint defines the limiting safety system setting for these Functions). See the Bases for the Nominal Trip Setpoints.

(j) Except when all MFIVs are closed.

(o) Each train requires a minimum of two programmable logic controllers to be OPERABLE.

(s) 1. If the as-found instrument channel setpoint is conservative with respect to the Allowable Value, but outside its as-found test 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 setpoint tolerance band on either side of the Nominal Trip Setpoint, or to a value that is more conservative than the Nominal Trip Setpoint; otherwise, the channel shall be declared inoperable. The Nominal Trip Setpoints and the methodology used to determine the as-found test acceptance criteria band and the as-left setpoint tolerance band shall be specified in the Bases.

Table 3.3.2-1 (page 5 of 8)
Engineered Safety Feature Actuation System Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	CONDITIONS	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE[a]
5. Turbine Trip and Feedwater Isolation					
e. Steam Generator Water Level Low-Low[q]					
(1) Steam Generator Water Level Low-Low (Adverse Containment Environment)	1, 2[j], 3[j]	4 per SG	D	SR 3.3.2.1 SR 3.3.2.5 SR 3.3.2.9 SR 3.3.2.10	≥ 20.6%[s] of Narrow Range Instrument Span
(2) Steam Generator Water Level Low-Low (Normal Containment Environment)	1[r], 2[j,r], 3[j,r]	4 per SG	D	SR 3.3.2.1 SR 3.3.2.5 SR 3.3.2.9 SR 3.3.2.10	≥ 16.6%[s] of Narrow Range Instrument Span
(3) Not used.					
(4) Containment Pressure - Environmental Allowance Modifier	1, 2[j], 3[j]	4	N	SR 3.3.2.1 SR 3.3.2.5 SR 3.3.2.9 SR 3.3.2.10	≤ 2.0 psig

(a) The Allowable Value defines the limiting safety system setting except for Functions 1.e, 4.e.(1), 5.c, 5.e.(1), 5.e.(2), 6.d.(1), and 6.d.(2) (the Nominal Trip Setpoint defines the limiting safety system setting for these Functions). See the Bases for the Nominal Trip Setpoints.
(j) Except when all MFIVs are closed.
(k) Not used.
(l) Not used.
(q) Feedwater isolation only.
(r) Except when the Containment Pressure – Environmental Allowance Modifier channels in the same protection sets are tripped.
(s) 1. If the as-found instrument channel setpoint is conservative with respect to the Allowable Value, but outside its as-found test 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 setpoint tolerance band on either side of the Nominal Trip Setpoint, or to a value that is more conservative than the Nominal Trip Setpoint; otherwise, the channel shall be declared inoperable. The Nominal Trip Setpoints and the methodology used to determine the as-found test acceptance criteria band and the as-left setpoint tolerance band shall be specified in the Bases.

Table 3.3.2-1 (page 6 of 8)
Engineered Safety Feature Actuation System Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	CONDITIONS	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE[a]
6. Auxiliary Feedwater					
a. Manual Initiation	1, 2, 3	1/pump	P	SR 3.3.2.8	NA
b. Automatic Actuation Logic and Actuation Relays (SSPS)	1,2,3	2 trains	G	SR 3.3.2.2 SR 3.3.2.4 SR 3.3.2.6	NA
c. Automatic Actuation Logic and Actuation Relays (BOP ESFAS)	1,2,3	2 trains	Q	SR 3.3.2.3	NA
d. SG Water Level Low-Low					
(1) Steam Generator Water Level Low-Low (Adverse Containment Environment)	1, 2, 3	4 per SG	D	SR 3.3.2.1 SR 3.3.2.5 SR 3.3.2.9 SR 3.3.2.10	≥ 20.6%[s] of Narrow Range Instrument Span
(2) Steam Generator Water Level Low-Low (Normal Containment Environment)	1[r], 2[r], 3[r]	4 per SG	D	SR 3.3.2.1 SR 3.3.2.5 SR 3.3.2.9 SR 3.3.2.10	≥ 16.6%[s] of Narrow Range Instrument Span

(a) The Allowable Value defines the limiting safety system setting except for Functions 1.e, 4.e.(1), 5.c, 5.e.(1), 5.e.(2), 6.d.(1), and 6.d.(2) (the Nominal Trip Setpoint defines the limiting safety system setting for these Functions). See the Bases for the Nominal Trip Setpoints.

(r) Except when the Containment Pressure – Environmental Allowance Modifier channels in the same protection sets are tripped.

(s) 1. If the as-found instrument channel setpoint is conservative with respect to the Allowable Value, but outside its as-found test 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 setpoint tolerance band on either side of the Nominal Trip Setpoint, or to a value that is more conservative than the Nominal Trip Setpoint; otherwise, the channel shall be declared inoperable. The Nominal Trip Setpoints and the methodology used to determine the as-found test acceptance criteria band and the as-left setpoint tolerance band shall be specified in the Bases.

Table 3.3.2-1 (page 7 of 8)
Engineered Safety Feature Actuation System Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	CONDITIONS	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE[a]
6. Auxiliary Feedwater					
d. SG Water Level Low-Low					
(3) Not used					
(4) Containment Pressure - Environmental Allowance Modifier	1, 2, 3	4	N	SR 3.3.2.1 SR 3.3.2.5 SR 3.3.2.9 SR 3.3.2.10	≤ 2.0 psig
e. Safety Injection	Refer to Function 1 (Safety Injection) for all initiation functions and requirements.				
f. Loss of Offsite Power	1,2,3	2 trains	R	SR 3.3.2.7 SR 3.3.2.10	NA
g. Trip of all Main Feedwater Pumps	1,2[n]	2 per pump	J	SR 3.3.2.8	NA
h. Auxiliary Feedwater Pump Suction Transfer on Suction Pressure - Low	1,2,3	3	O	SR 3.3.2.1 SR 3.3.2.9 SR 3.3.2.10 SR 3.3.2.12	≥ 20.64 psia

(a) The Allowable Value defines the limiting safety system setting except for Functions 1.e, 4.e.(1), 5.c, 5.e.(1), 5.e.(2), 6.d.(1), and 6.d.(2) (the Nominal Trip Setpoint defines the limiting safety system setting for these Functions). See the Bases for the Nominal Trip Setpoints.
(k) Not used.
(l) Not used.
(n) Trip function may be blocked just before shutdown of the last operating main feedwater pump and restored just after the first main feedwater pump is put into service following performance of its startup trip test.

Table 3.3.2-1 (page 8 of 8)
Engineered Safety Feature Actuation System Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	CONDITIONS	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE[a]
7. Automatic Switchover to Containment Sump					
a. Automatic Actuation Logic and Actuation Relays (SSPS)	1,2,3,4	2 trains	C	SR 3.3.2.2 SR 3.3.2.4 SR 3.3.2.13	NA
b. Refueling Water Storage Tank (RWST) Level - Low Low	1,2,3,4	4	K	SR 3.3.2.1 SR 3.3.2.5 SR 3.3.2.9 SR 3.3.2.10	≥ 35.2%
Coincident with Safety Injection	Refer to Function 1 (Safety Injection) for all initiation functions and requirements.				
8. ESFAS Interlocks					
a. Reactor Trip, P-4	1,2,3	2 per train, 2 trains	F	SR 3.3.2.11	NA
b. Pressurizer Pressure, P-11	1,2,3	3	L	SR 3.3.2.5 SR 3.3.2.9	≤ 1981 psig
9. Automatic Pressurizer PORV Actuation					
a. Automatic Actuation Logic and Actuation Relays (SSPS)	1,2,3	2 trains	H	SR 3.3.2.2 SR 3.3.2.4 SR 3.3.2.14	NA
b. Pressurizer Pressure – High	1,2,3	4	D	SR 3.3.2.1 SR 3.3.2.5 SR 3.3.2.9	≤2350 psig

(a) The Allowable Value defines the limiting safety system setting except for Functions 1.e, 4.e.(1), 5.c, 5.e.(1), 5.e.(2), 6.d.(1), and 6.d.(2) (the Nominal Trip Setpoint defines the limiting safety system setting for these Functions). See the Bases for the Nominal Trip Setpoints.

ATTACHMENT 3

PROPOSED TECHNICAL SPECIFICATION BASES CHANGES
(for information only)

B 3.3 INSTRUMENTATION

B 3.3.1 Reactor Trip System (RTS) Instrumentation

BASES

BACKGROUND

The RTS initiates a unit shutdown, based on the values of selected unit parameters, to protect against violating the core fuel design limits and Reactor Coolant System (RCS) pressure boundary during anticipated operational occurrences (AOOs) and to assist the Engineered Safety Features (ESF) Systems in mitigating accidents.

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

The LSSS, defined in this specification as the Allowable Values, in conjunction with the LCOs, establish the threshold for protective system action to prevent exceeding acceptable limits during Design Basis Accidents (DBAs). (INSERT B 3.3.1-1)

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

1. The Departure from Nucleate Boiling Ratio (DNBR) shall be maintained above the DNBR limit;

2. Fuel centerline melt shall not occur; and

3. The RCS pressure Safety Limit (SL) of 2735 psig shall not be exceeded.

Operation within the SLs of Specification 2.0, "Safety Limits (SLs)," also maintains the above values and assures that offsite dose will be within the 10 CFR 50 and 10 CFR 100 criteria during AOOs.

Accidents are events that are analyzed even though they are not expected to occur during the unit life. The acceptable limit during accidents is that offsite dose shall be maintained within an acceptable fraction of 10 CFR 100 limits. Different accident categories are allowed a different fraction of these limits, based on probability of occurrence.

(continued)

INSERT B 3.3.1-1

except for Trip Functions 14.a and 14.b in Technical Specification Table 3.3.1-1 (the Nominal Trip Setpoint defines the limiting safety system setting for these Trip Functions),

BASES

BACKGROUND (continued)

Meeting the acceptable dose limit for an accident category is considered having acceptable consequences for that event.

The RTS instrumentation is segmented into four distinct but interconnected modules as described in FSAR, Chapter 7 (Ref. 1), and as identified below:

1. Field transmitters or process sensors: provide a measurable electronic signal based upon the physical characteristics of the parameter being measured;

2. Signal Process Control and Protection System, including 7300 Process Protection System, Nuclear Instrumentation System (NIS), field contacts, and protection channel sets: provides signal conditioning, bistable setpoint comparison, process algorithm actuation, compatible electrical signal output to protection system devices, and control board/control room/miscellaneous indications;

3. Solid State Protection System (SSPS), including input, logic, and output bays: initiates proper unit shutdown and/or ESF actuation in accordance with the defined logic, which is based on the bistable outputs from the signal process control and protection system; and

4. Reactor trip switchgear, including reactor trip breakers (RTBs) and bypass breakers: provides the means to interrupt power to the control rod drive mechanisms (CRDMs) and allows the rod cluster control assemblies (RCCAs), or "rods," to fall into the core and shut down the reactor. The bypass breakers allow testing of the RTBs at power.

Field Transmitters or Sensors

To meet the design demands for redundancy and reliability, more than one, and often as many as four, field transmitters or sensors are used to measure unit parameters. To account for the calibration tolerances and instrument drift, which are assumed to occur between calibrations, statistical allowances are provided in the Trip Setpoints and Allowable Values. The OPERABILITY of each transmitter or sensor can be evaluated when its "as found" calibration data are compared against its documented acceptance criteria. Nominal

(continued)

BASES

BACKGROUND (continued)

Trip Setpoints and Allowable Values

The Trip Setpoints are the ~~nominal~~ values at which the bistables are set. Any bistable is considered to be properly adjusted when the "as left" value is within the two-sided tolerance band for calibration accuracy, ~~(typically ± 15 mV).~~

The Trip Setpoints listed in Table B 3.3.1-1 and used in the bistables are based on the analytical limits stated in Reference 2. 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 RTS channels that must function in harsh environments as defined by 10 CFR 50.49 (Ref. 4), the ~~Allowable Values~~ specified in Table 3.3.1-1 ~~in the accompanying LCO~~ 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 Reference 6. The actual nominal Trip Setpoint entered into the bistable is more conservative than that specified by the Allowable Value to account for changes in random measurement errors detectable by a COT. ~~One example of such a change in measurement error is drift during the surveillance interval.~~ If the measured setpoint does not exceed the Allowable Value, the bistable is considered OPERABLE.

INSERT B 3.3.1A

Setpoints in accordance with the Allowable Value ensure that design limits are not violated during AOOs (and that the consequences of DBAs will be acceptable, providing the unit is operated from within the LCOs at the onset of the AOO or DBA and the equipment functions as designed). Note that in the accompanying LCO 3.3.1, the Allowable Values of Table 3.3.1-1 are the LSSS, except for Trip Functions 14.a and 14.b (the Nominal Trip Setpoint defines the LSSS for these Trip Functions).

Each channel of the process control equipment can be tested on line to verify that the signal or setpoint accuracy is within the specified allowance requirements. Once a designated channel is taken out of service for testing, a simulated signal is injected in place of the field instrument signal. The process equipment for the channel in test is then tested, verified, and calibrated. SRs for the channels are specified in the SRs section.

The Allowable Values listed in Table 3.3.1-1 are based on the methodology described in Reference 6, and reviewed in support of Amendments 15, 43, 57, 84, 102, and 125, which incorporates all of the known uncertainties applicable for each channel. The magnitudes of these uncertainties are factored into the determination of each Trip Setpoint. All field sensors and signal processing equipment for these

INSERT B 3.3.1B

(continued)

INSERT B 3.3.1 A

The methodology used to calculate the Nominal Trip Setpoints for Functions 14.a and 14.b in Table B 3.3.1-1 is described in Reference 17. This is the same basic square root sum of the squares (SRSS) methodology described in References 6 and 18 (Reference 18 was reviewed and approved by NRC in support of Callaway Amendment 125 dated April 13, 1998), but with the inclusion of refinements to better reflect plant calibration practices and equipment performance. These refinements include the incorporation of a sensor reference accuracy term to address repeatability effects when performing a single pass calibration (i.e., one up and one down pass at several points verifies linearity and hysteresis, but not repeatability). In addition, sensor and rack error terms for calibration accuracy and drift are grouped in the Channel Statistical Allowance equation with their dependent M&TE terms, then combined with the other independent error terms using the SRSS methodology.

INSERT B 3.3.1 B

The Allowable Values for Functions 14.a and 14.b in the accompanying LCO are based on the Nominal Trip Setpoints and are determined by subtracting the rack calibration accuracy from the Nominal Trip Setpoint.

BASES

BACKGROUND Nominal Trip Setpoints and Allowable Values (continued)

channels are assumed to operate within the allowances of these uncertainty magnitudes.

Solid State Protection System

The SSPS equipment is used for the decision logic processing of outputs from the signal processing equipment bistables. To meet the redundancy requirements, two trains of SSPS, each performing the same functions, are provided. If one train is taken out of service for maintenance or test purposes, the second train will provide reactor trip and/or ESF actuation for the unit. If both trains are taken out of service or placed in test, a reactor trip will result. Each train is packaged in its own cabinet for physical and electrical separation to satisfy separation and independence requirements. The system has been designed to trip in the event of a loss of power, directing the unit to a safe shutdown condition.

The SSPS performs the decision logic for actuating a reactor trip or ESF actuation, generates the electrical output signal that will initiate the required trip or actuation, and provides the status, permissive, and annunciator output signals to the main control room of the unit.

The bistable outputs from the signal processing equipment are sensed by the SSPS equipment and combined into logic matrices that represent combinations indicative of various unit upset and accident transients. If a required logic matrix combination is completed, the system will initiate a reactor trip or send actuation signals via master and slave relays to those components whose aggregate Function best serves to alleviate the condition and restore the unit to a safe condition. Examples are given in the Applicable Safety Analyses, LCO, and Applicability sections of this Bases.

Reactor Trip Switchgear

The RTBs are in the electrical power supply line from the control rod drive motor generator set power supply to the CRDMs. Opening of the RTBs interrupts power to the CRDMs, which allows the shutdown rods and control rods to fall into the core by gravity. Each RTB is equipped with a bypass breaker to allow testing of the RTB while the unit is at power.

During normal operation the output from the SSPS is a voltage signal that energizes the undervoltage coils in the RTBs and bypass breakers, if in use. When the required logic matrix combination is completed, the SSPS

(continued)

BASES (continued)

BACKGROUND

Reactor Trip Switchgear (continued)

output voltage signal is removed, the undervoltage coils are de-energized, the breaker trip lever is actuated by the de-energized undervoltage coil, and the RTBs and bypass breakers are tripped open. This allows the shutdown rods and control rods to fall into the core. In addition to the de-energization of the undervoltage coils, each reactor trip breaker is also equipped with an automatic shunt trip device that is energized to trip the breaker open upon receipt of a reactor trip signal from the SSPS. Either the undervoltage coil or the shunt trip mechanism is sufficient by itself, thus providing a diverse trip mechanism.

The decision logic matrix Functions are described in the functional diagrams included in Reference 1. In addition to the reactor trip or ESF, these diagrams also describe the various "permissive interlocks" that are associated with unit conditions.

Each train has a built in testing device that can test the decision logic matrix Functions and the actuation devices while the unit is at power. When any one train is taken out of service for testing, the other train is capable of providing unit monitoring and protection until the testing has been completed. The testing device is semiautomatic to minimize testing time.

APPLICABLE SAFETY ANALYSES, LCO, AND APPLICABILITY

The RTS functions to maintain the applicable Safety Limits during all AOOs and mitigates the consequences of DBAs in all MODES in which the Rod Control System is capable of rod withdrawal or one or more rods are not fully inserted.

Each of the analyzed accidents and transients can be detected by one or more RTS Functions. The accident analysis described in Reference 2 takes credit for most RTS trip Functions. RTS trip Functions not specifically credited in the accident analysis are qualitatively credited in the safety analysis and the NRC staff approved licensing basis for the unit. These RTS trip Functions may provide protection for conditions that do not require dynamic transient analysis to demonstrate Function performance. They may also serve as backups to RTS trip Functions that were credited in the accident analysis.

The LCO requires all instrumentation performing an RTS Function, listed in Table 3.3.1-1 in the accompanying LCO, to be OPERABLE. Failure of any instrument renders the affected channel(s) inoperable and reduces the reliability of the affected Functions.

INSERT B 3.3.1-6

(continued)

INSERT B 3.3.1-6 (page 1 of 2)

The Allowable Value column for Trip Functions 14.a, Steam Generator Water Level Low-Low (Adverse Containment Environment), and 14.b, Steam Generator Water Level Low-Low (Normal Containment Environment) in TS Table 3.3.1-1 is modified by two Notes. If the as-found instrument channel setpoint for either of these specific Trip Function's channels is found to be outside the two-sided as-found test acceptance criteria band on either side of the Nominal Trip Setpoint, even if the as-found setting is conservative with respect to the Allowable Value, Note 1 requires that an assessment of channel performance shall be performed prior to returning the channel to service. The evaluation of channel performance will verify that the channel will continue to behave in accordance with design basis assumptions. The purpose of the assessment is to ensure confidence in the channel performance prior to returning the channel to service. An initial assessment shall be performed by the technician performing the surveillance who will evaluate the channel's ability to maintain a stable setpoint within the calibration tolerance band. The return of this channel to service shall require the approval of on-shift supervision after a review of the surveillance test results and the technician's initial assessment.

In addition, the affected channel shall be addressed under the corrective action program, including that program's evaluation completion time requirements.

Note 2 requires the instrument channel setpoint for a channel in these Trip Functions to be reset to a value within the as-left setpoint tolerance band for that channel on either side of the Nominal Trip Setpoint, or to a value that is more conservative than the Nominal Trip Setpoint. One example of a situation where the latter was used is discussed in Amendment 157. The conservative direction is indicated by the direction of the inequality sign applied to the Nominal Trip Setpoint in Bases Table B 3.3.1-1. Setpoint restoration and post-test verification assure that the assumptions in the plant setpoint methodology (Reference 17) are satisfied in order to protect the safety analysis limits. Note 2 preserves the safety analysis limits. If the channel can not be reset to a value within its as-left setpoint tolerance band, or to a value that is more conservative than the Nominal Trip Setpoint if required based on plant conditions, the channel shall be declared inoperable and the applicable Required Actions are taken. The methodology used to determine the as-found test acceptance criteria band and the as-left setpoint tolerance band is based on the square-root-sum-of-the-squares (SRSS) of the tolerances applicable to the instrument loop or sub-loop constituents being tested and is discussed in Reference 19.

For channels that have a history of proper performance, an out-of-tolerance condition may be a 5% statistical outlier which is to be expected for a setpoint methodology that is based on maintaining a 95% probability with a 95% confidence level of proper performance. If the channel performance evaluation demonstrates this to be the case, the as-found and as-left setpoint data will be trended and no further evaluation would be performed until the next CHANNEL OPERATIONAL TEST.

INSERT B 3.3.1-6 (page 2 of 2)

All as-found and as-left setpoint data for these specific Trip Functions obtained during CHANNEL OPERATIONAL TESTS shall be trended to demonstrate that the rack drift assumptions used in the plant setpoint methodology are valid. If the trending evaluation determines that a channel is performing inconsistent with the uncertainty allowances applicable to the periodic surveillance test being performed (e.g., whether it be a COT, CHANNEL CALIBRATION, etc.), the channel shall be evaluated under the corrective action program. If the channel is not capable of performing its specified safety function, it shall be declared inoperable.

BASES No change since OL#1248, 9-17-04 (Insert B 3.3.1.C has changed)

APPLICABLE SAFETY ANALYSES, LCO, AND APPLICABILITY

9. Pressurizer Water Level - High (continued)

pressure overshoot due to level channel failure cannot cause the safety valve to lift before reactor high pressure trip.

In MODE 1, when there is a potential for overfilling the pressurizer, the Pressurizer Water Level - High trip must be OPERABLE. This trip Function is automatically enabled on increasing power by the P-7 interlock. On decreasing power, this trip Function is automatically blocked below P-7. Below the P-7 setpoint, transients that could raise the pressurizer water level will be slow and the operator will have sufficient time to evaluate unit conditions and take corrective actions.

10. Reactor Coolant Flow – Low

The Reactor Coolant Flow - Low trip Function ensures that protection is provided against violating the DNBR limit due to low flow in one or more RCS loops, while avoiding reactor trips due to normal variations in loop flow. Above the P-7 setpoint, the reactor trip on low flow in two or more RCS loops is automatically enabled. Above the P-8 setpoint, a loss of flow in any RCS loop will actuate a reactor trip. Each RCS loop has three flow detectors to monitor flow. The flow signals are not used for any control system input.

The LCO requires three Reactor Coolant Flow - Low channels per loop to be OPERABLE in MODE 1 above P-7 (two-out-of-three trip logic). The Trip Setpoint is ≥ 90% of ~~loop Minimum Measured Flow (MMF = 95,660 gpm).~~ indicated loop flow.

INSERT B 3.3.1 C →

In MODE 1 above the P-8 setpoint, a loss of flow in one RCS loop could result in DNB conditions in the core because of the higher power level. In MODE 1 below the P-8 setpoint and above the P-7 setpoint, a loss of flow in two or more loops is required to actuate a reactor trip because of the lower power level and the greater margin to the design limit DNBR. Below the P-7 setpoint, all reactor trips on low flow are automatically blocked since there is insufficient heat production to generate DNB conditions.

11 Not used.

12. Undervoltage Reactor Coolant Pumps

The Undervoltage RCP reactor trip Function ensures that protection is provided against violating the DNBR limit due to a

(continued)

INSERT B 3.3.1 C

At the beginning of each cycle the plant will normalize the RCS flow transmitters during zero power, normal operating pressure, normal operating temperature (NOP/NOT) conditions such that they indicate at 100% flow in each respective loop. This normalization is then verified prior to exceeding 75% of RATED THERMAL POWER and again after reaching full power following a refueling outage when suitable plant conditions are established. The bistables for the low RCS flow trip function are calibrated separately to verify that they are set at the nominal trip setpoint of 90% of indicated loop flow. The nominal trip setpoint is based on the loop-specific normalized flow input (i.e., the indicated loop flow) from each of the three RCS flow transmitters per RCS loop.

BASES

REFERENCES (continued)

6. Callaway Setpoint Methodology Report, SNP (UE)-565 dated May 1, 1984.

7. Callaway OL Amendment No. 43 dated April 14, 1989.

8. FSAR Section 16.3, Table 16.3-1

9. WCAP-13632-P-A, Revision 2, "Elimination of Pressure Sensor Response Time Testing Requirements," January 1996.

FSAR Table 15.0-4.

11 WCAP-9226 P-A, "Reactor Core Response to Excessive Secondary Steam Releases," Revision 1, ~~January 1978.~~ February 1998.

12. NRC Generic Letter 85-09 dated May 23, 1985.

13. FSAR Section 15.1.1

14. RFR - 18637A.

WCAP-14036-P-A, Revision 1, "Elimination of Periodic Protection Channel Response Time Tests," October 1998.

16. FSAR Section 15.4.6.

17. Westinghouse letter SCP-04-90 dated August 27, 2004.

18. ULNRC-03748 dated February 27, 1998.

19. IDP-ZZ-00017.

B 3.3 INSTRUMENTATION

B 3.3.2 Engineered Safety Feature Actuation System (ESFAS) Instrumentation

BASES

BACKGROUND

The ESFAS initiates necessary safety systems, based on the values of selected unit parameters, to protect against violating core design limits and the Reactor Coolant System (RCS) pressure boundary, and to mitigate accidents.

The ESFAS instrumentation is segmented into three distinct but interconnected modules as identified below:

- Field transmitters or process sensors and instrumentation: provide a measurable electronic signal based on the physical characteristics of the parameter being measured;
- Signal processing equipment including 7300 Process Protection System, field contacts, and protection channel sets: provide signal conditioning, bistable setpoint comparison, process algorithm actuation, compatible electrical signal output to protection system devices, and control board/control room/miscellaneous indications; and
- Solid State Protection System (SSPS) including input, logic, and output bays and Balance of Plant (BOP) ESFAS circuitry: initiate the proper unit shutdown or engineered safety feature (ESF) actuation in accordance with the defined logic and based on the bistable outputs from the signal process control and protection system.

Field Transmitters or Sensors

To meet the design demands for redundancy and reliability, more than one, and often as many as four, field transmitters or sensors are used to measure unit parameters. In many cases, field transmitters or sensors that input to the ESFAS are shared with the Reactor Trip System (RTS). In some cases, the same channels also provide control system inputs. To account for calibration tolerances and instrument drift, which are assumed to occur between calibrations, statistical allowances are provided in the Nominal Trip Setpoint and Allowable Values. The OPERABILITY of each transmitter or sensor can be evaluated when its "as found" calibration data are compared against its documented acceptance criteria.

(continued)

BASES

BACKGROUND (continued)

Signal Processing Equipment

Generally, three or four channels of process control equipment are used for the signal processing of unit parameters measured by the field instruments. The process control equipment provides signal conditioning, comparable output signals for instruments located on the main control board, and comparison of measured input signals with setpoints established by safety analyses. If the measured value of a unit parameter exceeds the predetermined setpoint, an output from a bistable is forwarded to the SSPS for decision evaluation. Channel separation is maintained up to and through the input bays. However, not all unit parameters require four channels of sensor measurement and signal processing. Some unit parameters provide input only to the SSPS, while others provide input to the SSPS, the main control board, the unit computer, and one or more control systems.

Generally, if a parameter is used only for input to the protection circuits, three channels with a two-out-of-three logic are sufficient to provide the required reliability and redundancy. If one channel fails in a direction that would not result in a partial Function trip, the Function is still OPERABLE with a two-out-of-two logic. If one channel fails such that a partial Function trip occurs, a trip will not occur and the Function is still OPERABLE with a one-out-of-two logic.

Generally, if a parameter is used for input to the SSPS and a control function, four channels with a two-out-of-four logic are sufficient to provide the required reliability and redundancy. The circuit must be able to withstand both an input failure to the control system, which may then require the protection function actuation, and a single failure in the other channels providing the protection function actuation. Again, a single failure will neither cause nor prevent the protection function actuation.

These requirements are described in IEEE-279-1971 (Ref. 4). The actual number of channels required for each unit parameter is specified in Reference 2.

Nominal Trip Setpoints and Allowable Values

The Nominal Trip Setpoints are the ~~nominal~~ values at which the bistables are set. Any bistable is considered to be properly adjusted when the "as left" value is within the two-sided tolerance band for calibration accuracy ~~(typically ± 15 mV)~~ rack.

(continued)

BASES

BACKGROUND Trip Setpoints and Allowable Values (continued)

The Trip Setpoints listed in Table B 3.3.2-1 and used in the bistables are based on the analytical limits stated in Reference 3. 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~~ harsh environment errors for those ESFAS channels that must function in harsh environments as defined by 10 CFR 50.49 (Ref. 5), the ~~Allowable Values~~ Nominal Trip Setpoints specified in Table B 3.3.2-1 ~~in the accompanying LCO~~ are conservatively adjusted with respect to the analytical limits. A detailed description of the methodologies used to calculate the Trip Setpoints, including their explicit uncertainties, is provided in Reference 6. The BOP methodology used for Function 6.h is a similar square-root-sum-of-squares (SRSS) methodology as used for the RTS setpoints. The actual nominal Trip Setpoint entered into the bistable is more conservative than that specified by the Allowable Value to account for changes in random measurement errors detectable by a COT. ~~One example of such a change in measurement error is drift during the surveillance interval.~~ If the measured setpoint does not exceed the Allowable Value, the bistable is considered OPERABLE.

INSERT B 3.3.2A

Setpoints in accordance with the Allowable Value ensure that the consequences of Design Basis Accidents (DBAs) will be acceptable, providing the unit is operated from within the LCOs at the onset of the DBA and the equipment functions as designed.

Each channel can be tested on line to verify that the signal processing equipment and setpoint accuracy is within the specified allowance requirements. Once a designated channel is taken out of service for testing, a simulated signal is injected in place of the field instrument signal. The process equipment for the channel in test is then tested, verified, and calibrated. SRs for the channels are specified in the SR section, in the accompanying LCO, except for Functions 1.e, 4.e.(1), 5.c, 5.e.(1), 5.e.(2), 6.d.(1), and 6.d.(2).

The Allowable Values listed in Table 3.3.2-1 are based on the methodologies described in Reference 6, which incorporate all of the known uncertainties applicable for each channel. The magnitudes of these uncertainties are factored into the determination of each Trip Setpoint. All field sensors and signal processing equipment for these channels are assumed to operate within the allowances of these uncertainty magnitudes.

INSERT B 3.3.2.B

(continued)

INSERT B 3.3.2 A

Nominal

The methodology used to calculate the Trip Setpoints for Functions 1.e, 4.e.(1), 5.c, 5.e.(1), 5.e.(2), 6.d.(1), and 6.d.(2) in Table B 3.3.2-1 is described in Reference 18. This is the same basic square root sum of the squares (SRSS) methodology described in References 6 and 19 (Reference 19 was reviewed and approved by NRC in support of Callaway Amendment 125 dated April 13, 1998), but with the inclusion of refinements to better reflect plant calibration practices and equipment performance. These refinements include the incorporation of a sensor reference accuracy term to address repeatability effects when performing a single pass calibration (i.e., one up and one down pass at several points verifies linearity and hysteresis, but not repeatability). In addition, sensor and rack error terms for calibration accuracy and drift are grouped in the Channel Statistical Allowance equation with their dependent M&TE terms, then combined with the other independent error terms using the SRSS methodology.

INSERT B 3.3.2 B

The Allowable Values for Functions 1.e, 4.e.(1), 5.c, 5.e.(1), 5.e.(2), 6.d.(1), and 6.d.(2) in the accompanying LCO are based on the Trip Setpoints and are determined by subtracting (for low setpoint trips) or adding (for high setpoint trips) the rack calibration accuracy from/to the Trip Setpoint.

Nominal

BASES

BACKGROUND (continued)

Balance of Plant (BOP) ESFAS

The BOP ESFAS processes signals from SSPS, signal processing equipment (e.g., LSELS), and plant radiation monitors to actuate certain ESF equipment. There are two redundant trains of BOP ESFAS (separation groups 1 and 4), and a third separation group (separation group 2) to actuate the Turbine Driven Auxiliary Feedwater pump and reposition automatic valves (turbine steam supply valves, turbine trip and throttle valve) as required. The separation group 2 BOP-ESFAS cabinet is considered to be part of the end device (the Turbine Driven Auxiliary Feedwater pump) and its OPERABILITY is addressed under LCO 3.7.5, "Auxiliary Feedwater (AFW) System." The redundant trains provide actuation for the Motor Driven Auxiliary Feedwater pumps (and reposition automatic valves as required, i.e., steam generator blowdown and sample line isolation valves, ESW supply valves, CST supply valves), Containment Purge Isolation, Control Room Emergency Ventilation, and Emergency Exhaust Actuation functions.

The BOP ESFAS has a built-in automatic test insertion (ATI) feature which continuously tests the system logic. Any fault detected during the testing causes an alarm on the main control room overhead annunciator system to alert operators to the problem. Local indication shows the test step where the fault was detected.

APPLICABLE SAFETY ANALYSES, LCO, AND APPLICABILITY

Each of the analyzed accidents can be detected by one or more ESFAS Functions. One of the ESFAS Functions is the primary actuation signal for that accident. An ESFAS Function may be the primary actuation signal for more than one type of accident. An ESFAS Function may also be a secondary, or backup, actuation signal for one or more other accidents. For example, Pressurizer Pressure - Low is a primary actuation signal for small loss of coolant accidents (LOCAs) and a backup actuation signal for steam line breaks (SLBs) outside containment. Functions such as manual initiation, not specifically credited in the accident safety analysis, are qualitatively credited. These Functions may provide protection for conditions that do not require dynamic transient analysis to demonstrate Function performance. These Functions may also serve as backups to Functions that were credited in the accident analysis (Ref. 3).

INSERT B 3.3.2-5

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

(start new paragraph)

The LCO generally requires OPERABILITY of three or four channels in each instrumentation function and two channels in each logic and manual initiation function. The two-out-of-three and the two-out-of-four

(continued)

INSERT B 3.3.2-5 (page 1 of 2)

The Allowable Value column for Functions 1.e (Safety Injection on Steam Line Pressure - Low), 4.e.1 (Steam Line Isolation on Steam Line Pressure - Low), 5.c (Turbine Trip and Feedwater Isolation on Steam Generator Water Level High-High), 5.e.1 (Feedwater Isolation on Steam Generator Water Level Low-Low - Adverse Containment Environment), 5.e.2 (Feedwater Isolation on Steam Generator Water Level Low-Low - Normal Containment Environment), 6.d.1 (Auxiliary Feedwater Actuation on Steam Generator Water Level Low-Low - Adverse Containment Environment), and 6.d.2 (Auxiliary Feedwater Actuation on Steam Generator Water Level Low-Low - Normal Containment Environment) in TS Table 3.3.2-1 is modified by two Notes. If the as-found instrument channel setpoint for any of these specific Function's channels is found to be outside the two-sided as-found test acceptance criteria band on either side of the Nominal Trip Setpoint, even if the as-found setting is conservative with respect to the Allowable Value, Note 1 requires that an assessment of channel performance shall be performed prior to returning the channel to service. The evaluation of channel performance will verify that the channel will continue to behave in accordance with design basis assumptions. The purpose of the assessment is to ensure confidence in the channel performance prior to returning the channel to service. An initial assessment shall be performed by the technician performing the surveillance who will evaluate the channel's ability to maintain a stable setpoint within the calibration tolerance band. The return of this channel to service shall require the approval of on-shift supervision after a review of the surveillance test results and the technician's initial assessment.

In addition, the affected channel shall be addressed under the corrective action program, including that program's evaluation completion time requirements.

Note 2 requires the instrument channel setpoint for a channel in these Functions to be reset to a value within the as-left setpoint tolerance band for that channel on either side of the Nominal Trip Setpoint, or to a value that is more conservative than the Nominal Trip Setpoint. One example of a situation where the latter was used is discussed in Amendment 157. The conservative direction is indicated by the direction of the inequality sign applied to the Nominal Trip Setpoint in Bases Table B 3.3.2-1. Setpoint restoration and post-test verification assure that the assumptions in the plant setpoint methodology (Reference 18) are satisfied in order to protect the safety analysis limits. Note 2 preserves the safety analysis limits. If the channel can not be reset to a value within its as-left setpoint tolerance band, or to a value that is more conservative than the Nominal Trip Setpoint if required based on plant conditions, the channel shall be declared inoperable and the applicable Required Actions are taken. The methodology used to determine the as-found test acceptance criteria band and the as-left setpoint tolerance band is based on the square-root-sum-of-the-squares (SRSS) of the tolerances applicable to the instrument loop or sub-loop constituents being tested and is discussed in Reference 20.

INSERT B 3.3.2-5 (page 2 of 2)

For channels that have a history of proper performance, an out-of-tolerance condition may be a 5% statistical outlier which is to be expected for a setpoint methodology that is based on maintaining a 95% probability with a 95% confidence level of proper performance. If the channel performance evaluation demonstrates this to be the case, the as-found and as-left setpoint data will be trended and no further evaluation would be performed until the next CHANNEL OPERATIONAL TEST.

All as-found and as-left setpoint data for these specific Functions obtained during CHANNEL OPERATIONAL TESTS shall be trended to demonstrate that the rack drift assumptions used in the plant setpoint methodology are valid. If the trending evaluation determines that a channel is performing inconsistent with the uncertainty allowances applicable to the periodic surveillance test being performed (e.g., whether it be a COT, CHANNEL CALIBRATION, etc.), the channel shall be evaluated under the corrective action program. If the channel is not capable of performing its specified safety function, it shall be declared inoperable.

BASES

SURVEILLANCE REQUIREMENTS

SR 3.3.2.12 (continued)

opening the PORVs and depressurizing the RCS. If the PORV block valves are closed, there is not enough pressure to open the PORVs.

REFERENCES

1. FSAR, Chapter 6.
2. FSAR, Chapter 7.
3. FSAR, Chapter 15.
4. IEEE-279-1971
5. 10 CFR 50.49.
6. Callaway Setpoint Methodology Report (NSSS), SNP (UE)-565 dated May 1, 1984, and Callaway Instrument Loop Uncertainty Estimates (BOP), J-U-GEN.
7. Not used.
8. Callaway OL Amendment No. 64 dated October 9, 1991.
9. FSAR Section 16.3, Table 16.3-2.
10. WCAP-13632-P-A, Revision 2, "Elimination of Pressure Sensor Response Time Testing Requirements," January 1996.

Callaway OL Amendment No. 43 dated April 14, 1989.

12. SLNRC 84-0038 dated February 27, 1984.
13. Callaway OL Amendment No. 117 dated October 1, 1996.
14. WCAP-14036-P-A, Revision 1, "Elimination of Periodic Protection Channel Response Time Tests," October 1998.
15. FSAR, Section 15.5.1
16. FSAR, Section 15.6.1
17. Letter from Mel Gray (NRC) to Garry L. Randolph (UE), "Revision 20 of the Inservice Testing Program for Callaway Plant, Unit 1 (TAC No. MA4469)," dated March 19, 1999.
18. Westinghouse letter SCP-04-90 dated August 27, 2004.
19. ULNRC-03748 dated February 27, 1998.
20. IDP-ZZ-00017.