ENCLOSURE 3

VOGTLE ELECTRIC GENERATING PLANT
REQUEST TO REVISE TECHNICAL SPECIFICATIONS
REACTOR TRIP SYSTEM AND ENGINEERED SAFETY FEATURE
ACTUATION SYSTEM INSTRUMENTATION TRIP SETPOINTS

MARKED-UP TECHNICAL SPECIFICATION AND BASES PAGES

The following pages from VEGP Unit 1 and Unit 2 TS LCOs 3.3.1 and 3.3.2 have been marked to show the proposed changes. In addition, clean typed pages reflecting the proposed changes have been provided.

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	NOMINAL TRIP SETPOINT(n)
1. Manual Reactor Trip	1,2	2	B	SR 3.3.1.13	NA	NA
	3(a), 4(a), 5(a)	2	C	SR 3.3.1.13	NA	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 3.3.1.15	≤ 111.3% RTP	≤ 109% RTP
b. Low	1(b),2	4	E	SR 3.3.1.1 SR 3.3.1.8 SR 3.3.1.11 SR 3.3.1.15	≤ 27.3% RTP	≤ 25% RTP
3. Power Range Neutron Flux High Positive Rate	1,2	4	E	SR 3.3.1.7 SR 3.3.1.11	≤ 6.3% RTP with time constant ≥ 2 sec	≤ 5% RTP with time constant ≥ 2 sec
4. Intermediate Range Neutron Flux	1(b), 2(c)	2	F,G	SR 3.3.1.1 SR 3.3.1.8 SR 3.3.1.11	≤ 31.1% RTP	≤ 25% RTP
	2(d)	2	H	SR 3.3.1.1 SR 3.3.1.8 SR 3.3.1.11	≤ 31.1% RTP	≤ 25% RTP

(continued)

(a) With Reactor Trip Breakers (RTBs) closed and Rod Control System capable of rod withdrawal.

(b) Below the P-10 (Power Range Neutron Flux) interlocks.

(c) Above the P-6 (Intermediate Range Neutron Flux) interlocks.

(d) Below the P-6 (Intermediate Range Neutron Flux) interlocks.

(n) The Trip Setpoints may be set more conservative than the Nominal value as necessary in response to plant conditions.

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	NOMINAL TRIP SETPOINT(n)
5. Source Range Neutron Flux	2(d)	2	I,J	SR 3.3.1.1 SR 3.3.1.8 SR 3.3.1.11 SR 3.3.1.15	≤ 1.4 E5 cps	≤ 1.0 E5 cps
	3(a), 4(a), 5(a)	2	J,K	SR 3.3.1.1 SR 3.3.1.7 SR 3.3.1.11 SR 3.3.1.15	≤ 1.4 E5 cps	≤ 1.0 E5 cps
	3(e), 4(e), 5(e)	1	L	SR 3.3.1.1 SR 3.3.1.11	NA	NA
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 3.3.1.15	Refer to Note 1 (Page 3.3-20)	Refer to Note 1 (Page 3.3-20)
7. Overpower ΔT	1,2	4	E	SR 3.3.1.1 SR 3.3.1.7 SR 3.3.1.10 SR 3.3.1.15	Refer to Note 2 (Page 3.3-21)	Refer to Note 2 (Page 3.3-21)

(continued)

(a) With RTBs closed and Rod Control System capable of rod withdrawal.

(d) Below the P-6 (Intermediate Range Neutron Flux) interlocks.

(e) With the RTBs open. In this condition, source range Function does not provide reactor trip but does provide input to the High Flux at Shutdown Alarm System (LCO 3.3.8) and indication.

(n) The Trip Setpoints may be set more conservative than the Nominal value as necessary in response to plant conditions.

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	NOMINAL TRIP SETPOINT(n)
8. Pressurizer Pressure						
a. Low	1(f)	4	M	SR 3.3.1.1 SR 3.3.1.7 SR 3.3.1.10 SR 3.3.1.15	≥ 1950 psig	≥ 1960(g) psig
b. High	1,2	4	E	SR 3.3.1.1 SR 3.3.1.7 SR 3.3.1.10 SR 3.3.1.15	≤ 2395 psig	≤ 2385 psig
9. Pressurizer Water Level – High	1(f)	3	M	SR 3.3.1.1 SR 3.3.1.7 SR 3.3.1.10	≤ 93.9%	≤ 92%
10. Reactor Coolant Flow – Low						
a. Single Loop	1(h)	3 per loop	N	SR 3.3.1.1 SR 3.3.1.7 SR 3.3.1.10 SR 3.3.1.15	≥ 89.4%	≥ 90%
b. Two Loops	1(i)	3 per loop	M	SR 3.3.1.1 SR 3.3.1.7 SR 3.3.1.10 SR 3.3.1.15	≥ 89.4%	≥ 90%

(continued)

(f) Above the P-7 (Low Power Reactor Trips Block) interlock.

(g) Time constants utilized in the lead-lag controller for Pressurizer Pressure-Low are 10 seconds for lead and 1 second for lag.

(h) Above the P-8 (Power Range Neutron Flux) interlock.

(i) Above the P-7 (Low Power Reactor Trips Block) interlock and below the P-8 (Power Range Neutron Flux) interlock.

(n) The Trip Setpoints may be set more conservative than the Nominal value as necessary in response to plant conditions.

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	NOMINAL TRIP SETPOINT(n)
11. Undervoltage RCPs	1(f)	2 per bus	M	SR 3.3.1.9 SR 3.3.1.10 SR 3.3.1.15	≥ 9481 V	≥ 9600 V
12. Underfrequency RCPs	1(f)	2 per bus	M	SR 3.3.1.9 SR 3.3.1.10 SR 3.3.1.15	≥ 57.1 Hz	≥ 57.3 Hz
13. Steam Generator (SG) Water Level – Low Low	1,2	4 per SG	E	SR 3.3.1.1 SR 3.3.1.7 SR 3.3.1.10 SR 3.3.1.15	≥ 35.9%	≥ 37.8%

(continued)

(f) Above the P-7 (Low Power Reactor Trips Block) interlock.

(n) The Trip Setpoints may be set more conservative than the Nominal value as necessary in response to plant conditions.

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	NOMINAL TRIP SETPOINT(n)
14. Turbine Trip						
a. Low Fluid Oil Pressure	$1^{(j)}$	3	O	SR 3.3.1.10 SR 3.3.1.16	≥ 500 psig	≥ 580 psig
b. Turbine Stop Valve Closure	$1^{(j)}$	4	P	SR 3.3.1.10 SR 3.3.1.14	≥ 90% open	≥ 96.7% open
15. Safety Injection (SI) Input from Engineered Safety Feature Actuation System (ESFAS)	1,2	2 trains	Q	SR 3.3.1.13	NA	NA
16. Reactor Trip System Interlocks						
a. Intermediate Range Neutron Flux, P-6	$2^{(d)}$	2	R	SR 3.3.1.11 SR 3.3.1.12	≥ 6E-11 amp	≥ 1E-10 amp
b. Low Power Reactor Trips Block, P-7	1	1 per train	S	SR 3.3.1.5	NA	NA
c. Power Range Neutron Flux, P-8	1	4	S	SR 3.3.1.11 SR 3.3.1.12	≤ 50.3% RTP	≤ 48% RTP
d. Power Range Neutron Flux, P-9	1	4	S	SR 3.3.1.11 SR 3.3.1.12	≤ 52.3% RTP	≤ 50% RTP
e. Power Range Neutron Flux, P-10 and input to P-7	1,2	4	R	SR 3.3.1.11 SR 3.3.1.12	(l,m)	(l,m)
f. Turbine Impulse Pressure, P-13	1	2	S	SR 3.3.1.10 SR 3.3.1.12	≤ 12.3% Impulse Pressure Equivalent turbine	≤ 10% Impulse Pressure Equivalent turbine

(continued)

(d) Below the P-6 (Intermediate Range Neutron Flux) interlocks.

(j) Above the P-9 (Power Range Neutron Flux) interlock.

(l) For the P-10 input to P-7, the Allowable Value is ≤ 12.3% RTP and the Nominal Trip Setpoint is ≤ 10% RTP.

(m) For the Power Range Neutron Flux, P-10, the Allowable Value is ≥ 7.7% RTP and the Nominal Trip Setpoint is ≥ 10% RTP.

(n) The Trip Setpoints may be set more conservative than the Nominal value as necessary in response to plant conditions.

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	NOMINAL TRIP SETPOINT[(a)] (n)
17. Reactor Trip Breakers[(k)]	1,2	2 trains	T,V	SR 3.3.1.4	NA	NA
	$3^{(a)}$, $4^{(a)}$, $5^{(a)}$	2 trains	C	SR 3.3.1.4	NA	NA
18. Reactor Trip Breaker Undervoltage and Shunt Trip Mechanisms	1,2	1 each per RTB	U,V	SR 3.3.1.4	NA	NA
	$3^{(a)}$, $4^{(a)}$, $5^{(a)}$	1 each per RTB	C	SR 3.3.1.4	NA	NA
19. Automatic Trip Logic	1,2	2 trains	Q,V	SR 3.3.1.5	NA	NA
	$3^{(a)}$, $4^{(a)}$, $5^{(a)}$	2 trains	C	SR 3.3.1.5	NA	NA

(a) With RTBs closed and Rod Control System capable of rod withdrawal.

(k) Including any reactor trip bypass breakers that are racked in and closed for bypassing an RTB.

(n) The Trip Setpoints may be set more conservative than the Nominal value as necessary in response to plant conditions.

Table 3.3.1-1 (page 7 of 8)
Reactor Trip System Instrumentation

Note 1: Overtemperature Delta-T

The Overtemperature Delta-T Function Allowable Value shall not exceed the Trip Setpoint defined by the following equation by more than 2.25% of RTP.

$$\left[100\ \frac{\Delta T}{\Delta T_0}\frac{(1+\tau_1 s)}{(1+\tau_2 s)}\frac{1}{(1+\tau_3 s)}\right] \le \left[K_1 - K_2\frac{(1+\tau_4 s)}{(1+\tau_5 s)}\left[T\frac{1}{(1+\tau_6 s)} - T'\right] - K_3(P'-P) - f_1(AFD)\right]$$

Where:	ΔT	measured loop specific RCS differential temperature, degrees F
	ΔT_0	indicated loop specific RCS differential at RTP, degrees F
	$\frac{1+\tau_1 s}{1+\tau_2 s}$	lead-lag compensator on measured differential temperature
	τ_1, τ_2	time constants utilized in lead-lag compensator for differential temperature: $\tau_1 \ge 8$ seconds, $\tau_2 \le 3$ seconds
	$\frac{1}{1+\tau_3 s}$	lag compensator on measured differential temperature
	τ_3	time constant utilized in lag compensator for differential temperature, ≤ 2 seconds
	K_1	fundamental setpoint, ≤ 112% RTP
	K_2	modifier for temperature, ≥ 2.24% RTP per degree F
	$\frac{1+\tau_4 s}{1+\tau_5 s}$	lead-lag compensator on dynamic temperature compensation
	τ_4, τ_5	time constants utilized in lead-lag compensator for temperature compensation: $\tau_4 \ge 28$ seconds, $\tau_5 \le 4$ seconds
	T	measured loop specific RCS average temperature, degrees F
	$\frac{1}{1+\tau_6 s}$	lag compensator on measured average temperature
	τ_6	time constant utilized in lag compensator for average temperature, = 0 seconds
	T'	indicated loop specific RCS average temperature at RTP, ≤ 588.4 degrees F
	K_3	modifier for pressure, ≥ 0.115% RTP per psig
	P	measured RCS pressurizer pressure, psig
	P'	reference pressure, ≥ 2235 psig
	s	Laplace transform variable, inverse seconds
	$f_1(AFD)$	modifier for Axial Flux Difference (AFD):

1. for AFD between -32% and +10%, = 0% RTP
2. for each % AFD is below -32%, the trip setpoint shall be reduced by 3.25% RTP
3. for each % AFD is above +10%, the trip setpoint shall be reduced by 2.7% RTP

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

Note 2: Overpower Delta-T

The Overpower Delta-T Function ALLOWABLE VALUE shall not exceed the Nominal Trip Setpoint defined by the following equation by more than 2.85% of RTP.

$$\left[100\ \frac{\Delta T}{\Delta T_0}\ \frac{(1+\tau_1 s)}{(1+\tau_2 s)}\ \frac{1}{(1+\tau_3 s)}\right] \le \left[K_4 - \left[K_5\ \frac{(\tau_7 s)}{(1+\tau_7 s)}\ \frac{1}{(1+\tau_6 s)}\ T\right] - K_6\left[T\ \frac{1}{(1+\tau_6)} - T''\right] - f_2(AFD)\right]$$

Where:	ΔT	measured loop specific RCS differential temperature, degrees F
	ΔT_0	indicated loop specific RCS differential at RTP, degrees F
	$\frac{1+\tau_1 s}{1+\tau_2 s}$	lead-lag compensator on measured differential temperature
	τ_1, τ_2	time constants utilized in lead-lag compensator for differential temperature: $\tau_1 \ge 8$ seconds, $\tau \le 3$ seconds
	$\frac{1}{1+\tau_3 s}$	lag compensator on measured differential temperature
	τ_3	time constant utilized in lag compensator for differential temperature, ≤ 2 seconds
	K_4	fundamental setpoint, ≤ 109.5% RTP
	K_5	modifier for temperature change: ≥ 2% RTP per degree F for increasing temperature, ≥ 0% RTP per degree F for decreasing temperature
	$\frac{\tau_7 s}{1+\tau_7 s}$	rate-lag compensator on dynamic temperature compensation
	τ_7	time constant utilized in rate-lag compensator for temperature compensation, ≥ 10 seconds
	T	measured loop specific RCS average temperature, degrees F
	$\frac{1}{1+\tau_6 s}$	lag compensator on measured average temperature
	τ_6	time constant utilized in lag compensator for average temperature, = 0 seconds
	K_6	modifier for temperature: ≥ 0.20% RTP per degree F for T > T", = 0% RTP for T ≤ T"
	T"	indicated loop specific RCS average temperature at RTP, ≤ 588.4 degrees F
	s	Laplace transform variable, inverse seconds
	$f_2(AFD)$	modifier for Axial Flux Difference (AFD), = 0% RTP for all AFD

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

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	CONDITIONS	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE	NOMINAL TRIP SETPOINT (i)
1. Safety Injection						
a. Manual Initiation	1,2,3,4	2	B	SR 3.3.2.6	NA	NA
b. Automatic Actuation Logic and Actuation Relays	1,2,3,4	2	C	SR 3.3.2.2 SR 3.3.2.3 SR 3.3.2.5	NA	NA
c. Containment Pressure — High 1	1,2,3	3	D	SR 3.3.2.1 SR 3.3.2.4 SR 3.3.2.7 SR 3.3.2.8	≤ 4.4 psig	≤ 3.8 psig
d. Pressurizer Pressure — Low	1,2,3(a)	4	D	SR 3.3.2.1 SR 3.3.2.4 SR 3.3.2.7 SR 3.3.2.8	≥ 1856 psig	≥ 1870 psig
e. Steam Line Pressure - Low	1,2,3(a)	3 per steam line	D	SR 3.3.2.1 SR 3.3.2.4 SR 3.3.2.7 SR 3.3.2.8	≤ ≥ 570(b) psig	≥ 585(b) psig

(continued)

(a) Above the P-11 (Pressurizer Pressure) interlock.

(b) Time constants used in the lead/lag controller are $t_1 \geq 50$ seconds and $t_2 \leq 5$ seconds.

(i) The Trip Setpoints may be set more conservative than the Nominal value as necessary in response to plant conditions.

Table 3.3.2-1 (page 2 of 7)
Engineered Safety Feature Actuation System Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	CONDITIONS	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE	NOMINAL TRIP SETPOINT(i)
2. Containment Spray						
a. Manual Initiation	1,2,3,4	2	B	SR 3.3.2.6	NA	NA
b. Automatic Actuation Logic and Actuation Relays	1,2,3,4	2	C	SR 3.3.2.2 SR 3.3.2.3 SR 3.3.2.5	NA	NA
c. Containment Pressure						
High - 3	1,2,3	4	E	SR 3.3.2.1 SR 3.3.2.4 SR 3.3.2.7 SR 3.3.2.8	≤ 22.4 psig	≤ 21.5 psig

(continued)

(i) The Trip Setpoints may be set more conservative than the Nominal value as necessary in response to plant conditions.

Table 3.3.2-1 (page 3 of 7)
Engineered Safety Feature Actuation System Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	CONDITIONS	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE	NOMINAL TRIP SETPOINT(i)
3. Phase A Containment Isolation						
(a) Manual Initiation	1,2,3,4	2	B	SR 3.3.2.6	NA	NA
(b) Automatic Actuation Logic and Actuation Relays	1,2,3,4	2 trains	C	SR 3.3.2.2 SR 3.3.2.3 SR 3.3.2.5	NA	NA
(c) Safety Injection	Refer to Function 1 (Safety Injection) for all initiation functions and requirements.					
4. Steam Line Isolation						
a. Manual Initiation	1,2(c),3(c)	2	F	SR 3.3.2.6	NA	NA
b. Automatic Actuation Logic and Actuation Relays	1,2(c),3(c)	2	G	SR 3.3.2.2 SR 3.3.2.3 SR 3.3.2.5	NA	NA

(continued)

(c) Except when one main steam isolation valve and associated bypass isolation valve per steam line is closed.

(i) The Trip Setpoints may be set more conservative than the Nominal value as necessary in response to plant conditions.

Table 3.3.2-1 (page 4 of 7)
Engineered Safety Feature Actuation System Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	CONDITIONS	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE	NOMINAL TRIP SETPOINT (i)
4. Steam Line Isolation (continued)						
c. Containment Pressure – High 2	1, 2(c), 3(c)	3	D	SR 3.3.2.1 SR 3.3.2.4 SR 3.3.2.7 SR 3.3.2.8	≤ 15.4 psig	~~≤~~ 14.5 psig
d. Steam Line Pressure						
(1) Low	1, 2(c), 3(a)(c)	3 per steam line	D	SR 3.3.2.1 SR 3.3.2.4 SR 3.3.2.7 SR 3.3.2.8	≥ 570 (b) psig	~~≥~~ 585 (b) psig
(2) Negative Rate – High	3(d)(c)	3 per steam line	D	SR 3.3.2.1 SR 3.3.2.4 SR 3.3.2.7 SR 3.3.2.8	≤ 125 (e) psi/sec	~~≤~~ 100 (e) psi/sec

(continued)

(a) Above the P-11 (Pressurizer Pressure) interlock.
(b) Time constants used in the lead/lag controller are $t_1 \geq 50$ seconds and $t_2 \leq 5$ seconds.
(c) Except when one main steam isolation valve and associated bypass isolation valve per steam line is closed.
(d) Below the P-11 (Pressurizer Pressure) interlock.
(e) Time constant utilized in the rate/lag controller is ≥ 50 seconds.

(i) The Trip Setpoints may be set more conservative than the Nominal value as necessary in response to plant conditions.

Table 3.3.2-1 (page 5 of 7)
Engineered Safety Feature Actuation System Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	CONDITIONS	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE	NOMINAL TRIP SETPOINT (i)
5. Turbine Trip and Feedwater Isolation						
a. Automatic Actuation Logic and Actuation Relays	1,2$^{(f)}$	2 trains	H	SR 3.3.2.2 SR 3.3.2.3 SR 3.3.2.5	NA	NA
b. Low RCS Tavg	1,2$^{(f)}$	4	I	SR 3.3.2.1 SR 3.3.2.4 SR 3.3.2.7	≥ 561.5 °F	≥ 564 °F
Coincident with Reactor Trip, P-4	Refer to Function 8a for all P-4 requirements.					
c. SG Water Level – High High (P-14)	1,2$^{(f)}$	4 per SG	I	SR 3.3.2.1 SR 3.3.2.4 SR 3.3.2.7 SR 3.3.2.8	≤ 87.9%	≤ 86.0%
d. Safety Injection	Refer to Function 1 (Safety Injection) for all initiation functions and requirements.					
6. Auxiliary Feedwater						
a. Automatic Actuation Logic and Actuation Relays	1,2,3	2 trains	G	SR 3.3.2.2 SR 3.3.2.3 SR 3.3.2.5	NA	NA
b. SG Water Level – Low Low	1,2,3	4 per SG	D	SR 3.3.2.1 SR 3.3.2.4 SR 3.3.2.7 SR 3.3.2.8	≥ 35.9%	≥ 37.8%

(continued)

(f) Except when one MFIV or MFRV, and its associated bypass valve per feedwater line is closed and deactivated or isolated by a closed manual valve.

(i) The Trip Setpoints may be set more conservative than the Nominal value as necessary in response to plant conditions.

Table 3.3.2-1 (page 6 of 7)
Engineered Safety Feature Actuation System Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	CONDITIONS	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE	NOMINAL TRIP SETPOINT(i)
6. Auxiliary Feedwater (continued)						
c. Safety Injection	Refer to Function 1 (Safety Injection) for all initiation functions and requirements.					
d. Trip of all Main Feedwater Pumps	1,2(g)	1 per pump	J	SR 3.3.2.6	NA	NA
7. Semi-automatic Switchover to Containment Sump						
a. Automatic Actuation Logic and Actuation Relays	1,2,3,4(h)	2	C	SR 3.3.2.2 SR 3.3.2.3 SR 3.3.2.5	NA	NA
b. Refueling Water Storage Tank (RWST) Level – Low Low	1,2,3,4	4	K	SR 3.3.2.1 SR 3.3.2.4 SR 3.3.2.7 SR 3.3.2.8	≥ 264.9 in.	275.3 in.
Coincident with Safety Injection	Refer to Function 1 (Safety Injection) for all initiation functions and requirements.					

(continued)

(g) When the Main Feedwater System is operating to supply the SGs.

(h) In MODE 4, only 1 train is required to be OPERABLE to support semi-automatic switchover for the RHR pump that is required to be OPERABLE in accordance with Specification 3.5.3, ECCS-shutdown.

(i) The Trip Setpoints may be set more conservative than the Nominal value as necessary in response to plant conditions.

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

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	CONDITIONS	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE	NOMINAL TRIP SETPOINT (i)
8. ESFAS Interlocks						
a. Reactor Trip, P-4	1,2,3	1 per train, 2 trains	F	SR 3.3.2.9	NA	NA
b. Pressurizer Pressure, P-11	1,2,3	3	L	SR 3.3.2.4 SR 3.3.2.7	≤ 2010 psig	≤ 2000 psig

(i) The Trip Setpoints may be set more conservative than the Nominal value as necessary in response to plant conditions.

BASES

BACKGROUND

Reactor Trip Switchgear (continued)

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 automatically 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 SLs during all AOOs and mitigates the consequences of DBAs in all MODES in LCO, and which the RTBs are closed.

Each of the analyzed accidents and transients can be detected by one or more RTS Functions. The accident analysis described in Reference 3 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

The LCO generally requires OPERABILITY of four or three channels in each instrumentation Function, two channels of Manual Reactor Trip in each logic Function, and two trains in each Automatic Trip Logic Function. Four OPERABLE

(continued)

INSERT FOR BASES PAGE B 3.3-7

The Nominal Trip Setpoint column is modified by a Note that allows the Trip Setpoint to be set more conservatively than the nominal value. The conservative direction is established by the direction of the inequality applied to the Allowable Value. For example, the Power Range Neutron Flux High trip setpoint may be set to a value less than 109 % during initial startup following a refueling outage until a sufficiently high reactor power is achieved so that the power range channels may be calibrated. In addition, certain Required Actions may require that the Power Range Neutron Flux High trip setpoints be reduced based on plant conditions.

BASES

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY

6. Overtemperature ΔT (continued)

This results in a two-out-of-four trip logic. Section 7.2.2.3 of Reference 1 discusses control and protection system interactions for this function. Note that this Function also provides a signal to generate a turbine runback prior to reaching the Trip Setpoint. A turbine runback will reduce turbine power and reactor power. A reduction in power will normally alleviate the Overtemperature ΔT condition and may prevent a reactor trip.

Delta-T_0, as used in the overtemperature and overpower ΔT trips, represents the 100% RTP value as measured for each loop. This normalizes each loop's ΔT trips to the actual operating conditions existing at the time of measurement, thus forcing the trip to reflect the equivalent full power conditions as assumed in the accident analyses. These differences in RCS loop ΔT can be due to several factors, e.g., differences in RCS loop flows and slightly asymmetric power distributions between quadrants. While RCS loop flows are not expected to change with cycle life, radial power redistribution between quadrants may occur, resulting in small changes in loop specific ΔT values. Therefore, loop specific ΔT_0 values are measured as needed to ensure they represent actual core conditions.

INSERT New ¶

The LCO requires all four channels of the Overtemperature ΔT trip Function to be OPERABLE. Note that the Overtemperature ΔT Function receives input from channels shared with other RTS Functions. Failures that affect multiple Functions require entry into the Conditions applicable to all affected Functions.

In MODE 1 or 2, the Overtemperature ΔT trip must be OPERABLE to prevent DNB. In MODE 3, 4, 5, or 6, this trip Function does not have to be OPERABLE because the reactor is not operating and there is insufficient heat production to be concerned about DNB.

(continued)

INSERT FOR BASES PAGE B 3.3-16

The values for K_1, K_2, K_3, T', and P' may be treated as nominal values for the purpose of performing a CHANNEL CALIBRATION. The direction of conservatism for these values is as follows:

$K_1 \leq$ Identified Value	$K_2 \geq$ Identified Value	$K_3 \geq$ Identified Value
$T' \leq$ Identified Value	$P' \geq$ Identified Value	

Note that K_1 is the principle setpoint gain, since it defines the function offset. K_2 and K_3 define the temperature gain and pressure gain respectively. The values for T' and P' are key reference parameters corresponding directly to plant safety analyses initial conditions assumptions for the Overtemperature ΔT Function. The as left settings for these parameters should be as close as possible or conservative with respect to the identified values. In order to ensure that the Overtemperature ΔT setpoint is consistent with the assumptions of the safety analyses, it is necessary to verify during the CHANNEL OPERATIONAL TEST, that the Overtemperature ΔT setpoint is within the appropriate calibration tolerances for conditions where the temperature input is equal to T' and the pressure input is equal to P', and that appropriate penalties are generated to reduce the setpoint for a temperature input greater than T', and again for a pressure input less than P' (Ref. 9).

BASES

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY

7. Overpower ΔT (continued)

Delta-T_0, as used in the overtemperature and overpower ΔT trips, represents the 100% RTP value as measured for each loop. This normalizes each loop's ΔT trips to the actual operating conditions existing at the time of measurement, thus forcing the trip to reflect the equivalent full power conditions as assumed in the accident analyses. These differences in RCS loop ΔT can be due to several factors, e.g., difference in RCS loop flows and slightly asymmetric power distributions between quadrants. While RCS loop flows are not expected to change with cycle life, radial power redistribution between quadrants may occur, resulting in small changes in loop specific ΔT values. Therefore, loop specific ΔT_0 values are measured as needed to ensure they represent actual core conditions.

INSERT New P

The LCO requires four channels of the Overpower ΔT trip Function to be OPERABLE. Note that the Overpower ΔT trip Function receives input from channels shared with other RTS Functions. Failures that affect multiple Functions require entry into the Conditions applicable to all affected Functions.

In MODE 1 or 2, the Overpower ΔT trip Function must be OPERABLE. These are the only times that enough heat is generated in the fuel to be concerned about the heat generation rates and overheating of the fuel. In MODE 3, 4, 5, or 6, this trip Function does not have to be OPERABLE because the reactor is not operating and there is insufficient heat production to be concerned about fuel overheating and fuel damage.

8. Pressurizer Pressure

The same sensors (PI-0455A, B, & C, PI-0456, PI-0456A, PI-0457, PI-0457A, PI-0458, PI-0458A) provide input to the Pressurizer Pressure — High and — Low trips and the Overtemperature ΔT trip. Since the Pressurizer Pressure channels are also used to provide input to the Pressurizer Pressure Control System, the actuation logic must be able to withstand an input failure to

(continued)

INSERT FOR BASES PAGE B 3.3-18

The values for K_4, K_5, K_6, and T″ may be treated as nominal values for the purpose of performing a CHANNEL CALIBRATION. The direction of conservatism for these values is as follows:

K_4 ≤ Identified Value	K_5 ≥ Identified Value	K_6 ≥ Identified Value
T″ ≤ Identified Value		

Note that for K_5 in the case of decreasing temperature, the gain setting must be ≥ 0 to prevent generating setpoint margin on decreasing temperature rates. Similarly, the setting for K_6 is required to be equal to 0 for conditions where T ≤ T″. The value for T″ is a key reference parameter corresponding directly to plant safety analyses initial conditions assumptions for the Overpower ΔT Function. The as left settings for these parameters should be as close as possible or conservative with respect to the identified values. In order to ensure that the Overpower ΔT setpoint is consistent with the assumptions of the safety analyses, it is necessary to verify during the CHANNEL OPERATIONAL TEST, that the Overpower ΔT setpoint is within the appropriate calibration tolerances for conditions where the temperature input is equal to T″, and that the appropriate penalties are generated to reduce the setpoint for a temperature input greater than T″ (Ref. 9).

BASES

BACKGROUND

Sequencer Output Relays (continued)

sequencer and are part of the control circuitry of these ESF loads. There are two independent trains of sequencers and each is powered by the respective train of 120-Vac ESF electrical power supply. The power supply for the output relays is the sequencer power supply. The applicable output relays are tested in the slave relay testing procedures, and in particular, in conjunction with the specific slave relay also required to actuate to energize the applicable ESF load.

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 in the safety analysis and the NRC staff approved licensing basis for the unit. 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).

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.

The Nominal Trip Setpoint column of Table 3.3.2-1 is modified by a Note that allows the Trip Setpoints to be set more conservatively than the nominal value. The conservative direction is established by the direction of the inequality applied to the Allowable Value.

The LCO generally requires OPERABILITY of four or three 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 configurations allow one channel to be tripped during maintenance or testing without causing an ESFAS initiation. If an instrument channel is equipped with installed bypass capability, such that no jumpers or lifted leads are

(continued)

BASES

REFERENCES (continued)

2. FSAR, Chapter 6.

3. FSAR, Chapter 15.

4. IEEE-279-1971.

5. 10 CFR 50.49.

6. WCAP-11269, Westinghouse Setpoint Methodology for Protection Systems.

7. WCAP-10271-P-A, Supplement 2, Rev. 1, June 1990.

8. FSAR, Chapter 16.

9. Westinghouse Letter GP-16696, November 5, 1997.

BASES

SURVEILLANCE REQUIREMENTS

SR 3.3.2.8 (continued)

verification of these devices every 18 months. The 18 month Frequency is consistent with the typical refueling cycle and is based on unit operating experience, which shows that random failures of instrumentation components causing serious response time degradation, but not channel failure, are infrequent occurrences.

This SR is modified by a Note that clarifies that the turbine driven AFW pump is tested within 24 hours after reaching 900 psig in the SGs.

SR 3.3.2.9

SR 3.3.2.9 is the performance of a TADOT as described in SR 3.3.2.6 for the P-4 Reactor Trip Interlock, and the Frequency is once per 18 months. This Frequency is based on operating experience. The SR is modified by a note that excludes verification of setpoints during the TADOT. The function tested has no associated setpoint.

REFERENCES

1. FSAR, Chapter 6.
2. FSAR, Chapter 7.
3. FSAR, Chapter 15.
4. IEEE-279-1971.
5. 10 CFR 50.49.
6. WCAP-11269, Westinghouse Setpoint Methodology for Protection Systems.
7. WCAP-10271-P-A, Supplement 2, Rev. 1, June 1990.
8. FSAR, Chapter 16.
9. Westinghouse Letter GP-16696, November 5, 1997.

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	NOMINAL TRIP SETPOINT[n]
1. Manual Reactor Trip	1,2	2	B	SR 3.3.1.13	NA	NA
	3[a], 4[a], 5[a]	2	C	SR 3.3.1.13	NA	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 3.3.1.15	≤ 111.3% RTP	109% RTP
b. Low	1[b],2	4	E	SR 3.3.1.1 SR 3.3.1.8 SR 3.3.1.11 SR 3.3.1.15	≤ 27.3% RTP	25% RTP
3. Power Range Neutron Flux High Positive Rate	1,2	4	E	SR 3.3.1.7 SR 3.3.1.11	≤ 6.3% RTP with time constant ≥ 2 sec	5% RTP with time constant ≥ 2 sec
4. Intermediate Range Neutron Flux	1[b], 2[c]	2	F,G	SR 3.3.1.1 SR 3.3.1.8 SR 3.3.1.11	≤ 31.1% RTP	25% RTP
	2[d]	2	H	SR 3.3.1.1 SR 3.3.1.8 SR 3.3.1.11	≤ 31.1% RTP	25% RTP

(continued)

(a) With Reactor Trip Breakers (RTBs) closed and Rod Control System capable of rod withdrawal.

(b) Below the P-10 (Power Range Neutron Flux) interlocks.

(c) Above the P-6 (Intermediate Range Neutron Flux) interlocks.

(d) Below the P-6 (Intermediate Range Neutron Flux) interlocks.

(n) The Trip Setpoints may be set more conservative than the nominal value as necessary in response to plant conditions.

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	NOMINAL TRIP SETPOINT[n]
5. Source Range Neutron Flux	2[d]	2	I,J	SR 3.3.1.1 SR 3.3.1.8 SR 3.3.1.11 SR 3.3.1.15	≤ 1.4 E5 cps	1.0 E5 cps
	3[a], 4[a], 5[a]	2	J,K	SR 3.3.1.1 SR 3.3.1.7 SR 3.3.1.11 SR 3.3.1.15	≤ 1.4 E5 cps	1.0 E5 cps
	3[e], 4[e], 5[e]	1	L	SR 3.3.1.1 SR 3.3.1.11	NA	NA
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 3.3.1.15	Refer to Note 1 (Page 3.3-20)	Refer to Note 1 (Page 3.3-20)
7. Overpower ΔT	1,2	4	E	SR 3.3.1.1 SR 3.3.1.7 SR 3.3.1.10 SR 3.3.1.15	Refer to Note 2 (Page 3.3-21)	Refer to Note 2 (Page 3.3-21)

(continued)

(a) With RTBs closed and Rod Control System capable of rod withdrawal.

(d) Below the P-6 (Intermediate Range Neutron Flux) interlocks.

(e) With the RTBs open. In this condition, source range Function does not provide reactor trip but does provide input to the High Flux at Shutdown Alarm System (LCO 3.3.8) and indication.

(n) The Trip Setpoints may be set more conservative than the nominal value as necessary in response to plant conditions.

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	NOMINAL TRIP SETPOINT[n]
8. Pressurizer Pressure						
a. Low	1[(f)]	4	M	SR 3.3.1.1 SR 3.3.1.7 SR 3.3.1.10 SR 3.3.1.15	≥ 1950 psig	1960[(g)] psig
b. High	1,2	4	E	SR 3.3.1.1 SR 3.3.1.7 SR 3.3.1.10 SR 3.3.1.15	≤ 2395 psig	2385 psig
9. Pressurizer Water Level – High	1[(f)]	3	M	SR 3.3.1.1 SR 3.3.1.7 SR 3.3.1.10	≤ 93.9%	92%
10. Reactor Coolant Flow – Low						
a. Single Loop	1[(h)]	3 per loop	N	SR 3.3.1.1 SR 3.3.1.7 SR 3.3.1.10 SR 3.3.1.15	≥ 89.4%	90%
b. Two Loops	1[(i)]	3 per loop	M	SR 3.3.1.1 SR 3.3.1.7 SR 3.3.1.10 SR 3.3.1.15	≥ 89.4%	90%

(continued)

(f) Above the P-7 (Low Power Reactor Trips Block) interlock.

(g) Time constants utilized in the lead-lag controller for Pressurizer Pressure-Low are [illegible] onds for lead and 1 second for lag.

(h) Above the P-8 (Power Range Neutron Flux) interlock.

(i) Above the P-7 (Low Power Reactor Trips Block) interlock and below the P-8 (Power Range Neutron Flux) interlock.

(n) The Trip Setpoints may be set more conservative than the nominal value as necessary in response to plant conditions.

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	NOMINAL TRIP SETPOINT(n)
11.	Undervoltage RCPs	1(f)	2 per bus	M	SR 3.3.1.9 SR 3.3.1.10 SR 3.3.1.15	≥ 9481 V	9600 V
12.	Underfrequency RCPs	1(f)	2 per bus	M	SR 3.3.1.9 SR 3.3.1.10 SR 3.3.1.15	≥ 57.1 Hz	57.3 Hz
13.	Steam Generator (SG) Water Level — Low Low	1,2	4 per SG	E	SR 3.3.1.1 SR 3.3.1.7 SR 3.3.1.10 SR 3.3.1.15	≥ 35.9%	37.8%

(continued)

(f) Above the P-7 (Low Power Reactor Trips Block) interlock.

(n) The Trip Setpoints may be set more conservative than the nominal value as necessary in response to plant conditions.

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	NOMINAL TRIP SETPOINT[n]
14. Turbine Trip						
a. Low Fluid Oil Pressure	1[j]	3	O	SR 3.3.1.10 SR 3.3.1.16	≥ 500 psig	580 psig
b. Turbine Stop Valve Closure	1[j]	4	P	SR 3.3.1.10 SR 3.3.1.14	≥ 90% open	96.7% open
15. Safety Injection (SI) Input from Engineered Safety Feature Actuation System (ESFAS)	1,2	2 trains	Q	SR 3.3.1.13	NA	NA
16. Reactor Trip System Interlocks						
a. Intermediate Range Neutron Flux, P-6	2[d]	2	R	SR 3.3.1.11 SR 3.3.1.12	≥ 6E-11 amp	1E-10 amp
b. Low Power Reactor Trips Block, P-7	1	1 per train	S	SR 3.3.1.5	NA	NA
c. Power Range Neutron Flux, P-8	1	4	S	SR 3.3.1.11 SR 3.3.1.12	≤ 50.3% RTP	48% RTP
d. Power Range Neutron Flux, P-9	1	4	S	SR 3.3.1.11 SR 3.3.1.12	≤ 52.3% RTP	50% RTP
e. Power Range Neutron Flux, P-10 and input to P-7	1,2	4	R	SR 3.3.1.11 SR 3.3.1.12	(l,m)	(l,m)
f. Turbine Impulse Pressure, P-13	1	2	S	SR 3.3.1.10 SR 3.3.1.12	≤ 12.3% Impulse Pressure Equivalent turbine	10% Impulse Pressure Equivalent turbine

(continued)

(d) Below the P-6 (Intermediate Range Neutron Flux) interlocks.

(j) Above the P-9 (Power Range Neutron Flux) interlock.

(l) For the P-10 input to P-7, the Allowable Value is ≤ 12.3% RTP and the Nominal Trip Setpoint is 10% RTP.

(m) For the Power Range Neutron Flux, P-10, the Allowable Value is ≥ 7.7% RTP and the Nominal Trip Setpoint is 10% RTP.

(n) The Trip Setpoints may be set more conservative than the nominal value as necessary in response to plant conditions.

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	NOMINAL TRIP SETPOINT(n)
17. Reactor Trip Breakers(k)	1,2	2 trains	T,V	SR 3.3.1.4	NA	NA
	3(a), 4(a), 5(a)	2 trains	C	SR 3.3.1.4	NA	NA
18. Reactor Trip Breaker Undervoltage and Shunt Trip Mechanisms	1,2	1 each per RTB	U,V	SR 3.3.1.4	NA	NA
	3(a), 4(a), 5(a)	1 each per RTB	C	SR 3.3.1.4	NA	NA
19. Automatic Trip Logic	1,2	2 trains	Q,V	SR 3.3.1.5	NA	NA
	3(a), 4(a), 5(a)	2 trains	C	SR 3.3.1.5	NA	NA

(a) With RTBs closed and Rod Control System capable of rod withdrawal.

(k) Including any reactor trip bypass breakers that are racked in and closed for bypassing an RTB.

(n) The Trip Setpoints may be set more conservative than the nominal value as necessary in response to plant conditions.

Table 3.3.1-1 (page 7 of 8)
Reactor Trip System Instrumentation

Note 1: Overtemperature Delta-T

The Overtemperature Delta-T Function Allowable Value shall not exceed the Nominal Trip Setpoint defined by the following equation by more than 2.25% of RTP.

$$\left[100\ \frac{\Delta T}{\Delta T_0}\frac{(1+\tau_1 s)}{(1+\tau_2 s)}\frac{1}{(1+\tau_3 s)}\right] \le \left[K_1 - K_2\frac{(1+\tau_4 s)}{(1+\tau_5 s)}\left[T\frac{1}{(1+\tau_6 s)} - T'\right] - K_3(P'-P) - f_1(AFD)\right]$$

Where:

ΔT	measured loop specific RCS differential temperature, degrees F
ΔT_0	indicated loop specific RCS differential at RTP, degrees F
$\frac{1+\tau_1 s}{1+\tau_2 s}$	lead-lag compensator on measured differential temperature
τ_1, τ_2	time constants utilized in lead-lag compensator for differential temperature: $\tau_1 \ge 8$ seconds, $\tau_2 \le 3$ seconds
$\frac{1}{1+\tau_3 s}$	lag compensator on measured differential temperature
τ_3	time constant utilized in lag compensator for differential temperature, ≤ 2 seconds
K_1	fundamental setpoint, 112% RTP
K_2	modifier for temperature, 2.24% RTP per degree F
$\frac{1+\tau_4 s}{1+\tau_5 s}$	lead-lag compensator on dynamic temperature compensation
τ_4, τ_5	time constants utilized in lead-lag compensator for temperature compensation: $\tau_4 \ge 28$ seconds, $\tau_5 \le 4$ seconds
T	measured loop specific RCS average temperature, degrees F
$\frac{1}{1+\tau_6 s}$	lag compensator on measured average temperature
τ_6	time constant utilized in lag compensator for average temperature, = 0 seconds
T'	indicated loop specific RCS average temperature at RTP, 588.4 degrees F
K_3	modifier for pressure, 0.115% RTP per psig
P	measured RCS pressurizer pressure, psig
P'	reference pressure, 2235 psig
s	Laplace transform variable, inverse seconds
f_1(AFD)	modifier for Axial Flux Difference (AFD):

1. for AFD between -32% and +10%, = 0% RTP
2. for each % AFD is below -32%, the trip setpoint shall be reduced by 3.25% RTP
3. for each % AFD is above +10%, the trip setpoint shall be reduced by 2.7% RTP

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

<u>Note 2: Overpower Delta-T</u>

The Overpower Delta-T Function ALLOWABLE VALUE shall not exceed the Nominal Trip Setpoint defined by the following equation by more than 2.85% of RTP.

$$\left[100\ \frac{\Delta T}{\Delta T_0}\frac{(1+\tau_1 s)}{(1+\tau_2 s)}\frac{1}{(1+\tau_3 s)}\right] \le \left[K_4 - \left[K_5\frac{(\tau_7 s)}{(1+\tau_7 s)}\ \frac{1}{(1+\tau_6 s)}T\right] - K_6\left[T\frac{1}{(1+\tau_6)} - T''\right] - f_2(AFD)\right]$$

Where:	ΔT	measured loop specific RCS differential temperature, degrees F
	ΔT_0	indicated loop specific RCS differential at RTP, degrees F
	$\frac{1+\tau_1 s}{1+\tau_2 s}$	lead-lag compensator on measured differential temperature
	τ_1, τ_2	time constants utilized in lead-lag compensator for differential temperature: $\tau_1 \ge 8$ seconds, $\tau \le 3$ seconds
	$\frac{1}{1+\tau_3 s}$	lag compensator on measured differential temperature
	τ_3	time constant utilized in lag compensator for differential temperature, ≤ 2 seconds
	K_4	fundamental setpoint, 109.5% RTP
	K_5	modifier for temperature change: 2% RTP per degree F for increasing temperature, ≥ 0% RTP per degree F for decreasing temperature
	$\frac{\tau_7 s}{1+\tau_7 s}$	rate-lag compensator on dynamic temperature compensation
	τ_7	time constant utilized in rate-lag compensator for temperature compensation, ≥ 10 seconds
	T	measured loop specific RCS average temperature, degrees F
	$\frac{1}{1+\tau_6 s}$	lag compensator on measured average temperature
	τ_6	time constant utilized in lag compensator for average temperature, = 0 seconds
	K_6	modifier for temperature: 0.20% RTP per degree F for $T > T''$, = 0% RTP for $T \le T''$
	T''	indicated loop specific RCS average temperature at RTP, 588.4 degrees F
	s	Laplace transform variable, inverse seconds
	$f_2(AFD)$	modifier for Axial Flux Difference (AFD), = 0% RTP for all AFD

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

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	CONDITIONS	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE	NOMINAL TRIP SETPOINT[i]
1. Safety Injection						
a. Manual Initiation	1,2,3,4	2	B	SR 3.3.2.6	NA	NA
b. Automatic Actuation Logic and Actuation Relays	1,2,3,4	2	C	SR 3.3.2.2 SR 3.3.2.3 SR 3.3.2.5	NA	NA
c. Containment Pressure – High 1	1,2,3	3	D	SR 3.3.2.1 SR 3.3.2.4 SR 3.3.2.7 SR 3.3.2.8	≤ 4.4 psig	3.8 psig
d. Pressurizer Pressure – Low	1,2,3[a]	4	D	SR 3.3.2.1 SR 3.3.2.4 SR 3.3.2.7 SR 3.3.2.8	≥ 1856 psig	1870 psig
e. Steam Line Pressure - Low	1,2,3[a]	3 per steam line	D	SR 3.3.2.1 SR 3.3.2.4 SR 3.3.2.7 SR 3.3.2.8	≥ 570[b] psig	585[b] psig

(continued)

(a) Above the P-11 (Pressurizer Pressure) interlock.
(b) Time constants used in the lead/lag controller are $t_1 \geq 50$ seconds and $t_2 \leq 5$ seconds.
(i) The Trip Setpoints may be set more conservative than the nominal value as necessary in response to plant conditions.

Table 3.3.2-1 (page 2 of 7)
Engineered Safety Feature Actuation System Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	CONDITIONS	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE	NOMINAL TRIP SETPOINT[i]
2. Containment Spray						
a. Manual Initiation	1,2,3,4	2	B	SR 3.3.2.6	NA	NA
b. Automatic Actuation Logic and Actuation Relays	1,2,3,4	2	C	SR 3.3.2.2 SR 3.3.2.3 SR 3.3.2.5	NA	NA
c. Containment Pressure						
High – 3	1,2,3	4	E	SR 3.3.2.1 SR 3.3.2.4 SR 3.3.2.7 SR 3.3.2.8	≤ 22.4 psig	21.5 psig

(continued)

(i) The Trip Setpoints may be set more conservative than the nominal value as necessary in response to plant conditions.

Table 3.3.2-1 (page 3 of 7)
Engineered Safety Feature Actuation System Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	CONDITIONS	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE	NOMINAL TRIP SETPOINT[i]
3. Phase A Containment Isolation						
(a) Manual Initiation	1,2,3,4	2	B	SR 3.3.2.6	NA	NA
(b) Automatic Actuation Logic and Actuation Relays	1,2,3,4	2 trains	C	SR 3.3.2.2 SR 3.3.2.3 SR 3.3.2.5	NA	NA
(c) Safety Injection	Refer to Function 1 (Safety Injection) for all initiation functions and requirements.					
4. Steam Line Isolation						
a. Manual Initiation	1,2[c],3[c]	2	F	SR 3.3.2.6	NA	NA
b. Automatic Actuation Logic and Actuation Relays	1,2[c],3[c]	2	G	SR 3.3.2.2 SR 3.3.2.3 SR 3.3.2.5	NA	NA

(continued)

(c) Except when one main steam isolation valve and associated bypass isolation valve per steam line is closed.
(i) The Trip Setpoints may be set more conservative than the nominal value as necessary in response to plant conditions.

Table 3.3.2-1 (page 4 of 7)
Engineered Safety Feature Actuation System Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	CONDITIONS	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE	NOMINAL TRIP SETPOINT[i]
4. Steam Line Isolation (continued)						
c. Containment Pressure – High 2	$1, 2^{(c)}$, $3^{(c)}$	3	D	SR 3.3.2.1 SR 3.3.2.4 SR 3.3.2.7 SR 3.3.2.8	≤ 15.4 psig	14.5 psig
d. Steam Line Pressure						
(1) Low	$1, 2^{(c)}$, $3^{(a)(c)}$	3 per steam line	D	SR 3.3.2.1 SR 3.3.2.4 SR 3.3.2.7 SR 3.3.2.8	≥ 570 (b) psig	585 (b) psig
(2) Negative Rate – High	$3^{(d)(c)}$	3 per steam line	D	SR 3.3.2.1 SR 3.3.2.4 SR 3.3.2.7 SR 3.3.2.8	≤ 125 (e) psi/sec	100 (e) psi/sec

(continued)

(a) Above the P-11 (Pressurizer Pressure) interlock.
(b) Time constants used in the lead/lag controller are t_1 ≥ 50 seconds and t_2 ≤ 5 seconds.
(c) Except when one main steam isolation valve and associated bypass isolation valve per steam line is closed.
(d) Below the P-11 (Pressurizer Pressure) interlock.
(e) Time constant utilized in the rate/lag controller is ≥ 50 seconds.
(i) The Trip Setpoints may be set more conservative than the nominal value as necessary in response to plant conditions.

Table 3.3.2-1 (page 5 of 7)
Engineered Safety Feature Actuation System Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	CONDITIONS	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE	NOMINAL TRIP SETPOINT(i)
5. Turbine Trip and Feedwater Isolation						
a. Automatic Actuation Logic and Actuation Relays	1,2(f)	2 trains	H	SR 3.3.2.2 SR 3.3.2.3 SR 3.3.2.5	NA	NA
b. Low RCS Tavg	1,2(f)	4	I	SR 3.3.2.1 SR 3.3.2.4 SR 3.3.2.7	≥ 561.5 °F	564 °F
Coincident with Reactor Trip, P-4	Refer to Function 8a for all P-4 requirements.					
c. SG Water Level – High High (P-14)	1,2(f)	4 per SG	I	SR 3.3.2.1 SR 3.3.2.4 SR 3.3.2.7 SR 3.3.2.8	≤ 87.9%	86.0%
d. Safety Injection	Refer to Function 1 (Safety Injection) for all initiation functions and requirements.					
6. Auxiliary Feedwater						
a. Automatic Actuation Logic and Actuation Relays	1,2,3	2 trains	G	SR 3.3.2.2 SR 3.3.2.3 SR 3.3.2.5	NA	NA
b. SG Water Level – Low Low	1,2,3	4 per SG	D	SR 3.3.2.1 SR 3.3.2.4 SR 3.3.2.7 SR 3.3.2.8	≥ 35.9%	37.8%

(continued)

(f) Except when one MFIV or MFRV, and its associated bypass valve per feedwater line is closed and deactivated or isolated by a closed manual valve.
(i) The Trip Setpoints may be set more conservative than the nominal value as necessary in response to plant conditions.

Table 3.3.2-1 (page 6 of 7)
Engineered Safety Feature Actuation System Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	CONDITIONS	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE	NOMINAL TRIP SETPOINT(i)
6. Auxiliary Feedwater (continued)						
c. Safety Injection	Refer to Function 1 (Safety Injection) for all initiation functions and requirements.					
d. Trip of all Main Feedwater Pumps	1,2(g)	1 per pump	J	SR 3.3.2.6	NA	NA
7. Semi-automatic Switchover to Containment Sump						
a. Automatic Actuation Logic and Actuation Relays	1,2,3,4(h)	2	C	SR 3.3.2.2 SR 3.3.2.3 SR 3.3.2.5	NA	NA
b. Refueling Water Storage Tank (RWST) Level — Low Low	1,2,3,4	4	K	SR 3.3.2.1 SR 3.3.2.4 SR 3.3.2.7 SR 3.3.2.8	≥ 264.9 in.	275.3 in.
Coincident with Safety Injection	Refer to Function 1 (Safety Injection) for all initiation functions and requirements.					

(continued)

(g) When the Main Feedwater System is operating to supply the SGs.

(h) In MODE 4, only 1 train is required to be OPERABLE to support semi-automatic switchover for the RHR pump that is required to be OPERABLE in accordance with Specification 3.5.3, ECCS-shutdown.

(i) The Trip Setpoints may be set more conservative than the nominal value as necessary in response to plant conditions.

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

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	CONDITIONS	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE	NOMINAL TRIP SETPOINT(i)
8. ESFAS Interlocks						
a. Reactor Trip, P-4	1,2,3	1 per train, 2 trains	F	SR 3.3.2.9	NA	NA
b. Pressurizer Pressure, P-11	1,2,3	3	L	SR 3.3.2.4 SR 3.3.2.7	≤ 2010 psig	2000 psig

(i) The Trip Setpoints may be set more conservative than the nominal value as necessary in response to plant conditions.

BASES

BACKGROUND

Reactor Trip Switchgear (continued)

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 automatically 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 SLs during all AOOs and mitigates the consequences of DBAs in all MODES in LCO, and which the RTBs are closed.

Each of the analyzed accidents and transients can be detected by one or more RTS Functions. The accident analysis described in Reference 3 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. The Nominal Trip Setpoint column is modified by a Note that allows the Trip Setpoint to be set more conservatively than the nominal value. The conservative direction is established by the direction of

(continued)

BASES

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY (continued)

the inequality applied to the Allowable Value. For example, the Power Range Neutron Flux High trip setpoint may be set to a value less than 109% during initial startup following a refueling outage until a sufficiently high reactor power is achieved so that the power range channels may be calibrated. In addition, certain Required Actions may require that the Power Range Neutron Flux High trip setpoints be reduced based on plant conditions.

The LCO generally requires OPERABILITY of four or three channels in each instrumentation Function, two channels of Manual Reactor Trip in each logic Function, and two trains in each Automatic Trip Logic Function. Four OPERABLE

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BASES

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY

6. Overtemperature ΔT (continued)

This results in a two-out-of-four trip logic. Section 7.2.2.3 of Reference 1 discusses control and protection system interactions for this function. Note that this Function also provides a signal to generate a turbine runback prior to reaching the Trip Setpoint. A turbine runback will reduce turbine power and reactor power. A reduction in power will normally alleviate the Overtemperature ΔT condition and may prevent a reactor trip.

Delta-T_0, as used in the overtemperature and overpower ΔT trips, represents the 100% RTP value as measured for each loop. This normalizes each loop's ΔT trips to the actual operating conditions existing at the time of measurement, thus forcing the trip to reflect the equivalent full power conditions as assumed in the accident analyses. These differences in RCS loop ΔT can be due to several factors, e.g., differences in RCS loop flows and slightly asymmetric power distributions between quadrants. While RCS loop flows are not expected to change with cycle life, radial power redistribution between quadrants may occur, resulting in small changes in loop specific ΔT values. Therefore, loop specific ΔT_0 values are measured as needed to ensure they represent actual core conditions.

The values for K_1, K_2, K_3, T', and P' may be treated as nominal values for the purpose of performing a CHANNEL CALIBRATION. The direction of conservatism for these values is as follows:

$K_1 \leq$ Identified Value
$K_2 \geq$ Identified Value
$K_3 \geq$ Identified Value
T' $\leq$ Identified Value
P' $\geq$ Identified Value

Note that K_1 is the principle setpoint gain, since it defines the function offset. K_2 and K_3 define the temperature gain and pressure gain respectively. The values for T' and P' are key reference parameters corresponding directly to plant safety analyses

(continued)

BASES

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY

6. Overtemperature ΔT (continued)

initial conditions assumptions for the Overtemperature ΔT Function. The as left settings for these parameters should be as close as possible or conservative with respect to the identified values. In order to ensure that the Overtemperature ΔT setpoint is consistent with the assumptions of the safety analyses, it is necessary to verify during the CHANNEL OPERATIONAL TEST, that the Overtemperature ΔT setpoint is within the appropriate calibration tolerances for conditions where the temperature input is equal to T' and the pressure input is equal to P', and that appropriate penalties are generated to reduce the setpoint for a temperature input greater than T', and again for a pressure input less than P' (Ref. 9).

The LCO requires all four channels of the Overtemperature ΔT trip Function to be OPERABLE. Note that the Overtemperature ΔT Function receives input from channels shared with other RTS Functions. Failures that affect multiple Functions require entry

(continued)

BASES

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY

6. Overtemperature ΔT (continued)

into the Conditions applicable to all affected Functions.

In MODE 1 or 2, the Overtemperature ΔT trip must be OPERABLE to prevent DNB. In MODE 3, 4, 5, or 6, this trip Function does not have to be OPERABLE because the reactor is not operating and there is insufficient heat production to be concerned about DNB.

(continued)

BASES

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY (continued)

7. Overpower ΔT

The Overpower ΔT trip Function (TDI-0411B, TDI-0421B, TDI-0431B, TDI-0441B, TDI-0411A, TDI-0421A, TDI-0431A, TDI-0441A) ensures that protection is provided to ensure the integrity of the fuel (i.e., no fuel pellet melting and less than 1% cladding strain) under all possible overpower conditions. This trip Function also limits the required range of the Overtemperature ΔT trip Function and provides a backup to the Power Range Neutron Flux — High Setpoint trip. The Overpower ΔT trip Function ensures that the allowable heat generation rate (kW/ft) of the fuel is not exceeded. It uses the ΔT of each loop as a measure of reactor power with a setpoint that is automatically varied with the following parameters:

- reactor coolant average temperature — the Trip Setpoint is varied to correct for changes in coolant density and specific heat capacity with changes in coolant temperature; and

- rate of change of reactor coolant average temperature — including dynamic compensation for RTD response time delays.

The Overpower ΔT trip Function is calculated for each loop as per Note 2 of Table 3.3.1-1. Trip occurs if Overpower ΔT is indicated in two loops. Since the temperature signals are used for other control functions, the actuation logic must be able to withstand an input failure to the control system, which may then require the protection function actuation and a single failure in the remaining channels providing the protection function actuation. This results in a two-out-of-four trip logic. Section 7.2.2.3 of Reference 1 discusses control and protection system interactions for this function. Note that this Function also provides a signal to generate a turbine runback prior to reaching the Allowable Value. A turbine runback will reduce turbine power and reactor power. A reduction in power will normally alleviate the Overpower ΔT condition and may prevent a reactor trip.

(continued)

BASES

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY

7. Overpower ΔT (continued)

Delta-T_0, as used in the overtemperature and overpower ΔT trips, represents the 100% RTP value as measured for each loop. This normalizes each loop's ΔT trips to the actual operating conditions existing at the time of measurement, thus forcing the trip to reflect the equivalent full power conditions as assumed in the accident analyses. These differences in RCS loop ΔT can be due to several factors, e.g., difference in RCS loop flows and slightly asymmetric power distributions between quadrants. While RCS loop flows are not expected to change with cycle life, radial power redistribution between quadrants may occur, resulting in small changes in loop specific ΔT values. Therefore, loop specific ΔT_0 values are measured as needed to ensure they represent actual core conditions.

The values for K_4, K_5, K_6, and T" may be treated as nominal values for the purpose of performing a CHANNEL CALIBRATION. The direction of conservatism for these values is as follows:

$K_4 \leq$ Identified Value
$K_5 \geq$ Identified Value
$K_6 \geq$ Identified Value
T" $\leq$ Identified Value

Note that for K_5 in the case of decreasing temperature, the gain setting must be ≥ 0 to prevent generating setpoint margin on decreasing temperature rates. Similarly, the setting for K_6 is required to be equal to 0 for conditions where $T \leq T"$. The value for T" is a key reference parameter corresponding directly to plant safety analyses initial conditions assumptions for the Overpower ΔT Function. The as left settings for these parameters should be as close as possible or conservative with respect to the identified values. In order to ensure that the Overpower ΔT setpoint is consistent with the assumptions of the safety analyses, it is necessary to verify during the CHANNEL OPERATIONAL TEST, that the Overpower ΔT setpoint is within the appropriate calibration tolerances for conditions where the temperature input is equal to T", and that the appropriate penalties are generated to

(continued)

BASES

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY

7. Overpower ΔT (continued)

reduce the setpoint for a temperature input greater than T" (Ref. 9).

The LCO requires four channels of the Overpower ΔT trip Function to be OPERABLE. Note that the Overpower ΔT trip Function receives input from channels shared with other RTS Functions. Failures that affect multiple Functions require entry into the Conditions applicable to all affected Functions.

In MODE 1 or 2, the Overpower ΔT trip Function must be OPERABLE. These are the only times that enough heat is generated in the fuel to be concerned about the heat generation rates and overheating of the fuel. In MODE 3, 4, 5, or 6, this trip Function does not have to be OPERABLE because the reactor is not operating and there is insufficient heat production to be concerned about fuel overheating and fuel damage.

8. Pressurizer Pressure

The same sensors (PI-0455A, B, & C, PI-0456, PI-0456A, PI-0457, PI-0457A, PI-0458, PI-0458A) provide input to the Pressurizer Pressure — High and — Low trips and the Overtemperature ΔT trip. Since the Pressurizer Pressure channels are also used to provide input to the Pressurizer Pressure Control System, the actuation logic must be able to withstand an input failure to

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BASES

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BASES

REFERENCES (continued)

2. FSAR, Chapter 6.

3. FSAR, Chapter 15.

4. IEEE-279-1971.

5. 10 CFR 50.49.

6. WCAP-11269, Westinghouse Setpoint Methodology for Protection Systems.

7. WCAP-10271-P-A, Supplement 2, Rev. 1, June 1990.

8. FSAR, Chapter 16.

9. Westinghouse Letter GP-16696, November 5, 1997.

BASES

BACKGROUND

Sequencer Output Relays (continued)

sequencer and are part of the control circuitry of these ESF loads. There are two independent trains of sequencers and each is powered by the respective train of 120-Vac ESF electrical power supply. The power supply for the output relays is the sequencer power supply. The applicable output relays are tested in the slave relay testing procedures, and in particular, in conjunction with the specific slave relay also required to actuate to energize the applicable ESF load.

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 in the safety analysis and the NRC staff approved licensing basis for the unit. 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).

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. The Nominal Trip Setpoint column of Table 3.3.2-1 is modified by a note that allows the Trip Setpoints to be set more conservatively than the nominal value. The conservative direction is established by the direction of the inequality applied to the Allowable Value.

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BASES

APPLICABLE SAFETY ANALYSIS, LCO, AND APPLICABILITY (continued)	The LCO generally requires OPERABILITY of four or three 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 configurations allow one channel to be tripped during maintenance or testing without causing an ESFAS initiation. If an instrument channel is equipped with installed bypass capability, such that no jumpers or lifted leads are

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BASES

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BASES

SURVEILLANCE REQUIREMENTS

SR 3.3.2.8 (continued)

verification of these devices every 18 months. The 18 month Frequency is consistent with the typical refueling cycle and is based on unit operating experience, which shows that random failures of instrumentation components causing serious response time degradation, but not channel failure, are infrequent occurrences.

This SR is modified by a Note that clarifies that the turbine driven AFW pump is tested within 24 hours after reaching 900 psig in the SGs.

SR 3.3.2.9

SR 3.3.2.9 is the performance of a TADOT as described in SR 3.3.2.6 for the P-4 Reactor Trip Interlock, and the Frequency is once per 18 months. This Frequency is based on operating experience. The SR is modified by a note that excludes verification of setpoints during the TADOT. The function tested has no associated setpoint.

REFERENCES

1. FSAR, Chapter 6.
2. FSAR, Chapter 7.
3. FSAR, Chapter 15.
4. IEEE-279-1971.
5. 10 CFR 50.49.
6. WCAP-11269, Westinghouse Setpoint Methodology for Protection Systems.
7. WCAP-10271-P-A, Supplement 2, Rev. 1, June 1990.
8. FSAR, Chapter 16.
9. Westinghouse Letter GP-16696, November 5, 1997.