Table 3.3.1-1 (page 2 of 5)
Reactor Trip System Instrumentation

	FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	CONDITIONS	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE	TRIP SETPOINT
6.	Overtemperature ΔT	1,2	4	E	SR 3.3.1.1 SR 3.3.1.3 SR 3.3.1.4 SR 3.3.1.6 SR 3.3.1.8 SR 3.3.1.11	Refer to Note 3 (Page 3.3-16)	Refer to Note 1 (Page 3.3-16)
7.	Overpower ΔT	1,2	4	E	SR 3.3.1.1 SR 3.3.1.6 SR 3.3.1.8 SR 3.3.1.11	Refer to Note 4 (Page 3.3-16)	Refer to Note 2 (Page 3.3-16)
8.	Pressurizer Pressure						
	a. Low Setpoint	1(f)	4	K	SR 3.3.1.1 SR 3.3.1.6 SR 3.3.1.8 SR 3.3.1.11		[≥ 1785 psig]
	b. High Setpoint	1,2	4	E	SR 3.3.1.1 SR 3.3.1.6 SR 3.3.1.8 SR 3.3.1.11		[≤ 2445 psig]
9.	Pressurizer Water Level - High 3	1(f)	4	K	SR 3.3.1.1 SR 3.3.1.6 SR 3.3.1.8		[≤ [redacted]] ← 87%
10.	Reactor Coolant Flow - Low						
	a. Single Cold Leg	1(g)	4 per cold leg	L	SR 3.3.1.1 SR 3.3.1.6 SR 3.3.1.8 SR 3.3.1.11		[≥ 87%(i)]
	b. Two Cold Legs	1(h)	4 per cold leg	K	SR 3.3.1.1 SR 3.3.1.6 SR 3.3.1.8 SR 3.3.1.11		[≥ 87%(i)]

(continued)

(f) Above the P-10 (Power Range Neutron Flux) interlock.

(g) Above the P-11 (Power Range Neutron Flux) interlock.

(h) Above the P-10 (Power Range Neutron Flux) interlock and below the P-8 (Power Range Neutron Flux) interlock.

(i) Percent of thermal design flow.

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Table 3.3.2-1 (page 1 of 12)
Engineered Safeguards Actuation System Instrumentation

	FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	CONDITIONS	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE	TRIP SETPOINT
1.	Safeguards Actuation						
	a. Manual Initiation	1,2,3,4	2 switches	E,O	SR 3.3.2.3		N/A
		5	2 switches	G,Y	SR 3.3.2.3		N/A
	b. Containment Pressure - High 2	1,2,3,4	4	B,O	SR 3.3.2.1 SR 3.3.2.4 SR 3.3.2.5 SR 3.3.2.6		[≤ 8.0 psig]
	c. Pressurizer Pressure - Low	1,2,3[a]	4	B,M	SR 3.3.2.1 SR 3.3.2.4 SR 3.3.2.5 SR 3.3.2.6		[≥ 1685 psig]
	d. Steam Line Pressure - Low	1,2,3[a]	4 per steam line	B,M	SR 3.3.2.1 SR 3.3.2.4 SR 3.3.2.5 SR 3.3.2.6		[≥ 405 ~~or 525 (b)~~ psig ~~See Note 1~~]
	e. RCS Cold Leg Temperature (T_{cold}) - Low	1,2,3[a]	4 per loop	B,M	SR 3.3.2.1 SR 3.3.2.4 SR 3.3.2.5 SR 3.3.2.6		[≥ ~~510 or 470°F~~ ≥ 470°F ~~See Note 2~~]

(continued)

(a) Above the P-11 (Pressurizer Pressure) interlock, when the RCS boron concentration is below that necessary to meet the shutdown margin requirements at an RCS temperature of 200°F.

(b) Time constants used in the lead/lag controller are $\tau_1 \geq$ [50] seconds and $\tau_2 \leq$ [5] seconds.

Reviewer Note: The values specified in brackets in the Trip Setpoint column are the SSAR Chapter 15 safety analysis values and are included for reviewer information only.

The values specified in brackets followed by " * " in the Trip Setpoint column are typical values for the Function. No credit was assumed for these Functions (typically diverse trips/actuations) in the SSAR Chapter 15 safety analyses and no safety analysis value is available.

The "Battery Charger Input Voltage - Low" Functions (15.c and 20.b) value specified is a typical value for the Function. The actual value will depend on the capabilities of the equipment selected with regard to its ability to function with degraded voltage as well as the setpoint methodology.

Following the setpoint study, the values specified in brackets must be replaced with the actual Trip Setpoints. Upon selection of the instrumentation the Trip Setpoints will be calculated in accordance with the setpoint methodology described in WCAP-14606. Allowable values will be calculated in accordance with the setpoint methodology and specified in the Allowable value column. The setpoint calculations will reflect the design basis and incorporate NRC accepted setpoint methodology.

~~Note 1: 405 psig is for a steamline break outside containment.~~
~~525 psig is for a steamline break inside containment.~~

~~Note 2: 470°F is for a steamline break. 510°F is for CVS malfunction.~~

Table 3.3.2-1 (page 3 of 12)
Engineered Safeguards Actuation System Instrumentation

	FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	CONDITIONS	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE	TRIP SETPOINT
4.	Steam Line Isolation						
	a. Manual Initiation	1,2,3,4(1)	2 switches	E,S	SR 3.3.2.3		N/A
	b. Containment Pressure - High 2	1,2,3,4(1)	4	B,N	SR 3.3.2.1 SR 3.3.2.4 SR 3.3.2.5 SR 3.3.2.6		[≤ 8.0 psig]
	c. Steam Line Pressure						
	(1) Steam Line Pressure - Low	1,2,3(a)	4 per steam line	B,M	SR 3.3.2.1 SR 3.3.2.4 SR 3.3.2.5 SR 3.3.2.6		[≥ 405 ~~or 525(b)~~ (h) psig ~~See Note 1~~]
	(2) Steam Line Pressure-Negative Rate - High	3(d)	4 per steam line	B,M	SR 3.3.2.1 SR 3.3.2.4 SR 3.3.2.5 SR 3.3.2.6		[≤ 100 psi with time constant ≥ 50 seconds]
	d. T_{cold} - Low	1,2,3(a)	4 per loop	B,M	SR 3.3.2.1 SR 3.3.2.4 SR 3.3.2.5 SR 3.3.2.6		[≥ ~~510 or 470°F~~ ≥ 490°F ~~See Note 2~~]
5.	Turbine Trip						
	a. Manual Main Feedwater Isolation	1,2	Refer to Function 6.a (Manual Main Feedwater Control Valve Isolation) for requirements.				
	b. SG Narrow Range Water Level - High 2	1,2	4 per SG	B,L	SR 3.3.2.1 SR 3.3.2.4 SR 3.3.2.5 SR 3.3.2.6		[≤ 95%]
	c. Safeguards Actuation	Refer to Function 1 (Safeguards Actuation) for initiating functions and requirements.					
	d. Reactor Trip	Refer to Function 18.a (ESFAS Interlocks, Reactor Trip, P-4) for requirements.					

(continued)

(a) Above the P-11 (Pressurizer Pressure) interlock, when the RCS boron concentration is below that necessary to meet the shutdown margin requirements at an RCS temperature of 200°F.

(b) Time constants used in the lead/lag controller are $\tau_1 \geq$ [50] seconds and $\tau_2 \leq$ [5] seconds.

(d) Below the P-11 (Pressurizer Pressure) interlock.

(1) Not applicable if the MSIVs are closed.

~~Note 1: 405 psig is for a steamline break outside containment. 525 psig is for a steamline break inside containment.~~

~~Note 2: 470°F is for a steamline break. 510°F is for CVS malfunction.~~

Table 3.3.2-1 (page 5 of 12)
Engineered Safeguards Actuation System Instrumentation

	FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	CONDITIONS	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE	TRIP SETPOINT
8.	Startup Feedwater Isolation						
	a. SG Narrow Range Water Level - High 2	1,2,3,4(o)	4 per SG	B,S	SR 3.3.2.1 SR 3.3.2.4 SR 3.3.2.5 SR 3.3.2.6		[≤ 95%]
	b. T_{cold} - Low	1,2,3(a)	4 per loop	B,M	SR 3.3.2.1 SR 3.3.2.4 SR 3.3.2.5 SR 3.3.2.6		[~~≥ 510 or 470°F See Note 2~~] ≥490°F
9.	ADS Stages 1, 2 & 3 Actuation						
	a. Manual Initiation	1,2,3,4	2 switch sets	E,O	SR 3.3.2.3		N/A
		5,6(g)	2 switch sets	G,X	SR 3.3.2.3		N/A
	b. Core Makeup Tank (CMT) Level - Low 1	1,2,3,4	4 per tank	B,O	SR 3.3.2.1 SR 3.3.2.4 SR 3.3.2.5 SR 3.3.2.6		[≥ 67.5%] volume
		5(c)	4 per tank	B,V	SR 3.3.2.1 SR 3.3.2.4 SR 3.3.2.5 SR 3.3.2.6		[≥ 67.5%] volume
	Coincident with CMT Actuation	Refer to Function 2 (CMT Actuation) for all initiating functions and requirements.					

(continued)

(a) Above the P-11 (Pressurizer Pressure) interlock, when the RCS boron concentration is below that necessary to meet the shutdown margin requirements at an RCS temperature of 200°F.

(c) Above the P-12 (Pressurizer Level) interlock.

(g) With upper internals in place and refueling cavity less than full.

(o) Not applicable when the startup feedwater flow paths are isolated.

~~Note 2: 470°F is for a steamline break. 510°F is for CVS malfunction.~~

Table 3.3.2-1 (page 8 of 12)
Engineered Safeguards Actuation System Instrumentation

	FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	CONDITIONS	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE	TRIP SETPOINT
13.	Passive Residual Heat Removal Heat Exchanger Actuation						
	a. Manual Initiation	1,2,3,4~~(j)~~	2 switches	E,~~N~~ O	SR 3.3.2.3		N/A
		~~4(p)~~, 5(i)	2 switches	E,U	SR 3.3.2.3		N/A
	b. SG Narrow Range Water Level - Low	1,2,3,4(j)	4 per SG	B,N	SR 3.3.2.1 SR 3.3.2.4 SR 3.3.2.5 SR 3.3.2.6		[≥ 45,000 lbm]
	Coincident with Startup Feedwater Flow - Low	1,2,3,4(j)	2 per feedwater line	H,N	SR 3.3.2.1 SR 3.3.2.4 SR 3.3.2.5 SR 3.3.2.6		[≥ 200 gpm per SG*]
	c. SG Wide Range Water Level - Low	1,2,3,4(j)	4 per SG	B,N	SR 3.3.2.1 SR 3.3.2.4 SR 3.3.2.5 SR 3.3.2.6		[≥ 25,000 lbm]
	d. ADS Stages 1,2 & 3 Actuation	Refer to Function 9 (ADS Stages 1, 2 & 3 Actuation) for initiating functions and requirements.					
	e. CMT Actuation	1,2,3,4~~(j)~~	Refer to Function 2 (CMT Actuation) for initiating functions and requirements.				
		~~4(p)~~, 5(i)	Refer to Functions 2.a and 2.b (CMT Actuation) for initiating functions and requirements.				
	f. Pressurizer Water Level, High 3	1,2,3,4(j,p)	4	B,N	SR 3.3.2.1 SR 3.3.2.4 SR 3.3.2.5 SR 3.3.2.6		[≤ ~~80%~~ 87%]

(continued)

(i) With the RCS pressure boundary intact.

(j) With the RCS not being cooled by the Normal Residual Heat Removal System (RNS).

~~(n) With the RCS being cooled by the RNS.~~

(p) Above the P-19 (RCS Pressure) interlock.

Table 3.3.2-1 (page 9 of 12)
Engineered Safeguards Actuation System Instrumentation

	FUNCTION	APPLICABLE MODES OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	CONDITIONS	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE	TRIP SETPOINT
14.	SG Blowdown Isolation						
	a. Passive Residual Heat Removal Heat Exchanger Actuation	1,2,3,4(j,m)	Refer to Function 13 (Passive Residual Heat Removal Heat Exchanger Actuation) for all initiating functions and requirements.				
	b. SG Narrow Range Water Level - Low	1,2,3,4(j)	4 per SG	B,R	SR 3.3.2.1 SR 3.3.2.4 SR 3.3.2.5 SR 3.3.2.6		[≥ 45,000 lbm]
15.	Boron Dilution Block						
	a. Source Range Neutron Flux Multiplication	2(f),3,4(m)	4	B,T	SR 3.3.2.1 SR 3.3.2.4 SR 3.3.2.5 SR 3.3.2.6		[≤ Source Range Flux x 1.6 in 50 minutes]
		5(m)	4	B,P	SR 3.3.2.1 SR 3.3.2.4 SR 3.3.2.5 SR 3.3.2.6		[≤ Source Range Flux x 1.6 in 50 minutes
	b. Reactor Trip	Refer to Function 18.a (ESFAS Interlocks, Reactor Trip, P-4) for all requirements.					
	c. Battery Charger Input Voltage - Low	1,2,3,4(m)	4 divisions	B,T	SR 3.3.2.3 SR 3.3.2.4		[≥ 343 V*]
		5(m)	4 divisions	B,P	SR 3.3.2.3 SR 3.3.2.4		[≥ 343 V*]
16.	Chemical Volume and Control System Makeup Isolation						
	a. SG Narrow Range Water Level - High 2	1,2,3,4(j,m)	4 per SG	B,R	SR 3.3.2.1 SR 3.3.2.4 SR 3.3.2.5 SR 3.3.2.6		[≤ 95%]
	b. Pressurizer Water Level - High 1	1,2,3(m)	4	B,Q	SR 3.3.2.1 SR 3.3.2.4 SR 3.3.2.5 SR 3.3.2.6		[≤ 30%*]
	c. Pressurizer Water Level - High 2	1,2,3,4(j,m,p)	4	B,T	SR 3.3.2.1 SR 3.3.2.4 SR 3.3.2.5 SR 3.3.2.6		[≤ ~~67% or~~ 74%. ~~See Note *~~]
	d. Containment Radioactivity - High 2	1,2,3(m)	4	B,Q	SR 3.3.2.1 SR 3.3.2.4 SR 3.3.2.5 SR 3.3.2.6		[≤ 100 R/hr]

(continued)

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

(j) With the RCS not being cooled by the Normal Residual Heat Removal System (RHS).

(m) Not applicable for valve isolation Functions whose associated flow path is isolated.

(p) Above the P-19 (RCS Pressure) interlock.

~~Note *: 67% is the nominal setpoint. 74% is the analyzed setpoint.~~