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3/4.3 INSTRUMENTATION

3/4.3.1 REACTOR PROTECTIVE INSTRUMENTATION

LIMITING CONDITION FOR OPERATION

3.3.1 As a minimum, the reactor protective instrumentation channels and bypasses of Table 3.3-1 shall be OPERABLE with RESPONSE TIMES as shown in Table 3.3-2.

APPLICABILITY: As shown in Table 3.3-1.

ACTION:

As shown in Table 3.3-1.

- 4.3.1.1 Each reactor protective instrumentation channel shall be demonstrated OPERABLE by the performance of the CHANNEL CHECK, CHANNEL CALIBRATION and CHANNEL FUNCTIONAL TEST operations for the MODES and at the frequencies shown in Table 4.3-1.
- 4.3.1.2 The logic for the bypasses shall be demonstrated OPERABLE prior to each reactor startup unless performed during the preceding 92 days. The total bypass function shall be demonstrated OPERABLE at least once per 18 months during CHANNEL CALIBRATION testing of each channel affected by bypass operation.
- 4.3.1.3 The REACTOR TRIP SYSTEM RESPONSE TIME of each reactor trip function shall be demonstrated to be within its limit at least once per 18 months. Each test shall include at least one channel per function such that all channels are tested at least once every N times 18 months where N is the total number of redundant channels in a specific reactor trip function as shown in the "Total No. of Channels" column of Table 3.3-1.
- 4.3.1.4 The isolation characteristics of each CEA isolation amplifier and each optical isolator for CEA Calculator to Core Protection Calculator data transfer shall be verified at least once per 18 months during the shutdown per the following tests:
 - a. For the CEA position isolation amplifiers:
 - With 120 volts AC (60 Hz) applied for at least 30 seconds across the output, the reading on the input does not exceed 0.015 volts DC.

TABLE 3.3-2 REACTOR PROTECTIVE INSTRUMENTATION RESPONSE TIMES

FUN	CTIONAL UNIT	RESPONSE TIME
1.	Manual Reactor Trip	Not Applicable
2.	Linear Power Level - High	< 0.40 second*
3.	Logarithmic Power Level - High	≤ 0.40 second*
4.	Pressurizer Pressure - High	≤ 0.90 second
5.	Pressurizer Pressure - Low	< 0.90 second
6.	Containment Pressure - High	≤ 1.70 seconds
7.	Steam Generator Pressure - Low	≤ 0.90 second
8.	Steam Generator Level - Low	< 0.90 second
9.	Local Power Density - High	
	a. Neutron Flux Power from Excore Neutron Detectors b. CEA Positions c. CEA Positions: CEAC Penalty Factor	<pre>< 0.429 second* < 0.424 second** < 0.379 second</pre>
10.	DNBR - Low	
	a. Neutron Flux Power from Excore Neutron Detectors b. CEA Positions c. Cold Leg Temperature d. Hot Leg Temperature e. Primary Coolant Pump Shaft Speed f. Reactor Coolant Pressure from Pressurizer g. CEA Positions: CEAC Penalty Factor	<pre>< 0.429 second* < 0.424 second** < 0.258 second# < 0.429 second# < 0.237 second** < 0.429 second## < 0.379 second</pre>

REACTOR PROTECTIVE INSTRUMENTATION RESPONSE TIMES

FUN	CTIONAL UNIT	RESPONSE TIME
11.	Steam Generator Level - High	Not Applicable
12.	Reactor Protection System Logic	Not Applicable
13.	Reactor Trip Breakers	Not Applicable
14.	Core Protection Calculators	Not Applicable
15.	CEA Calculators	Not Applicable
16.	Reactor Coolant Flow - Low	0.70 second

^{*}Neutron detectors are exempt from response time testing. Response time of the neutron flux signal portion of the channel shall be measured from detector output or input of first electronic component in channel.

^{**}Response time shall be measured from the time the CPC/CEAC receives an input signal until the electrical power is interrupted to the CEA drive mechanism.

[#]Response time shall be measured from the output of the sensor. RTD response time for all the RTDs shall be measured at least once per 18 months. The measured P_{τ} of the slowest RTD shall be less than or equal to 8 seconds (P_{τ} assumed in the safety analysis).

^{##}Response time shall be measured from the output of the pressure transmitter. The transmitter response time shall be less than or equal to 0.70 second.

INSTRUMENTATION

3/4.3.2 ENGINEERED SAFETY FEATURES ACTUATION SYSTEM INSTRUMENTATION

LIMITING CONDITION FOR OPERATION

3.3.2 The Engineered Safety Features Actuation System (ESFAS) instrumentation channels and bypasses shown in Table 3.3-3 shall be OPERABLE with their trip setpoints set consistent with the values shown in the Trip Setpoint column of Table 3.3-4 and with RESPONSE TIMES as shown in Table 3.3-5.

APPLICABILITY: As shown in Table 3.3-3.

ACTION:

- a. With an ESFAS instrumentation channel trip setpoint less conservative than the value shown in the Allowable Values column of Table 3.3-4, declare the channel inoperable and apply the applicable ACTION requirement of Table 3.3-3 until the channel is restored to OPERABLE status with the trip setpoint adjusted consistent with the Trip Setpoint value.
- b. With an ESFAS instrumentation channel inoperable, take the ACTION shown in Table 3.3-3.

- 4.3.2.1 Each ESFAS instrumentation channel shall be demonstrated OPERABLE by the performance of the CHANNEL CHECK, CHANNEL CALIBRATION and CHANNEL FUNCTIONAL TEST operations for the MODES and at the frequencies shown in Table 4.3-2.
- 4.3.2.2 The logic for the bypasses shall be demonstrated OPERABLE during the at power CHANNEL FUNCTIONAL TEST of channels affected by bypass operation. The total bypass function shall be demonstrated OPERABLE at least once per 18 months during CHANNEL CALIBRATION testing of each channel affected by bypass operation.
- 4.3.2.3 The ENGINEERED SAFETY FEATURES RESPONSE TIME of each ESFAS function shall be demonstrated to be within the limit at least once per 18 months. Each test shall include at least one channel per function such that all channels are tested at least once every N times 18 months where N is the total number of redundant channels in a specific ESFAS function as shown in the "Total No. of Channels" Column of Table 3.3-3.

TABLE 3.3-5

ENGINEERED SAFETY FEATURES RESPONSE TIMES

INITIATING SIGNAL AND FUNCTION

RESPONSE TIME IN SECONDS

1. Manual

a. SIAS Safety Injection (ECCS) Not Applicable Shield Building Filtration System Not Applicable

CSAS 6. Containment Spray Not Applicable

CIAS Containment Isolation Not Applicable MSIS d.

Main Steam Isolation Not Applicable RAS 0.

Safety Injection System Sump Recirculation Not Applicable

f. EFAS Emergency Feedwater Pumps Not Applicable

ENGINEERED SAFETY FEATURES RESPONSE TIMES

INI	TIATING SIGNAL AND FUNCTION	RESPONSE TIME IN SECONDS
2.	Pressurizer Pressure-Low	
	 a. Safety Injection (ECCS) (1) High Pressure Safety Injection (2) Low Pressure Safety Injection 	< 30.0*/18.5** < 45.5*/34.0**
	b. Containment Isolation	< 23.5*/12.0**
	c. Containment Cooling	31.0*/19.5**
3.	Containment Pressure-High	
	a. Safety Injection (ECCS) (1) High Pressure Safety Injection (2) Low Pressure Safety Injection	< 30.0*/18.5** < 45.5*/34.0**
	 Containment Isolation Main Steam Isolation Main Feedwater Isolation 	< 23.5*/12.0** < 5.0*/5.0** < 6.0*/6.0**
	e. Containment Cooling	< 31.0*/19.5**
	Containment PressureHigh-High	
	a. Containment Spray Pump b. Containment Spray Valves c. CCW to RCP Valves	< 15.2*/2.7** < 11.0*/11.0** < 23.5*/12.0**
	Containment Area Radiation-High#	
	Containment Purge Valves Isolation	< 6.2*/6.2**
	Steam Generator Pressure-Low	
	a. Main Steam Isolation b. Main Feedwater Isolation	< 5.0*/5.0** < 6.0*/6.0**
	Refueling Water Storage Pool-Low	
	Containment Sump Recirculation	< 120.0*/108.5**
	4.16 kV Emergency Bus Undervoltage (Loss of	Voltage)
	Loss of Power (0 volts)	< 2***
,	480V Emergency Bus Undervoltage (Loss of Vol	tage)
	Loss of Power (0 volts)	N.A.
0.	4.16 kV Emergency Bus Undervoltage (Degraded	Voltage)
	Loss of Power	< 14***
		-

ENGINEERED SAFETY FEATURES RESPONSE TIMES

INITIATING SIGNAL AND FUNCTION

RESPONSE TIME IN SECONDS

11. Steam Generator Level-Low

Emergency Feedwater Pump and Block Valves

< 54.0*/42.0**

Wide Range Steam Generator Level-Low

Emergency Feedwater Control Valves < 25.0*/25.0**

NOTE: Response time for all Motor-Driven and Steam-Driven Emergency Feedwater Pumps on all ESF signal starts.

< 54.0

TABLE MOTATIONS

*Diesel generator starting and sequence loading delays included. Response time limit includes movement of valves and attainment of pump or blower discharge pressure.

**Diesel generator starting and sequence loading delays not included. Offsite power available. Response time limit includes movement of valves and attainment of pump or blower discharge pressure.

***Response time measured from the sensing relay to the channel output only.

#Response time does not include the detector.

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ATTACHMENT B

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3/4.3 INSTRUMENTATION

3/4.3.1 REACTOR PROTECTIVE INSTRUMENTATION

LIMITING CONDITION FOR OPERATION

3.3.1 As a minimum, the reactor protective instrumentation channels and bypasses of Table 3.3-1 shall be OPERABLE with RESPONSE TIMES as shown in Table 3.3-2.

APPLICABILITY: As shown in Table 3.3-1

ACTION

As shown in Table 3.3-1.

- 4.3.1.1 Each reactor protective instrumentation channel shall be demonstrated OPERABLE by the performance of the CHANNEL CHECK. CHANNEL CALIBRATION and CHANNEL FUNCTIONAL TEST operations for the MODES and at the frequencies shown in Table 4.3-1.
- 4.3.1.2 The logic for the bypasses shall be demonstrated OPERABLE prior to each reactor startup unless performed during the preceding 92 days. The total bypass function shall be demonstrated OPERABLE at least once per 18 months during CHANNEL CALIBRATION testing of each channel affected by bypass operation.
- 4.3.1.3 The REACTOR TRIP SYSTEM RESPONSE TIME of each reactor trip function shall be demonstrated to be within its limit at least once per 18 months. Neutron detectors are exempt from response time testing. Each test shall include at least once channel per function such that all channels are tested at least once every N times 18 months where N is the total number of redundant channels in a specific reactor trip function as shown in the "Total No. of Channels" column of Table 3.3-1.
- 4.3.1.4 The isolation characteristics of each CEA isolation amplifier and each optical isolator for CEA Calculator to Core Protection Calculator data transfer shall be verified at least once per 18 months during the shutdown per the following tests:
 - a. For the CEA position isolation amplifiers:
 - With 120 volts AC (60 Hz) applied for at least 30 seconds across the output, the reading on the input does not exceed 0.015 volts DC

+

EUNCTIONAL UNIT

JODDES KITEWAY DV30 SUOTISES V30

Reactor Coolant Pressure from Pressurizer

Pullodes 6/8 0 5

BESPONSE TIME

##PU0005 621 0 >

--beed then fund instead then beed **DU0092 /65.0 2 Hot leg lemperature -p #pu0305 621 0 > --aunieuadwai bai bioi #puopas 892 0 5 -0 SU011150d V33 **DU0008 1/21 0 5 Meutron Flux Power from Excore Weutron Detectors -- p * DU0005 627 0 > 10 DMBR CEV POSITIONS: CEAC Penalty Factor -9 pubbes 6/8:0 5 -- g CEA POSITIONS **DU0305 121 0 > Meutron Flux Rower from Excore Meutron Detectors *Duopes 621 0 5 ubin - Virand nawon 16001 Steam Generator Level - Low puesas 06 0-5 MOT - Bunssaug JOTEJBUB9 WEBTS t pubbas 66 0 5 -9 ubin - aunssaug inamnieinoj spuedes 0/ T-5 -9 MOT - BURSSBURG LOZIUMSSBURG pueses 06 0 5 \Rightarrow Bressur Zer Pressure - High pubbas 06 0 5 9 FORSEL CHIEF FORSE LEVEL HIGH ≠Du0395 01 0 5 LINEAR POWER LEVEL HIGH x0u00as 07 0 5 ÷ Manual Reactor Intp Not Applicable

MENCION PROTECTIVE INSTRUMENTATION RESPONSE TIMES

5 6 6 3 JBAT

TABLE 3,3-2 (Continued)

FUNCT

2

13

14

15

-91

Steam Generator Level High Reactor Protection System Logic Reactor Trip Breakers Gore Protection Calculators	Not Applicable Not Applicable Not Applicable Not Applicable
CEA Calculators	Not Applicable

portion of the channel shall be measured from detector output or input of first electronic component in channel AMeutron detectors are exempt from response time testing. Response time of the neutron flux signal

***ARESponse time shall be measured from the time the CPC/CEAC receives an input signal until the electrical power is interrupted to the CEA drive mechanism

shall be measured at least once per 18 months. The measured P_t of the slowest RTD shall be less than #Response time shall be measured from the output of the sensor. RID response time for all the RIDs or equal to 8 seconds (Pt. assumed in the safety analysis) ##Response time shall be measured from the output of the pressure transmitter. The transmitter response time shall be less than or equal to 0.70 second. Page 3/4 3-9 has been deleted.

INSTRUMENTATION

3/4.3.2 ENGINEERED SAFETY FEATURES ACTUATION SYSTEM INSTRUMENTATION

LIMITING CONDITION FOR OPERATION

3.3.2 The Engineered Safety Features Actuation System (ESFAS)instrumentation channels and bypasses shown in Table 3.3-3 shall be OPERABLE with their trip setpoints set consistent with the values shown in the Trip Setpoint column of Table 3.3-4. and with RESPONSE TIMES as shown in Table 3.3-5:

APPLICABILITY: As shown in Table 3.3-3.

ACTION

- a. With an ESFAS instrumentation channel trip setpoint less conservative than the value shown in the Allowable Values column of Table 3.3-4, declare the channel inoperable and apply the applicable ACTION requirement of Table 3.3-3 until the channel is restored to OPERABLE status with the trip setpoint adjusted consistent with the Trip Setpoint value.
- b. With an ESFAS instrumentation channel inoperable, take the ACTION shown in Table 3.3-3.

- 4.3.2.1 Each ESFAS instrumentation channel shall be demonstrated OPERABLE by the performance of the CHANNEL CHECK. CHANNEL CALIBRATION and CHANNEL FUNCTIONAL TEST operations for the MODES and at the frequencies shown in Table 4.3-2.
- 4.3.2.2 The logic for the bypasses shall be demonstrated OPERABLE during the at power CHANNEL FUNCTIONAL TEST of channels affected by bypass operation. The total bypass function shall be demonstrated OPERABLE at least once per 18 months during CHANNEL CALIBRATION testing of each channel affected by bypass operation.
- 4.3.2.3 The ENGINEERED SAFETY FEATURES RESPONSE TIME of each ESFAS function shall be demonstrated to be within the limit at least once per 18 months. Each test shall include at least one channel per function such that all channels are tested at least once every N times 18 months where N is the total number of redundant channels in a specific ESFAS function as shown in the "Total No. of Channels" Column of Table 3.3-3.

TABLE 3.3-5

ENGINEERED SAFETY FEATURES RESPONSE TIMES

INIT	IATING S	IGNAL AND FUNCTION	RESPONSE TIME IN SECONDS
1-	Manua	1	
	â-	SIAS Safety Injection (ECCS)	Not Applicable
		Shield Building Filtration System	Not Applicable
	b	CSAS Containment Spra/	Not-Applicable
	c	CIAS Containment Isolation	No: Applicable
	4-	MSIS Main Steam Isolation	Most Applicable
	-	RAS Safety Injection System Sump Recirculation	Not Applicable
	€-	EFAS Emergency Feedwater Pumps	Not Applicable

ENGINEERED SAFETY FEATURES RESPONSE TIMES

INIT	ATING S	IGNAL AND FUNCTION	RESPONSE TIME IN SECONDS	
2.	Pres	purizer Pressure Low		
		Factor Visional Vision		
	4	Safety Injection (ECCS)	70 00 10 00	
		(1) High Pressure Safety Injection	< 30.0*/18.5**	
		(2) Low Pressure Safety Injection	< 45.5*/34.0**	
	Đ-	Containment Isolation	<23.6*/12.0**	
	6-7	Containment Cooling	S 31 0*/19 5**	
3-	Cont	sinment Pressure High		
	a.	Safety Injection (ECCS)		
	100.0	(1) High Pressure Safety Injection	≤ 30.0*/18.5**	
		(2) Low Pressure Safety Injection	< 45 6*/34 0**	
	B	Containment-Isolation	<23.5*/12.0**	
		Main Steam Isolation	≤ 5.0*/5.0**	
	4-	Main Feedwater Isolation	s 6.0*/6.0**	
	9-	Containment Cooling	≤31-0*/19-5**	
4-	Cont	sinment Pressure High High		
	a-	Containment Spray Pump	s 15 2*/2 7**	
	Đ-,	Containment Spray Valves	< -11.0*/11.0**	
		CCW to RCP Valves	s-23.5*/12.0**	
5	Cont	ainment Area Radiation High #		
	Cont	ainment Purge Valves Isolation	≤ 6.2*/6.2**	
ő-	Stea	m Generator Pressure Low		
	-	Main Steam Isolation	<-4 ()*/4 ()**	
	b-	Main Feedwater Isolation	≤ 6.0*/6.0**	
ş.,	Refu	eling Water Storage Pool Low		
	Cont	ainment Sump Recirculation	S120-0*/108-5**	
8-	4.16	kV Emergency Bus Undervoltage (Loss of Voltage)		
	Loss	of Power (0-volts)	<2***	
9	480¥	Emergency Bus Undervoltage (Loss of Voltage)		
		of Power (0 volts)	N-A-	
10-	4.16	kV Emergency Bus Undervoltage (Degraded Voltage)		
		of Power	S-14xxx	
	2000			

ENGINEERED SAFETY FEATURES RESPONSE TIMES

INITIATING SIGNAL AND FUNCTION

RESPONSE TIME IN SECONDS

11 Steam Generator Level Low

Emergency Feedwater Pump and Block Valves ≤ 54 ()*/42 ()**

12- Wide Range Steam Generator Level Low

Emergency Feedwater Control Valves

<--25 0*/25 0**

NOTE: Response time for all Motor Driven and Steam Driven Emergency Feedwater Pumps on all ESF signal starts - 5A D

TABLE NOTATIONS

-*Diesel generator starting and sequence loading delays included. Response time limit includes movement of valves and attainment of pump or blower discharge pressure.

-**Diesel generator starting and sequence loading delays not included. Offsite power available. Response time limit includes movement of valves and attainment of pump or blower discharge pressure.

***Response time measured from the sensing relay to the channel output only.

#Response time does not include the detector.

Pages 3/4 3-23 and 3/4 3-24 have been deleted.