

TABLE 2.2.1-1

REACTOR PROTECTION SYSTEM INSTRUMENTATION SETPOINTS

<u>FUNCTIONAL UNIT AND INSTRUMENT NUMBER</u>	<u>TRIP SETPOINT</u>	<u>ALLOWABLE VALUES</u>
1. Intermediate Range Monitor, Neutron Flux - High <sup>(1)</sup> (C51-IRM-K601 A,B,C,D,E,F,G,H)	$\leq 120$ divisions of full scale	$\leq 120$ divisions of full scale
2. Average Power Range Monitor (C51-APRM-CH.A,B,C,D,E,F)		
a. Neutron Flux - High, 15% <sup>(2)</sup>	$\leq 15\%$ of RATED THERMAL POWER	$\leq 15\%$ of RATED THERMAL POWER
b. Flow Biased Neutron Flux - High <sup>(3)(4)</sup>	$\leq (0.66 W + 54\%)$	$\leq (0.66 W + 54\%)$
c. Fixed Neutron Flux - High <sup>(4)</sup>	$\leq 120\%$ of RATED THERMAL POWER	$\leq 120\%$ of RATED THERMAL POWER
3. Reactor Vessel Steam Dome Pressure - High (B21-PTM-N023A-1,B-1,C-1,D-1)	$\leq 1045$ psig	$\leq 1045$ psig
4. Reactor Vessel Water Level - Low, Level <sup>#1</sup> (B21-LTM-N017A-1,B-1,C-1,D-1)	$> +162.5$ inches above top fuel guide	$> +162.5$ inches above top fuel guide
5. Main Steam Line Isolation Valve - Closure <sup>(5)</sup> (B21-F022 A,B,C,D; B21-F028 A,B,C,D)	$\leq 10\%$ closed	$\leq 10\%$ closed
6. Main Steam Line Radiation - High (D12-RM-K603 A,B,C,D)	$\leq 3 \times$ full power background	$\leq 3.5 \times$ full power background

TABLE 2.2.1-1 (continued)

## REACTOR PROTECTION SYSTEM INSTRUMENTATION SETTINGS

<u>FUNCTIONAL UNIT AND INSTRUMENT NUMBER</u>	<u>TRIP SETPOINT</u>	<u>ALLOWABLE VALUES</u>
7. Drywell Pressure - High (C71-PS-N002 A,B,C,D)	$\leq 2$ psig	$\leq 2$ psig
8. Scram Discharge Volume Water Level - High (C11-LSH-N013 A,B,C,D)	$\leq 109$ gallons	$\leq 109$ gallons
9. Turbine Stop Valve - Closure <sup>(6)</sup> (EHC-SVOS-1X,2X,3X,4X)	$< 10\%$ closed	$< 10\%$ closed
10. Turbine Control Valve Fast Closure, Control Oil Pressure - Low <sup>(6)</sup> (EHC-PSL-1756,1757,1758,1759)	$\geq 500$ psig	$\geq 500$ psig

TABLE 3.3.1-1

## REACTOR PROTECTION SYSTEM INSTRUMENTATION

FUNCTIONAL UNIT AND INSTRUMENT NUMBER	APPLICABLE OPERATIONAL CONDITIONS	MINIMUM NUMBER OPERABLE CHANNELS PER TRIP SYSTEM(a)(b)	ACTION
1. Intermediate Range Monitors: (C51-IRM-K601A,B,C,D,E,F,G,H)			
a. Neutron Flux - High	2, 5 <sup>(b)</sup> 3, 4	3 2	1 2
b. Inoperative	2, 5 3, 4	3 2	1 2
2. Average Power Range Monitor: (C51-APRM-CH.A,B,C,D,E,F,)			
a. Neutron Flux - High, 15%	2, 5	2	3
b. Flow Biased Neutron Flux - High	1	2	4
c. Fixed Neutron Flux-High, 120%	1	2	4
d. Inoperative	1, 2, 5	2	5
e. Downscale	1	2	4
f. LPRM	1, 2, 5	(c)	NA
3. Reactor Vessel Steam Dome Pressure - High (B21-PT-N023A,B,C,D) (B21-PTM-N023A-1,B-1,C-1,D-1)	1, 2 <sup>(d)</sup>	2	6
4. Reactor Vessel Water Level Low, Level #1 (B21-LT-N017A-1,B-1,C-1,D-1) (B21-LTM-N017A-1,B-1,C-1,D-1)	1, 2	2	6
5. Main Steam Line Isolation Valve - Closure (B21-F022A,B,C,D, and B21-F028A,B,C,D)	1	4	4

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TABLE 3.3.1-1 (Continued)

## REACTOR PROTECTION SYSTEM INSTRUMENTATION

<u>FUNCTIONAL UNIT AND INSTRUMENT NUMBER</u>	<u>APPLICABLE OPERATIONAL CONDITIONS</u>	<u>MINIMUM NUMBER OPERABLE CHANNELS PER TRIP SYSTEM(a) (b)</u>	<u>ACTION</u>
6. Main Steam Line Radiation - High (DI2-RM-K603A,B,C,D)	1, 2 <sup>(d)</sup>	2	1
7. Drywell Pressure - High (C71-PS-N002 A,B,C,D)	1, 2 <sup>(e)</sup>	2	6
8. Scram Discharge Volume Water Level - High (C11-LSH-N013A,B,C,D)	1, 2, 5 <sup>(f)</sup>	2	5
9. Turbine Stop Valve - Closure (EHC-SVOS-1X,2X,3X,4X)	1 <sup>(g)</sup>	4	8
10. Turbine Control Valve Fast Closure Control Oil Pressure - Low (EHC-PSL-1756,1757,1758,1759)	1 <sup>(g)</sup>	2	8
11. Reactor Mode Switch in Shutdown Position (C71A-S1)	1, 2, 3, 4, 5	1	9
12. Manual Scram (C71A-S3A,B)	1, 2, 3, 4, 5	1	10

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TABLE 3.3.1-2

REACTOR PROTECTION SYSTEM RESPONSE TIMESFUNCTIONAL UNIT AND INSTRUMENT NUMBERRESPONSE TIME (Seconds)

1. Intermediate Range Monitors (C51-IRM-K601A,B,C,D,E,F,G,H):	
a. Neutron Flux - High*	NA
b. Inoperative	NA
2. Average Power Range Monitor* (C51-APRM-CH.A,B,C,D,E,F):	
a. Neutron Flux - High, 15%	<0.09
b. Flow Biased Neutron Flux - High	NA
c. Neutron Flux - High, 120%	<0.09
d. Inoperative	NA
e. Downscale	NA
f. LPRM	NA
3. Reactor Vessel Steam Dome Pressure - High (B21-PT-N023A,B,C,D) (B21-PTM-N023A-1,B-1,C-1,D-1)	<0.55
4. Reactor Vessel Water Level - Level #1 (B21-LT-N017A-1,B-1,C-1,D-1) (B21-LTM-N017A-1,B-1,C-1,D-1)	<1.05
5. Main Steam Line Isolation Valve-Closure (B21-F022A,B,C,D and B21-F028A,B,C,D)	<0.06
6. Main Steam Line Radiation - High (D12-RM-K603A,B,C,D)	NA
7. Drywell Pressure - High (C71-PS-N002 A,B,C,D)	NA
8. Scram Discharge Volume Water Level - High (C11-LSH-N013A,B,C,D)	NA
9. Turbine Stop Valve - Closure (EHC-SV03-1X,2X,3X,4X)	<0.06

TABLE 3.3.1-2 (Continued)

REACTOR PROTECTION SYSTEM RESPONSE TIMES	RESPONSE TIME (Seconds)
FUNCTIONAL UNIT AND INSTRUMENT NUMBER	
10. Turbine Control Valve Fast Closure, Control Oil Pressure - Low (EHC-PSL-1756, 1757, 1758, 1759)	< 0.08
11. Reactor Mode Switch In Shutdown Position (C71A-S1)	NA
12. Manual Scram (C71A-S3A, B)	NA

\* Neutron detectors are exempt from response time testing. Response time shall be measured from detector output or input of first electronic component in channel.

TABLE 4.3.1-1

## REACTOR PROTECTION SYSTEM INSTRUMENTATION SURVEILLANCE REQUIREMENTS

FUNCTIONAL UNIT AND INSTRUMENT NUMBER	CHANNEL CHECK	CHANNEL FUNCTIONAL TEST	CHANNEL CALIBRATION <sup>(a)</sup>	OPERATIONAL CONDITIONS IN WHICH SURVEILLANCE REQUIRED
1. Intermediate Range Monitors: (C51-IRM-K601 A,B,C,D,E,F,G,H)				
a. Neutron Flux - High	D	S/U <sup>(b)</sup> (c)	R	2
	D	W	R	3, 4, 5
b. Inoperative	NA	W	NA	2, 3, 4, 5
2. Average Power Range Monitor: (C51-APRM-CH A,B,C,D,E,F)				
a. Neutron Flux - High 15%	S	S/U <sup>(b)</sup> , W <sup>(d)</sup>	Q	2
	S	W	Q	5
b. Flow Biased Neutron Flux-High	S	S/U <sup>(b)</sup> , W	W <sup>(e)</sup> (f), Q	1
c. Fixed Neutron Flux - High, 120%	S	S/U <sup>(b)</sup> , W	W <sup>(e)</sup> , Q	1
d. Inoperative	NA	W	NA	1, 2, 5
e. Downscale	NA	W	NA	1
f. LPRM	D	NA	(g)	1, 2, 5
3. Reactor Vessel Steam Dome Pressure - High (B21-PT-NO23A, B, C, D) (B21-PIM-NO23A-1, B-1, C-1, D-1)	NA <sup>(k)</sup>	NA	R(1) M	1, 2
4. Reactor Vessel Water Level - Low Level #1 (B21-LT-NO17A-1, B-1, C-1, D-1) (B21-LTM-NO17A-1, B-1, C-1, D-1)	NA <sup>(k)</sup>	NA	R(1) M	1, 2
5. Main Steam Line Isolation Valve - Closure (B21-F022 A,B,C,D and B21-F028 A,B,C,D)	NA	M	R(h)	1

TABLE 4.3.1-1 (continued)

## REACTOR PROTECTION SYSTEM INSTRUMENTATION SURVEILLANCE REQUIREMENTS

FUNCTIONAL UNIT AND INSTRUMENT NUMBER	CHANNEL CHECK	CHANNEL FUNCTIONAL TEST	CHANNEL CALIBRATION <sup>(a)</sup>	OPERATIONAL CONDITIONS IN WHICH SURVEILLANCE REQUIRED
6. Main Steam Line Radiation-High (D12-RM-K603 A,B,C,D)	S	M <sup>(1)</sup>	R <sup>(j)</sup>	1, 2
7. Drywell Pressure - High (C71-PS-N002 A,B,C,D)	NA	M	Q	1, 2
8. Scram Discharge Volume Water Level - High (C11-LSH-N013 A, B, C, D)	NA	Q	R	1, 2, 5
9. Turbine Stop Valve - Closure (EHC-SVOS-1X, 2X, 3X, 4X)	NA	M	R <sup>(h)</sup>	1
10. Turbine Control Valve Fast Closure, Control Oil Pressure- Low (EHC-PSL-1756,1757,1758, 1759)	NA	M	R	1
11. Reactor Mode Switch in Shutdown Position (C71A-S1)	NA	R	NA	1, 2, 3, 4, 5
12. Manual Scram (C71A-S3A,B)	NA	Q	NA	1, 2, 3, 4, 5

- Neutron detectors may be excluded from CHANNEL CALIBRATION.
- Within 24 hours prior to startup, if not performed within the previous 7 days.
- The IRM channels shall be compared to the APRM channels and the SRM instruments for overlap during each startup, if not performed within the previous 7 days.
- When changing from CONDITION 1 to CONDITION 2, perform the required surveillance within 12 hours after entering CONDITION 2.
- This calibration shall consist of the adjustment of the APRM readout to conform to the power values calculated by a heat balance during CONDITION 1 when THERMAL POWER  $\geq$  25% of RATED THERMAL POWER.

TABLE 4.3.1-1 (continued)

REACTOR PROTECTION SYSTEM INSTRUMENTATION SURVEILLANCE REQUIREMENTS

- f. This calibration shall consist of the adjustment of the APRM flow biased setpoint to conform to a calibrated flow signal.
- g. The LPRM's shall be calibrated at least once per effective full power month (EFPM) using the TIP system.
- h. This calibration shall consist of a physical inspection and actuation of these position switches.
- i. Instrument alignment using a standard current source.
- j. Calibration using a standard radiation source.
- k. The transmitter channel check is satisfied by the trip unit channel check.  
A separate transmitter check is not required.
- l. Transmitters are exempted from the monthly channel calibration.

TABLE 3.3.2-1

ISOLATION ACTUATION INSTRUMENTATION

<u>TRIP FUNCTION AND INSTRUMENT NUMBER</u>	<u>VALVE GROUPS OPERATED BY SIGNAL(a)</u>	<u>MINIMUM NUMBER OPERABLE CHANNELS PER TRIP SYSTEM(b)(c)</u>	<u>APPLICABLE OPERATIONAL CONDITION</u>	<u>ACTION</u>
<u>1. PRIMARY CONTAINMENT ISOLATION</u>				
a. Reactor Vessel Water Level - Low				
1. Level #1 (B21-LT-N017A-1,B-1,C-1,D-1) (B21-LTM-N017A-1,B-1,C-1,D-1)	2, 6, 7, 8	2	1, 2, 3	20
2. Level #2 (B21-LT-N024A-1,B-1, and B21-LT-N025A-1,B-1  (B21-LTM-N024A-1,B-1 and B21-LTM-N025A-1,B-1)	1, 3	2	1, 2, 3	20
b. Drywell Pressure - High (C71-PS-N002 A,B,C,D)	2, 6, 7	2	1, 2, 3	20
c. Main Steam Line				
1. Radiation - High (d) (DI2-RM-K603A,B,C,D)	1	2	1, 2, 3	21
2. Pressure - Low (B21-PS-N015 A,B,C,D)	1	2	1	22

TABLE 3.3.2-1 (Continued)

ISOLATION ACTUATION INSTRUMENTATION

<u>TRIP FUNCTION AND INSTRUMENT NUMBER</u>	<u>VALVE GROUPS OPERATED BY SIGNAL(a)</u>	<u>MINIMUM NUMBER OPERABLE CHANNELS PER TRIP SYSTEM(b)(c)</u>	<u>APPLICABLE OPERATIONAL CONDITION</u>	<u>ACTION</u>
1. <u>PRIMARY CONTAINMENT ISOLATION (Continued)</u>				
c. <u>Main Steam Line (Continued)</u>				
3. Flow - High (B21-dPIS-N006 A,B,C,D; B21-dPIS-N007 A,B,C,D; B21-dPIS-N008 A,B,C,D; and B21-dPIS-N009 A,B,C,D)	1	2/line	1	22
d. <u>Main Steam Line Tunnel Temperature - High</u> (B21-TS-N010A,B,C,D; B21-TS-N011A,B,C,D; B21-TS-N012A,B,C,D and B21-TS-N013A,B,C,D)	1	2(e)	1, 2, 3	21
e. <u>Condenser Vacuum - Low</u> (B21-PS-N056 A,B,C,D)	1	2	1, 2(f)	21
f. <u>Turbine Building Area Temperature - High</u> (B21-TS-3225A,B,C,D; B21-TS-3226A,B,C,D; B21-TS-3227A,B,C,D; B21-TS-3228A,B,C,D; B21-TS-3229A,B,C,D; B21-TS-3230A,B,C,D; B21-TS-3231A,B,C,D; and B21-TS-3232A,B,C,D)	1	4(e)	1, 2, 3	21

TABLE 3.3.2-1 (Continued)

## ISOLATION ACTUATION INSTRUMENTATION

TRIP FUNCTION AND INSTRUMENT NUMBER	VALVE GROUPS OPERATED BY SIGNAL(a)	MINIMUM NUMBER OPERABLE CHANNELS PER TRIP SYSTEM(b)(c)	APPLICABLE OPERATIONAL CONDITION	ACTION
2. <u>SECONDARY CONTAINMENT ISOLATION</u>				
a. Reactor Building Exhaust Radiation - High (DI2-RM-N010A,B)	6	1	1, 2, 3, 5 and *	23
b. Drywell Pressure - High (C71-PS-N002 A,B,C,D)	2, 6, 7	2	1, 2, 3	23
c. Reactor Vessel Water Level - Low, Level #2 (B21-LT-N024A-1,B-1 and B21-LT-N025A-1,B-1)				
(B21-LTM-N024A-1,B-1 and B21-LTM-N025A-1,B-1)	1, 3	2	1, 2, 3	23
3. <u>REACTOR WATER CLEANUP SYSTEM ISOLATION</u>				
a. $\Delta$ Flow - High (C31-dFS-N603-1A,1B)	3	1	1, 2, 3	24
b. Area Temperature - High (C31-TS-N600A,B,C,D,E,F)	3	2	1, 2, 3	24
c. Area Ventilation $\Delta$ Temp. - High (C31-TS-N602A,B,C,D,E,F)	3	2	1, 2, 3	24
d. SLCS Initiation (C41A-S1)	3(g)	NA	1, 2, 3	24
e. Reactor Vessel Water Level - Low, Level #2 (B21-LT-N024A-1,B-1 and B21-LT-N025A-1,B-1)				
(B21-LTM-N024A-1,B-1 and B21-LTM-N025A-1,B-1)	1, 3	2	1, 2, 3	24

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TABLE 3.3.2-1 (Continued)

ISOLATION ACTUATION INSTRUMENTATION

<u>TRIP FUNCTION AND INSTRUMENT NUMBER</u>	<u>VALVE GROUPS OPERATED BY SIGNAL(a)</u>	<u>MINIMUM NUMBER OPERABLE CHANNELS PER TRIP SYSTEM(b)(c)</u>	<u>APPLICABLE OPERATIONAL CONDITION</u>	<u>ACTION</u>
5. <u>SHUTDOWN COOLING SYSTEM ISOLATION</u>				
a. Reactor Vessel Water - Low, Level #1 (B21-LT-N017A-1,B-1,C-1,D-1) (B21-LTH-N017A-1,B-1,C-1,D-1)	2, 6, 7, 8	2	3, 4, 5	27
b. Reactor Steam Dome Pressure - High (B32-PS-N018A,B)	7, 8	1	1, 2, 3	27

TABLE 3.3.2-2

ISOLATION ACTUATION INSTRUMENTATION SETPOINTS

<u>TRIP FUNCTION AND INSTRUMENT NUMBER</u>	<u>TRIP SETPOINT</u>	<u>ALLOWABLE VALUE</u>
<b>1. PRIMARY CONTAINMENT ISOLATION</b>		
a. Reactor Vessel Water Level - Low		
1. Level #1 (B21-LTM-NO17A-1, B-1, C-1, D-1)	$\geq +162.5$ inches	$\geq +162.5$ inches
2. Level #2 (B21-LTM-NO24A-1, B-1 and B21-LTM-NO25A-1, B-1)	$\geq +112$ inches	$\geq +112$ inches
b. Drywell Pressure - High (C71-PS-N002 A,B,C,D)	$\leq 2$ psig	$\leq 2$ psig
c. Main Steam Line		
1. Radiation - High (D12-RM-K603 A, B, C, D)	$\leq 3 \times$ full power background	$\leq 3.5 \times$ full power background
2. Pressure - Low (B21-PS-N015 A,B,C,D)	$\geq 825$ psig	$\geq 825$ psig
3. Flow - High (B21-dPIS-N006 A,B,C,D; B21-dPIS-N007 A,B,C,D; B21-dPIS-N008 A,B,C,D; and B21-dPIS-N009 A,B,C,D)	$\leq 140\%$ of rated flow	$\leq 140\%$ of rated
d. Main Steam Line Tunnel Temperature - High (B21-TS-N010 A, B, C, D; B21-TS-N011 A, B, C, D; B21-TS-N012 A, B, C, D; and B21-TS-N013 A, B, C, D)	$\leq 200^{\circ}$ F	$\leq 200^{\circ}$ F
e. Condenser Vacuum - Low (B21-PS-N056 A,B,C,D)	$\geq 7$ Inches Hg Vacuum	$\geq 7$ Inches Hg vacuum
f. Turbine Building Area Temp. - High (B21-TS-3225 A, B, C, D; B21-TS-3226 A, B, C, D; B21-TS-3227 A, B, C, D; B21-TS-3228 A, B, C, D; B21-TS-3229 A, B, C, D; B21-TS-3230 A, B, C, D; B21-TS-3231 A, B, C, D and B21-TS-3232 A, B, C, D)	$\leq 200^{\circ}$ F	$\leq 200^{\circ}$ F

TABLE 3.3.2-2 (Continued)

ISOLATION ACTUATION INSTRUMENTATION SETPOINTS

<u>TRIP FUNCTION AND INSTRUMENT NUMBER</u>	<u>TRIP SETPOINT</u>	<u>ALLOWABLE VALUE</u>
<u>2. SECONDARY CONTAINMENT ISOLATION</u>		
a. Reactor Building Exhaust Radiation - High (D12-RM-N010 A, B)	$\leq 11$ mr/hr	$\leq 11$ mr/hr
b. Drywell Pressure - High (C71-PS-N002 A,B,C,D)	$\leq 2$ psig	$\leq 2$ psig
c. Reactor Vessel Water Level - Low, Level #2 (B21-LTM-N024A-1, B-1 and B21-LTM-N025A-1, B-1)	$\geq +112$ inches	$\geq +112$ inches
<u>3. REACTOR WATER CLEANUP SYSTEM ISOLATION</u>		
a. $\Delta$ Flow - High (G31-dFS-N603-1A, 1B)	$\leq 53$ gal/min	$\leq 53$ gal/min
b. Area Temperature - High (G31-TS-N600A, B, C, D, E, F)	$\leq 150^{\circ}$ F	$\leq 150^{\circ}$ F
c. Area Ventilation Temperature $\Delta$ Temp - High (G31-TS-N602A, B, C, D, E, F)	$\leq 50^{\circ}$ F	$\leq 50^{\circ}$ F
d. SLCS Initiation (C41A-S1)	NA	NA
e. Reactor Vessel Water - Low, Level #2 (B21-LTM-N024A-1, B-1 and B21-LTM-N025A-1, B-1)	$\geq +112$ inches	$\geq +112$ inches

TABLE 3.3.2-2 (continued)

ISOLATION ACTUATION INSTRUMENTATION SETPOINTS

<u>TRIP FUNCTION AND INSTRUMENT NUMBER</u>	<u>TRIP SETPOINT</u>	<u>ALLOWABLE VALUE</u>
5. <u>SHUTDOWN COOLING SYSTEM ISOLATION</u>		
a. Reactor Vessel Water - Low, Level #1 (B21-LTM-NO17A-1, B-1, C-1, D-1)	$\geq +162.5$ inches	$\geq +162.5$ inches
b. Reactor Steam Dome Pressure - High (B32-PS-NO18A, B)	$\leq 140$ psig	$\leq 140$ psig

TABLE 3.3.2.-3ISOLATION SYSTEM RESPONSE TIME

<u>TRIP FUNCTION AND INSTRUMENT NUMBER</u>	<u>RESPONSE TIME (Seconds)</u>
<u>1. PRIMARY CONTAINMENT ISOLATION</u>	
a. Reactor Vessel Water Level - Low	
1. Level #1 (B21-LT-N017A-1,B-1,C-1,D-1) (B21-LTM-N017A-1,B-1,C-1,D-1)	≤13
2. Level #2 (B21-LT-N024A-1,B-1 and B21-LT-N025A-1,B-1) (B21-LTM-N024A-1,B-1 and B21-LTM-N025A-1,B-1)	≤1.0**
b. Drywell Pressure - High (C71-PS-N002 A,B,C,D)	≤13
c. Main Steam Line	
1. Radiation - High* (D12-RM-K603A,B,C,D)	≤1.0**
2. Pressure - Low (B21-PS-N015 A,B,C,D)	≤13
3. Flow - High (B21-dPIS-N006 A,B,C,D; B21-dPIS-N007 A,B,C,D; B21-dPIS-N008 A,B,C,D and B21-dPIS-N009 A,B,C,D)	≤0.5**
d. Main Steam Line Tunnel Temperature - High (B21-TS-N010A,B,C,D; B21-TS-N011A,B,C,D; B21-TS-N012A,B,C,D; and B21-TS-N013A,B,C,D)	≤13
e. Condenser Vacuum - Low (S21-PS-N056 A,B,C,D)	≤13

TABLE 3.3.2-3 Continued

ISOLATION SYSTEM RESPONSE TIME

<u>TRIP FUNCTION AND INSTRUMENT NUMBER</u>	<u>RESPONSE TIME (Seconds)</u>
<u>1. PRIMARY CONTAINMENT ISOLATION (Continued)</u>	
f. Turbine Building Area Temperature - High (B21-TS-3225A,B,C,D; B21-TS-3226A,B,C,D; B21-TS-3227A,B,C,D; B21-TS-3228A,B,C,D; B21-TS-3229A,B,C,D; B21-TS-3230A,B,C,D; B21-TS-3231A,B,C,D; B21-TS-3232A,B,C,D)	NA
<u>2. SECONDARY CONTAINMENT ISOLATION</u>	
a. Reactor Building Exhaust Radiation - High * (D12-RM-NO10A,B)	≤13
b. Drywell Pressure - High (C71-PS-NO02 A,B,C,D)	≤13
c. Reactor Vessel Water Level - Low, Level #2 (B21-LT-NO24A-1,B-1 and B21-LT-NO25A-1,B-1) (B21-LTM-NO24A-1,B-1 and B21-LTM-NO25A-1,B-1)	≤1.0**

TABLE 3.3.2-1 (Continued)

ISOLATION SYSTEM RESPONSE TIME

<u>TRIP FUNCTION AND INSTRUMENT NUMBER</u>	<u>RESPONSE TIME (Seconds)</u>
<u>3. REACTOR WATER CLEANUP SYSTEM ISOLATION</u>	
a. $\Delta$ Flow - High (G31-dFS-N603-1A,1B)	$\leq 13$
b. Area Temperature - High (G31-TS-N600A,B,C,D,E,F)	$\leq 13$
c. Area Ventilation Temperature $\Delta$ T - High (G31-TS-N602A,B,C,D,E,F)	$\leq 13$
d. SLCS Initiation (C41A-S1)	NA
e. Reactor Vessel Water - Low, Level #2 (B21-LT-N024A-1,B-1 and B21-LT-N025A-1,B-1) B21-LTM-N024A-1,B-1 and B21-LTM-N025A-1,B-1)	$\leq 1.0^{**}$
<u>4. CORE STANDBY COOLING SYSTEMS ISOLATION</u>	
a. High Pressure Coolant Injection Isolation	
1. HPCI Steam Line Flow - High (E41-dPIS-N004 and E41-dPIS-N005)	$\leq 13$
2. HPCI Steam Supply Pressure - Low (E41-PSL-N001A,B,C,D)	$\leq 13$
3. HPCI Steam Line Tunnel Temperature - High (E41-TS-3314; E41-TS-3315; E41-TS-3316; E41-TS-3317; E41-TS-3318; E41-TS-3354; E41-TS-3488 and E41-TS-3489)	$\leq 13$
4. Bus Power Monitor (E41-K55 and E41-K56)	NA
5. HPCI Turbine Exhaust Diaphragm Pressure - High (E41-PSH-N012A,B,C,D)	NA
6. HPCI Steam Line Ambient Temperature - High (E51-TS-N603C,D)	NA
7. HPCI Steam Line Area $\Delta$ Temp - High (E51-dTS-N604C,D)	NA
8. Emergency Area Cooler Temperature - High (E41-TS-602A,B)	NA

TABLE 3.3.2-3 (Continued)

ISOLATION SYSTEM RESPONSE TIME

<u>TRIP FUNCTION AND INSTRUMENT NUMBER</u>	<u>RESPONSE TIME (Seconds)</u>
b. Reactor Core Isolation Cooling System Isolation	
1. RCIC Steam Line Flow - High (E51-dPIS-N017 and E51-dPIS-N018)	NA
2. RCIC Steam Supply Pressure - Low (E51-PS-N019A,B,C,D)	NA
3. RCIC Steam Line Tunnel Temp - High (E51-TS-3319; E51-TS-3320; E51-TS-3321; E51-TS-3322; E51-TS-3323; E51-TS-3355 and E51-TS-3487)	NA
4. Bus Power Monitor (E51-K42 and E51-K43)	NA
5. RCIC Turbine Exhaust Diaphragm Pressure - High (E51-PS-N012A,B,C,D)	NA
6. RCIC Steam Line Ambient Temperature - High (E51-TS-N603A,B)	NA
7. RCIC Steam Line Area $\Delta$ Temp - High (E51-dTS-N604A,B)	NA
8. Emergency Area Cooler Temperature - High (E51-TS-N602A,B)	NA
9. RCIC Equipment Room $\Delta$ Temp - High (E51-dTS-N601A,B)	NA
5. <u>SHUTDOWN COOLING SYSTEM ISOLATION</u>	
a. Reactor Vessel Water Level - Low, Level #1 (B21-LT-N017A-1,B-1,C-1,D-1) (B21-LTM-N017A-1,B-1,C-1,D-1)	NA
b. Reactor Steam Dome Pressure - High (B32-PS-N018A,B)	NA

\* Radiation monitors are exempt from response time testing. Response time shall be measured from detector output or the input of the first electronic component in the channel.

\*\* Isolation actuation instrumentation response time only.

TABLE 4.3.2-1

## ISOLATION ACTUATION INSTRUMENTATION SURVEILLANCE REQUIREMENTS

TRIP FUNCTION AND INSTRUMENT NUMBER	CHANNEL CHECK	CHANNEL FUNCTIONAL TEST	CHANNEL CALIBRATION	OPERATIONAL CONDITIONS IN WHICH SURVEILLANCE REQUIRED
1. PRIMARY CONTAINMENT ISOLATION				
a. Reactor Vessel Water Level - Low				
1. Level #1				
(B21-LT-N017A-1, B-1, C-1, D-1)	NA <sup>(a)</sup>	NA	R <sup>(b)</sup>	1, 2, 3
(B21-LTM-N017A-1, B-1, C-1, D-1)	D	H	H	
2. Level #2				
(B21-LT-N024A-1, E-1 and B21-LT-N025A-1, B-1)	NA <sup>(a)</sup>	NA	R <sup>(b)</sup>	1, 2, 3
(B21-LTM-N024A-1, B-1 and B21-LTM-N025A-1, B-1)	D	H	H	
b. Drywell Pressure - High (C71-PS-N002 A, B, C, D)	NA	M	Q	1, 2, 3
c. Main Steam Line				
1. Radiation - High (D12-RM-K603A, B, C, D)	D	W	R	1, 2, 3
2. Pressure - Low (B21-PS-N015 A, B, C, D)	NA	M	Q	1
3. Flow - High (B21-dPIS-N006 A, B, C, D; B21-dPIS-N007 A, B, C, D; B21-dPIS-N008 A, B, C, D; and B21-dPIS-N009 A, B, C, D)	NA	M	Q	1

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TABLE 4.3.2.-1 (Continued)

ISOLATION ACTUATION INSTRUMENTATION SURVEILLANCE REQUIREMENTS

<u>TRIP FUNCTION AND INSTRUMENT NUMBER</u>	<u>CHANNEL CHECK</u>	<u>CHANNEL FUNCTIONAL TEST</u>	<u>CHANNEL CALIBRATION</u>	<u>OPERATIONAL CONDITIONS IN WHICH SURVEILLANCE REQUIRED</u>
1. <u>PRIMARY CONTAINMENT ISOLATION</u> (Continued)				
d. Main Steam Line Tunnel Temperature - High (B21-TS-N010A,B,C,D; B21-TS-N011A,B,C,D; B21-TS-N012A,B,C,D and B21-TS-N013A,B,C,D)	NA	M	R	1, 2, 3
e. Condenser Vacuum - Low (B21-PS-N056 A,B,C,D)	NA	M	R	1, 2 <sup>#</sup>
f. Turbine Building Area Temp - High (B21-TS-3225A,B,C,D; B21-TS-3226A,B,C,D; B21-TS-3227A,B,C,D; B21-TS-3228A,B,C,D; B21-TS-3229A,B,C,D; B21-TS-3230A,B,C,D; B21-TS-3231A,B,C,D and B21-TS-3232A,B,C,D)	NA	M	R	1, 2, 3

<sup>#</sup>When reactor steam pressure  $\geq 500$  psig.

TABLE 4.3.2.-1 (Continued)

ISOLATION ACTUATION INSTRUMENTATION SURVEILLANCE REQUIREMENTS

<u>TRIP FUNCTION AND INSTRUMENT NUMBER</u>	<u>CHANNEL CHECK</u>	<u>CHANNEL FUNCTIONAL TEST</u>	<u>CHANNEL CALIBRATION</u>	<u>OPERATIONAL CONDITIONS IN WHICH SURVEILLANCE REQUIRED</u>
<b>2. <u>SECONDARY CONTAINMENT ISOLATION</u></b>				
a. Reactor Building Exhaust Radiation - High (D12-RM-N010A,B)	D	M	R	1, 2, 3, 5 and *
b. Drywell Pressure - High (C71-PS-N002 A,B,C,D)	NA	M	Q	1, 2, 3
c. Reactor Vessel Water Level - Low, Level #2 (B21-LT-N024A-1,B-1 and B21-LT-N025A-1,B-1) (B21-LTM-N024A-1,B-1 and B21-LTM-N025A-1,B-1)	NA <sup>(a)</sup>  D	NA  M	R <sup>(b)</sup>  H	  1, 2, 3
<b>3. <u>REACTOR WATER CLEANUP SYSTEM ISOLATION</u></b>				
a. $\Delta$ Flow - High (G31-dFS-N603-1A,1B)	D	M	R	1, 2, 3
b. Area Temperature - High (G31-TS-N604A,B,C,D,E,F)	NA	M	R	1, 2, 3
c. Area Ventilation $\Delta$ Temp - High (G31-TS-N602A,B,C,D,E,F)	NA	M	R	1, 2, 3

\*When handling irradiated fuel in the secondary containment.

TABLE 4.3.2-1 (Continued)

ISOLATION ACTUATION INSTRUMENTATION SURVEILLANCE REQUIREMENTS

<u>TRIP FUNCTION AND INSTRUMENT NUMBER</u>	<u>CHANNEL CHECK</u>	<u>CHANNEL FUNCTIONAL TEST</u>	<u>CHANNEL CALIBRATION</u>	<u>OPERATIONAL CONDITIONS IN WHICH SURVEILLANCE REQUIRED</u>
3. <u>REACTOR WATER CLEANUP SYSTEM ISOLATION</u> (continued)				
d. SLCS Initiation (C41A-S1)	NA	R	NA	1, 2, 3
e. Reactor Vessel Water Level - Low, Level #2 (B21-LT-N024A-1,B-1 and B21-LT-N025A-1,B-1) (B21-LTM-N024A-1,B-1 and B21-LTM-N025A-1,B-1)	NA <sup>(a)</sup>  D	NA  M	R <sup>(b)</sup>  M	  1, 2, 3

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TABLE 4.3.2-1 (Continued)

ISOLATION ACTUATION INSTRUMENTATION SURVEILLANCE REQUIREMENTS

<u>TRIP FUNCTION AND INSTRUMENT NUMBER</u>	<u>CHANNEL CHECK</u>	<u>CHANNEL FUNCTIONAL TEST</u>	<u>CHANNEL CALIBRATION</u>	<u>OPERATIONAL CONDITIONS IN WHICH SURVEILLANCE REQUIRED</u>
5. <u>SHUTDOWN COOLING SYSTEM ISOLATION</u>				
a. Reactor Vessel Water - Low, Level #1 (B21-LT-N017A-1,B-1,C-1,D-1) (B21-LTM-N017A-1,B-1,C-1,D-1)	NA <sup>(a)</sup> D	NA M	R <sup>(b)</sup> M	1, 2, 3
b. Reactor Steam Dome Pressure High (B32-PS-N018A,B)	NA	S/U*, M	R	1, 2, 3

\* If not performed within the previous 31 days.

(a) The transmitter channel check is satisfied by the trip unit channel check.  
A separate transmitter check is not required.

(b) Transmitters are exempted from the monthly channel calibration.

TABLE 3.3.3-1

EMERGENCY CORE COOLING SYSTEM ACTUATION INSTRUMENTATION

<u>TRIP FUNCTION AND INSTRUMENT NUMBER</u>	<u>MINIMUM NUMBER OPERABLE CHANNELS PER TRIP SYSTEM</u>	<u>APPLICABLE OPERATIONAL CONDITIONS</u>	<u>ACTION</u>
1. <u>CORE SPRAY SYSTEM</u>			
a. Reactor Vessel Water Level - Low, Level #3 (B21-LT-NO31A, B, C, D) (B21-LTS-NO31A-4, B-4, C-4, D-4)	2	1, 2, 3, 4, 5	30
b. Reactor Steam Dome Pressure - Low (Injection Permissive) (B21-PT-NO21A, B, C, D) (B21-PTM-NO21A-1, B-1, C-1, D-1) (B21-PTS-NO21A-2, B-2, C-2, D-2)	2	1, 2, 3, 4, 5	31
c. Drywell Pressure - High (E11-PS-NO11A,B,C,D)	2	1, 2, 3	30
d. Time Delay Relay	1	1, 2, 3, 4, 5	31
e. Bus Power Monitor #(E21-K1A, B)	1/bus	1, 2, 3, 4, 5	32
2. <u>LPCI MODE OF RHR SYSTEM</u>			
a. Drywell Pressure - High (E11-PS-NO11A,B,C,D)	2	1, 2, 3	30
b. Reactor Vessel Water Level - Low, Level #3 (B21-LT-NO31A, B, C, D) (B21-LTS-NO31A-4, B-4, C-4, D-4)	2	1, 2, 3, 4, <sup>A</sup> 5 <sup>A</sup>	30

<sup>A</sup>Not applicable when two core spray system subsystems are OPERABLE per Specification 3.5.3.1.

#Alarm Only.

TABLE 3.3.3-1 (continued)

EMERGENCY CORE COOLING SYSTEM ACTUATION INSTRUMENTATION

<u>TRIP FUNCTION AND INSTRUMENT NUMBER</u>	<u>MINIMUM NUMBER OPERABLE CHANNELS PER TRIP SYSTEM</u>	<u>APPLICABLE OPERATIONAL CONDITIONS</u>	<u>ACTION</u>
2. <u>LPCI MODE OF RHR SYSTEM</u> (continued)			
c. Reactor Vessel Shroud Level (Drywell Spray Permissive) (B21-LT-NO36 and B21-LT-NO37) (B21-LTM-NO36-1 and B21-LTM-NO37-1)	1	1, 2, 3, 4*, 5*	31
d. Reactor Steam Dome Pressure - Low (Injection Per- missive) (B21-PT-NO21A, B, C, D) (B21-PTM-NO21A-1, B-1, C-1, D-1) (B21-PTS-NO21A-2, B-2, C-2, D-2)			
1. RHR Pump Start and LPCI Injection Valve Actuation	2	1, 2, 3, 4*, 5*	31
2. Recirculation Loop Pump Discharge Valve Actuation	2	1, 2, 3, 4*, 5*	31
e. RHR Pump Start - Time Delay Relay	1	1, 2, 3, 4*, 5*	31
f. Bus Power Monitor# (E11-K106A, B)	1/bus	1, 2, 3, 4*, 5*	32

\*Not applicable when two core spray system subsystems are OPERABLE per Specification 3.5.3.1.  
 #Alarm only.

TABLE 3.3.3-1 (continued)

EMERGENCY CORE COOLING SYSTEM ACTUATION INSTRUMENTATION

<u>TRIP FUNCTION AND INSTRUMENT NUMBER</u>	<u>MINIMUM NUMBER OPERABLE CHANNELS PER TRIP SYSTEM</u>	<u>APPLICABLE OPERATIONAL CONDITIONS</u>	<u>ACTION</u>
3. <u>HPCI SYSTEM</u>			
a. Reactor Vessel Water Level - Low, Level #2 (B21-LT-NO31A, B, C, D) (B21-LTM-NO31A-1, B-1, C-1, D-1; B21-LTS-NO31A-2, B-2, C-2, D-2)	2	1, 2, 3	30
b. Drywell Pressure - High (E11-PS-NO11A,B,C,D)	2	1, 2, 3	30
c. Condensate Storage Tank Level-Low (E41-LS-NO02, E41-LS-NO03)	2**	1, 2, 3	33
d. Suppression Chamber Water Level-High (E41-LSH- NO15A, B)	2**	1, 2, 3	33
e. Bus Power Monitor # (E41-K55 and E41-K56)	1/bus	1, 2, 3	32
4. <u>ADS</u>			
a. Drywell Pressure - High, coincident with (E11-PS-NO10A,B,C,D)	2	1, 2, 3	30
b. Reactor Vessel Water Level - Low, Level #3 (B21-LT-NO31A, B, C, D) (B21-LTS-NO31A-3, B-3, C-3, D-3)	2	1, 2, 3	30

# Alarm only.

\*\*Provides signal to HPCI pump suction valves only.

TABLE 3.3.3-1 (continued)

EMERGENCY CORE COOLING SYSTEM ACTUATION INSTRUMENTATION

<u>TRIP FUNCTION AND INSTRUMENT NUMBER</u>	<u>MINIMUM NUMBER OPERABLE CHANNELS PER TRIP SYSTEM</u>	<u>APPLICABLE OPERATIONAL CONDITIONS</u>	<u>ACTION</u>		
4. <u>ADS</u> (continued)					
c. Reactor Vessel Water Level - Low Level #1 (B21-LT-N042A, B; B21-LTM-N042A-1, F-1)	1	1, 2, 3	30		
d. ADS Timer (B21-TDPU-K5A, B)	1	1, 2, 3	31		
e. Core Spray Pump Discharge Pressure - High (Permissive) (E21-PS-N008A, B and E21-PS-N009A, B)	2	1, 2, 3	31		
f. RHR (LPCI MODE) Pump Discharge Pressure - High (Permissive) (E11-PS-N016A,B,C,D and E11-PS-N020A,B,C,D)	2/pump	1, 2, 3	31		
g. Bus Power Monitor # (B21-K1A, B)	1/bus	1, 2, 3	32		
	<u>TOTAL NO. OF CHANNELS</u>	<u>CHANNELS TO TRIP</u>	<u>MINIMUM CHANNELS OPERABLE</u>	<u>APPLICABLE OPERATIONAL CONDITIONS</u>	<u>ACTION</u>
5. <u>LOSS OF POWER</u>					
a. 4.16 kv Emergency Bus Undervoltage (Loss of Voltage)	1/bus	1/bus	1/bus	1, 2, 3, 4 <sup>##</sup> , 5 <sup>##</sup>	34
b. 4.16 kv Emergency Bus Undervoltage (Degraded Voltage)	3/bus	2/bus	2/bus	1, 2, 3, 4 <sup>##</sup> , 5 <sup>##</sup>	35

#Alarm only.

##Required when ESF equipment is required to be OPERABLE.

TABLE 3.3.3-2

EMERGENCY CORE COOLING SYSTEM ACTUATION INSTRUMENTATION SETPOINTS

<u>TRIP FUNCTION AND INSTRUMENT NUMBER</u>	<u>TRIP SETPOINT</u>	<u>ALLOWABLE VALUE</u>
<u>1. CORE SPRAY SYSTEM</u>		
a. Reactor Vessel Water Level - Low, Level #3 (B21-LTS-N031A-4, B-4, C-4, D-4)	$\geq +2.5$ inches above top fuel guide	$\geq +2.5$ inches above top fuel guide
b. Reactor Steam Dome Pressure - Low (B21-PTS-N021A-2, B-2, C-2, D-2)	$410 \pm 15$ psig	$410 \pm 15$ psig
c. Drywell Pressure - High (E11-PS-N011A,B,C,D)	$\leq 2$ psig	$\leq 2$ psig
d. Time Delay Relay	$14 \leq t \leq 16$ secs	$14 \leq t \leq 16$ secs
e. Bus Power Monitor (E21-K1A, B)	NA	NA
<u>2. LPCI MODE OF RHR SYSTEM</u>		
a. Drywell Pressure - High (E11-PS-N011A,B,C,D)	$\leq 2$ psig	$\leq 2$ psig
b. Reactor Vessel Water Level - Low, Level #3 (B21-LTS-N031A-4, B-4, C-4, D-4)	$\geq +2.5$ inches above top fuel guide	$\geq +2.5$ inches above top fuel guide
c. Reactor Vessel Shroud Level (B21-LTM-N036-1 and B21-LTM-N037-1)	$\geq 53"$ below top fuel guide	$\geq 53"$ below top fuel guide

TABLE 3.3.3-2 (continued)

EMERGENCY CORE COOLING SYSTEM ACTUATION INSTRUMENTATION SETPOINTS

<u>TRIP FUNCTION AND INSTRUMENT NUMBER</u>	<u>TRIP SETPOINT</u>	<u>ALLOWABLE VALUE</u>
d. Reactor Steam Dome Pressure - Low		
1. RHR Pump Start and LCPI Injection Valve Actuation (B21-PTS-NO21A-2, B-2, C-2, D-2)	410 $\pm$ 15 psig	410 $\pm$ 15 psig
2. Recirculation Pump Discharge Valve Actuation (B21-P1M-NO21A-1, B-1, C-1, D-1)	310 $\pm$ 15 psig	310 $\pm$ 15 psig
e. RHR Pump Start - Time Delay Relay	9 $\leq$ t $\leq$ 11 seconds	9 $\leq$ t $\leq$ 11 seconds
f. Bus Power Monitor (E11-K106A, B)	NA	NA

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TABLE 3.3.3-2 (continued)

EMERGENCY CORE COOLING SYSTEM ACTUATION INSTRUMENTATION SETPOINTS

<u>TRIP FUNCTION AND INSTRUMENT NUMBER</u>	<u>TRIP SETPOINT</u>	<u>ALLOWABLE VALUE</u>
<b>3. HPCI SYSTEM</b>		
a. Reactor Vessel Water Level - Low, Level #2 (B21-LTS-N031A-2, B-2, C-2, D-2)	> +112 inches above top fuel guide	> +112 inches above top fuel guide
b. Drywell Pressure - High (E11-PS-N011A,B,C,D)	< 2 psig	< 2 psig
c. Condensate Storage Tank Level - Low (E41-LS-N002, E41-LS-N003)	> 23'4"	> 23'4"
d. Suppression Chamber Water Level - High* (E41-LSH-N015A, B)	< -2 feet	< -2 feet
e. Bus Power Monitor (E41-K55 and E41-K56)	N/A	N/A
<b>4. ADS</b>		
a. Drywell Pressure - High (E11-PS-N010A,B,C,D)	< 2 psig	< 2 psig
b. Reactor Vessel Water Level - Low, Level #3 (B21-LTS-N031A-3, B-3, C-3, D-3)	> +2.5 inches	> +2.5 inches
c. Reactor Vessel Water Level - Low, Level #1 (B21-LTM-N042A-1, B-1)	> +162.5 inches	> +162.5 inches
d. ADS Timer (B21-TDPU-K5A, B)	< 120 seconds	< 120 seconds
e. Core Spray Pump Discharge Pressure - High (E21-PS-N008A, B and E21-PS-N009A, B)	> 100 psig	> 100 psig
f. RHR (LPCI Mode) Pump Discharge Pressure- High (E11-PS-N016A, B, C, D and E11-PS-N020A, B, C, D)	> 100 psig	> 100 psig

\*Suppression chamber water level zero is the torus centerline minus 1 inch.

TABLE 3.3.3-2 (Continued)

EMERGENCY CORE COOLING SYSTEM ACTUATION INSTRUMENTATION SETPOINTS

TRIP FUNCTION AND INSTRUMENT NUMBER	TRIP SETPOINT	ALLOWABLE VALUE
4. <u>ADS</u> (continued)		
g. Bus Power Monitor (B21-K1A, B)	NA	NA
5. <u>LOSS OF POWER</u>		
a. 4.16 kv Emergency Bus Undervoltage (Loss of Voltage)*	a. 4.16 kv Basis - $2940 \pm 161$ volts b. 120 v Basis - $84 \pm 4.6$ volts c. $\leq 10$ sec. time delay	$2940 \pm 315$ volts $84 \pm 9$ volts $\leq 10$ sec. time delay
b. 4.16 kv Emergency Bus Undervoltage (Degraded Voltage)	a. 4.16 kv Basis - $3727 \pm 9$ volts b. 120 v Basis - $106.5 \pm 0.25$ volts c. $10 \pm 0.5$ sec. time delay	$3727 \pm 21$ volts $106.5 \pm 0.60$ volts $10 \pm 1.0$ sec. time delay

\*This is an inverse time delay voltage relay. The voltages shown are the maximum that will not result in a trip. Lower voltage conditions will result in decreased trip times.

TABLE 4.3.3-1

## EMERGENCY CORE COOLING SYSTEM ACTUATION INSTRUMENTATION SURVEILLANCE REQUIREMENTS

<u>TRIP FUNCTION AND INSTRUMENT NUMBER</u>	<u>CHANNEL CHECK</u>	<u>CHANNEL FUNCTIONAL TEST</u>	<u>CHANNEL CALIBRATION</u>	<u>OPERATIONAL CONDITIONS IN WHICH SURVEILLANCE REQUIRED</u>
<u>1. CORE SPRAY SYSTEM</u>				
a. Reactor Vessel Water Level - Low, Level #3 (B21-LT-N031A,B,C,D) (B21-LTS-N031A-4,B-4,C-4,D-4)	NA <sup>(a)</sup> D	NA M	R <sup>(b)</sup> M	1, 2, 3, 4, 5
b. Reactor Steam Dome Pressure - Low (B21-PT-N021A,B,C,D) (B21-PTM-N021A-1,B-1,C-1,D-1) (B21-PTS-N021A-2,B-2,-2,D-2)	NA <sup>(a)</sup> D D	NA M M	R <sup>(b)</sup> M M	1, 2, 3, 4, 5
c. Drywell Pressure - High (E11-PS-N011A,B,C,D)	NA	M	Q	1, 2, 3
d. Time Delay Relay	NA	R	R	1, 2, 3, 4, 5
e. Bus Power Monitor (E21-K1A,B)	NA	R	NA	1, 2, 3, 4, 5
<u>2. LPCI MODE OF RHR SYSTEM</u>				
a. Drywell Pressure - High (E11-PS-N011A,B,C,D)	NA	M	Q	1, 2, 3

(a) The transmitter channel check is satisfied by the trip unit channel check. A separate transmitter check is not required.

(b) Transmitters are exempted from the monthly channel calibration.

TABLE 4.3.3.-1 (Continued)

## EMERGENCY CORE COOLING SYSTEM ACTUATION INSTRUMENTATION SURVEILLANCE REQUIREMENTS

TRIP FUNCTION AND INSTRUMENT NUMBER	CHANNEL CHECK	CHANNEL FUNCTIONAL TEST	CHANNEL CALIBRATION	OPERATIONAL CONDITIONS IN WHICH SURVEILLANCE REQUIRED
2. LPCI MODE OF RHR SYSTEM (Continued)				
b. Reactor Vessel Water Level - Low, Level #3 (B21-LT-N031A,B,C,D) (B21-LTS-N031A-4,B-4,C-4,D-4)	NA <sup>(a)</sup> D	NA M	R <sup>(b)</sup> M	1, 2, 3, 4*, 5*
c. Reactor Vessel Shroud Level (B21-LT-N036; B21-LF-N037) (B21-LTM-N036-1 and B21-LTM-N037-1)	NA <sup>(a)</sup> D	NA M	R <sup>(b)</sup> M	1, 2, 3, 4*, 5*
d. Reactor Steam Dome Pressure - Low (B21-PT-N021A,B,C,D)	NA <sup>(a)</sup>	NA	R <sup>(b)</sup>	
1. RHR Pump Start and LPCI Injection Valve Actuation (B21-PTS-N021A-2,B-2,C-2,D-2)	D	M	M	1, 2, 3, 4*, 5*
2. Recirculation Loop Pump Discharge Valve Actuation (B21-PTH-N021A-1,B-1,C-1,D-1)	D	M	M	1, 2, 3, 4*, 5*
e. RHR Pump Start-Time Delay Relay	NA	R	R	1, 2, 3, 4*, 5*
f. Bus Power Monitor (E11-K106A,B)	NA	R	NA	1, 2, 3, 4*, 5*

\* Not applicable when two core spray system subsystems are OPERABLE per Specification 3.5.3.1.

(a) The transmitter channel check is satisfied by the trip unit channel check. A separate transmitter check is not required.

(b) Transmitters are exempted from the monthly channel calibration.

TABLE 4.3.2 -1 (Continued)

## EMERGENCY CORE COOLING SYSTEM ACTUATION INSTRUMENTATION SURVEILLANCE REQUIREMENTS

TRIP FUNCTION AND INSTRUMENT NUMBER	CHANNEL CHECK	CHANNEL FUNCTIONAL TEST	CHANNEL CALIBRATION	OPERATIONAL CONDITIONS IN WHICH SURVEILLANCE REQUIRED
3. HPCI SYSTEM				
a. Reactor Vessel Water Level - Low Level #2 (B21-LT-N031A,B,C,D) (B21-LTM-N031A-1,B-1,C-1,D-1) (B21-LTS-N031A-2,B-2,C-2,D-2)	NA <sup>(a)</sup> D D	NA M M	R <sup>(b)</sup> M M	1, 2, 3
b. Drywell Pressure - High (E11-PS-N011A,B,C,D)	NA	M	Q	1, 2, 3
c. Condensate Storage Tank Level Low (E41-LS-N002, E41-LS-N003)	NA	M	Q	1, 2, 3
d. Suppression Chamber Water Level - High (E41-LSH-N015A,B)	NA	M	Q	1, 2, 3
e. Bus Power Monitor (E41-K55 and E41-K56)	NA	R	NA	1, 2, 3
4. ADS				
a. Drywell Pressure - High (E11-PS-N010A,B,C,D)	NA	M	Q	1, 2, 3

(a) The transmitter channel check is satisfied by the trip unit channel check.  
A separate transmitter check is not required.

(b) Transmitters are exempted from the monthly channel calibration.

TABLE 4.3.3-1 (Continued)

## EMERGENCY CORE COOLING SYSTEM ACTUATION INSTRUMENTATION SURVEILLANCE REQUIREMENTS

TRIP FUNCTION AND INSTRUMENT NUMBER	CHANNEL CHECK	CHANNEL FUNCTIONAL TEST	CHANNEL CALIBRATION	OPERATIONAL CONDITIONS IN WHICH SURVEILLANCE REQUIRED
4. ADS (Continued)				
b. Reactor Vessel Water Level - Low, Level #3 (B21-LT-N031A,B,C,D) (B21-LTS-N031A-3,B-3,C-3,D-3)	NA <sup>(a)</sup> D	NA M	R <sup>(b)</sup> M	1, 2, 3
c. Reactor Vessel Water Level - Low Level #1 (B21-LT-N042A,B) (B21-LTM-N042A-1,B-1)	NA <sup>(a)</sup> D	NA M	R <sup>(b)</sup> M	1, 2, 3
d. ADS Timer (B21-TDPU-K5A,B)	NA	R	R	1, 2, 3
e. Core Spray Pump Discharge Pressure - High (E21-PS-N008A,B and E21-PS-N009A,B)	NA	M	Q	1, 2, 3
f. RHR (LPCI MODE) Pump Discharge Pressure - High (E11-PS-N016A,B,C,D and E11-PS-N020A,B,C,D)	NA	M	Q	1, 2, 3
g. Bus Power Monitor (B21-K1A,B)	NA	R	NA	1, 2, 3

(a) The transmitter channel check is satisfied by the trip unit channel check.  
A separate transmitter check is not required.

(b) Transmitters are exempted from the monthly channel calibration.

TABLE 4.3.3-1 (Continued)

EMERGENCY CORE COOLING SYSTEM ACTUATION INSTRUMENTATION SURVEILLANCE REQUIREMENTS

<u>FUNCTIONAL UNIT</u>	<u>CHANNEL CHECK</u>	<u>CHANNEL FUNCTIONAL TEST</u>	<u>CHANNEL CALIBRATION</u>	<u>OPERATIONAL CONDITIONS IN WHICH SURVEILLANCE REQUIRED</u>
5. <u>LOSS OF POWER</u>				
a. 4.16 kv Emergency Bus Undervoltage (Loss of Voltage)	NA	NA	R	1, 2, 3, 4*, 5*
b. 4.16 kv Emergency Bus Undervoltage (Degraded Voltage)	S	M	R	1, 2, 3, 4*, 5*

\*Required when ESF equipment is required to be OPERABLE.

TABLE 3.3.5.3-1

POST-ACCIDENT MONITORING INSTRUMENTATION

<u>INSTRUMENT AND INSTRUMENT NUMBER</u>	<u>MINIMUM NO. OF OPERABLE INSTRUMENT CHANNELS</u>
1. Reactor Vessel Water Level (B21-LITS-NO26A,B; B21-LR-615; B21-LI-R604A,B; B21-LT-NO37 and B21-LTM-NO37-1)	2
2. Reactor Vessel Pressure (B21-PI-ROO6A,B; C32-LPR-R608 and C32-PT-NO05A,B)	2
3. Containment Pressure (CAC-PI-2599; CAC-PT-2559; CAC-FR-1257-1 and CAC-PT-1257-1)	2
4. Containment Pressure (CAC-TR-1258-1 thru 13,22,23,24 and C91-P602)	2
5. Suppression Chamber Atmosphere Temperature (CAC-TR-1258-17 thru 20 and C91-P602)	2
6. Suppression Chamber Water Level (CAC-LI-2601-3; CAC-LA-2602; CAC-LT-2601; CAC-LT-2602 and CAC-LY-2601-1)	2
7. Suppression Chamber Water Temperature (CAC-TR-1258-14, 21 and C91-P602)	2
8. Containment Radiation (CAC-AR-1260; CAC-AQH-1260-1,2,3; CAC-AR-1261; CAC-AQH-1261-1,2,3; CAC-AR-1262 and CAC-AQH-1262-1,2,3)	2
9. Containment Oxygen (CAC-AT-1259-2; CAC-AR-1259; CAC-AT-1263-2 and CAC-AR-1263)	2
10. Containment Hydrogen (CAC-AT-1959-1; CAC-AR-1259; CAC-AT-1263-1 and CAC-AR-1263)	2
11. Safety relief valve position indication: Primary - Sonic (B21-FY-4157 through 4167 Secondary - Temp. (B21-TR-R614 points 1-11)	1/valve

TABLE 4.3.5.3-1

## POST-ACCIDENT MONITORING INSTRUMENTATION SURVEILLANCE REQUIREMENTS

INSTRUMENT AND INSTRUMENT NUMBER	CHANNEL CHECK	CHANNEL CALIBRATION
1. Reactor Vessel Water Level (B21-LITS-N026A,B; B21-LR-R615; B21-LI-R604A,B; B21-LT-N037 and B21-LTH-N037-1)	M	R
2. Reactor Vessel Pressure (B21-PI-R004A,B; C32-LPR-R608 and C32-PT-N005A,B)	M	R
3. Containment Pressure (CAC-PI-2599; CAC-PT-2599; CAC-PR-1257-1 and CAC-PT-1257-1)	M	R
4. Containment Temperature (CAC-TR-1258-1 thru 13,22,23,24 and C91-P602)	M	R
5. Suppression Chamber Atmosphere Temperature (CAC-TR-1258-17 thru 20 and C91-P602)	M	R
6. Suppression Chamber Water Level (CAC-LI-2601-3; CAC-LR-2602; CAC-LT-2601; CAC-LT-2602 and CAC-LY-2601-1)	M	R
7. Suppression Chamber Water Temperature (CAC-TR-1258-14, 21 and C91-P602)	M	R
8. Containment Radiation (CAC-AR-1260; CAC-AQH-1260-1,2,3; CAC-AR-1261; CAC-AQH-1261-1,2,3; CAC-AR-1262 and CAC-AQH-1262-1,2,3)	M	R
9. Containment Oxygen Concentration (CAC-AT-1259-2; CAC-AR-1259; CAC-AT-1263-2 and CAC-AR-1263)	M	R
10. Containment Hydrogen Concentration (CAC-AT-1259-1; CAC-AR-1259; CAC-AT-1263-1 and CAC-AR-1263)	M	R
11. Safety relief valve position indication (Primary-Sonic) (B21-FY-4157 thru 4167)	M	R
12. Safety relief valve position indication (Secondary-Temperature) (B21-TR-R614 points 1 thru 11)	M	R

TABLE 3.3.6.1-1

ATWS RECIRCULATION PUMP TRIP SYSTEM INSTRUMENTATION

<u>TRIP FUNCTION AND INSTRUMENT NUMBER</u>	<u>MINIMUM NUMBER OPERABLE TRIP SYSTEMS PER OPERATING PUMP</u>
1. Reactor Vessel Water Level - Low Low, Level 2 (B21-LT-N024A-2, B-2 and B21-LT-N025A-2, B-2) B21-LTM-N024A-2, B-2 and B21-LTM-N025A-2, B-2)	1
2. Reactor Vessel Pressure - High (B21-PS-N045A, B, C, D)	1

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TABLE 3.3.6.1-2

ATWS RECIRCULATION PUMP TRIP SYSTEM INSTRUMENTATION SETPOINTS

<u>TRIP FUNCTION AND INSTRUMENT NUMBER</u>	<u>TRIP SETPOINT</u>	<u>ALLOWABLE VALUE</u>
1. Reactor Vessel, Water Level - Low low, Level 2 (B21-LTM-NO24A-2, B-2 and B21-LTM-NO25A-2, B-2)	$\geq$ +112 inches above top fuel guide	$\geq$ +112 inches above top fuel guide
2. Reactor Vessel Pressure - High (B21-PS-NO45A, B, C, D)	$\leq$ 1120 psig	$\leq$ 1.20 psig

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TABLE 4.3.6.1-1

REACTOR RECIRCULATION PUMP TRIP SYSTEM INSTRUMENTATION SURVEILLANCE REQUIREMENTS

<u>TRIP FUNCTION AND INSTRUMENT NUMBER</u>	<u>CHANNEL CHECK</u>	<u>CHANNEL FUNCTIONAL TEST</u>	<u>CHANNEL CALIBRATION</u>
1. Reactor Vessel Water Level - Low Low, Level 2 (B21-LT-NO24A-2, B-2; B21-LT-NO25A-2, B-2) B21-LTM-NO24A-2, B-2; B21-LTM-NO25A-2, B-2)	NA <sup>(a)</sup> D	NA H	R <sup>(b)</sup> H
2. Reactor Vessel Pressure - High (B21-PS-NO45A, B, C, D)	NA	H	R

(a) The transmitter channel check is satisfied by the trip unit channel check.  
A separate transmitter check is not required.

(b) Transmitters are exempted from the monthly channel calibration.

## ELECTRICAL POWER SYSTEMS

### SURVEILLANCE REQUIREMENTS (Continued)

d. At least once per 18 months, during shutdown, by verifying that either:

1. The battery capacity is adequate to supply and maintain in OPERABLE status all of the actual emergency loads for 8 hours when the battery is subjected to a battery service test, or

2. The battery capacity is adequate to supply a dummy load of the following profile while maintaining the battery terminal voltage  $\geq$  105 volts.

a) During the initial 60 seconds of the test;

- 1) Battery 1A-1  $\geq$  1056.42 amperes,
- 2) Battery 1A-2  $\geq$  1211.90 amperes,
- 3) Battery 1B-1  $\geq$  1089.06 amperes, and
- 4) Battery 1B-2  $\geq$  1042.67 amperes.

b) During the remainder of the first 30 minutes of the test;

- 1) Battery 1A-1  $\geq$  243.19 amperes,
- 2) Battery 1A-2  $\geq$  159.10 amperes,
- 3) Battery 1B-1  $\geq$  176.79 amperes, and
- 4) Battery 1B-2  $\geq$  216.67 amperes.

c) During the remainder of the 8 hour test;

- 1) Battery 1A-1  $\geq$  89.52 amperes,
- 2) Battery 1A-2  $\geq$  50.34 amperes,
- 3) Battery 1B-1  $\geq$  53.39 amperes, and
- 4) Battery 1B-2  $\geq$  75.09 amperes.

3. At the completion of either of the above tests, the battery charger shall be demonstrated capable of recharging its battery at a rate of at least 200 amperes while supplying normal D.C. loads. The battery shall be charged to at least 95% capacity in  $\leq$  24 hours.

e. At least once per 60 months during shutdown by verifying that the battery capacity is at least 80% of the manufacturer's rating when subjected to a performance discharge test. This performance discharge test shall be performed subsequent to the satisfactory completion of the required battery service test and after normal equalizer charge.

TABLE 3.3.3-1 (Continued)

## EMERGENCY CORE COOLING SYSTEM ACTIVATION INSTRUMENTATION

TRIP FUNCTION AND INSTRUMENT NUMBER	MINIMUM NUMBER OPERABLE CHANNELS PER TRIP SYSTEM	APPLICABLE OPERATIONAL CONDITIONS	ACTION
4. ADS			
a. Drywell Pressure - High, coincident with (E11-PS-N010A,B,C,D)	2	1, 2, 3	30
b. Reactor Vessel Water Level - Low, Level #3 (B21-L1S-N031A,B,C,D)	2	1, 2, 3	30
c. Reactor Vessel Water Level - Low Level #1 (B21-L1S-N042 A, B)	1	1, 2, 3	30
d. ADS Timer (B21-TDPU-K5A,B)	1	1, 2, 3	31
e. Core Spray Pump Discharge Pressure - High (Permissive) (E21-PS-N008A,B and E21-PS-N009A,B)	2	1, 2, 3	31
f. RHR (LPCI MODE) Pump Discharge Pressure - High (Permissive) (E11-PS-N016A,B,C,D and E11-PS-N020A,B,C,D)	2/pump	1, 2, 3	31
g. Bus Power Monitor# (B21-K1A,B)	1/bus	1, 2, 3	32

FUNCTIONAL UNIT	TOTAL NO. OF CHANNELS	CHANNELS TO TRIP	MINIMUM CHANNELS OPERABLE	APPLICABLE OPERATIONAL CONDITIONS	ACTION
5. LOSS OF POWER					
a. 4.16 kv Emergency Bus Undervoltage (Loss of Voltage)	1/bus	1/bus	1/bus	1, 2, 3, 4 <sup>#</sup> , 5 <sup>##</sup>	34
b. 4.16 kv Emergency Bus Undervoltage (Degraded Voltage)	5/bus	2/bus	2/bus	1, 2, 3, 4 <sup>#</sup> , 5 <sup>##</sup>	35

\*Not applicable when two core spray system subsystems are OPERABLE per Specification 3.5.3.1.

\*\*Provides signal to HPCI pump suction valves only.

#Alarm only.

##Required when ESF equipment is required to be OPERABLE.

TABLE 3.3.3-2 (Continued)  
EMERGENCY CORE COOLING SYSTEM ACTUATION INSTRUMENTATION SETPOINTS

TRIP FUNCTION AND INSTRUMENT NUMBER	TRIP SETPOINT	ALLOWABLE VALUE
<b>3. HPCI SYSTEM</b>		
a. Reactor Vessel Water Level - Low, Level #2 (B21-LIS-N031A,B,C,D)	$\geq 112$ inches	$\geq 112$ inches
b. Drywell Pressure-High (E11-PS-N011A,B,C,D)	$\leq 2$ psig	$\leq 2$ psig
c. Condensate Storage Tank Level - Low (E41-LS-N002, E41-LS-N003)	$\geq 23'4''$	$\geq 23'4''$
d. Suppression Chamber Water Level - High* (E41-LSII-N015A,B)	$\leq -2$ feet	$\leq -2$ feet
e. Bus Power Monitor (E41-K55 and E41-K56)	NA	NA
<b>4. ADS</b>		
a. Drywell Pressure-High (E11-PS-N010A,B,C,D)	$\leq 2$ psig	$\leq 2$ psig
b. Reactor Vessel Water Level - Low, Level #3 (B21-LIS-N031A,B,C,D)	$\geq 2.5$ inches	$\geq 2.5$ inches
c. Reactor Vessel Water Level - Low Level #1 (B21-LIS-N042 A, B)	$\geq 162.5$ inches	$\geq 162.5$ inches
d. ADS Timer (B21-TOPU-K5A,B)	$\leq 120$ seconds	$\leq 120$ seconds
e. Core Spray Pump Discharge Pressure - High (E21-PS-N008A,B and E21-PS-N009A,B)	$\geq 100$ psig	$\geq 100$ psig
f. RHR (LPCI MODE) Pump Discharge Pressure - High (E11-PS-N016A,B,C,D and E11-PS-N020A,B,C,D)	$\geq 100$ psig	$\geq 100$ psig
g. Bus Power Monitor (B21-K1A,B)	NA	NA

\*Suppression chamber water level zero is the torus centerline minus 1 inch.