FUN	ICTIONAL UNIT	CHANNEL	CHANNEL CALIBRATION	CHANNEL FUNCTIONAL TEST	MODES IN WHICH SURVEILLANCE REQUIRED
1.	Manual Reactor Trip	NA	NA	S/U <sup>(1)</sup>	NA
2.	Power Level - High				
	a. Nuclear Power	S	D <sup>(2)</sup> ,M <sup>(3)</sup> ,Q <sup>(5)</sup>	(MQ)	1, 2
	b. AT Power	S	D <sup>(4)</sup> ,R	(ma)	1
3.	Reactor Coolant Flow - Low	S	R	SMQ.	1, 2
4.	Pressurizer Pressure - High	S	R (	Mal	1, 2
5.	Containment Pressure - High	S	R /	MR	1, 2
6.	Steam Generator Pressure - Low	S	R	MQ)	1, 2
7.	Steam Generator Water Level - Low	S	R (	MQ	1, 2
8.	Axial Flux Offset	S	R	MQS	1
9.	a. Thermal Margin/Low Pressure	S	R	MQ1	1, 2
	<ul> <li>b. Steam Generator Pressure</li> <li>Difference - High</li> </ul>	S	R	Mal	1, 2
10.	Loss of Load	NA	NA	S/U <sup>(1)</sup>	NA

**TABLE 4.3-1** 

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CALVERT CLIFFS - UNIT 1

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REACTOR PROTECTIVE	CE REQUIREMENTS			
FUNCTIONAL UNIT	CHANNEL	CHANNEL CALIBRATION	CHANNEL FUNCTIONAL TEST	MODES IN WHICH SURVEILLANCE REQUIRED
11. Wide Range Logarithmic Neutron Flux Monitor	S	R <sup>(5)</sup>	S/U <sup>(1)</sup>	1, 2, 3, 4, 5 and
12. Reactor Protection System Logic Matrices	NA		and S/U <sup>(1)</sup>	1, 2
<ol> <li>Reactor Protection System Logic Matrix Relays</li> </ol>	NA	NA E	QM) and S/U <sup>(1)</sup>	1, 2
14. Reactor Trip Breakers	NA	NA	м	1, 2 and *

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FUNC	CTIONAL UNIT	CHANNEL CHECK	CHANNEL CALIBRATION	CHANNEL FUNCTIONAL TEST	MODES IN WHICH SURVEILLANCE <u>REQUIRED</u>
1.	SAFETY INJECTION (SIAS)				
	<ul> <li>a. Manual (Trip buttons)</li> <li>b. Containment Pressure - High</li> <li>c. Pressurizer Pressure - Low</li> <li>d. Automatic Actuation Logic</li> </ul>	NA S S NA	NA R R NA	M(1)(2)(3)	NA 1, 2, 3 1, 2, 3 1, 2, 3 1, 2, 3
2.	CONTAINMENT SPRAY (CSAS)				
	a. Manual (Trip buttons) b. Containment Pressure - High c. Automatic Actuation Logic	NA S NA	NA R NA	M(1)(6)	NA 1, 2, 3 1, 2, 3

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CAL		TAB	LE 4.3-2 (Contin	nued)		
CALVERT		ENGINEERED SAFETY FEATURE ACTUATIO	N SYSTEM INSTRU	MENTATION SURVEI	LLANCE REQUIR	EMENTS
CLIFFS -	FUN	ICTIONAL UNIT	CHANNEL CHECK	CHANNEL CALIBRATION	CHANNEL FUNCTIONAL <u>TEST</u>	MODES IN WHICH SURVEILLANCE REQUIRED
UNIT	4.	MAIN STEAM LINE ISOLATION (SGIS)				
4		a. Manual SGIS (MSIV Hand Switches and Feed Head Isolation Hand Switches)	NA	NA	R	NA
		b. Steam Generator Pressure - Low c. Automatic Actuation Logic	S NA	R NA	MITIS	1, 2, 3 1, 2, 3
3/4	5.	CONTAINMENT SUMP RECIRCULATION (RAS)				
3-20		a. Manual RAS (Trip Buttons) b. Refueling Water Tank - Low c. Automatic Actuation Logic	NA NA NA	NA R NA	M	NA 1, 2, 3 1, 2, 3
	6.	CONTAINMENT PURGE VALVES ISOLATION				
		<ul> <li>Manual (Purge Valve Control Switches)</li> </ul>	NA	NA	R	NA
Ame		<ul> <li>b. Containment Radiation - High Area Monitor</li> </ul>	S	R	(M.S)	6**

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TABLE	4.3-2	(Continued)
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# ENGINEERED SAFETY FEATURE ACTUATION SYSTEM INSTRUMENTATION SURVEILLANCE REQUIREMENTS

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FUI	ACTIONAL UNIT	CHANNEL CHECK	CHANNEL CALIBRATION	CHANNEL FUNCTIONAL TEST	MODES IN WHICH SURVEILLANCE REQUIRED	
7.	LOSS OF POWER					
	a. 4.16 kv Emergency Bus Undervoltage	NA	R	(ma)	1, 2, 3	
	<pre>(Loss of Voltage) b. 4.16 kv Emergency Bus Undervoltage (Degraded Voltage)</pre>	NA	R	To	1, 2, 3	
8.	CVCS ISOLATION					
	West Penetration Room/Letdown Heat Exchanger Room Pressure - High	NA	R	(ma)	1, 2, 3, 4	
9.	AUXILIARY FEEDWATER					
	a. Manual (Trip Buttons) b. Steam Generator Level - Low c. Steam Generator ∆P - High d. Automatic Actuation Logic	NA S S NA	NA R R NA	R CAR	NA 1, 2, 3 1, 2, 3 1, 2, 3 1, 2, 3	

CALVERT CLIFFS - UNIT 1

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	TABLE 4.3-2 (Continued)
	TABLE NOTATION
1	Containment isolation of non-essential penetrations is also initiated by SIAS (functional units 1.a and 1.c).
**	Must be <b>OPERABLE</b> only in <b>MODE</b> 6 when the valves are required <b>OPERABLE</b> and they are open.
(1)	The logic circuits shall be tested manually at least once per 31 days.
(2)劇	SIAS logic circuits A-10 and B-10 shall be tested monthly with the exception of the Safety Injection Tank isolation valves. The SIAS logic circuits for these valves are exempted from testing during operation; however, these logic circuits shall be tested at least once per 18 months during shutdown.
(3)	SIAS logic circuits A-5, and B-5 are exempted from testing during operation; however, these logic circuits shall be tested at least once per 18 months during shutdown.
(4)	CIS logic circuits A-5 and B-5 are exempted from testing during operation; however, these logic circuits shall be tested at least once per 18 months during shutdown.
(5)	SGIS logic circuits A-1 and B-1 are exempted from testing during operation; however, these logic circuits shall be tested at least once per 18 months during shutdown.
(6)	CSAS logic circuits A-3 and B-3 are exempted from testing during operation; however, these logic circuits shall be tested at least once per 18 months during shutdown.
K	Monthly tests not required on A-10 and B-10 until EDG logic circuit modifications completed. Modifications to be completed during or before Unit 1 Refueling Outage Number 10.

CALVERT CLIFFS - UNIT 1

Amendment No. 184 \$

### BASES

### 3/4.3.1 and 3/4.3.2 PROTECTIVE AND ENGINEERED SAFETY FEATURES (ESF) INSTRUMENTATION

The OPERABILITY of the protective and ESF instrumentation systems and bypasses ensure that 1) the associated ESF action and/or reactor trip will be initiated when the parameter monitored by each channel or combination thereof exceeds its setpoint, 2) the specified coincidence logic is maintained. 3) sufficient redundancy is maintained to permit a channel to be out of service for testing or maintenance, and 4) sufficient system functional capability is available for protective and ESF purposes from diverse parameters.

The OPERABILITY of these systems is required to provide the overall reliability, redundance and diversity assumed available in the facility design for the protection and mitigation of accident and transient conditions. The integrated operation of each of these systems is consistent with the assumptions used in the accident analyses.

The surveillance requirements specified for these systems ensure that the overall system functional capability is maintained comparable to the original design standards. The periodic surveillance tests performed at the minimum frequencies are sufficient to demonstrate this capability.

The measurement of response time at the specified frequencies provides assurance that the protective and ESF action function associated with each channel is completed within the time limit assumed in the accident analyses. No credit was taken in the analyses for those channels with response times indicated as not applicable.

Response time may be demonstrated by any series of sequential, overlapping or total channel test measurements provided that such tests demonstrate the total channel response time as defined. Sensor response time verification may be demonstrated by either 1) in place, onsite or offsite test measurements or 2) utilizing replacement sensors with certified response times. The response time limits are contained in UFSAR Chapter 7, and updated in accordance with 10 CFR 50.71(e).

3/4.3.3 MONITORING INSTRUMENTATION

### 3/4.3.3.1 Radiation Monitoring Instrumentation

The **OPERABILITY** of the radiation monitoring channels ensures that 1) the radiation levels are continually measured in the areas served by the individual channels and 2) the alarm or automatic action is initiated when the radiation level trip setpoint is exceeded.

The quarterly frequency for the channel functional tests for these systems is based on the analysis presented in the NRC approved topical Report CEN-327, "RAS/ESFAS Extended Test Interval Evaluation," as supplemented.

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# ATTACHMENT (2)

# UNIT 2 TECHNICAL SPECIFICATION REVISED PAGES

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INSTRUMENTATION

## REACTOR PROTECTIVE INSTRUMENTATION SURVEILLANCE REQUIREMENTS

FUN	CTIONAL UNIT	CHANNEL	CHANNEL CALIBRATION	CHANNEL FUNCTIONAL TEST	MODES IN WHICH SURVEILLANCE REQUIRED
1.	Manual Reactor Trip	NA	NA	S/U <sup>(1)</sup>	NA
2.	Power Level - High				
	a. Nuclear Power	S	D <sup>(2)</sup> ,M <sup>(3)</sup> ,Q <sup>(5)</sup>	EMQ)	1, 2
	b. AT Power	S	D <sup>(4)</sup> ,R	>Mal	1
3.	Reactor Coolant Flow - Low	S	R	(MQ)	1, 2
4.	Pressurizer Pressure - High	S	R	(MQ)	1, 2
5.	Containment Pressure - High	S	R	> Ma 1	1, 2
6.	Steam Generator Pressure - Low	S	R	Mal	1, 2
7.	Steam Generator Water Level - Low	S	R	MR	1, 2
8.	A: 1 Flux Offset	S	R (	MQ	1
9.	a. Thermal Margin/Low Pressure	S	R (	MQJ	1, 2
	<ul> <li>Steam Generator Pressure</li> <li>Difference - High</li> </ul>	S	R	mat	1, 2
10.	Loss of Load	NA	NA	S/U <sup>(1)</sup>	NA

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REACTOR PROTECTIVE I	INSTRUMENTA	TION SURVEILLANC	E REQUIREMENTS		
UNCTIONAL UNIT	CHANNEL	CHANNEL CALIBRATION	CHANNEL FUNCTIONAL TEST	MODES IN WHICH SURVEILLANCE REQUIRED	
1. Wide Range Logarithmic Neutron Flux Monitor	S	R <sup>(5)</sup>	S/U <sup>(1)</sup>	1, 2, 3, 4, 5 and	
<ol> <li>Reactor Protection System Logic Matrices</li> </ol>	NA	~	$Q$ M and $S/U^{(1)}$	1, 2	
<ol> <li>Reactor Protection System Logic Matrix Relays</li> </ol>	NA	NA EC	Mand S/U <sup>(1)</sup>	1, 2	
4. Reactor Trip Breakers	NA	NA	м	1, 2 and *	

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FUN	CTIONAL UNIT	CHANNEL CHECK	CHANNEL CALIBRATION	CHANNEL FUNCTIONAL TEST	MODES IN WHICH SURVEILLANCE <u>REQUIRED</u>
1.	SAFETY INJECTION (SIAS)				
	a. Manual (Trip buttons) b. Containment Pressure - High c. Pressurizer Pressure - Low d. Automatic Actuation Logic	NA S S NA	NA R R NA	M(1)(2)(3)	NA 1, 2, 3 1, 2, 3 1, 2, 3 1, 2, 3
2.	CONTAINMENT SPRAY (CSAS)				
	a. Manual (Trip buttons) b. Containment Pressure - High c. Automatic Actuation Logic	NA S NA	NA R NA	M(1)(6)	NA 1, 2, 3 1, 2, 3
3.	CONTAINMENT ISOLATION (CIS)"				
	a. Manual CIS (Trip buttons) b. Containment Pressure - High c. Automatic Actuation Logic	NA S NA	NA R NA	M(1)(4)	NA 1, 2, 3 1, 2, 3

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TABLE 4.3-2

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		TABI	LE 4.3-2 (Contin	nued)					
ENGINEERED SAFETY FEATURE ACTUATION SYSTEM INSTRUMENTATION SURVEILLANCE REQUIREMENTS									
FUNCTIONAL UNIT			CHANNEL CHECK	CHANNEL CALIBRATIO.	CHANNEL FUNCTIONAL <u>TEST</u>	MODES IN WHICH SURVEILLANCE <u>REQUIRED</u>			
4. MAIN STEAM LINE ISOLATION (SGIS)									
	and	al SGIS (MSIV Hand Switches Feed Head Isolation Hand ches)	NA	NA	R	NA			
	b. Stea	m Generator Pressure - Low matic Actuation Logic	S NA	R NA	MITIS	1, 2, 3 1, 2, 3			
5.	CONTAINM	ENT SUMP RECIRCULATION (RAS)							
	b. Refu	al RAS (Trip Buttons) eling Water Tank - Low matic Actuation Logic	NA NA NA	NA R NA	MAR Q	NA 1, 2, 3 1, 2, 3			
6.	CONTAINM	EN PURGE VALVES ISOLATION							
		al (Perge Valve Control ches)	NA	NA	Ra	NA 6			
	b. Cont	airsect Radiation - High Hunitor	S	R	i				

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			LLANCE REQUIR	EMENTS	
CTIONAL UNIT	CHANNEL CHECK	CHANNEL CALIBRATION	CHANNEL FUNCTIONAL TEST	MODES IN WHICH SURVEILLANCE <u>REQUIRED</u>	
LOSS OF POWER					
a. 4.16 ky Emergency Bus Undervoltage	NA	R	EMQ	1, 2, 3	
<pre>(Loss of Voltage) b. 4.16 kv Emergency Bus Undervoltage (Degraded Voltage)</pre>	NA	R	MD	1, 2, 3	
CVCS ISOLATION					
West Penetration Room/Letdown Heat Exchanger Rocm Pressure - High	NA	R	EMQ	1, 2, 3, 4	
AUXILIARY FEEDWATER					
<ul> <li>a. Manual (Trip Buttons)</li> <li>b. Steam Generator Level - Low</li> <li>c. Steam Generator △P - High</li> <li>d. Automatic Actuation Logic</li> </ul>	NA S S NA	NA R R NA	M R R	NA 1, 2, 3 1, 2, 3 1, 2, 3 1, 2, 3	
	<ul> <li>ENGINEERED SAFETY FEATURE ACTUATION</li> <li>CTIONAL UNIT</li> <li>LOSS OF POWER</li> <li>a. 4.16 kv Emergency Bus Undervoltage (Loss of Voltage)</li> <li>b. 4.16 kv Emergency Bus Undervoltage (Degraded Voltage)</li> <li>CVCS ISOLATION</li> <li>West Penetration Room/Letdown Heat Exchanger Rocm Pressure - High</li> <li>AUXILLIARY FEEDWATER</li> <li>a. Manual (Trip Buttons)</li> <li>b. Steam Generator Level - Low</li> <li>c. Steam Generator ΔP - High</li> </ul>	ENGINEERED SAFETY FEATURE ACTUATION SYSTEM INSTRU         CTIONAL UNIT       CHANNEL CHECK         LOSS OF POWER       CHECK         a. 4.16 kv Emergency Bus Undervoltage (Loss of Voltage)       NA (Loss of Voltage)         b. 4.16 kv Emergency Bus Undervoltage (Degraded Voltage)       NA (Degraded Voltage)         CVCS ISOLATION       NA Heat Exchanger Rocm Pressure - High         AUXILIARY FEEDWATER       NA S. Steam Generator Level - Low         a. Manual (Trip Buttons)       NA S.	CTIONAL UNITCHANNEL CHECKCHANNEL CALIBRATIONLOSS OF POWERa. 4.16 kv Emergency Bus UndervoltageNAR (Loss of Voltage)b. 4.16 kv Emergency Bus UndervoltageNAR (Degraded Voltage)b. 4.16 kv Emergency Bus UndervoltageNAR (Degraded Voltage)CVCS ISOLATIONVAR Heat Exchanger Rocm Pressure - HighAUXILIARY FEEDWATERNANAa. Manual (Trip Buttons)NANA Sb. Steam Generator Level - LowSR Cc. Steam Generator $\Delta P$ - HighSR	ENGINEERED SAFETY FEATURE ACTUATION SYSTEM INSTRUMENTATION SURVEILLANCE REQUIR         CHANNEL       CHANNEL       CHANNEL       CHANNEL       CHANNEL         CTIONAL UNIT       CHECK       CALIBRATION       FUNCTIONAL         LOSS OF POWER       a. 4.16 kv Emergency Bus Undervoltage       NA       R       IEST         LOSS of Voltage)       b. 4.16 kv Emergency Bus Undervoltage       NA       R       IEST         D. 4.16 kv Emergency Bus Undervoltage       NA       R       Image: CVCS ISOLATION         VCCS ISOLATION       Vest Penetration Room/Letdown       NA       R       Image: CVCS         AUXILLIARY FEEDWATER       A.       NA       R       Image: CVCS         a.       Manual (Trip Buttons)       NA       NA       R         b.       Steam Generator Level - Low       S       R       Image: CVCS         c.       Steam Generator AP - High       S       R       Image: CVCS	

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INSTRUMENTATION

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### TABLE 4.3-2 (Continued)

### TABLE NOTATION

Containment isolation of non-essential penetrations is also initiated by SIAS (functional units 1.a and 1.c).

\*\* Must be OPERABLE only in MODE 6 when the valves are required OPERABLE and they are open.

- (1) The logic circuits shall be tested manually at least once per 31 days.
- (2) SIAS logic circuits A-10 and B-10 shall be tested monthly with the exception of the Safety Injection Tank isolation valves. The SIAS logic circuits for these valves are exempted from testing during operation; however, these logic circuits shall be tested at least once per 18 months during shutdown.
- (3) SIAS logic circuits A-5 and B-5 are exempted from testing during operation; however, these logic circuits shall be tested at least once per 18 months during shutdown.
- (4) CIS logic circuits A-5 and B-5 are exempted from testing during operation; however, these logic circuits shall be tested at least once per 18 months during shutdown.
- (5) SGIS logic circuits A-1 and B-1 are exempted from testing during operation; however, these logic circuits shall be tested at least once per 18 months during shutdown.
- (6) CSAS logic circuits A-3 and B-3 are exempted from testing during operation; however, these logic circuits shall be tested at least once per 18 months during shutdown.

Monthly tests not required on A-10 and B-10 until EDG logic circuit modifications completed. Modifications to be completed during or before Unit 2 Refueling Outage Number 9.

CALVERT CLIFFS - UNIT 2

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### BASES

### 3/4.3.1 and 3/4.3.2 PROTECTIVE AND ENGINEERED SAFETY FEATURES (ESF) INSTRUMENTATION

The **OPERABILITY** of the protective and ESF instrumentation systems and bypasses ensure that 1) the associated ESF action and/or reactor trip will be initiated when the parameter monitored by each channel or combination thereof exceeds its setpoint, 2) the specified coincidence logic is maintained, 3) sufficient redundancy is maintained to permit a channel to be out of service for testing or maintenance, and 4) sufficient system functional capability is available for protective and ESF purposes from diverse parameters.

The OPERABILITY of these systems is required to provide the overall reliability, redundance and diversity assumed available in the facility design for the protection and mitigation of accident and transient conditions. The integrated operation of each of these systems is consistent with the assumptions used in the accident analyses.

The surveillance requirements specified for these systems ensure that the overall system functional capability is maintained comparable to the original design standards. The periodic surveillance tests performed at the minimum frequencies are sufficient to demonstrate this capability.

The measurement of response time at the specified frequencies provides assurance that the protective and ESF action function associated with each channel is completed within the time limit assumed in the accident analyses. No credit was taken in the analyses for those channels with response times indicated as not applicable.

Response time may be demonstrated by any series of sequential, overlapping or total channel test measurements provided that such tests demonstrate the total channel response time as defined. Sensor response time verification may be demonstrated by either 1) in place, onsite or offsite test measurements or 2) utilizing replacement sensors with certified response times. The response time limits are contained in UFSAR Chapter 7, and updated in accordance with 10 CFR 50.71(e).

3/4.3.3 MONITORING INSTRUMENTATION

3/4.3.3.1 Radiation Monitoring Instrumentation

The OPERABILITY of the radiation monitoring channels ensures that 1) the radiation levels are continually measured in the areas served by the individual channels and 2) the alarm or automatic action is initiated when the radiation level trip setpoint is exceeded.

The guarterly frequency for the channel functional tests for these systems is based on the analysis presented in the NRC approved topical Report CEN-327, "RPS/ESFAS Extended Test Interval Evaluation," as supplemented.

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