

STPEGS UFSAR

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CHAPTER 16

TECHNICAL SPECIFICATIONS

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CHAPTER 16

TECHNICAL SPECIFICATIONS

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16.0 TECHNICAL SPECIFICATIONS

16.1 TECHNICAL REQUIREMENTS MANUAL

The Technical Requirements Manual is a document containing in part information that has been relocated from the Technical Specifications. Relocation of information from the Technical Specifications to the Technical Requirements Manual is based on the requirements of the “Final Policy Statement on Technical Specifications Improvements for Nuclear Power Reactors” issued by the NRC in 1993. The Technical Requirements Manual is considered a licensing basis document and as such overall control of the document is governed by applicable station requirements for control of licensing basis documents.

Changes made to the Technical Requirements Manual are governed by the criteria of 10CFR50.59 to determine if changes require approval by the NRC prior to implementation.

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TABLE 16.1-1

CONTAINMENT ISOLATION VALVES

Penetration	Valve No.	Function	Maximum Isolation Time (seconds)
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CONTAINMENT ISOLATION PHASE A

M-51	CV0033A*	CVCS Seal Water Injection	10
M-51	CV0033B*	CVCS Seal Water Injection	10
M-52	CV0033C*	CVCS Seal Water Injection	10
M-52	CV0033D*	CVCS Seal Water Injection	10
M-46	XCV0023	CVCS Letdown	15
M-46	XCV0024	CVCS Letdown	15
M-48	XCV0025	CVCS Charging	15
M-47	CV0077	RCP Seal Water Leakoff Return	10
M-47	CV0079	RCP Seal Water Leakoff Return	10
M-72	ED0064	Containment Normal Sump Discharge	10
M-72	FV-7800	Containment Normal Sump Discharge	10
M-77	FP0756	Containment Fire Protection	10

M-72 ⁽¹⁾	FV-2453	Containment Sump Post Accident Sample	5
M-86 ⁽¹⁾	FV-2454	RHR Post Accident Sample	5
M-85 ⁽¹⁾	FV-2455	RCS Post Accident Sample	5
M-85 ⁽¹⁾	FV-2455A	RCS Post Accident Sample	5

HISTORIC INFORMATION

HISTORIC INFORMATION
CN-3309 and CN-3301

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TABLE 16.1-1 (Continued)

CONTAINMENT ISOLATION VALVES

Penetration	Valve No.	Function	Maximum Isolation Time (seconds)
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CONTAINMENT ISOLATION PHASE A (Continued)

M-82 ⁽¹⁾	FV-2456	Containment Atmosphere Post Accident Sample	5
M-82 ⁽¹⁾	FV-2457	Containment Atmosphere Post Accident Sample	5
M-45 ⁽¹⁾	FV-2458	Liquid Post Accident Sample Discharge	5
M-45	FV-3651	Pressurizer Relief Tank Makeup	10
M-68	FV-3652	Pressurizer Relief Tank Vent	10
M-68	FV-3653	Pressurizer Relief Tank Vent	5
M-68	FV-3970	SIS Check Valve Test	10
M-68	FV-3971	SIS Check Valve Test	10
M-68	FV-3983	Accumulator Nitrogen Supply	10
M-80 ⁽¹⁾	FV-4135	Containment Hydrogen Monitoring	5
M-80 ⁽¹⁾	FV-4101	Containment Hydrogen Monitoring	5
M-82 ⁽¹⁾	FV-4104	Containment Hydrogen Monitoring	5
M-80 ⁽¹⁾	FV-4127	Containment Hydrogen Monitoring	5
M-80 ⁽¹⁾	FV-4128	Containment Hydrogen Monitoring	5
M-82 ⁽¹⁾	FV-4136	Containment Hydrogen Monitoring	5

HISTORIC INFORMATION

HISTORIC INFORMATION
CN-3309 and CN-3301

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TABLE 16.1-1 (Continued)

CONTAINMENT ISOLATION VALVES

Penetration	Valve No.	Function	Maximum Isolation Time (seconds)
CONTAINMENT ISOLATION PHASE A (Continued)			
M-82 ⁽¹⁾	FV-4133	Containment Hydrogen Monitoring	5
M-82 ⁽¹⁾	FV-4134	Containment Hydrogen Monitoring	5
M-85 ⁽¹⁾	FV-4450	Pressurizer Vapor Sample	5
M-85 ⁽¹⁾	FV-4451	Pressurizer Liquid Sample	5
M-85 ⁽¹⁾	FV-4452	Pressurizer Vapor Sample	10
M-85 ⁽¹⁾	FV-4451B	Pressurizer Liquid Sample	10
M-85 ⁽¹⁾	FV-4454	RCS Hot Leg Sample	5
M-85 ⁽¹⁾	FV-4455	RCS Hot Leg Sample	5
M-85 ⁽¹⁾	FV-4456	RCS Hot Leg Sample	10
N.A.	FV-1025	Personnel Air Lock Air Supply	10
N.A.	FV-1026	Personnel Air Lock Air Supply	10
N.A.	FV-1027	Personnel Air Lock Auto Leak Rate Monitoring	10
N.A.	FV-1028	Personnel Air Lock Auto Leak Rate Monitoring	10
M-86 ⁽¹⁾	FV-4823	RHR Sample	5
M-86 ⁽¹⁾	FV-4461	RHR Sample	10
M-29 ⁽¹⁾	FV-4824	SI Accumulator Sample	5
M-29 ⁽¹⁾	FV-4466	SI Accumulator Sample	10
M-58	FV-8565	Containment Instrument Air	10
M-56	WL0312	RCDT Discharge	10

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TABLE 16.1-1 (Continued)

CONTAINMENT ISOLATION VALVES

Penetration	Valve No.	Function	Maximum Isolation Time (seconds)
CONTAINMENT ISOLATION PHASE A (Continued)			
M-56	FV-4913	RCDT Discharge	10
M-30	FV-4919	RCDT Vent	10
M-30	FV-4920	RCDT Vent	5
CONTAINMENT VENTILATION ISOLATION			
M-43 ⁽²⁾	FV-9776	Containment Supplementary Purge Supply	5
M-43 ⁽²⁾	HC0003	Containment Supplementary Purge Supply	10
M-44 ⁽²⁾	HC0005	Containment Supplementary Purge Exhaust	10
M-44 ⁽²⁾	FV-9777	Containment Supplementary Purge Exhaust	5
M-42	HC0007	Containment Normal Purge Supply	60
M-42	HC0008	Containment Normal Purge Supply	60
M-41	HC0009	Containment Normal Purge Exhaust	60
M-41	HC0010	Containment Normal Purge Exhaust	60
M-80	RA0001	Containment Atmosphere Radiation Monitor	10
M-80	RA0003	Containment Atmosphere Radiation Monitor	10

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TABLE 16.1-1 (Continued)

CONTAINMENT ISOLATION VALVES

Penetration	Valve No.	Function	Maximum Isolation Time (seconds)
CONTAINMENT VENTILATION ISOLATION (Continued)			
M-80	RA0004	Containment Atmosphere Radiation Monitor	10
M-80	RA0006	Containment Atmosphere Radiation Monitor	10
CONTAINMENT ISOLATION PHASE B			
M-39	CC0291	CCW to RCPs	10
M-39	CC0318	CCW to RCPs	10
M-40	CC0403	CCW from RCPs	10
M-40	CC0404	CCW from RCPs	10
M-40	CC0542	CCW from RCPs	10
M-40	FV-4493	CCW from RCPs	10
REMOTE MANUAL			
M-83 ⁽³⁾	AF0019	AFW Supply	N.A.
M-94 ⁽³⁾	AF0048	AFW Supply	N.A.
M-95 ⁽³⁾	AF0065	AFW Supply	N.A.
M-84 ⁽³⁾	AF0085	AFW Supply	N.A.
M-33	CC0012	CCW to RHR HX and RHR Pump	N.A.
M-34	CC0049	CCW from RHR HX and RHR Pump	N.A.
M-34	CC0050	CCW from RHR HX and RHR Pump	N.A.
M-25	CC0057	CCW to RCFC	N.A.
M-26	CC0068	Cooling Water from RCFC	N.A.

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TABLE 16.1-1 (Continued)

CONTAINMENT ISOLATION VALVES

Penetration	Valve No.	Function	Maximum Isolation Time (seconds)
REMOTE MANUAL (Continued)			
M-26	CC0069	CCW from RCFC	N.A.
M-35	CC0122	CCW to RHR HX and RHR Pump	N.A.
M-36	CC0129	CCW from RHR HX and RHR Pump	N.A.
M-36	CC0130	CCW from RHR HX and RHR Pump	N.A.
M-27	CC0136	CCW to RCFC	N.A.
M-28	CC0147	Cooling Water from RCFC	N.A.
M-28	CC0148	CCW from RCFC	N.A.
M-37	CC0182	CCW to RHR HX and RHR Pump	N.A.
M-38	CC0189	CCW from RHR HX and RHR Pump	N.A.
M-38	CC0190	CCW from RHR HX and RHR Pump	N.A.
M-24	CC0197	CCW to RCFC	N.A.
M-23	CC0208	Cooling Water from RCFC	N.A.
M-23	CC0210	CCW From RCFC	N.A.
M-1 ⁽³⁾	MS0143	Main Steam Supply to AFW Turbine	N.A.
M-1 ⁽³⁾	FV-0143	Bypass for MS Supply to AFW Turbine	N.A.
M-18	XSI0004A	High Head SI Discharge	N.A.
M-14	XSI0004B	High Head SI Discharge	N.A.
M-10	XSI0004C	High Head SI Discharge	N.A.
M-22	XSI0016A	Emergency Sump Recirculation	N.A.
M-21	XSI0016B	Emergency Sump Recirculation	N.A.
M-20	XSI0016C	Emergency Sump Recirculation	N.A.

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TABLE 16.1-1 (Continued)

CONTAINMENT ISOLATION VALVES

Penetration	Valve No.	Function	Maximum Isolation Time (seconds)
REMOTE MANUAL (Continued)			
M-19	XSI0018A	Low Head SI Discharge	N.A.
M-15	XSI0018B	Low Head SI Discharge	N.A.
M-11	XSI0018C	Low Head SI Discharge	N.A.
M-17 ⁽⁶⁾	XCS0001A	Containment Spray to Ring Header	N.A.
M-13 ⁽⁶⁾	XCS0001B	Containment Spray to Ring Header	N.A.
M-9 ⁽⁶⁾	XCS0001C	Containment Spray to Ring Header	N.A.
MANUAL AND CHECK VALVES			
M-82 ⁽⁴⁾	BA0004	Breathing Air to Containment	N.A.
M-82	BA0006	Breathing Air to Containment	N.A.
M-33	CC0013	CCW to RHR HX and RHR Pump	N.A.
M-25	CC0058	Cooling Water to RCFC	N.A.
M-35	CC0123	CCW to RHR HX and RHR Pump	N.A.
M-27	CC0138	Cooling Water to RCFC	N.A.
M-37	CC0183	CCW to RHR HX and RHR Pump	N.A.
M-24	CC0198	Cooling Water to RCFC	N.A.
M-39	CC0319	CCW to RCPs	N.A.
M-40	CC0446	CCW from RCPs	N.A.
M-46	CV0022	CVCS Letdown	N.A.
M-51	CV0034A	CVCS Seal Water Injection	N.A.
M-51	CV0034B	CVCS Seal Water Injection	N.A.

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TABLE 16.1-1 (Continued)

CONTAINMENT ISOLATION VALVES

Penetration	Valve No.	Function	Maximum Isolation Time (seconds)
MANUAL AND CHECK VALVES (Continued)			
M-52	CV0034C	CVCS Seal Water Injection	N.A.
M-52	CV0034D	CVCS Seal Water Injection	N.A.
M-47	CV0078	CVCS Seal Water Leakoff Return	N.A.
M-48	XCV0026	CVCS Charging	N.A.
M-53	XCV0157	CVCS to RHR	N.A.
M-53	XCV0158	CVCS to RHR	N.A.
M-17	XCS0002	Containment Spray Header	N.A.
M-13	XCS0004	Containment Spray Header	N.A.
M-13	XCS0005	Containment Spray Header	N.A.
M-9	XCS0006	Containment Spray Header	N.A.
M-61 ⁽⁴⁾	DW0501	Demineralized Water Supply	N.A.
M-61	DW0502	Demineralized Water Supply	N.A.
M-58	IA0541	Instrument Air to Containment	N.A.
M-70	XFC0006C	In Containment Spent Fuel Storage to SFP Pump	N.A.
M-70	XFC0007C	In Containment Spent Fuel Storage to SFP Pump	N.A.
M-69	XFC0013E	SFP HX Return to Containment	N.A.
M-69	XFC0013F	SFP HX Return to Containment	N.A.
M-69	XFC0050	SFP HX Return to Containment	N.A.
M-77	FP0943	Containment Fire Protection	N.A.
M-2 ⁽⁴⁾	MS-0543	Main Steam Line Drain	N.A.
M-3 ⁽⁴⁾	MS-0544	Main Steam Line Drain	N.A.
M-4 ⁽⁴⁾	MS-0545	Main Steam Line Drain	N.A.
M-1 ⁽⁴⁾	MS-0546	Main Steam Line Drain	N.A.
M-45	XRC0046	Makeup to Pressurizer Relief Tank	N.A.

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TABLE 16.1-1 (Continued)

CONTAINMENT ISOLATION VALVES

Penetration	Valve No.	Function	Maximum Isolation Time (seconds)
MANUAL AND CHECK VALVES (Continued)			
M-88	RD0008	Reactor Coolant Vacuum Degassing	N.A.
M-88	RD0010	Reactor Coolant Vacuum Degassing	N.A.
M-55	XRH0063B	Refueling Cavity to RWST	N.A.
M-76	XRH0063C	Refueling Cavity to RWST	N.A.
M-55	XRH0064B	Refueling Cavity to RWST	N.A.
M-76	XRH0064C	Refueling Cavity to RWST	N.A.
M-57 ⁽⁴⁾	SA0504	Service Air	N.A.
M-57	SA0505	Service Air	N.A.
M-16	SL0002	Sludge Lancing High Pressure	N.A.
M-16	SL0004	Sludge Lancing High Pressure	N.A.
M-79	SL0012	Sludge Lancing Low Pressure	N.A.
M-79	SL0014	Sludge Lancing Low Pressure	N.A.
M-12	SL0027	Chemical Cleaning Return	N.A.
M-12	SL0029	Chemical Cleaning Return	N.A.
M-81	Penetration has been capped		
M-75	P00217	RCP Oil Return	N.A.
M-75	P00218	RCP Oil Return	N.A.
M-18	XSI0005A	High Head SI Discharge	N.A.
M-14	XSI0005B	High Head SI Dishcharge	N.A.
M-10	XSI0005C	High Head SI Discharge	N.A.

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TABLE 16.1-1 (Continued)

CONTAINMENT ISOLATION VALVES

Penetration	Valve No.	Function	Maximum Isolation Time (seconds)
MANUAL AND CHECK VALVES (Continued)			
M-19	XSI0030A	Low Head SI Discharge	N.A.
M-15	XSI0030B	Low Head SI Discharge	N.A.
M-11	XSI0030C	Low Head SI Discharge	N.A.
M-68	SI0058	Accumulator Nitrogen Supply	N.A.
OTHER AUTOMATIC VALVES (SI Actuated Valves)			
M-25	CC0059	RCFC Chilled Water Supply	10
M-26	CC0070	RCFC Chilled Water Return	10
M-26	FV-0862	RCFC Chilled Water Return	10
M-27	CC0137	RCFC Chilled Water Supply	10
M-28	CC0149	RCFC Chilled Water Return	10
M-28	FV-0863	RCFC Chilled Water Return	10
M-24	CC0199	RCFC Chilled Water Supply	10
M-23	CC0209	RCFC Chilled Water Return	10
M-23	FV-0864	RCFC Chilled Water Return	10
OTHER AUTOMATIC VALVES (Steam Line Isolation Actuated Valves)			
M-2 ⁽³⁾	FV-7412	Main Steam Isolation Bypass	5
M-3 ⁽³⁾	FV-7422	Main Steam Isolation Bypass	5
M-4 ⁽³⁾	FV-7432	Main Steam Isolation Bypass	5
M-1 ⁽³⁾	FV-7442	Main Steam Isolation Bypass	5
M-2 ^(3, 5)	FSV-7414	Main Steam Isolation	5

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TABLE 16.1-1 (Continued)

CONTAINMENT ISOLATION VALVES

Penetration	Valve No.	Function	Maximum Isolation Time (seconds)
OTHER AUTOMATIC VALVES B (Steam Line Isolation Actuated Valves) (Continued)			
M-3 ^(3, 5)	FSV-7424	Main Steam Isolation	5
M-4 ^(3, 5)	FSV-7434	Main Steam Isolation	5
M-1 ^(3, 5)	FSV-7444	Main Steam Isolation	5
OTHER AUTOMATIC VALVES (Feedwater Isolation Actuated Valves)			
M-6 ^(3, 7)	FV-7141	Feedwater Isolation	10
M-83 ⁽³⁾	FV-7192	Feedwater Isolation – SG Preheater Bypass	10
M-7 ^(3, 7)	FV-7142	Feedwater Isolation	10
M-84 ⁽³⁾	FV-7191	Feedwater Isolation – SG Preheater Bypass	10
M-8 ^(3, 7)	FV-7143	Feedwater Isolation	10
M-94 ⁽³⁾	FV-7189	Feedwater Isolation – SG Preheater Bypass	10
M-5 ^(3, 7)	FV-7144	Feedwater Isolation	10
M-95 ⁽³⁾	FV-7190	Feedwater Isolation – SG Preheater Bypass	10
M-5 ⁽³⁾	FV-7145A	Feedwater Isolation Valve Bypass	10

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TABLE 16.1-1 (Continued)

CONTAINMENT ISOLATION VALVES

Penetration	Valve No.	Function	Maximum Isolation Time (seconds)
OTHER AUTOMATIC VALVES (Feedwater Isolation Actuated Valves) (Continued)			
M-8 ⁽³⁾	FV-7146A	Feedwater Isolation Valve Bypass	10
M-7 ⁽³⁾	FV-7147A	Feedwater Isolation Valve Bypass	10
M-6 ⁽³⁾	FV-7148A	Feedwater Isolation Valve Bypass	10
OTHER AUTOMATIC VALVES (Auxiliary Feedwater Initiation Actuated Valves)			
M-62 ⁽³⁾	FV-4150	Steam Generator Blowdown	35
M-65 ⁽³⁾	FV-4151	Steam Generator Blowdown	35
M-64 ⁽³⁾	FV-4152	Steam Generator Blowdown	35
M-63 ⁽³⁾	FV-4153	Steam Generator Blowdown	35
M-86 ⁽³⁾	FV-4186	Steam Generator Sample	5
M-86 ⁽³⁾	FV-4187	Steam Generator Sample	5
M-86 ⁽³⁾	FV-4188	Steam Generator Sample	5
M-86 ⁽³⁾	FV-4189	Steam Generator Sample	5

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Notes to Table 16.1-1

- * Valves isolate on concurrent Containment Phase A isolation and low charging header pressure signals.
- 1. Valves opened only when sample needed.
- 2. Valve could be opened during normal operation, as needed.
- 3. Not subject to Type C Leakage Tests.
- 4. May be opened on an intermittent basis under administrative control.
- 5. These valves are included for table completeness. The requirements of Technical Specification 3/4.6.3 do not apply; instead, the requirements of Technical Specification 3/4.7.1.5 apply to the main steam isolation valves.
- 6. These valves are included for table completeness. The requirements of Technical Specification 3/4.6.3 do not apply; instead, the requirements of Technical Specification 4.6.2.1 apply. Valve stroke times, where specified, will be tested pursuant to Technical Specification 4.0.5.
- 7. These valves are included for table completeness. The requirements of Technical Specification 3/4.6.3 do not apply; instead, the requirements of Technical Specification 3/4.7.1.7 apply to the feedwater isolation valves.

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TABLE 16.1-2

REACTOR VESSEL MATERIAL SURVEILLANCE PROGRAM –
WITHDRAWAL SCHEDULE

Unit 1

<u>CAPSULE NUMBER</u>	<u>VESSEL LOCATION (degrees)</u>	<u>LEAD FACTOR (Capsule)</u>	<u>ACTUAL/RECOMMENDED WITHDRAWAL TIME (EFPY)</u>
U	58.5°	3.59 ⁽¹⁾	0.78 (Removed) ⁽⁴⁾
Y	241.0°	3.28 ⁽¹⁾	4.9 (Removed) ⁽⁴⁾
V	61.0°	3.04 ⁽²⁾	11.13 (Removed) ⁽⁴⁾
X	238.5°	3.28 ⁽³⁾	N/A
W	121.5°	3.24 ⁽³⁾	18 ⁽⁵⁾
Z	301.5°	3.24 ⁽³⁾	N/A

Unit 2

<u>CAPSULE NUMBER</u>	<u>VESSEL LOCATION (degrees)</u>	<u>LEAD FACTOR (Capsule)</u>	<u>ACTUAL/RECOMMENDED WITHDRAWAL TIME (EFPY)^(c)</u>
V	61.0°	3.09 ⁽¹⁾	0.87 (Removed) ⁽⁴⁾
Y	241.0°	3.11 ⁽¹⁾	5.13 (Removed) ⁽⁴⁾
U	58.5°	3.20 ⁽²⁾	10.31 (Removed) ⁽⁴⁾
X	238.5°	3.22 ⁽³⁾	N/A
W	121.5°	3.19 ⁽³⁾	18 ⁽⁵⁾
Z	301.5°	3.19 ⁽³⁾	N/A

1. Lead factor derived from reanalysis of sensor sets from previously withdrawn capsules
2. Lead factor calculated based on actual end of cycle fluence
3. Lead factor based on cycle specific exposure calculations for current fluence
4. Actual Effective Full Power Years (EFPY) at removal
5. Recommended removal time in EFPY. These values are approximate and are selected to ensure that excessive exposure is not attained.

TABLE 16.1-3

REACTOR TRIP SYSTEM INSTRUMENTATION RESPONSE TIMES

<u>FUNCTIONAL UNIT</u>	<u>RESPONSE TIME</u>
1. Manual Reactor Trip	N.A.
2. Power Range, Neutron Flux	≤ 0.5 second*
3. Power Range, Neutron Flux, High Positive Rate	≤ 0.5 second*
4. Intermediate Range, Neutron Flux	N.A.
5. Source Range, Neutron Flux	≤ 0.5 second*
6. Extended Range, Neutron Flux	N.A.
7. Overtemperature ΔT	≤ 10.0 seconds*
8. Overpower ΔT	≤ 10.0 seconds*
9. Pressurizer Pressure - - Low	≤ 2 seconds
10. Pressurizer Pressure - - High	≤ 2 seconds
11. Pressurizer Water Level - - High	≤ 2 seconds

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TABLE 16.1-3 (Continued)

REACTOR TRIP SYSTEM INSTRUMENTATION RESPONSE TIMES

<u>FUNCTIONAL UNIT</u>	<u>RESPONSE TIME</u>
12. Reactor Coolant Flow - - Low	
a. Single Loop (Above P-8)	≤ 1 second
b. Two Loops (Above P-7 and below P-8)	≤ 1 second
13. Steam Generator Water Level - - Low – Low	≤ 2 seconds
14. Undervoltage – Reactor Coolant Pumps	≤ 1.5 seconds
15. Underfrequency – Reactor Coolant Pumps	≤ 0.6 second
16. Turbine Trip	
a. Low Emergency Trip Fluid Pressure	N.A.
b. Turbine Stop Valve Closure	N.A.
17. Safety Injection Input from ESFAS	N.A.
18. Reactor Trip System Interlocks	N.A.
19. Reactor Trip Breakers	N.A.
20. Automatic Trip and Interlock Logic	N.A.

* 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.

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TABLE 16.1-4

ENGINEERED SAFETY FEATURES RESPONSE TIMES

<u>INITIATION SIGNAL AND FUNCTION</u>	<u>RESPONSE TIME IN SECONDS</u>
1. Manual Initiation	
a. Safety Injection (ECCS)	N.A.
b. Containment Spray	N.A.
c. Phase "A" Isolation	N.A.
d. Phase "B" Isolation	N.A.
e. Containment Ventilation Isolation	N.A.
f. Steam Line Isolation	N.A.
g. Feedwater Isolation	N.A.
h. Auxiliary Feedwater	N.A.
i. Essential Cooling Water	N.A.
j. Reactor Containment Fan Coolers	N.A.
k. Control Room Ventilation	N.A.
l. Reactor Trip	N.A.
m. Start Diesel Generator	N.A.
2. Containment Pressure - - High - 1	
a. Safety Injection (ECCS)	$\leq 27^{(1)}/12^{(5)}$
1).Reactor Trip	$\leq 2^{(3)}$
2).Feedwater Isolation	$\leq 12^{(3)}$
3).Phase "A" Isolation	$\leq 33^{(1)} / 23^{(2)}$
4).Containment Ventilation Isolation (18-inch lines)	$\leq 23^{(1)} / 13^{(2)}$
5).Auxiliary Feedwater	≤ 60
6).Essential Cooling Water	$\leq 62^{(1)} / 52^{(2)}$
7).Reactor Containment Fan Coolers	$\leq 38^{(1)} / 28^{(2)}$
8).Control Room Ventilation	N.A.
9).Start Standby Diesel Generators	≤ 12

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TABLE 16.1-4 (Continued)

ENGINEERED SAFETY FEATURES RESPONSE TIME

<u>INITIATION SIGNAL AND FUNCTION</u>	<u>RESPONSE TIME IN SECONDS</u>
3. Pressurizer Pressure - - Low	
a. Safety Injection (ECCS)	$\leq 27^{(1)}/12^{(5)}$
1) Reactor Trip	$\leq 2^{(3)}$
2) Feedwater Isolation	$\leq 12^{(3)}$
3) Phase "A" Isolation	$\leq 33^{(1)} / 23^{(2)}$
4) Containment Ventilation Isolation	N.A
5) Auxiliary Feedwater	≤ 60
6) Essential Cooling Water	$\leq 62^{(1)} / 52^{(2)}$
7) Reactor Containment Fan Coolers	$\leq 38^{(1)} / 28^{(2)}$
8) Control Room Ventilation	N.A.
9) Start Standby Diesel Generators	≤ 12
4. Deleted	
5. Compensated Steam Line Pressure -- Low	
a. Safety Injection (ECCS)	$\leq 22^{(4)}/12^{(5)}$
1) Reactor Trip	$\leq 2^{(3)}$
2) Feedwater Isolation	$\leq 12^{(3)}$
3) Phase "A" Isolation	$\leq 33^{(1)} / 23^{(2)}$
4) Containment Ventilation Isolation	N.A.
5) Auxiliary Feedwater	≤ 60
6) Essential Cooling Water	$\leq 62^{(1)} / 52^{(2)}$
7) Reactor Containment Fan Coolers	$\leq 38^{(1)} / 28^{(2)}$
8) Control Room Ventilation	N.A.
9) Start Diesel Generators	≤ 12
b. Steam Line Isolation	$\leq 8^{(3)}$

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TABLE 16.1-4 (Continued)

ENGINEERED SAFETY FEATURES RESPONSE TIMES

<u>INITIATION SIGNAL AND FUNCTION</u>	<u>RESPONSE TIME IN SECONDS</u>
6. Containment Pressure - - High - 3	
a. Containment Spray	$\leq 30^{(1)} / 20^{(2)}$
b. Phase "B" Isolation	$\leq 28^{(1)} / 18^{(2)}$
7. Containment Pressure - - High - 2	
Steam Line Isolation	$\leq 7^{(3)}$
8. Steam Line Pressure – Negative Rate - - High	N.A
Steam Line Isolation	
9. Steam Generator Water Level - - High - High	
a. Turbine Trip	$\leq 2.5^{(3)}$ (N/A in MODES 2 & 3)
b. Feedwater Isolation	$\leq 12^{(3)}$
10. Steam Generator Water Level - - Low - Low	
a. Motor-Driven Auxiliary Feedwater Pumps	≤ 60
b. Turbine-Driven Auxiliary Feedwater Pump	≤ 60
11. RWST Level - - Low-Low Coincident with Safety Injection	
Automatic Switchover to Containment Sump	$\leq 32^{(2)}$
12. Loss of Power	
a. 4.16 kV ESF Bus Undervoltage (Loss of Voltage)	$\leq 12^{(7)}$
b. 4.16 kV ESF Bus Undervoltage (Tolerable Degraded Voltage Coincident with Safety Injection)	$\leq 49^{(7)}$
c. 4.16 kV ESF Bus Undervoltage (Sustained Degraded Voltage)	$\leq 65^{(7)}$

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TABLE 16.1-4 (Continued)

ENGINEERED SAFETY FEATURES RESPONSE TIMES

<u>INITIATION SIGNAL AND FUNCTION</u>	<u>RESPONSE TIME IN SECONDS</u>
13. Deleted	
14. Deleted	
15. Deleted	N.A.
16. Tavg – Low Coincident with Reactor Trip Feedwater Isolation	
17. Control Room Intake Air Radioactivity--High Control Room Ventilation	N.A.
18. Deleted	
19. Charging Header Pressure – Low	N.A.

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TABLE 16.1-4 (Continued)

TABLE NOTATIONS

- (1) Diesel generator starting and sequence loading delays included.
- (2) Diesel generator starting delay not included, sequence loading delay is included. Offsite power available.
- (3) Not dependent upon diesel generator starting or sequence loading delays.
- (4) Diesel generator starting and sequence loading delay included. Low Head Safety Injection pumps not included.
- (5) Diesel generator starting delays not included, sequence loading delay is included. Low Head Safety Injection pumps not included.
- (6) Actuation times for Control Room Ventilation do not include the opening times for the modulating damper.
- (7) Diesel generator starting delay is included, sequence loading delay is not included.