

TABLE 3.5-2 (Continued)  
ENGINEERED SAFETY FEATURE ACTUATION INSTRUMENTATION

NO. FUNCTIONAL UNIT	1 TOTAL NO. of CHANNELS	2 NO. of CHANNELS TO TRIP	3 MIN. OPERABLE CHANNELS	4 PERMISSIBLE BYPASS CONDITIONS	5 OPERATOR ACTION IF CONDITIONS OF COLUMN 1 OR 3 CANNOT BE MET	6 CHANNEL OPERABLE ABOVE
3. AUXILIARY FEEDWATER Motor and Turbine Driven						
a. Manual	1/pump	1/pump	1/pump		8	$T_{RCS} = 350^{\circ}\text{F}$
12 Stm. Gen. Water Level-low-low						
i. Start Motor Driven Pumps	3/stm.gen.	2/stm.gen. either gen.	2/stm.gen. both gen.		9	$T_{RCS} = 350^{\circ}\text{F}$
ii. Start Turbine Driven Pump	3/stm.gen.	2/stm.gen. both gen.	2/stm.gen. either gen.		12 9	$T_{RCS} = 350^{\circ}\text{F}$
12 Loss of 4 KV Voltage Start Turbine Driven Pump	2/bus	1/bus (both buses)	2/bus (either bus)	Change #12 #13	12 9	$T_{RCS} = 350^{\circ}\text{F}$
12 Safety Injection Start Motor Driven Pumps		(see Item 1)				
12 Trip of both Feed- water Pumps starts Motor Driven Pumps	2/pump	1/pump both pumps	2/pump either pump	Change #12	12 8	5% power
Standby Motor Driven						
a. Manual	1/pump	1/pump	1/pump		8	$T_{RCS} = 350^{\circ}\text{F}$
b. Automatic Actuation Logic and Actuation Relays	2	1	2		19	$T_{RCS} = 350^{\circ}\text{F}$

TABLE 4.1-1

MINIMUM FREQUENCIES FOR CHECKS, CALIBRATIONS AND  
TEST OF INSTRUMENT CHANNELS

Channel Description	Check	Calibrate	Test	Remarks
1. Nuclear Power Range	S M*(3)	D(1) Q*(3)	Change #6 B/W(2)(4) P(2)(5) (C)	1) Heat balance calculation** 2) Signal to $\Delta T$ ; bistable action (permissive, rod stop, trips) 3) Upper and lower chambers for axial offset** 4) High setpoint ( $\leq 109\%$ of rated power) 5) Low setpoint ( $\leq 25\%$ of rated power) 6)
2. Nuclear Intermediate Range	S(1)	N.A.	P(2)	1) Once/shift when in service 2) Log level; bistable action (permissive, rod stop, trip) 3)
3. Nuclear Source Range	S(1)	N.A.	P(2)	1) Once/shift when in service 2) Bistable action (alarm, trip) 3)
4. Reactor Coolant Temperature	S	R Change #6	(1) (2)	1) Overtemperature-Delta T 2) Overpower - Delta T
5. Reactor Coolant Flow	S	R	(1) (C)	
6. Pressurizer Water Level	S	R	(1) (C)	
7. Pressurizer Pressure	S	R Change #16	(1) (C)	
8. 4 Kv Voltage & Frequency	N.A.	R Change #17	(1) (C)	For both RTS and SI activation 4KV Frequency Reactor Protection circuits only. 4KV Voltage both RTS and AFW initiation
9. Rod Position Indication	S(1,2)	N.A.	M	1) With step counters 2) Log rod position indications each 4 hours when rod deviation monitor is out of service

If not performed within the last 31 days

\* By means of the movable in-core detector system.

\*\* Not required during hot, cold, or refueling shutdown but as soon as possible after return to power.

TABLE 4.1-1 (Continued)

Channel Description	Check	Calibrate	Test	Remarks
10. Rod Position Bank Counters	S(1,2)	N.A.	N.A.	1) With rod position indication 2) Log rod position indications each 4 hours when rod deviation monitor is out of service
11. Steam Generator Level	S	R	N.A.	<div>Change #68</div> <div>Change #16</div> <div>Ⓜ</div> <div>Ⓢ</div> <div>For RTS, AFW initiation and Feedwater Isolation</div>
12. Charging Flow	N.A.	R	N.A.	
13. Residual Heat Removal Pump Flow	N.A.	R	N.A.	
14. Boric Acid Storage Tank Level	D	R	N.A.	Note 4
15. Refueling Water Storage Tank Level	N.A.	R	N.A.	
16. Volume Control Tank Level	N.A.	R	N.A.	
17. Reactor Containment Pressure	Ⓢ	R	Ⓜ(1)	1) Isolation Valve signal
18. Radiation Monitoring System	D	R	M	Area Monitors R1 to R9, System Monitor R17
19. Boric Acid Control	N.A.	R	N.A.	
20. Containment Drain Sump Level	N.A.	R	N.A.	
21. Valve Temperature Interlocks	N.A.	N.A.	R	
22. Pump-Valve Interlock	R	N.A.	N.A.	<div>All ESFAS activation logic and relays</div> <div>1) Block Trip</div> <div>1) Setpoint verification is not required for Stop Valve Closure trip.</div> <div>2) If not performed within last 31 days.</div>
23. Turbine Trip Set-Point	N.A.	R	Ⓜ(1)	
24. Accumulator Level and Pressure	S	R	N.A.	

See page 4.1-7a

<u>Channel Description</u>	<u>Check</u>	<u>Calibrate</u>	<u>Test</u>	<u>Remarks</u>
42. SI Input from ESFAS	N.A.	N.A.	R	
43. RCP Breaker Position Trip	N.A.	N.A.	R	
44. Overtemperature $\Delta T$	S	R	Q(1)	1) Each channel shall be tested at least once every 92 days on a staggered test basis
45. Overpower $\Delta T$	S	R	Q(1)	1) Each channel shall be tested at least once every 92 days on a staggered test basis
46. Safety Injection Manual Initiation (ESFAS)	N.A.	N.A.	R	
47. Containment Spray Manual Initiation (ESFAS)	N.A.	N.A.	R	
48. Containment Isolation Manual Initiation	N.A.	N.A.	R	
49. Containment Ventilation Isolation Manual Initiation	N.A.	N.A.	R	
50. Steam Line Isolation Manual Initiation	N.A.	N.A.	R	
51. Auxiliary Feedwater Manual Initiation	N.A.	N.A.	R	
52. Feedwater Line Isolation Manual Initiation	N.A.	N.A.	R	

Change #9

Change #17

TABLE 4.1-2

MINIMUM FREQUENCIES FOR EQUIPMENT AND SAMPLING TESTS

	<u>Test</u>	<u>Frequency</u>
1. Reactor Coolant Chemistry Samples	Chloride and Fluoride Oxygen	3 times/week and at least every third day 5 times/week and at least every second day except when below 250°F
2. Reactor Coolant Boron	Boron Concentration	Weekly
3. Refueling Water Storage Tank Water Sample	Boron Concentration	Weekly
4. Boric Acid Storage Tank	Boron Concentration	Twice/Week <sup>(1)</sup>
5. Control Rods	Rod drop times of all full length rods	After vessel head removal and at least once per 18 months (1)
6a. Full Length Control Rod	Move any rod not fully inserted a sufficient number of steps in any one direction to cause a change of position as indicated by the rod position indication system	Monthly
6b. Full Length Control Rod	Move each rod through its full length to verify that the rod position indication system transitions occur	Each Refueling Shutdown
7. Pressurizer Safety Valves	Set point	Each Refueling Shutdown
8. Main Steam Safety Valves	Set point	Each Refueling Shutdown
9. Containment Isolation Trip	Functioning	Each Refueling Shutdown
10. Refueling System Interlocks	Functioning	Prior to Refueling Operations

Change #17

Relocated to Table 4.1-1, #48