

TABLE 15.4.1-1 (1 of 5)

MINIMUM FREQUENCIES FOR CHECKS, CALIBRATIONS AND TEST OF INSTRUMENT CHANNELS

No.	Channel Description	Check	Calibrate	Test	Remarks
1.	Nuclear Power Range	S(1)** M*(3)**(4)	D(1)** Q*(3)**(4)	Q(2)** M(2)**	(1) Heat Balance (2) Signal to ΔT ; (bistable action permissive, rod stops, trips) (3) Upper and lower chambers for axial off-set (4) Compare incore to excore axial flux difference. Recalibrate if the absolute difference is greater than or equal to 3 percent.
2.	Nuclear Intermediate Range	S(1)**	N.A.	P(2)	(1) Once/shift when in service (2) Log level; (bistable action permissive, rod stop, trips)
3.	Nuclear Source Range	S(1)	N.A.	P(2)	(1) Once/shift when in service (2) Bistable action (alarm, trips)
4.	Reactor Coolant Temperature	S	R	Q(1)** M(1)** (2)	(1) Overtemperature - ΔT (2) Overpower - ΔT
5.	Reactor Coolant Flow	S**	R	Q** M**(1) R(2)	(1) Analog and single loop loss of flow logic testing. (2) Logic channel testing for reactor trip on loss of reactor coolant flow in both loops shall be performed each refueling interval.
6.	Pressurizer Water Level	S**	R	Q** M**	
7.	Pressurizer Pressure	S**	R	Q** M**	
8.	4 KV Voltage	N.A.	R	M**	Reactor protection circuits only

9. Analog Rod Position

S(1)** R

N.A.
M**

(1) With step counters

- * By means of the moveable incore detector system.
- ** Not required during periods of refueling shutdown, but must be performed prior to starting up if it has not been performed during the previous surveillance period.

~~Tests of permissive and low power trip bistable setpoints which cannot be done during power operations shall be conducted prior to startup if not done in the previous two weeks.~~

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Channel No.	Description	Check	Calibrate	Test	Remarks
10.	Rod Position Bank Counters	S(1)**	N.A.	N.C.	(1) With analog rod position
11.	Steam Generator Level	S**	R	Q(1)** M(1)**	(1) Includes test of logic for reactor trip on low low level and automatic actuation logic for auxiliary feedwater pumps
12.	Steam Generator Low Level Coincident with Steam Flow/ Feed Flow Mismatch	S**	R	Q** M**	
13.	Charging Flow	N.A.	R	N.A.	
14.	Residual Heat Removal Pump Flow	N.A.	R	N.A.	
15.	Boric Acid Tank Level	D	R	N.A.	
16.	Refueling Water Storage Tank Level	N.A.	R	N.A.	
17.	Volume Control Tank Level	N.A.	R	N.A.	
18.	Reactor Containment Pressure	S	R	Q(1)** M(1)**	(1) Isolation valve signal
19.	Radiation Monitoring System	D	R	M	(1) Radioactive Effluent Monitoring Instrumentation Surveillance Requirements are specified in 15.7.4.
20.	Boric Acid Control	N.A.	R	N.A.	
21.	Containment Water Level	M	R	N.A.	
22.	Turbine Overspeed Trip*	N.A.	R	M(1)**	(1) Block trip
23.	Accumulator Level and Pressure	S	R	N.A.	

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- * Overspeed Trip Mechanism, and Independent Turbine Speed Detection and Valve Trip System
 - ** Not required during periods of refueling shutdown, but must be performed prior to starting up if it has not been performed during the previous surveillance period.

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No.	Channel Description	Check	Calibration	Test	Remarks
24.	Containment Pressure	C S	R R	Q** M**	Normal (-3.0)
25.	Steam Generator Pressure	S***	R	Q**	
	Steam Generator Pressure	S***	R	M**	
25.	Turbine First Stage Pressure	S**	R	M**	
26.	Emergency Plan Radiation Survey Instruments	Q	R	Q	
27.	Environmental Monitors	M	N.A.	N.A.	
28.	Overpressure Mitigating	S	R	****	
29.	PORV Position Indicator	S	R	R	
30.	PORV Block Valve Position Indicator	Q	R	N.A.	
31.	Safety Valve Position Indicator	M	R	N.A.	
32.	PORV Operability	N.A.	R R	Q M	Performance of a channel functional test but excluding valve operation
33.	Subcooling Margin Monitor	M	R	N.A.	
34.	Undervoltage on 4 KV Bus Initiation	N.	R	M**	For Auxiliary Feedwater Pump
35.	Auxiliary Feedwater Flow Rate	See Remarks	R	N.A.	Flow Rate indication will be checked at each unit startup and shutdown
36.	Degraded 4.16 KV Voltage	S	R	M**	

37. a. Loss of Voltage (4.16 KV)	S	R	M**
b. Loss of Voltage (480 V)	S	R	M**
39. 4160 V Frequency	N.A.	R	N.A.

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<u>No.</u>	<u>Channel Description</u>	<u>Check</u>	<u>Calibrate</u>	<u>Test</u>	<u>Remarks</u>
39.	Containment High Range Radiation	S **	R	M **	Calibration to be verification of response to a source.
40.	Containment Hydrogen Monitor	D	R/Q	N.A.	Gas Calibration - Q, Electronic Calibration - R Sample gas for calibration at 2% and 6% hydrogen.
41.	Reactor Vessel Fluid Level System	M	R	N.A.	
42.	In-Core Thermocouple	M	R	N.A.	Calibration to be verification of response to a source.

**Not required during periods of refueling shutdown, but must be performed prior to starting up if it has not been performed during the previous surveillance period.

***During cold or refueling shutdown, a check of one pressure channel per steam generator is required when the steam generator could be pressurized.

****When used for the overpressure mitigating system each PORV shall be demonstrated operable by:

- a. Performance of a channel functional test on the PORV actuation channel, but excluding valve operation, within 31 days prior to entering a condition in which the PORV is required operable and at least once per 31 days thereafter when the PORV is required operable.
- b. Testing valve operation in accordance with the inservice test requirements of the ASME Boiler and Pressure Vessel Code, Section XI.

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No.	Channel Description	Check	Calibrate	Test	Remarks
43.	Reactor Protection System and Emergency Safety Feature Actuation System Logic	N.A.	N.A.	M**	Each train tested at least every 62 days on a staggered basis. Reactor Trip on loss of reactor coolant flow in both loops shall be performed each refueling interval.
44.	Reactor Trip System Interlocks				
a.	Intermediate Range Neutron Flux P-6	N.A.	R	R	Neutron detectors excluded from calibration
b.	Power Range Neutron Flux, P-8	N.A.	R	R	Neutron detectors excluded from calibration
c.	Power Range Neutron Flux, P-9	N.A.	R	R	Neutron detectors excluded from calibration
d.	Power Range Neutron Flux, P-10	N.A.	R	R	Neutron detectors excluded from calibration
e.	1st Stage Turbine Impulse Pressure	S**	R	R	

S - Each Shift
D - Daily
W - Weekly
B/W - Biweekly
Q - Quarterly

M - Monthly
P - Prior to each startup if not done previous week.
R - Each Refueling interval (But not to exceed 18 months).
N.A. - Not applicable.

** Not required during periods of refueling shutdown, but must be performed prior to starting up if it has not been performed during the previous surveillance interval.