5. Pressurizer Power Operated Relief Valves (PORV) and PORV Block Valves.

a. Two PORV's and their associated block valves shall be operable during steady state power operation.

1. If a pressurizer PORV is inoperable, the PORV shall be restored to an operable condition within one hour or the associated block valve shall be closed. 47

2. If a PORV block valve is inoperable, the block valve shall be restored to an operable condition within one hour or the block valve shall be closed with power removed from the valve; otherwise the unit shall be placed in the hot shutdown condition using normal operating procedures.

Basis

When the boron concentration of the Reactor Coolant System is to be reduced, the process must be uniform to prevent sudden reactivity changes in the reactor. Mixing of the reactor coolant will be sufficient to maintain a uniform boron concentration if at least one reactor coolant pump or one residual heat removal pump is running while the change is taking place. The residual heat removal pump will circulate the equivalent of the primary system volume in approximately one-half hour.

Part 1 of the specification requires that both reactor coolant pumps be operating when the reactor is in power operation to provide core cooling in the event that a loss of flow occurs. Planned power operation with one loop out of service is not allowed in the present design because the system does not meet the single failure (locked rotor) criteria requirement for this mode of operation. The flow provided in each case in Part 1 will keep DNBR well above 1.30. Therefore, cladding damage and release of fission products to the reactor coolant will not occur. One pump operation is not permitted for any length of time except for tests. Upon loss of one pump below 10% full power the core power shall be reduced to a level below the maximum power determined for zero power testing. Natural circulation will remove decay heat up to 10% power. Above 10% power, an automatic reactor trip will occur if flow from either pump is lost.(1)

Each of the pressurizer safety valves is designed to relieve 325,000 lbs per hour of saturated steam at set point. Below 350°F and 350 psig, the Residual Heat Removal System can remove decay heat and thereby control system temperature and pressure. If no residual heat were removed by any of the means available, the amount of steam which could be generated at safety valve relief pressure would be less than half the valves' capacity. One valve therefore provides adequate protection against over-pressurization.

The Basis for the Pressure Isolation Valves is contained with Reference 2.

The pressurizer power operated relief valves (PORV's) operate as part of the pressurizer pressure control system. They are intended to relieve RCS pressure below the setting of the code safety valves. These relief valves have remotely operated block valves to provide a positive shutoff capability should a relief valve become inoperable. 47

References:

(1) FSAR Section 7.2.2

(2) Order for Modification of License dated 4/20/81.

3.5 INSTRUMENTATION SYSTEM

Applicability

Applies to reactor protection and engineered safety features instrumentation systems.

Objective

To provide for automatic initiation of the engineered safety features in the event that principal process variable limits are exceeded, and to delineate the conditions of the reactor protection instrumentation and engineered safety features circuits necessary to ensure reactor safety.

Specification

a. Setting limits for instrumentation which initiate operation of the engineered safety features shall be as stated in Table TS 3.5-1.

b. For on-line testing or in the event of failure of a sub-system instrumentation channel, plant operation shall be permitted to continue at rated power in accordance with Tables TS 3.5-2 through TS 3.5-4.

c. If for Tables TS 3.5-2 through TS 3.5-4 the number of channels of a particular sub-system in service falls below the limits given in Column Three, or if the values in Column Four cannot be achieved, operation shall be limited according to the requirement shown in Column 6, as soon as practicable.

d. In the event of sub-system instrumentation channel failure permitted by Specification 3.5.b, Tables TS 3.5-2 through TS 3.5-4 need not be observed during the short period of time (approximately 4 hours) the operable sub-system channels are tested, where the failed channel must be blocked to prevent unnecessary reactor trip.

e. The instrumentation in Table 3.5-5 shall be operable. In the event the instrumentation becomes inoperable, operator action will be in accordance with column 2. 47

Instrument Operating Conditions

During plant operations, the complete protective instrumentation systems will normally be in service. Reactor safety is provided by the Reactor Protection Systems, which automatically initiates appropriate action to prevent exceeding established limits. Safety is not compromised, however, by continuing operation with certain instrumentation channels out of service since provisions were made for this in the plant design. This specification outlines limiting conditions for operation necessary to preserve the effectiveness of the Reactor Control and Protection System when any one or more of the channels is out of service.

Almost all reactor protection channels are supplied with sufficient redundancy to provide the capability for channel calibration and test at power. Exceptions are backup channels such as reactor coolant pump breakers. The removal of one trip channel on process control equipment is accomplished by placing that channel bistable in a tripped mode: e.g., a two-out-of-three circuit becomes a one-out-of-two circuit. The source and intermediate range nuclear instrumentation system channels are not intentionally placed in a tripped mode since these are one-out-of-two trips. and the trips are therefore bypassed during testing. Testing does not trip the system unless a trip condition exists in another channel.

The operability of the instrumentation noted in Table 3.5-5 assures that sufficient information is available on these selected plant parameters to aid the operator in identification of an accident and assessment of plant conditions during and following an accident. In the event the instrumentation noted in Table 3.5-5 is not operable, the operator is given instruction on compensatory actions. 47

References:

(1) FSAR Section 7.5

(2) FSAR Section 14.3

(3) FSAR Section 14.2.5

TABLE 3.5-1 Page 1 of 2

ENGINEERED SAFETY FEATURES INITIATION INSTRUMENT SETTING LIMITS

NO.	FUNCTIONAL UNIT	CHANNEL	SETTING LIMIT
1	High Containment Pressure (Hi)	Safety Injection*	≤ 4 psig
2	High Containment Pressure (Hi-Hi)	a. Containment Spray	≤ 23 psig
		b. Steam Line Isolation of Both Lines	≤ 17 psig
3	Pressurizer Low Pressure	Safety Injection*	≥ 1815 psig
4	Low Steam Line Pressure	Safety Injection*	≥ 500 psig
		Lead Time Constant	≥ 12 seconds
		Lag Time Constant	≤ 2 seconds
5	High Steam Flow in a Steam Line Coincident with Safety Injection and Low T_{avg}	Steam Line Isolation of Affected Line **	d/p corresponding to < 0.745 x 10^6 lb/hr at 1005 psig
			≥ 540°F
6	High-High Steam Flow in a Steam Line Coincident with Safety Injection	Steam Line Isolation of Affected Line **	≤ d/p corresponding to 4.5 x 10^6 lb/hr at 735 psig
7	Forebay Level	Trip circ. water pumps	

Table TS 3.5-1 (Page 1 of 2) Proposed Amendment No. 47
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ENGINEERED SAFETY FEATURES INITIATION, INSTRUMENT SETTING LIMITS

NO.	FUNCTIONAL UNIT	CHANNEL	SETTING LIMIT
8	Containment Radiation	Containment Ventilation Isolation	***

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* Initiates containment isolation, feedwater line isolation, shield building ventilation, auxiliary building special vent, and starting of all containment fans. In addition, the signal overrides any bypass on the accumulator valves.

** Confirm main steam isolation valves closure within 5 seconds when tested
d/p = differential pressure

*** The setting limit is derived from the technical specification allowable release rates found in Technical Specification 3.9.b.

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TABLE TS 3.5-3

EMERGENCY COOLING

NO.	FUNCTIONAL UNIT	1 NO. OF CHANNELS	2 NO. OF CHANNELS TO TRIP	3 MINIMUM OPERABLE CHANNELS	4 MINIMUM DEGREE OF REDUNDANCY	5 PERMISSIBLE BYPASS CONDITIONS	6 OPERATOR ACTION IF CONDITIONS OF COLUMN 3 OR 4 CANNOT BE MET
1	SAFETY INJECTION						
	a. Manual	2	1	1	-		Hot Shutdown***
	b. High Containment Pressure	3	2	2	-		Hot Shutdown***
	c. Low Steam Pressure/Line	3	2	2	-		Hot Shutdown***
	d. Pressurizer Low Pressure	3	2	2	-	Primary pressure < 2000 psig	Hot Shutdown***
2	CONTAINMENT SPRAY						
	a. Manual	2	2	2	**		Hot Shutdown***
	b. Hi-Hi Containment Pressure (Containment Spray)	3 sets of 2	1 of 2 in each set	1 per set	1/set		Hot Shutdown***

(Deleted)

Table TS3.5-3 (Page 1 of 2) Proposed Amendment No. 47

EMERGENCY COOLING

NO.	FUNCTIONAL UNIT	1 NO. OF CHANNELS	2 NO. OF CHANNELS TO TRIP	3 MINIMUM OPERABLE CHANNELS	4 MINIMUM DEGREE OF REDUNDANCY	5 PERMISSIBLE BYPASS CONDITIONS	6 OPERATOR ACTION IF CONDITIONS OF COLUMN 3 OR 4 CANNOT BE MET
3	MOTOR DRIVEN AUXILIARY FEEDWATER PUMPS						
	a. Either Steam Generator Lo-Lo Level	3/loop	2/loop	2/loop	-		Maintain hot shutdown
	b. Loss of Main Feedwater ****	1	1	1			Maintain hot shutdown
	c. Safety Injection or Black out	(Refer to Item 1 of this Table)					
4	TURBINE DRIVEN AUXILIARY FEEDWATER PUMPS						
	a. Both Steam Generator Lo-Lo Level	3/loop	2/loop	2/loop	-		Maintain hot shutdown
	b. 4 KV Buses 1-1 and 1-2 under voltage	(Refer to Item B of Table TS 3.5-2)					

** Must actuate 2 switches.

*** If minimum conditions are not met within 24 hours, steps shall be taken to place the plant in cold shutdown condition.

**** Tripping of both Main Feedwater Pump Breakers starts both motor driven auxiliary feedwater pumps.

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TABLE TS 3.5-4 Page 1 of 2

INSTRUMENT OPERATING CONDITIONS FOR ISOLATION FUNCTIONS

NO.	FUNCTIONAL UNIT	1 NO. OF CHANNELS	2 NO. OF CHANNELS TO TRIP	3 MINIMUM OPERABLE CHANNELS	4 MINIMUM DEGREE OF REDUNDANCY	5 PERMISSIBLE BYPASS CONDITIONS	6 OPERATOR ACTION IF CONDITIONS OF COLUMN 3 OR 4 CANNOT BE MET
1	CONTAINMENT ISOLATION						
	a. Safety Injection	See Item No. 1 of Table TS 3.5-3					Hot Shutdown***
	b. Manual	2	1	1	-		Hot Shutdown
2	STEAM LINE ISOLATION						
	a. Hi-Hi Steam Flow with Safety Injection	2/loop	1	1	-		Hot Shutdown***
	b. Hi Steam Flow and 2 of 4 Low T_{avg} with Safety Injection	2/loop	1	1	-		Hot Shutdown***
	c. Hi Containment Pressure	3	2	2	-		Hot Shutdown***
	d. Manual	1/loop	1/loop	1/loop	-		Hot Shutdown

Table TS3.5-4 (Page 1 of 2) Proposed Amendment No. 47
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TABLE TS 3.5-4 Page 2 of 2

INSTRUMENT OPERATING CONDITIONS FOR ISOLATION FUNCTIONS

NO.	FUNCTIONAL UNIT	1 NO. OF CHANNELS	2 NO. OF CHANNELS TO TRIP	3 MINIMUM OPERABLE CHANNELS	4 MINIMUM DEGREE OF REDUNDANCY	5 PERMISSIBLE BYPASS CONDITIONS	6 OPERATOR ACTION IF CONDITIONS OF COLUMN 3 OR 4 CANNOT BE MET
3	CONTAINMENT VENTILATION ISOLATION						
	a. High Containment Radiation	2	1	1	-	-	Operation may continue provided containment purge and ventilation system isolation valves are maintained closed. ****
	b. Safety Injection	(Refer to Item 1 of Table TS 3.5-3)					
	c. Containment Spray	(Refer to Item 2 of Table TS 3.5-3)					

*** If minimum conditions are not met within 24 hours, steps shall be taken to place the plant in a cold shutdown condition.

**** Technical Specification 3.1.d.5 limits operation to 12 hours when all containment radiation monitors are inoperable.

Table TS 3.5-4 (Page 2 of 2) Proposed Amendment No. 47 10-13-81

TABLE TS 3.5-5

INSTRUMENT OPERATING CONDITIONS FOR INDICATION

NO.	FUNCTIONAL UNIT (1)	NO. OF CHANNELS (1)	OPERATOR ACTION IF INSTRUMENTATION BECOMES INOPERABLE (2)
1	Pressurizer PORV Position Indicator	1/valve	If the PORV position indicator is inoperable, monitor other RCS parameters, tailpipe temperatures, pressurizer relief tank conditions, etc., to determine the status of the associated PORV. If the indicator cannot be restored to operability within 48 hours, shut the associated PORV block valve. (SEE NOTE)
2	Pressurizer PORV Block Valve Position Indicator	1/valve	If the block valve position indicator is inoperable, close the associated block valve. (SEE NOTE)
3	Pressurizer Safety Valve Position Indicator	1/valve	If the Safety Valve position indicator is inoperable, monitor other RCS parameters, tailpipe temperatures, pressurizer relief tank conditions, etc., to determine the position of the safety valve.
4	Reactor Coolant System Subcooling	1	If the subcooling monitor is inoperable, monitor RCS subcooling via the process computer or through manual calculation.
5	Auxiliary Feedwater Flow Rate	1/S/G	If Auxiliary Feedwater Flow Rate Indicator is inoperable, verify adequacy of heat sink by monitoring steam generator levels.

NOTE: The compensatory action of closing the PORV block valve applies to steady state conditions only. It is permissible to open the PORV block valves to recover from reactor transients or to mitigate the consequences of an accident.

TABLE TS 4.1-1

MINIMUM FREQUENCIES FOR CHECKS, CALIBRATIONS AND TEST OF INSTRUMENT CHANNELS
(Page 1 of 4)

	Channel Description	Check	Calibrate	Test	Remarks
1.	Nuclear Power Range	S (1) EFPM (3)****	D (1) EFPQ (3)****	(M) (2) ***	1) Heat balance 2) Signal to ΔT; bistable action (permissive, rod stop, trips) 3) Upper and lower chambers for axial off-set using in-core detectors
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	M (1) M (2)	1) Overtemperature ΔT 2) Overpower ΔT
5.	Reactor Coolant Flow	S	R**	M	
6.	Pressurizer Water Level	S	R**	M	
7.	Pressurizer Pressure	S	R**	M	
8A.	4-KV Voltage & Frequency	N.A.	R	M	Reactor protection circuits only
8B.	4-KV Voltage	N.A.	R	R	Safeguards buses only

Table TS4.1-1 (1 of 4)

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TABLE TS 4.1-1

MINIMUM FREQUENCIES FOR CHECKS, CALIBRATIONS AND TEST OF INSTRUMENT CHANNELS
(Page 2 of 4)

	Channel Description	Check	Calibrate	Test	Remarks
9.	Analog Rod Position	S (1,2)	R **	R	1) With step counters 2) Following rod motion in excess of six in. when computer is out of service
10.	Rod Position Bank Counters	S (1,2)	N.A.	R	1) With analog rod position 2) Following rod motion in excess of six in. when computer is out of service
11.	Steam Generator Level	S	R **	M	
12.	Steam Generator Flow Mismatch	S	R **	M	
13.	Charging Flow	S	R	N.A.	
14.	Residual Heat Removal Pump Flow	S (when in operation)	R	N.A.	
15.	Boric Acid Tank Level	D	R	M	
16.	Refueling Water Storage Tank Level	W	A	N.A.	
17.	Volume Control Tank Level	S	R	N.A.	
18A.	Containment Pressure (SIS signal)	S	R **	M (1)	1) Isolation valve signal
18B.	Containment Pressure (Steamline Isol)	S	R **	M	Narrow range containment pressure (-3.0, +3.0 psig excluded)
18C.	Containment Pressure (Cont. Spray Act)	S	R**	M	
18D.	Annulus Pressure (Vacuum Breaker)	N.A.	R**	R	

TABLE TS 4.1-1

MINIMUM FREQUENCIES FOR CHECKS, CALIBRATIONS AND TEST OF INSTRUMENT CHANNELS
(Page 3 of 4)

	Channel Description	Check	Calibrate	Test	Remarks
19.	Radiation Monitoring System	*D	R	M	Includes all 24 channels
20.	Boric Acid Make-Up Flow Channel	N.A.	R	N.A.	
21.	Containment Sump Level	N.A.	N.A.	R	
22.	Accumulator Level and Pressure	S	R	N.A.	
23.	Steam Generator Pressure	S	R	M	
24.	Turbine First Stage Pressure	S	A**	M	
25.	Portable Radiation Survey Instruments	*M	A	Q	
26.	Protective System Logic Channel Testing	N.A.	N.A.	M	Includes auto load sequencer
27.	Environmental Monitors	*M	N.A.	N.A.	
28.	Turbine Overspeed Protection Trip Channel	N.A.	R	M	
29.	Seismic Monitoring System	R	R	N.A.	
30.	Fore Bay Water Level	N.A.	R**	R	

MINIMUM FREQUENCIES FOR CHECKS, CALIBRATIONS AND TEST OF INSTRUMENT CHANNELS

	CHANNEL DESCRIPTION	CHECK	CALIBRATE	TEST	REMARKS
31	AFW Flow Rate	See Remarks	R	N.A.	Flow Rate Indication will be checked at each unit startup and shut-down
32	PORV Position Indication	M	R	N.A.	
33	PORV Block Valve Position Indicator	M	R	N.A.	
34	Safety Valve Position Indicator	M	R	N.A.	
35	FW Pump Trip (AFW Initiation)	N.A.	N.A.	R	

A - Annually
D - Daily
M - Monthly
P - Prior to each startup if not done previous week
Q - Quarterly

R - Each refueling cycle not to exceed 18 mos.
S - Each shift
B/W - Every two weeks
N.A. - Not applicable
W - Weekly
EFPM - Effective Full Power Month
EFPQ - Effective Full Power Quarter

* See Specification 4.1.d
** Only if test indicates calibration required
*** Permissives P8 and P10 and the 25% reactor trip are tested quarterly
**** The check and calibration for axial offset shall also be performed prior to exceeding 75 percent power following any core alteration.

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MINIMUM FREQUENCIES FOR EQUIPMENT TESTS

	Equipment Tests***	Test	Frequency	Maximum Time Between Test (Days)
1.	Control Rods	Rod drop times of all full length rods	Each refueling outage	N.A.
		Partial movement of all rods	Every 2 weeks	17
1a.	Reactor Trip Breakers	Open trip	Monthly	37
1b.	Reactor Coolant Pump Breakers-Open-Reactor Trip	Operability	Each refueling outage	N.A.
2.	Pressurizer Safety Valves	Set point	One each refueling	N.A.
3.	Main Steam Safety Valves	Set point	Two each refueling outage	N.A.
4.	Containment Isolation Trip	Operability	Each refueling outage	N.A.
5.	Refueling System Interlocks	Operability	Prior to each refueling outage	N.A.
6.	Ventilation System a. Shield Building b. Auxiliary Building SV Zone c. Spent Fuel Pool	Halide, DOP and Methyl Iodide Pressure Drop Test Visual Inspection	During each refueling outage except as specified in Note**	N.A.
7.	Fire Protection Pump and Power Supply	*Operability	Monthly	37
8.	RCS Leak Detection	Operability	Weekly	8
9.	Diesel Fuel Supply	*Fuel inventory	Weekly	8
10.	Turbine Stop and Governor Valves	Operability	Monthly(1)(2)	37(1)(2)
11.	Fuel Assemblies	Visual Inspection	Each refueling outage	N.A.
12.	Guard Pipes	Visual Inspection	Each refueling outage	N.A.

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TABLE 4.1-3 Page 2 of 2

MINIMUM FREQUENCIES FOR EQUIPMENT TESTS

	EQUIPMENT TEST	TEST	FREQUENCY	MAXIMUM TIME BETWEEN TESTS (DAYS)
13.	Pressurizer PORV's	Operability	Each Refueling Cycle	NA
14.	Pressurize PORV Block Valves	Operability	Each Refueling Cycle	NA
15.	Pressurizer Heaters	Continuity	Each Refueling Cycle	NA

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NOTES

* See Specification 4.1.d

** Tests and frequency shall be in accordance with Specifications 4.4.d and 4.12.

*** Following maintenance on the above equipment that could affect the operation of the equipment tests should be performed to verify operability.

(1) This test may be waived for end of cycle operations when boron concentrations are less than 150 ppm, due to operational limitations.

c. At least one licensed operator shall be in the control room when fuel is in the reactor.

d. At least two licensed operators shall be present in the control room during reactor startup, turbine generator synchronization to the grid, and during recovery from reactor trips.

e. An individual qualified in radiation protection procedures shall be on site when fuel is in the reactor. This individual may be one of the shift operators.

f. Refueling operations shall be directed by a licensed Senior Reactor Operator assigned to the refueling operation who has no other concurrent responsibilities during the refueling operation.

g. A Fire Brigade of at least three members shall be maintained at all times. The Fire Brigade shall not include a minimum crew of two control operators necessary for safe shutdown of the unit during a fire emergency. This change is effective 90 days after issuance of this amendment.

h. When the reactor is above the cold shutdown condition, a qualified Shift Technical Advisor shall be within 10 minutes of the control room. 4

6.3 PLANT STAFF QUALIFICATIONS

6.3.1 Qualifications of each member of the Plant Staff shall meet or exceed the minimum acceptable levels of ANSI-N18.1-1971 for comparable positions.

6.3.2 The Shift Technical Advisor shall have a bachelors degree or equivalent in a scientific or engineering discipline, or have qualified as a Senior Reactor Operator on a pressurized water reactor, with specific training in the design of the Kewaunee Plant and plant transient and accident analysis. 4

6.4 TRAINING

6.4.1 A retraining and replacement training program for the Plant Staff shall be maintained under the direction of the Training Supervisor and shall meet or exceed the requirements and recommendations of Section 5.5 of ANSI-N18.1-1971 and Appendix A of 10 CFR Part 55.

6.4.2 A training program for the Fire Brigade shall be maintained under the direction of the Fire Marshall and shall meet or exceed the requirements of Section 27 of the NFPA Code-1975, except that training sessions shall be held quarterly.

6.5 REVIEW AND AUDIT

6.5.1 PLANT OPERATIONS REVIEW COMMITTEE (PORC)

FUNCTION

6.5.1.1 The PORC shall function to advise the Plant