

3/4.3 INSTRUMENTATION

3/4.3.1 REACTOR PROTECTION SYSTEM INSTRUMENTATION

LIMITING CONDITION FOR OPERATION

3.3.1 As a minimum, the reactor protection system instrumentation channels shown in Table 3.3.1-1 shall be OPERABLE with the REACTOR PROTECTION SYSTEM RESPONSE TIME as shown in Table 3.3.1-2.

APPLICABILITY: As shown in Table 3.3.1-1.

ACTION:

- a. With the number of OPERABLE channels less than required by the Minimum OPERABLE Channels per Trip System requirement for one trip system, place the inoperable channel and/or that trip system in the tripped condition\* within ~~one~~ <sup>twelve Ls</sup> hour. The provisions of Specification 3.0.4 are not applicable.
- b. With the number of OPERABLE channels less than required by the Minimum OPERABLE Channels per Trip System requirement for both trip systems, place at least one trip system\*\* in the tripped condition within one hour and take the ACTION required by Table 3.3.1-1.

SURVEILLANCE REQUIREMENTS

4.3.1.1 Each reactor protection system instrumentation channel shall be demonstrated OPERABLE by the performance of the CHANNEL CHECK, CHANNEL FUNCTIONAL TEST and CHANNEL CALIBRATION operations for the OPERATIONAL CONDITIONS and at the frequencies shown in Table 4.3.1.1-1.

4.3.1.2 LOGIC SYSTEM FUNCTIONAL TESTS and simulated automatic operation of all channels shall be performed at least once per 18 months.

4.3.1.3 The REACTOR PROTECTION SYSTEM RESPONSE TIME of each reactor trip functional unit shown in Table 3.3.1-2 shall be demonstrated to be within its limit at least once per 18 months. Each test shall include at least one channel per trip system such that all channels are tested at least once every N times 18 months where N is the total number of redundant channels in a specific reactor trip system.

\*An inoperable channel need not be placed in the tripped condition where this would cause the Trip Function to occur. In these cases, the inoperable channel shall be restored to OPERABLE status within <sup>2</sup> hours or the ACTION required by Table 3.3.1-1 for that Trip Function shall be taken.

\*\*The trip system need not be placed in the tripped condition if this would cause the Trip Function to occur. When a trip system can be placed in the tripped condition without causing the Trip Function to occur, place the trip system with the most inoperable channels in the tripped condition; if both systems have the same number of inoperable channels, place either trip system in the tripped condition.

TABLE 3.3.1-1 (Continued)

REACTOR PROTECTION SYSTEM INSTRUMENTATIONTABLE NOTATIONS

- (a) A channel may be placed in an inoperable status for up to <sup>6</sup>2 hours for required surveillance without placing the trip system in the tripped condition provided at least one OPERABLE channel in the same trip system is monitoring that parameter.
- (b) The "shorting links" shall be removed from the RPS circuitry prior to and during the time any control rod is withdrawn\* per Specification 3.9.2 and shutdown margin demonstrations performed per Specification 3.10.3.
- (c) An APRM channel is inoperable if there are less than 2 LPRM inputs per level or less than 14 LPRM inputs to an APRM channel.
- (d) This function is not required to be OPERABLE when the reactor pressure vessel head is unbolted or removed per Specification 3.10.1.
- (e) This function shall be automatically bypassed when the reactor mode switch is not in the Run position.
- (f) This function is not required to be OPERABLE when DRYWELL INTEGRITY is not required.
- (g) With any control rod withdrawn. Not applicable to control rods removed per Specification 3.9.10.1 or 3.9.10.2.
- (h) This function shall be automatically bypassed when operating below the appropriate turbine first stage pressure setpoint of:
- (1)  $\leq 26.9\%^{**}$  of the value of turbine first-stage pressure at valves wide open (VWO) steam flow when operating with rated feedwater temperature of greater than or equal to 420°F, or
  - (2)  $\leq 22.5\%^{**}$  of the value of turbine first-stage pressure at VWO steam flow when operating with rated feedwater temperature between 370°F and 420°F.

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\*Not required for control rods removed per Specification 3.9.10.1 or 3.9.10.2.

\*\*Allowable setpoint values of turbine first-stage pressure equivalent to  
- THERMAL POWER less than 40% of RATED THERMAL POWER.

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TABLE 4.3.1.1-1

REACTOR PROTECTION SYSTEM INSTRUMENTATION SURVEILLANCE REQUIREMENTS

FUNCTIONAL UNIT	CHANNEL CHECK	CHANNEL FUNCTIONAL ST	CHANNEL CALIBRATION (a)	OPERATIONAL CONDITIONS FOR WHICH SURVEILLANCE REQUIRED
1. Intermediate Range Monitors:				
a. Neutron Flux - High	S/U, S, (b) S	S/U, W W	R R	2 3, 4, 5
b. Inoperative	NA	W	NA	2, 3, 4, 5
2. Average Power Range Monitor: (f)				
a. Neutron Flux - High, Sutdown	S/U, S, (b) S	S/U, W W	SA SA	2 3, 5
b. Flow Biased Simulated Thermal Power - High	S, D (h)	W Q	W (d)(e), SA, R (i)	1
c. Neutron Flux - High	S	W Q	W (d), SA	1
d. Inoperative	NA	W Q	NA	1, 2, 3, 5
3. Reactor Vessel Steam Dome Pressure - High	S	W Q	R (g)	1, 2 (j)
4. Reactor Vessel Water Level - Low, Level 3	S	W Q	R (g)	1, 2
5. Reactor Vessel Water Level - High, Level B	S	W Q	R (g)	1
6. Main Steam Line Isolation Valve - Closure	NA	W Q	R	1
7. Main Steam Line Radiation - High	S	W Q	R	1, 2 (j)
8. Drywell Pressure - High	S	W Q	R (q)	1, 2 (k)

TABLE 4.3.1.1-1 (Continued)  
 REACTOR PROTECTION SYSTEM INSTRUMENTATION SURVEILLANCE REQUIREMENTS

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FUNCTIONAL UNIT	CHANNEL CHECK	CHANNEL FUNCTIONAL TEST	CHANNEL CALIBRATION	OPERATIONAL CONDITIONS FOR WHICH SURVEILLANCE REQUIRED
9. Scram Discharge Volume Water Level - High				
a. Transmitter/Trip Unit	S	M Q	R(g)	1, 2, 5(1)
b. Float Switch	NA	M Q	R	1, 2, 5(1)
10. Turbine Stop Valve - Closure	S	M Q	R(g)	1
11. Turbine Control Valve Fast Closure Valve Trip System Oil Pressure - Low	S	M Q	R(g)	1
12. Reactor Mode Switch Shutdown Position	NA	R	NA	1, 2, 3, 4, 5
13. Manual Scram	NA	M W	NA	1, 2, 3, 4, 5

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- (a) Neutron detectors may be excluded from CHANNEL CALIBRATION.
- (b) The IRM and SRM channels shall be determined to overlap for at least 1/2 decade during each startup after entering OPERATIONAL CONDITION 2 and the IRM and APRM channels shall be determined to overlap for at least 1/2 decade during each controlled shutdown, if not performed within the previous 7 days.
- (c) [DELETED]
- (d) This calibration shall consist of the adjustment of the APRM channel to conform to the power values calculated by a heat balance during OPERATIONAL CONDITION 1 when THERMAL POWER > 25% of RATED THERMAL POWER. Adjust the APRM channel if the absolute difference is greater than 2% of RATED THERMAL POWER.
- (e) This calibration shall consist of the adjustment of the APRM flow biased channel to conform to a calibrated flow signal.
- (f) The LPRMs shall be calibrated at least once per 1000 MWD/T using the TIP system.
- (g) Calibrate trip unit at least once per ~~30~~ days. 92
- (h) Verify measured drive flow to be less than or equal to established drive flow at the existing flow control valve position.
- (i) This calibration shall consist of verifying the  $6 \pm 1$  second simulated thermal power time constant.
- (j) Not applicable when the reactor pressure vessel head is unbolted or removed per Specification 3.10.1.
- (k) Not applicable when DRYWELL INTEGRITY is not required.
- (l) Applicable with any control rod withdrawn. Not applicable to control rods removed per Specification 3.9.10.1 or 3.9.10.2.

Amendment No. 21  
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3/4.3 INSTRUMENTATIONBASES3/4.3.1 REACTOR PROTECTION SYSTEM INSTRUMENTATION

The reactor protection system automatically initiates a reactor scram to:

- a. Preserve the integrity of the fuel cladding.
- b. Preserve the integrity of the reactor coolant system.
- c. Minimize the energy which must be absorbed following a loss-of-coolant accident, and
- d. Prevent inadvertent criticality.

This specification provides the limiting conditions for operation necessary to preserve the ability of the system to perform its intended function even during periods when instrument channels may be out of service because of maintenance. When necessary, one channel may be made inoperable for brief intervals to conduct required surveillance.

The reactor protection system is made up of two independent trip systems. There are usually four channels to monitor each parameter with two channels in each trip system. The outputs of the channels in a trip system are combined in a logic so that either channel will trip that trip system. The tripping of both trip systems will produce a reactor scram. The bases for the trip settings of the RPS are discussed in the bases for Specification 2.2.1. Insert

The measurement of response time at the specified frequencies provides assurance that the protective functions associated with each channel are completed within the time limit assumed in the accident analysis. No credit was taken 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 measurement, provided 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.

3/4.3.2 ISOLATION ACTUATION INSTRUMENTATION

This specification ensures the effectiveness of the instrumentation used to mitigate the consequences of accidents by prescribing the OPERABILITY trip setpoints and response times for isolation of the reactor systems. When necessary, one channel may be inoperable for brief intervals to conduct required surveillance. Some of the trip settings may have tolerances explicitly stated where both the high and low values are critical and may have a substantial effect on safety. Negative barometric pressure fluctuations are accounted for in the trip setpoints and allowable values specified for drywell pressure-high. The setpoints of other instrumentation, where only the high or low end of the setting have a direct bearing on safety, are established at a level away from the normal operating range to prevent inadvertent actuation of the systems involved.

Except for the MSIVs, the safety analysis does not address individual sensor response times or the response times of the logic systems to which the sensors are connected. For D.C. operated valves, a 3 second delay is assumed before the valve starts to move. For A.C. operated valves, it is assumed that

Insert to Bases 3/4.3.1

Specified surveillance intervals and surveillance and maintenance outage times have been determined in accordance with NEDC-30851P, "Technical Specification Improvement Analyses for BWR Reactor Protection System," as approved by the NRC and documented in the SER (letter T. A. Pickens from A. Thadani dated July 15, 1987).