

INFORMATION

Docket Number 50-346
License Number NPF-3
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DEFINITIONS

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REPORTABLE EVENT

1.7 A REPORTABLE EVENT shall be any of those conditions specified in Section 50.73 of 10 CFR Part 50.

CONTAINMENT INTEGRITY

1.8 CONTAINMENT INTEGRITY shall exist when:

- a. All penetrations required to be closed during accident conditions are either:
 1. Capable of being closed by the Safety Features Actuation System, or
 2. Closed by manual valves, blind flanges, or deactivated automatic valves secured in their closed positions, except those approved to be open under administrative controls.
- b. All equipment hatches are closed and sealed.
- c. Each airlock is OPERABLE pursuant to Specification 3.6.1.3.
- d. The containment leakage rates are within the limits of Specification 3.6.1.2, and
- e. The sealing mechanism associated with each penetration (e.g., welds, bellows or O-rings) is OPERABLE.

CHANNEL CALIBRATION

1.9 A CHANNEL CALIBRATION shall be the adjustment, as necessary, of the channel output such that it responds with necessary range and accuracy to known values of the parameter which the channel monitors. The CHANNEL CALIBRATION shall encompass the entire channel including the sensor and alarm and/or trip functions, and shall include the CHANNEL FUNCTIONAL TEST. CHANNEL CALIBRATION may be performed by any series of sequential, overlapping or total channel steps such that the entire channel is calibrated.

CHANNEL CHECK

1.10 A CHANNEL CHECK shall be the qualitative assessment of channel behavior during operation by observation. This determination shall include, where possible, comparison of the channel indication and/or status with other indications and/or status derived from independent instrument channels measuring the same parameter.

DAVIS-BESSE, UNIT 1

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Amendment No. 93.12B, 147

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3/4.3 INSTRUMENTATION

3/4.3.1 REACTOR PROTECTION SYSTEM INSTRUMENTATION

LIMITING CONDITION FOR OPERATION

3.3.1.1 As a minimum, the Reactor Protection System instrumentation channels and bypasses of Table 3.3-1 shall be OPERABLE with RESPONSE TIMES as shown in Table 3.3-2.

APPLICABILITY: As shown in Table 3.3-1.

ACTION:

As shown in Table 3.3-1.

SURVEILLANCE REQUIREMENTS

4.3.1.1.1 Each Reactor Protection System instrumentation channel shall be demonstrated OPERABLE by the performance of the CHANNEL CHECK, CHANNEL CALIBRATION and CHANNEL FUNCTIONAL TEST operations during the MODES and at the frequencies shown in Table 4.3-1.

4.3.1.1.2 The total bypass function shall be demonstrated OPERABLE at least once per 18 months during CHANNEL CALIBRATION testing of each channel affected by bypass operation.

4.3.1.1.3 The REACTOR PROTECTION SYSTEM RESPONSE TIME of each reactor trip function shall be demonstrated to be within its limit at least once per 18 months. Each test shall include at least one channel per function 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 function as shown in the "Total No. of Channels" column of Table 3.3-1.

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TABLE 3.3-1

REACTOR PROTECTION SYSTEM INSTRUMENTATION

FUNCTIONAL UNIT	TOTAL NO. OF CHANNELS	CHANNELS TO TRIP	MINIMUM CHANNELS OPERABLE	APPLICABLE NODES	ACTION
1. Manual Reactor Trip	2	1	2	1, 2 and *	1
2. High Flux	4	2	3	1, 2	28, 10
3. RC High Temperature	4	2	3	1, 2	38, 10
4. Flux - & Flux - Flow	4	2(a)(b)	3	1, 2	28, 10
5. RC Low Pressure	4	2(a)	3	1, 2	38, 10
6. RC High Pressure	4	2	3	1, 2	38, 10
7. RC Pressure-Temperature	4	2(a)	3	1, 2	38, 10
8. High Flux/Number of Reactor Coolant Pumps On	4	2(a)(b)	3	1, 2	38, 10
9. Containment High Pressure	4	2	3	1, 2	38, 10
10. Intermediate Range, Neutron Flux and Rate	2	N/A	2(c)	1, 2 and *	4
11. Source Range, Neutron Flux and Rate					
A. Startup	2	N/A	2	288 and *	5
B. Shutdown	2	N/A	1	3, 4 and 5	6
12. Control Rod Drive Trip Breakers	2 per trip system	1 per trip system	2 per trip system	1, 2 and *	78, 88
13. Reactor Trip Module	2 per trip system	1 per trip system	2 per trip system	1, 2 and *	78
14. Shutdown Bypass High Pressure	4	2	3	288, 388 488, 588	68
15. SCR Relays	2	2	2	1, 2 and *	98

DAVIS-BESSE, UNIT 1

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Amendment No. ADG-135

TABLE 3.3-1 (Continued)

TABLE NOTATION

*With the control rod drive trip breakers in the closed position and the control rod drive system capable of rod withdrawal.

**When Shutdown Bypass is actuated.

*The provisions of Specification 3.0.4 are not applicable.

*High voltage to detector may be de-energized above 10^{-10} amps on both Intermediate Range channels.

(a) Trip may be manually bypassed when RCS pressure \leq 1820 psig by actuating Shutdown Bypass provided that:

(1) The High Flux Trip Setpoint is \leq 5% of RATED THERMAL POWER,

(2) The Shutdown Bypass High Pressure Trip Setpoint of \leq 1820 psig is imposed, and

(3) The Shutdown Bypass is removed when RCS pressure $>$ 1820 psig.

(b) Trip may be manually bypassed when Specification 3.10.3 is in effect.

(c) The minimum channels OPERABLE requirement may be reduced to one when Specification 3.10.1 or 3.10.2 is in effect.

ACTION STATEMENTS

ACTION 1 - With the number of channels OPERABLE one less than required by the Minimum Channels OPERABLE requirement, restore the inoperable channel to OPERABLE status within 48 hours or be in at least HOT STANDBY within the next 6 hours and/or open the control rod drive trip breakers.

ACTION 2 - With the number of OPERABLE channels one less than the Total Number of Channels STARTUP and/or POWER OPERATION may proceed provided ~~all~~ ^{both} of the following conditions are satisfied:

a. The inoperable channel is placed in the ^{bypassed or} tripped condition within one hour.

~~b. The Minimum Channels OPERABLE requirement is met; however, one additional channel may be bypassed for up to 2 hours for surveillance testing per Specification 4.3.1.1.1.~~

TABLE 3.3-1 (Continued)

ACTION STATEMENTS (Continued)

~~and the inoperable channel above may be bypassed for up to 30 minutes in any 24 hour period when necessary to test the trip breaker associated with the logic of the channel being tested per Specification 4.3.1.1.1, and~~

- b. Either, THERMAL POWER is restricted to $\leq 75\%$ of R/TED THERMAL POWER and the High Flux Trip Setpoint is reduced to $< 85\%$ of RATED THERMAL POWER within 4 hours or QUADRANT POWER TILT is monitored at least once per 12 hours.

ACTION 3 - With the number of OPERABLE channels one less than the Total Number of Channels STARTUP and POWER OPERATION may proceed provided, ~~both of the following conditions are satisfied:~~

~~a. The inoperable channel is placed in the~~ ^{bypassed or} tripped condition within one hour.

~~b. The Minimum Channels OPERABLE requirement is met; however, one additional channel may be bypassed for up to 3 hours for surveillance testing per Specification 4.3.1.1.1, and the inoperable channel above may be bypassed for up to 30 minutes in any 24 hour period when necessary to test the trip breaker associated with the logic of the channel being tested per Specification 4.3.1.1.1.~~

ACTION 4 - With the number of channels OPERABLE one less than required by the Minimum Channels OPERABLE requirement and with the THERMAL POWER level:

- a. $< 5\%$ of RATED THERMAL POWER restore the inoperable channel to OPERABLE status prior to increasing THERMAL POWER above 5% of RATED THERMAL POWER.
- b. $> 5\%$ of RATED THERMAL POWER, POWER OPERATION may continue.

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TABLE 3.3-1 (Continued)

ACTION STATEMENTS (Continued)

- ACTION 5 - With the number of channels OPERABLE one less than required by the Minimum Channels OPERABLE requirement and with the THERMAL POWER level:
- a. $\leq 10^{-10}$ amps on the Intermediate Range (IR) instrumentation, restore the inoperable channel to OPERABLE status prior to increasing THERMAL POWER above 10^{-10} amps on the IR instrumentation.
 - b. $> 10^{-10}$ amps on the IR instrumentation, operation may continue.
- ACTION 6 - With the number of channels OPERABLE one less than required by the Minimum Channels OPERABLE requirement, verify compliance with the SHUTDOWN MARGIN requirements of Specification 3.1.1.1 within one hour and at least once per 12 hours thereafter.
- ACTION 7 - With the number of OPERABLE channels one less than the Total Number of Channels STARTUP and/or POWER OPERATION may proceed provided all of the following conditions are satisfied:
- a. Within 1 hour:
 1. Place the inoperable channel in the tripped condition, or
 2. Remove power supplied to the control rod trip device associated with the inoperative channel.
 - b. One additional channel may be bypassed for up to 2 hours for surveillance testing per Specification 4.3.1.1.1, and the inoperable channel above may be bypassed for up to 30 minutes in any 24 hour period when necessary to test the trip breaker associated with the logic of the channel being tested per Specification 4.3.1.1.1. The inoperable channel above may not be bypassed to test the logic of a channel of the trip system associated with the inoperable channel.

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TABLE 3.3-1 (Continued)

ACTION STATEMENTS (Continued)

- ACTION 8 - With one of the Reactor Trip Breaker diverse trip features (undervoltage or shunt trip devices) inoperable, restore it to OPERABLE status in 48 hours or place the breaker in trip in the next hour.
- ACTION 9 - With one or both channels of SCR Relays inoperable, restore the channels to OPERABLE status during the next COLD SHUTDOWN exceeding 24 hours.
- ACTION 10 - With the number of channels OPERABLE one less than the Minimum Channels OPERABLE requirement, within one hour, place one inoperable channel in trip and the second inoperable channel in bypass, and restore one of the inoperable channels to OPERABLE status within 48 hours or be in HOT STANDBY within the next 6 hours and open the reactor trip breakers.

TABLE 3.3-2

REACTOR PROTECTION SYSTEM INSTRUMENTATION RESPONSE TIMES

FUNCTIONAL UNIT	RESPONSE TIMES** (seconds)
1. Manual Reactor Trip	Not Applicable
2. High Flux*	≤ 0.266
3. RC High Temperature	Not Applicable
4. Flux - Δ Flux - Flow* - Variable Flow	≤ 1.77
- Constant Flow	≤ 0.266
5. RC Low Pressure	≤ 0.341
6. RC High Pressure	≤ 0.341
7. RC Pressure - Temperature - Constant Temperature	Not Applicable
8. High Flux/Number of Reactor Coolant Pumps On*	$\leq 0.631^{***}$
9. Containment High Pressure	Not Applicable

* 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.

** Including sensor (except as noted) RPS instrument delay and the breaker delay.

*** A 0.24 sec delay time has been assumed for pump monitor.

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TABLE 4.3-1

REACTOR PROTECTION SYSTEM INSTRUMENTATION SURVEILLANCE REQUIREMENTS

FUNCTIONAL UNIT	CHANNEL CHECK	CHANNEL CALIBRATION	CHANNEL FUNCTIONAL TEST	MODES IN WHICH SURVEILLANCE REQUIRED	
1. Manual Reactor Trip	N.A.	N.A.	S/U(9)	N.A.	
2. High Flux	S	D(2), and Q(6,9)	N ² N.A.	1, 2	
3. RC High Temperature	S	R	N ² SA(9)	1, 2	
4. Flux - ΔFlux - Flow	S(4)	H(3) and Q(6,7,9)	N ² N.A.	1, 2	
5. RC Low Pressure	S	R	N ² SA(4)	1, 2	
6. RC High Pressure	S	R	N ² SA(9)	1, 2	
7. RC Pressure-Temperature	S	R	N ² SA(4)	1, 2	
8. High Flux/Number of Reactor Coolant Pumps On	S	R ² Q(6,9)	N ² N.A.	1, 2	
9. Containment High Pressure	S	R	N ² SA(9)	1, 2	
10. Intermediate Range, Neutron Flux and Rate	S	R(5)	S/U(5)(1) N.A.	1, 2 and 4	
11. Source Range, Neutron Flux and Rate	S	R(6)	N.A. N² end-S/U(1)(5)	2, 3, 4 and 5	
12. Control Rod Drive Trip Breakers	N.A.	N.A.	N(8,9) and S/U(1)(8)	1, 2 and 4	
13. Reactor Trip Module Logic	N.A.	N.A.	N(9)	1, 2 and 4	
14. Shutdown Bypass High Pressure	S	R	N ² SA(9)	2 and 4 and 5 and 6 and 7 and 8 and 9 and 10 and 11 and 12 and 13 and 14 and 15 and 16 and 17 and 18 and 19 and 20 and 21 and 22 and 23 and 24 and 25 and 26 and 27 and 28 and 29 and 30 and 31 and 32 and 33 and 34 and 35 and 36 and 37 and 38 and 39 and 40 and 41 and 42 and 43 and 44 and 45 and 46 and 47 and 48 and 49 and 50 and 51 and 52 and 53 and 54 and 55 and 56 and 57 and 58 and 59 and 60 and 61 and 62 and 63 and 64 and 65 and 66 and 67 and 68 and 69 and 70 and 71 and 72 and 73 and 74 and 75 and 76 and 77 and 78 and 79 and 80 and 81 and 82 and 83 and 84 and 85 and 86 and 87 and 88 and 89 and 90 and 91 and 92 and 93 and 94 and 95 and 96 and 97 and 98 and 99 and 100	1, 2 and 4
15. SCR Relays	N.A.	N.A.	R	1, 2 and 4	

TABLE 4.3-1 (Continued)

NOTATION

- (1) - If not performed in previous 7 days.
- (2) - Heat balance only, above 15% of RATED THERMAL POWER.
- (3) - When THERMAL POWER [TP] is above 50% of RATED THERMAL POWER [RTP], and at steady state, compare out-of-core measured AXIAL POWER IMBALANCE [API_o] to incore measured AXIAL POWER IMBALANCE [API_i] as follows:

$$\frac{RTP}{TP} [API_o - API_i] = \text{Offset Error}$$

Recalibrate if the absolute value of the Offset Error is $\geq 2.5\%$

- (4) - AXIAL POWER IMBALANCE and loop flow indications only.
- (5) - Verify at least one decade overlap if not verified in previous 7 days.
- (6) - Neutron detectors may be excluded from CHANNEL CALIBRATION.
- (7) - Flow rate measurement sensors may be excluded from CHANNEL CALIBRATION. However, each flow measurement sensor shall be calibrated at least once per 18 months.
- (8) - The CHANNEL FUNCTIONAL TEST shall independently verify the OPERABILITY of both the undervoltage and shunt trip devices of the Reactor Trip Breakers.

* - With any control rod drive trip breaker closed.

** - When Shutdown Bypass is actuated.

-(9)- Performed on a STAGGERED TEST BASIS.

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INSTRUMENTATION

ANTICIPATORY REACTOR TRIP SYSTEM INSTRUMENTATION

LIMITING CONDITION FOR OPERATION

3.3.2.3 The Anticipatory Reactor Trip System instrumentation channels of Table 3.3-17 shall be OPERABLE.

APPLICABILITY: As shown in Table 3.3-17

ACTION: As shown in Table 3.3-17

SURVEILLANCE REQUIREMENTS

4.3.2.3 The Anticipatory Reactor Trip System shall be demonstrated OPERABLE by the performance of the CHANNEL CHECK, CHANNEL CALIBRATION and CHANNEL FUNCTIONAL TEST for the modes and at the frequencies shown in Table 4.3-17.

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TABLE 3.3-17
ANTICIPATORY REACTOR TRIP SYSTEM INSTRUMENTATION

<u>FUNCTIONAL UNIT</u>		<u>TOTAL NO. OF CHANNELS</u>	<u>CHANNELS TO TRIP</u>	<u>MINIMUM CHANNELS OPERABLE</u>	<u>APPLICABLE MODES</u>	<u>ACTION</u>	
1.	Turbine Trip	4	2 ^(a)	3	1 ^(b)	18	
2.	Trip of Both Main Feed Pump Turbines	4	2	3	1	19	
3.	Output Logic	4	2	3	1	20	

- (a) Trip automatically bypassed below 45 percent of RATED THERMAL POWER
(b) Applicable only above 45 percent of RATED THERMAL POWER

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TABLE 3.3-17 (CONTINUED)

ACTION STATEMENTS

- ACTION 18 - With the number of channels OPERABLE one less than required by the Minimum Channels OPERABLE requirements, restore the inoperable channel to OPERABLE status within 72 hours or reduce reactor power to less than 45 percent of RATED THERMAL POWER within the next 6 hours.
- ACTION 19 - With the number of channels OPERABLE one less than required by the Minimum Channels OPERABLE requirements, restore the inoperable channel to OPERABLE status within 72 hours or be in at least a SCRAMMED condition within the next 6 hours.
- ACTION 20 - With the number of OPERABLE channels one less than the Total Number of Channels, (TARTUP and/or POWER OPERATION may proceed) provided both of the following conditions are satisfied:
- a) The control rod drive trip breaker associated with the inoperable channel is placed in the tripped condition within one hour.
 - b) The Minimum Channels OPERABLE requirement is met; however, one additional control rod drive trip breaker associated with another channel may be tripped for up to 2 hours for surveillance testing per Specification 4.3.2.3, after reclosing the control rod drive trip breaker opened in a) above.

TABLE 4.3.17

ANTICIPATORY REACTOR TRIP SYSTEM INSTRUMENTATION SURVEILLANCE REQUIREMENTS

<u>FUNCTIONAL UNIT</u>	<u>CHANNEL CHECK</u>	<u>CHANNEL CALIBRATION</u>	<u>CHANNEL FUNCTIONAL TEST</u>	<u>MODES IN WHICH SURVEILLANCE IS REQUIRED</u>
1. Turbine Trip ^(a)	S	Not Applicable	H SA ^(c)	1 ^(b)
2. Main Feed Pump Turbine Trip	S	Not Applicable	H SA ^(c)	1
3. Output Logic	Not Applicable	Not Applicable	H	1

(a) Trip automatically bypassed below 45 percent of RATED THERMAL POWER

(h) Applicable only above 45 percent of RATED THERMAL POWER

(c) Perform on a STAGGERED TEST BASIS

SPECIAL TEST EXCEPTIONS

PHYSICS TESTS

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LIMITING CONDITION FOR OPERATION

3.10.2 The limitations of Specifications 3.1.1.3, 3.1.3.1, 3.1.3.2, 3.1.3.5, 3.1.3.6, 3.1.3.7, and 3.1.3.9 may be suspended during the performance of PHYSICS TESTS provided:

- a. The THERMAL POWER does not exceed 5% of RATED THERMAL POWER, and
- b. The reactor trip setpoints on the OPERABLE High Flux Channels are set at $\leq 25\%$ of RATED THERMAL POWER.
- c. The nuclear instrumentation Source Range and Intermediate Range high startup rate control rod withdrawal inhibit are OPERABLE.

APPLICABILITY: MODE 2.

ACTION:

With the THERMAL POWER $> 5\%$ of RATED THERMAL POWER, immediately open the control rod drive trip breakers.

SURVEILLANCE REQUIREMENTS

4.10.2.1 The THERMAL POWER shall be determined to be $\leq 5\%$ of RATED THERMAL POWER at least once per hour during PHYSICS TESTS.

4.10.2.2 Each Source and Intermediate Range and High Flux Channel shall be subjected to a CHANNEL FUNCTIONAL TEST within 12 hours prior to initiating PHYSICS TESTS.

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3/4.3 INSTRUMENTATION

EASES

3/4.3.1 and 3/4.3.2 REACTOR PROTECTION SYSTEM AND SAFETY SYSTEM INSTRUMENTATION

The OPERABILITY of the RPS, SFAS and SFRCS instrumentation systems ensure that 1) the associated action and/or trip will be initiated when the parameter monitored by each channel or combination thereof exceeds its setpoint, 2) the specified coincidence logic is maintained, 3) sufficient redundancy is maintained to permit a channel to be out of service for testing or maintenance, and 4) sufficient system functional capability is available for RPS, SFAS and SFRCS purposes from diverse parameters.

The OPERABILITY of these systems is required to provide the overall reliability, redundancy and diversity assumed available in the facility design for the protection and mitigation of accident and transient conditions. The integrated operation of each of these systems is consistent with the assumptions used in the accident analyses.

The surveillance requirements specified for these systems ensure that the overall system functional capability is maintained comparable to the original design standards. The periodic surveillance tests performed at the minimum frequencies are sufficient to demonstrate this capability.

The measurement of response time at the specified frequencies provides assurance that the RPS, SFAS, and SFRCS action function associated with each channel is completed within the time limit assumed in the safety analyses. No credit was taken in the analyses 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 measurements provided that 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.

A SFRCS channel consists of 1) the sensing device(s), 2) associated logic and output relays (including Isolation of Main Feedwater Non Essential Valves and Turbine Trip), and 3) power sources.

The SFRCS response time for the turbine stop valve closure is based on the combined response times of main steam line low pressure sensors, logic cabinet delay for main steam line low pressure signals and closure time of the turbine stop valves. This SFRCS response time ensures that the auxiliary feedwater to the unaffected steam generator will not be isolated due to a SFRCS low pressure trip during a main steam line break accident.

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3/4.3 INSTRUMENTATION

BASES

3/4.3.1 and 3/4.3.2 REACTOR PROTECTION SYSTEM AND SAFETY SYSTEM INSTRUMENTATION (Continued)

Safety-grade anticipatory reactor trip is initiated by a turbine trip (above 45 percent of RATED THERMAL POWER) or trip of both main feedwater pump turbines. This anticipatory trip will operate in advance of the reactor coolant system high pressure reactor trip to reduce the peak reactor coolant system pressure and thus reduce challenges to the pilot operated relief valve. This anticipatory reactor trip system was installed to satisfy Item II.K.2.10 of NUREG-0737. The justification for the ARTS turbine trip arming level of 45% is given in BAW-1893, October, 1985.

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