ATTACHMENT A

TECHNICAL SPECIFICATION 3/4.3.1

REACTOR TRIP SYSTEM INSTRUMENTATION

A. Description of amendment request:

This amendment request revises the Technical Specifications of the Operating Licenses to incorporate the changes proposed by WCAP-10271 and subsequently approved by the NRC in their safety evaluation of WCAP-10271 "Evaluation of Surveillance Frequencies and Out of Service Times For The Reactor Protection Instrumentation System," dated February 21, 1985.

1. Present condition of license:

As described in the current Diablo Canyon Unit 1 Technical Specifications (NUREG-1102), and the Unit 2 Technical Specifications (NUREG-1132), Specification 3/4.3.1, pages 3-1 through 3-13 and B 3/4 3-1.

2. Proposed condition of license:

Changes as described in the marked up copy of Technical Specification 3/4.3.1 (Attachment B). These changes include:

(a) Increase in surveillance intervals for Reactor Trip System (RTS) analog channel operational tests from once per month to once per quarter or startup in accordance with WCAP-10271 and current NRC Staff positions.

(b) Increase in the time that an inoperable RTS analog channel may be maintained in an untripped condition from 1 hour to 6 hours.

(c) Increase in the time that an inoperable RTS analog channel may be bypassed to allow testing of another channel in the same function from 2 hours to 4 hours.

3. Justification

The proposed changes noted in A.2 above are consistent with the NRC Staff's position as stated in their safety evaluation of WCAP-10271. The NRC Staff has stated in their safety evaluation of WCAP-10271 that approval of these changes is contingent upon confirmation that several conditions are met. PGandE's response to these conditions is provided below.

SER Condition

The NRC Staff stated in their safety evaluation (page 10) that approval of Item A.2.(a) above is contingent on performance of the testing on a staggered test basis.

PGandE Response

PGandE will perform the analog channel operational test for all reactor trip system instrumentation on a STAGGERED TEST BASIS. This change shall be implemented upon approval of the proposed changes in the surveillance interval and is reflected in the revised technical specifications.

SER Condition

The NRC Staff stated in their safety evaluation (page 10) that approval of Item A.2.(a) above is further contingent on ... implementation of procedures to evaluate failures for common cause and perform additional testing if necessary.

PGandE Response

PGandE will implement procedures or procedural steps to evaluate failures for common cause and to perform any additional testing as necessary, in accordance with the Westinghouse Owners Group Guidelines on this topic.

SER Condition

The NRC Staff stated in their safety evaluation (page 10) that for channels which provide dual inputs to other safety related systems such as ESFAS, the approval of items A.2(a) through A.2(c) above applies only to the RTS function.

PGandE Response

The channels which provide dual inputs to other safety-related systems such as ESFAS have been identified and a cautionary note has been added to the revised Technical Specifications.

SER Condition

The NRC Staff stated in their safety evaluation (page 10) that approval of channel testing in a bypassed condition for item A.2(c) above is contingent on the capability of the RTS design to allow such testing without lifting leads or installing temporary jumpers.

PGandE Response

At present PGandE does not have bypass capability for any of the instrumentation that are associated with Action Statements 2 and 6 in Table 3.3-1. Therefore, Action Statements 2 and 6 will not be revised, at this time, to provide testing in a bypassed condition. However, PGandE may in the future decide to install a bypass function and at that time a revision to the specification will be requested.

SER Condition

The NRC Staff has stated in their safety evaluation (page 9) that acceptance of items A.2.(a) through A.2.(c) above is contingent on confirmation that the instrument setpoint methodology includes sufficent adjustments to offset the drift anticipated as a result of less frequent surveillance.

PGandE Response

PGandE will implement a program to evaluate setpoint drift in accordance with the Westinghouse Owners Group Guidelines on this topic.

B. Proposed basis for no significant hazards consideration determination:

The standards used to arrive at a proposed determination that a request for amendment involves no significant hazards consideration are included in 10 CFR 50.92. The regulations state that the operation of the facilities in accordance with the proposed amendments would not: (1) involve a significant increase in the probability or consequences of an accident previously evaluated, or (2) create the possiblity of a new or different kind of accident from any accident previously evaluated, or (3) involve a significant reduction in a margin of safety.

The Commission has provided guidance concerning the application of these standards by providing examples of amendments considered likely, and not likely, to involve a significant hazards consideration. These were published in the Federal Register on April 6, 1983. One of the examples (iv) of actions not likely to involve a significant hazards consideration is a relief granted upon demonstration of acceptable operation from an operating restriction that was imposed because acceptable operation was not yet demonstrated. This assumes that the operating restriction and the criteria to be applied to a request for relief have been established in a prior review and that it is justified in a satisfactory way that the criteria have been met. The proposed changes to revise the reactor trip system instrumentation to be consistent with WCAP-10271 fit this example in that they have been approved by the NRC Staff as given in Safety Evaluation Report, "Evaluation of Surveillance Frequencies and Out of Service Times for the Reactor Protection Instrumentation System," dated February 21, 1985.

ATTACHMENT B

TECHNICAL SPECIFICATION 3/4.3.1

REACTOR TRIP SYSTEM INSTRUMENTATION

3/4.3 INSTRUMENTATION

3/4.3.1 REACTOR TRIP SYSTEM INSTRUMENTATION

LIMITING CONDITION FOR OPERATION

3.3.1 As a minimum, the Reactor Trip System instrumentation channels and interlocks 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 Each Reactor Trip System instrumentation channel and interlock and the automatic trip logic shall be demonstrated OPERABLE by performance of the Reactor Trip System Instrumentation Surveillance Requirements specified in Table 4.3-1.

4.3.1.2 The REACTOR TRIP 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 train such that both trains are tested at least once per 36 months and 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 TRIP SYSTEM INSTRUMENTATION

FUNCTIONAL UNIT	TOTAL NO. OF CHANNELS	CHANNELS TO TRIP	MINIMUM CHANNELS OPERABLE	APPLICABLE MODES	ACTION
1. Manual Reactor Trip	2	1	2	1, 2	1
	2	1	2	3*, 4*, 5*	12
2. Power Range, Neutron Flux					
a. High Setpoint	4	2	3	1, 2	2#
b. Low Setpoint	4	2	3	1###,2	2#
3. Power Range, Neutron Flux High Positive Rate	4	2	3	1, 2	2#
4. Power Range, Neutron Flux High Negative Rate	4	2	3	1, 2	2#
5. Intermediate Range, Neutron Flux	2	1	2	1###, 2	3
6. Source Range, Neutron Flux					
a. Startup	2	1	2	2##	4
b. Shutdown	2	1	2	3*, 4*, 5*	12
c. Shutdown	2	0	1	3, 4, and 5	5
7. Overtemperature ΔT	4	2	3	1, 2	6#
8. Overpower ΔT	4	2	3	1, 2	6#
9. Pressurizer Pressure-Low	4	2	3	1	6#
10. Pressurizer Pressure-High	4	2	3	1, 2	6#
11. Pressurizer Water Level-High	3	2	2	1	6#

TABLE 3.3-1 (Continued)

REACTOR TRIP SYSTEM INSTRUMENTATION

FUNCTIONAL UNIT	TOTAL NO. OF CHANNELS	CHANNELS TO TRIP	MINIMUM CHANNELS OPERABLE	APPLICABLE MODES	ACTION
12. Reactor Coolant Flow-Low					
a. Single Loop (Above P-8)	3/loop	2/loop in one loop	2/loop in each loop	1	6 ∇#
b. Two Loops (Above P-7 and below P-8)	3/loop	2/loop in two loops	2/loop in each loop	1	6 ∇#
13. Steam Generator Water Level-Low-Low	3/S.G.	2/S.G. in one S.G.	2/S.G. in each S.G.	1, 2	6 ∇# (1)
14. Steam Generator Water Level-Low Coincident With Steam/Feedwater Flow Mismatch	2 S.G. level and 2 stm./feed flow mismatch per S.G.	1 S.G. level coincident with 1 stm./feed flow mismatch in same S.G.	1 S.G. level and 2 stm./feed flow mismatch, or 2 S.G. level and 1 stm./feed flow mismatch per S.G.	1, 2	6 ∇#
15. Undervoltage-Reactor Coolant Pumps	2/bus	1/bus both busses	1/bus	1	6# (1)
16. Underfrequency-Reactor Coolant Pumps	3/bus	2 on same bus	2/bus	1	6#
17. Turbine Trip					
a. Low Autostop Oil Pressure	3	2	2	1	7#
b. Turbine Stop Valve Closure	4	4	4	1	7#

TABLE 3.3-1 (Continued)

REACTOR TRIP SYSTEM INSTRUMENTATION

FUNCTIONAL UNIT	TOTAL NO. OF CHANNELS	CHANNELS TO TRIP	MINIMUM CHANNELS OPERABLE	APPLICABLE MODES	ACTION
18. Safety Injection Input from ESF	2	1	2	1, 2	11
19. Reactor Coolant Pump Breaker Position Trip					
a. Above P-8	1/breaker	1	1/breaker	1	9
b. Above P-7	1/breaker	2	1/breaker	1	10
20. Reactor Trip Breakers	2	1	2	1, 2	11
	2	1	2	3*, 4*, 5*	12
21. Automatic Trip and Interlock Logic	2	1	2	1, 2	11
	2	1	2	3*, 4*, 5*	12
22. Reactor Trip System Interlocks					
a. Intermediate Range Neutron Flux, P-6	2	1	2	2##	8
b. Low Power Reactor Trips Block, P-7 P-10 Input	4	2	3	1	8 #
P-13 Input	2	1	2	1	8 #
c. Power Range Neutron Flux, P-8	4	2	3	1	8 #
d. Power Range Neutron Flux, P-10	4	2	3	1, 2	8 #
e. Turbine Impulse Chamber Pressure, P-13 (Input to P-7)	2	1	2	1	8 #
23. Seismic Trip	3 directions (x,y,z) in 3 locations	2/3 locations one direction	2/3 locations all directions	1, 2	6#

TABLE 3.3-1 (Continued)

TABLE NOTATIONS

*When the Reactor Trip System breakers are in the closed position and the Control Rod Drive System is capable of rod withdrawal.

#The provisions of Specification 3.0.4 are not applicable.

##Below the P-6 (Intermediate Range Neutron Flux Interlock) Setpoint.

###Below the P-10 (Low Setpoint Power Range Neutron Flux Interlock) Setpoint.

(1) These channels also provide inputs to ESFAS. Comply with the applicable Modes and Action statements of Specification 3.3.2, for any portion of the channel required to be OPERABLE by Specification 3.3.2.

←Insert←

ACTION STATEMENTS

ACTION 1 - With the number of channels OPERABLE one less than 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.

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

a. The inoperable channel is placed in the tripped condition within 6 hours, and

b. The Minimum Channels OPERABLE requirement is met; however, the inoperable channel may be bypassed for up to 4 hours for surveillance testing per Specification 4.3.1.1, and

c. Either, THERMAL POWER is restricted to less than or equal to 75% of RATED THERMAL POWER and the Power Range Neutron Flux Trip Setpoint is reduced to less than or equal to 85% of RATED THERMAL POWER within 4 hours; or, the QUADRANT POWER TILT RATIO is monitored at least once per 12 hours per Specification 4.2.4.2.

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TABLE 3.3-1 (Continued)

ACTION STATEMENTS (Continued)

ACTION 3 - With the number of channels OPERABLE one less than the Minimum Channels OPERABLE requirement and with the THERMAL POWER level:

a. Below the P-6 (Intermediate Range Neutron Flux Interlock) Setpoint, restore the inoperable channel to OPERABLE status prior to increasing THERMAL POWER above the P-6 Setpoint, and

b. Above the P-6 Setpoint, but below 10% of RATED THERMAL POWER, restore the inoperable channel to OPERABLE status prior to increasing THERMAL POWER above 10% of RATED THERMAL POWER.

ACTION 4 - With the number of channels OPERABLE one less than the Minimum Channels OPERABLE requirement suspend all operations involving positive reactivity changes.

ACTION 5 - With the number of channels OPERABLE one less than the Minimum Channels OPERABLE requirement, verify compliance with the SHUTDOWN MARGIN requirements of Specification 3.1.1.1 or 3.1.1.2, as applicable, within 1 hour and at least once per 12 hours thereafter.

ACTION 6 - With the number of OPERABLE channels one less than the Total Number of Channels, STARTUP and/or POWER OPERATION may proceed provided the following conditions are satisfied:

a. The inoperable channel is placed in the tripped condition within 6 hours; and

b. The Minimum Channels OPERABLE requirement is met; however, the inoperable channel may be bypassed for up to 4 hours for surveillance testing of other channels per Specification 4.3.1.1.

ACTION 7 - With the number of OPERABLE channels ~~one~~ less than the Total Number of Channels, STARTUP and/or POWER OPERATION may proceed ~~until performance of the next required ANALOG CHANNEL OPERATIONAL TEST~~ provided the inoperable channel(s) is placed in the tripped condition within 6 hours.

ACTION 8 - With less than the Minimum Number of Channels OPERABLE, within 1 hour determine by observation of the associated permissive annunciator window(s) that the interlock is in its required state for the existing plant condition, or apply Specification 3.0.3.

ACTION 9 - With a channel inoperable, restore the inoperable channel to OPERABLE status within 6 hours or reduce THERMAL POWER to below the P-8 (Block of Low Reactor Coolant Pump Flow and Reactor Coolant Pump Breaker Position) Setpoint within the next 2 hours. Operation below the P-8 setpoint may continue pursuant to ACTION 10.

TABLE 3.3-1 (Continued)

ACTION STATEMENTS (Continued)

ACTION 10 - With less than the Minimum Number of Channels OPERABLE, operation may continue provided the inoperable channel is placed in the tripped condition within ~~1~~ 6 hours.
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ACTION 11 - With the number of channels OPERABLE one less than the Minimum Channels OPERABLE requirement, be in at least HOT STANDBY within 6 hours; however, one channel may be bypassed for up to 2 hours for surveillance testing per Specification 4.3.1.1, provided the other channel is OPERABLE.

ACTION 12 - With the number of OPERABLE channels one less than the Minimum Channels OPERABLE requirement, restore the inoperable channel to OPERABLE status within 48 hours or open the Reactor trip breakers within the next hour.

TABLE 3.3-2

REACTOR TRIP SYSTEM INSTRUMENTATION RESPONSE TIMES

FUNCTIONAL UNIT	RESPONSE TIME
1. Manual Reactor Trip	N.A.
2. Power Range, Neutron Flux	≤ 0.5 second*
3. Power Range, Neutron Flux, High Positive Rate	N.A.
4. Power Range, Neutron Flux, High Negative Rate	≤ 0.5 second*
5. Intermediate Range, Neutron Flux	N.A.
6. Source Range, Neutron Flux	≤ 0.5 second*
7. Overtemperature ΔT	≤ 4 seconds*
8. Overpower ΔT	N.A.
9. Pressurizer Pressure-Low	≤ 2 seconds
10. Pressurizer Pressure-High	≤ 2 seconds
11. Pressurizer Water Level-High	N.A.
12. Reactor Coolant Flow-Low	
a. Single Loop (Above P-8)	≤ 1 second
b. Two Loops (Above P-7 and below P-8)	≤ 1 second
13. Steam Generator Water Level-Low-Low	≤ 2 seconds
14. Steam Generator Water Level-Low Coincident With Steam/Feedwater Flow Mismatch	N.A.
15. Undervoltage-Reactor Coolant Pumps	≤ 1.2 seconds
16. Underfrequency-Reactor Coolant Pumps	≤ 0.6 second

*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.

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TABLE 3.3-2 (Continued)

REACTOR TRIP SYSTEM INSTRUMENTATION RESPONSE TIMES

FUNCTIONAL UNIT	RESPONSE TIME
17. Turbine Trip	
a. Low Fluid Oil Pressure	N.A.
b. Turbine Stop Valve	N.A.
18. Safety Injection Input from ESF	N.A.
19. Reactor Coolant Pump Breaker Position Trip	N.A.
20. Reactor Trip Breakers	N.A.
21. Automatic Trip and Interlock Logic	N.A.
22. Reactor Trip System Interlocks	N.A.
23. Seismic Trip	N.A.

TABLE 4.3-1

REACTOR TRIP SYSTEM INSTRUMENTATION SURVEILLANCE REQUIREMENTS

FUNCTIONAL UNIT	CHANNEL CHECK	CHANNEL CALIBRATION	ANALOG CHANNEL OPERATIONAL TEST	TRIP ACTUATING DEVICE OPERATIONAL TEST	ACTUATION LOGIC TEST	MODES FOR WHICH SURVEILLANCE IS REQUIRED
1. Manual Reactor Trip	N.A.	N.A.	N.A.	R	N.A.	1, 2, 3*, 4*, 5*
2. Power Range, Neutron Flux						
a. High Setpoint	S	D(2, 4), M(3, 4), Q(4, 6), R(4, 5)	M Q (13)	N.A.	N.A.	1, 2
b. Low Setpoint	S	R(4)	M S/U (1)	N.A.	N.A.	1###, 2
3. Power Range, Neutron Flux, High Positive Rate	N.A.	R(4)	M Q (13)	N.A.	N.A.	1, 2
4. Power Range, Neutron Flux, High Negative Rate	N.A.	R(4)	M Q (13)	N.A.	N.A.	1, 2
5. Intermediate Range, Neutron Flux	S	R(4, 5)	S/U(1), M	N.A.	N.A.	1###, 2
6. Source Range, Neutron Flux	S	R(4, 5)	S/U(1), M Q (9)(13)	N.A.	N.A.	2##, 3, 4, 5
7. Overtemperature ΔT	S	R(12)	M Q (13)	N.A.	N.A.	1, 2
8. Overpower ΔT	S	R	M Q (13)	N.A.	N.A.	1, 2
9. Pressurizer Pressure-Low	S	R	M Q (13)	N.A.	N.A.	1
10. Pressurizer Pressure-High	S	R	M Q (13)	N.A.	N.A.	1, 2
11. Pressurizer Water Level-High	S	R	M Q (13)	N.A.	N.A.	1
12. Reactor Coolant Flow-Low	S	R	M Q (13)	N.A.	N.A.	1

TABLE 4.3-1 (Continued)

REACTOR TRIP SYSTEM INSTRUMENTATION SURVEILLANCE REQUIREMENTS

FUNCTIONAL UNIT	CHANNEL CHECK	CHANNEL CALIBRATION	ANALOG CHANNEL OPERATIONAL TEST	TRIP ACTUATING DEVICE OPERATIONAL TEST	ACTUATION LOGIC TEST	MODES FOR WHICH SURVEILLANCE IS REQUIRED
13. Steam Generator Water Level-Low-Low	S	R	~~M~~ Q(13)(14)	N.A.	N.A.	1, 2
14. Steam Generator Water Level-Low Coincident with Steam/Feedwater Flow Mismatch	S	R	~~M~~ Q(13)(14)	N.A.	N.A.	1, 2
15. Undervoltage-Reactor Coolant Pumps	N.A.	R	N.A.	~~M~~ Q(13)(14)	N.A.	1
16. Underfrequency-Reactor Coolant Pumps	N.A.	R	N.A.	~~M~~ Q(13)	N.A.	1
17. Turbine Trip						
a. Low Fluid Oil Pressure	N.A.	N.A.	N.A.	S/U(1, 10)	N.A.	1
b. Turbine Stop Valve Closure	N.A.	N.A.	N.A.	S/U(1, 10)	N.A.	1
18. Safety Injection Input from ESF	N.A.	N.A.	N.A.	R	N.A	1, 2
19. Reactor Coolant Pump Breaker Position Trip	N.A.	N.A.	N.A.	R	N.A.	1
20. Reactor Trip System Interlocks						
a. Intermediate Range Neutron Flux, P-6	N.A.	R(4)	~~M~~ S/U (1)	N.A.	N.A.	2##
b. Low Power Reactor Trips Block, P-7	N.A.	R(4)	~~M(8)~~ S/U (1)	N.A.	N.A.	1
c. Power Range Neutron Flux, P-8	N.A.	R(4)	~~M(8)~~ S/U (1)	N.A.	N.A.	1

TABLE 4.3-1 (Continued)

REACTOR TRIP SYSTEM INSTRUMENTATION SURVEILLANCE REQUIREMENTS

FUNCTIONAL UNIT	CHANNEL CHECK	CHANNEL CALIBRATION	ANALOG CHANNEL OPERATIONAL TEST	TRIP ACTUATING DEVICE OPERATIONAL TEST	ACTUATION LOGIC TEST	MODES FOR WHICH SURVEILLANCE IS REQUIRED
20. Reactor Trip System Interlocks (Continued)						
d. Low Setpoint Power Range Neutron Flux, P-10	N.A.	R(4)	~~M(8)~~ S/U(1)	N.A.	N.A.	1, 2
e. Turbine Impulse Chamber Pressure, P-13	N.A.	R	Q M(8)(13)	N.A.	N.A.	1
21. Reactor Trip Breaker	N.A.	N.A.	N.A.	M(7, 11)	N.A.	1, 2, 3*, 4*, 5*
22. Automatic Trip and Interlock Logic	N.A.	N.A.	N.A.	N.A.	M(7)	1, 2, 3*, 4*, 5*
23. Seismic Trip	N.A.	R	N.A.	SA	R	1, 2

TABLE 4.3-1 (Continued)

TABLE NOTATIONS

* - When the Reactor Trip System breakers are closed and the Control Rod Drive System is capable of rod withdrawal.

- Below P-6 (Intermediate Range Neutron Flux Interlock) Setpoint.

- Below P-10 (Low Setpoint Power Range Neutron Flux Interlock) Setpoint.

(1) - If not performed in previous ~~X~~ 31 days.

(2) - Heat balance only, above 15% of RATED THERMAL POWER. Adjust channel if absolute difference greater than 2%. The provisions of Specification 4.0.4 are not applicable for entry into MODE 2 or 1.

(3) - Compare incore to excore axial flux difference at least once per 31 Effective Full Power days above 15% of RATED THERMAL POWER. Recalibrate if the absolute difference is greater than or equal to 3%. The provisions of Specification 4.0.4 are not applicable for entry into MODE 2 or 1.

(4) - Neutron detectors may be excluded from CHANNEL CALIBRATION.

(5) - Detector plateau curves shall be obtained and evaluated. For the Intermediate Range and Power Range Neutron Flux Channels the provisions of Specification 4.0.4 are not applicable for entry into MODE 2 or 1.

(6) - Incore - Excore Calibration, above 75% of RATED THERMAL POWER. The provisions of Specification 4.0.4 are not applicable for entry into MODE 2 or 1. at least once per 92 Effective Full Power days

(7) - Each train shall be tested at least every 62 days on a STAGGERED TEST BASIS.

(8) - With power greater than or equal to the Interlock Setpoint the required ANALOG CHANNEL OPERATIONAL TEST shall consist of verifying that the interlock is in the required state by observing the permissive annunciator window.

(9) - Monthly Surveillance in MODES 3*, 4* and 5* shall also include verification that permissives P-6 and P-10 are in their required state for existing plant conditions by observation of the permissive annunciator window.

(10) - Setpoint verification is not applicable.

(11) - At least once per 18 months and following maintenance or adjustment of the Reactor trip breakers, the TRIP ACTUATING DEVICE OPERATIONAL TEST shall include verification of the independence of the Undervoltage trip and the Shunt trip.

(12) - CHANNEL CALIBRATION shall include the RTD bypass loops flow rate.

Insert

(13) - Each channel shall be tested at least every 92 days on a STAGGERED TEST BASIS.

(14) - These channels also provide inputs to ESFAS. Comply with the applicable Modes and surveillance frequencies of Specification 4.3.2.1 for any portion of the channel required to be OPERABLE by Specification 3.3.2.

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and sufficient redundancy is maintained to permit a channel to be out of service for testing or maintenance consistent with maintaining an appropriate level of reliability of the Reactor Protection and Engineered Safety Features instrumentation and,

3/4.3.1 and 3/4.3.2 REACTOR TRIP SYSTEM and ENGINEERED SAFETY FEATURES ACTUATION SYSTEM INSTRUMENTATION

The OPERABILITY of the Reactor Trip System and Engineered Safety Features Actuation System instrumentation and interlocks ensure that: (1) the associated ACTION and/or Reactor trip will be initiated when the parameter monitored by each channel or combination thereof reaches 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 from diverse parameters.

Insert

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.

Insert

Specified surveillance intervals and surveillance and maintenance outage times have been determined in accordance with WCAP-10271, "Evaluation of Surveillance Frequencies and Out of Service Times for the Reactor Protection Instrumentation System", and supplements to that report. Surveillance intervals and out of service times were determined based on maintaining an appropriate level of reliability of the Reactor Protection System.

The Engineered Safety Features Actuation System senses selected plant parameters and determines whether or not predetermined limits are being exceeded. If they are, the signals are combined into logic matrices sensitive to combinations indicative of various accidents, events, and transients. Once the required logic combination is completed, the system sends actuation signals to those engineered safety features components whose aggregate function best serves the requirements of the condition. As an example, the following actions may be initiated by the Engineered Safety Features Actuation System to mitigate the consequences of a steam line break or loss of coolant accident: (1) safety injection pumps start and automatic valves position, (2) Reactor trip, (3) feedwater isolation, (4) startup of the emergency diesel generators, (5) containment spray pumps start and automatic valves position, (6) containment isolation, (7) steam line isolation, (8) Turbine trip, (9) auxiliary feedwater pumps start and automatic valve position, (10) containment cooling fans start and automatic valves position, and (11) component cooling water pumps start and automatic valves position.

The Engineered Safety Features Actuation System interlocks perform the following functions:

P-4 Reactor tripped - Actuates Turbine trip, closes main feedwater valves on T_{avg} below Setpoint, prevents the opening of the main feedwater valves which were closed by a Safety Injection or High Steam Generator Water Level signal, allows Safety Injection block so that components can be reset or tripped.

Reactor not tripped - prevents manual block of Safety Injection.

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