Pacific Gas and Electric Company

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April 2, 2004

PG&E Letter DCL-04-029

U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, DC 20555-0001

Docket No. 50-275, OL-DPR-80
Docket No. 50-323, OL-DPR-82
Diablo Canyon Units 1 and 2
Response to NRC Request for Additional Information Regarding License Amendment Request 02-06, "Revisions to Technical Specifications 3.3.1, 'Reactor Trip System (RTS) Instrumentation' and 3.3.2, 'Engineered Safety Feature Actuation System (ESFAS) Instrumentation'"

Dear Commissioners and Staff:

PG&E Letter DCL-02-125, dated November 1, 2002, submitted License Amendment Request (LAR) 02-06, "Revisions to Technical Specifications 3.3.1, 'Reactor Trip System (RTS) Instrumentation' and 3.3.2, 'Engineered Safety Feature Actuation System (ESFAS) Instrumentation'." LAR 02-06 proposes to: (1) revise both the RTS and ESFAS instrumentation TS and TS bases to change or clarify the allowances for bypassing and tripping tested channels with other channels inoperable; (2) remove Surveillance Requirement 3.3.1.10 from Function 16.b, "Turbine Stop Valve Closure"; (3) correct the Nominal Trip Setpoint value for Function 16.b, "Turbine Stop Valve Closure"; (4) correct the Allowable Value for the Function 18.f, "Turbine Impulse Chamber Pressure, P-13"; and, (5) remove and relocate the nonsafety-related turbine trip function from Function 5 of Table 3.3.2-1, "Turbine Trip and Feedwater Isolation," to other owner controlled documents.

On December 23, 2003, the NRC staff requested additional information required to complete the review of LAR 02-06. PG&E's responses to the staff's questions are provided in Enclosure 1. The responses to the Staff's questions require revisions to the TS changes submitted in DCL-02-125. As an additional change, the Notes for TS 3.3.1 Action X and TS 3.3.2 Action M were identified as requiring modification. These changes are discussed in Enclosure 1. Enclosure 2 provides marked-up TS pages, Enclosure 3 provides marked-up TS Bases pages, and Enclosure 4 provides retyped TS pages. These three enclosures supersede Enclosures 2, 3 and 4 of PG&E Letter DCL-02-125 in their entirety.

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This information does not affect the results of the technical evaluation and no significant hazards consideration determination previously transmitted in PG&E Letter DCL-02-125.

If you have any questions, or require additional information, please contact Stan Ketelsen at (805) 545-4720.

Sincerely,

David H. Oatley
Vice President and General Manager – Diablo Canyon

dxs/4540
Enclosures
cc: Edgar Bailey, DHS
Bruce S. Mallett
David L. Proulx
Diablo Distribution
cc/enc: Girija S. Shukla

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

In the Matter of PACIFIC GAS AND ELECTRIC COMPANY	)	Docket No. 50-275 Facility Operating License No. DPR-80
Diablo Canyon Power Plant Units 1 and 2	)	Docket No. 50-323 Facility Operating License No. DPR-82

AFFIDAVIT

David H. Oatley, of lawful age, first being duly sworn upon oath says that he is Vice President and General Manager – Diablo Canyon of Pacific Gas and Electric Company; that he has executed this response to the NRC request for additional information on License Amendment Request 02-06 on behalf of said company with full power and authority to do so; that he is familiar with the content thereof; and that the facts stated therein are true and correct to the best of his knowledge, information, and belief.

David H. Oatley
Vice President and General Manager – Diablo Canyon

Subscribed and sworn to before me this 2nd day of April 2004.

Notary Public
County of San Luis Obispo
State of California

SANDRA L. RECTOR
Commission # 1339380
Notary Public - California
San Luis Obispo County
My Comm. Expires Jan 12, 2006

ENCLOSURE 1

PG&E Response to NRC Request for Additional Information Regarding License Amendment Request 02-06, "Revisions to Technical Specifications 3.3.1, 'Reactor Trip System (RTS) Instrumentation' and 3.3.2, 'Engineered Safety Feature Actuation System (ESFAS) Instrumentation'"

NRC Question 1:

The licensee has requested revisions to the RTS and ESFAS bypass notes in TS 3.3.1 and TS 3.3.2 that would allow:

a) Two channels, one inoperable and one operable, to be placed in bypass at the same time for:

> *RTS Actions E, M and X for 2/4 logic and ESFAS Actions D and M for 2/4 logic,*

b) Either the inoperable channel to be placed in trip and the operable channel to be placed in bypass, or the inoperable channel to be placed in bypass and the operable channel to be placed in trip for:

> *RTS Actions E, M and X for 2/4 logic and ESFAS Actions D and M for 2/4 logic, and*
> *RTS Actions E and M for 2/3 logic and ESFAS Actions D and J of 2/3 logic,*

c) Two channels to be tested at the same time with either both in bypass or one in bypass and one in trip for:

> *RTS Actions E, M and X for 2/4 logic and ESFAS Actions D and M for 2/4 logic,*
> *RTS Actions E and M for 2/3 logic and ESFAS Actions D and J of 2/3 logic, and*
> *ESFAS Actions E and P for 2/4 logic.*

WCAP-10271 and its supplements do not address these three allowances (except for two channels placed in bypass at the same time for ESFAS Actions E and P). The allowances discussed in WCAP-10271 and its supplements are based on specific plant design features. The licensee should describe what is unique about the Diablo Canyon design that would allow these three allowances and provide detailed justifications for these allowances.

Although the licensee has verbally stated that they do not intend to test multiple channels at the same time, the proposed wording would allow multiple channels to be tested at the same time. The licensee should discuss any proposed restrictions that would prohibit or allow multiple channels to be tested at the same time.

PG&E Response:

The change proposed in license amendment request (LAR) 02-06 clarified the allowances for bypassing and tripping channels with other channels inoperable for the RTS and ESFAS. WCAP-10271 and its supplements specify that testing of an instrument channel should not actuate the protected system, and provide direction on testing both in bypass and non-bypassed configurations. The Diablo Canyon Power Plant (DCPP) design is unique in that it provides the ability to routinely test in the bypass configuration as approved in License Amendment (LA) 84/83, for Units 1 and 2 respectively. The bypass note is being clarified to acknowledge routine testing in bypass with an inoperable channel and to specify how the function should be tested considering 2/4 and 2/3 logic. This results in notes similar to those in Actions E and P that already reflected routine testing in the bypass configuration.

PG&E does not intend to routinely test coincident channels at the same time. However, similar to those conditions outlined in WCAP-10271, the notes provided in LAR 02-06 are only applicable if one channel is inoperable and the action to place it in trip within 6 hours has already been taken. The next action is to restore that channel to operable status to avoid the partial trip condition as soon as practical. However, if unforeseen conditions prevented the inoperable channel from being restored before the next channel surveillance is due, the proposed notes provided in LAR 02-06 would allow the necessary actions.

In response to NRC concerns about allowing routine testing of coincident channels, with the exception of the note for RTS Condition X and ESFAS Condition M, PG&E is adding a restriction to the LAR 02-06 proposed changes to the technical specifications (TS) to ensure that coincident channel testing is not performed on a routine basis. The proposed notes provided in LAR 02-06 will be revised to include the following: "This note is not intended to allow simultaneous testing of coincident channels on a routine basis." For RTS Condition X and ESFAS Condition M, the note will state: "This note is not intended to allow simultaneous testing of multiple Trip Time Delay (TTD) channels (processors) on a routine basis." This variance in the note is explained below.

In response to the NRC's request for information and subsequent discussion, PG&E reviewed the note changes proposed in the LAR. The review identified the need to modify the proposed notes for actions related to the following functions: TS Table 3.3.1-1, RTS Function 14.b, Steam Generator (SG) Water Level Low-Low TTD and TS Table 3.3.2-1, Function 6.d.2, SG Water Level Low-Low TTD.

These functions provide time delay for the actuation of a reactor trip and auxiliary feedwater pumps start on a low-low SG level for reactor power levels below 50% of rated thermal power (RTP). The low-low water level in any protection set in any SG will generate a signal, which starts an elapsed TTD timer. The allowable trip time delay is based upon the prevailing power level at the time the low-low level trip setpoint is reached. The use of this delay allows added time for natural SG level

stabilization or operator intervention to avoid an inadvertent protection system actuation.

Both of the actual time delay functions are controlled by imbedded software as a part of the Eagle 21 system, which acts as TTD processors. There are four TTD processors (channels) as required in the RTS Table 3.3.1-1 and the ESFAS Table 3.3.2-1. Each of these processors controls the RTS Function 14b, SG Water Level Low-Low TTD and the ESFAS Function 6.d.2, SG Water Level Low-Low TTD. These four TTD processors provide trip output signals to the four SG low-low water level trip functions. Two of the four TTD processors provide one trip output to each of the four SG low-low water level trip functions. The other two TTD processors each provide trip outputs to the SG low-low water level trip functions for two of the four steam generators. Between the two TTD processors that provide outputs to two SG's, the third TTD output is provided to the low-low water level trip functions for all four SG's. If a four-output TTD processor is inoperable then it affects one output to each of the four associated SG low-low water level trip functions. An inoperable two-output TTD processor affects its two associated SG low-low water level trip functions.

If a TTD processor is determined to be inoperable, then the TS provides two required actions for continued operation in Modes 1 and 2 for RTS functions, and Modes 1, 2, and 3 for ESFAS functions. One of these requires that the time delay be reduced to zero, which would ensure that a valid trip signal would be transmitted directly to the associated SG low-low water level trip functions, without delay. The other required action is to place the affected SG low-low water level trip channels in trip. For the four-output TTD processors, that would require one output channel to each SG low-low water level trip function to be placed in trip and the two-output TTD processors would require the two associated output SG low-low water level trip channels to be tripped. The SG low-low water level trip requires two trip signals out of three from any one SG to cause a reactor trip and auxiliary feedwater pump start.

The note proposed in LAR 02-06 is being modified because the four TTD processors function together as a two-out-of-three logic, not a two-out-of-four logic. The note applies to an inoperable TTD processor that has either met Required Action X.1 (M.1 for ESFAS), or Required Action X.2 (M.2 or M.3.1 for ESFAS). The note does not apply to Required Action X.3 (M.3.2 for ESFAS), as these functions are not required to be operable in other than Modes 1 and 2 for RTS, and Modes 1, 2 and 3 for ESFAS.

Required Action X.1 (M.1 for ESFAS) is met by adjusting the time delay to zero. This would, in effect, eliminate the time delay and pass a trip signal straight to the SG low-low water level trip function without delay. As such, it would not keep a valid signal from reaching the SG low-low water level trip function and would provide the same trip function output, as an operable TTD processor except it would be without any delay. As a result, the associated SG low-low water level trip channels would be considered operable. In this configuration, testing of the inoperable TTD

processor, and/or one additional TTD processor, could be done with one in trip and one in bypass, without tripping the plant.

Required Action X.2 (M.2 for ESFAS) is met by tripping the affected SG low-low water level trip output channels. The affected outputs from a single TTD processor would include tripping the associated channel to each of the SG low-low water level trip functions associated with this TTD processor. This would, in effect, be seen as a valid trip signal to each of the associated SG low-low water level trip functions. In this condition, a valid trip signal from a coincident channel would cause the plant to trip from a two-out-of-three logic. With the affected SG low-low water level trip output channels in trip for the inoperable TTD processor, testing of another TTD processor may be performed as long as its associated SG low-low water level trip output channels are tested in bypass. However, the revised note also would allow the inoperable TTD processor SG low-low water level trip output channels to be placed in bypass to allow another TTD processor to be tested in trip.

The revised note also indicates that the intent of this note is not to allow testing of multiple TTD processors simultaneously on a routine basis.

To correct the proposed notes and to clearly define the testing configuration requirements, Enclosures 2 and 3 have been marked up to provide the corrected notes and the bases for those notes.

NRC Question 2:

The licensee has requested to eliminate the requirement for channel calibration, SR 3.3.1.10, and revise the setpoint for RTS Turbine Trip - Turbine Stop Valve Closure. Part of the licensee's justification for the elimination of the requirement for channel calibration is the claim that the valve position switches do not have instrumentation setpoint adjustment features. This appears to be a conflict because the licensee has also requested the revision of the setpoint. How can the setpoint be revised if the setpoint is not adjustable? The licensee should explain why this is not a conflict.

The licensee should discuss the instrument setpoint methodology used to calculate trip setpoint and allowable values of the plant parameters affected by this change. If the methodology has not been previously reviewed by the staff then a copy of this methodology should be submitted for the staff's review and approval. If the licensee uses Method 3 specified in ISA S67.04.02, then the licensee should confirm that a check calculation is performed to account for all loop uncertainty not measured during the Channel Operational Test / Channel Functional Test. The licensee should provide a sample calculation to demonstrate this.

PG&E Response:

A position switch mounted on the stop valve actuates the turbine stop valve closure reactor trip input. The trip function originally carried both a calibration requirement and a trip actuation device operational test (TADOT) requirement per TS

Table 3.3.1-1. Because of the nature of the function (a position switch that does not have the traditional channel configuration of sensor, instrument loop, trip bistable device, and actuation device), a traditional channel calibration was not being done for this function. PG&E experience determined that the currently performed channel calibration is identical to the current TADOT, and therefore redundant. Although the setting was being verified, since the position switch is a mechanical device and does not have instrumentation setpoint adjustment features, there are very little, if any, setting variations.

There are no setpoint calculations for this setting and the value specified in the TS is used as the desired position setup on the valve. The current nominal trip setpoint value listed for Function 16.b, "Turbine Stop Valve Closure," is the same as the allowable value for that function. This is not consistent with other values contained in the TS. DCL-02-125 proposed revising the nominal trip setpoint value to 2% from the currently listed 1%. The allowable value is listed as greater than or equal to 1% and, to assure meeting that value, the nominal trip setpoint should be set above that value, considering setup and instrument uncertainties. The DCPP current practice is to determine the nominal trip value considering setup and instrument uncertainty, thus identifying a trip setpoint that protects the allowable value. Past operating experience has shown that a nominal trip setting of 2% allows for any variance in the setup and ensures protection of the allowable value. This change is acceptable because it provides a nominal trip setpoint that is more conservative than the current requirement and provides margin to ensure the credited allowable value is protected and that the operability is assured. Thus, the nominal trip value is being changed for consistency with the other values in the TS and tolerance purposes, and will be used as the most limiting setting during setup of the valve and position switch operation.

NRC Question 3:

The licensee has requested a change in the allowable value and setpoint for RTS Reactor Trip System Interlock - Turbine Impulse Chamber Pressure, P-13 based on a change in terminology.

The licensee should discuss the instrument setpoint methodology used to calculate trip setpoint and allowable values of the plant parameters affected by this change. If the methodology has not been previously reviewed by the staff then a copy of this methodology should be submitted for the staff's review and approval. If the licensee uses Method 3 specified in ISA S67.04.02, then the licensee should confirm that a check calculation is performed to account for all loop uncertainty not measured during the Channel Operational Test / Channel Functional Test. The licensee should provide a sample calculation to demonstrate this.

PG&E Response:

PG&E uses a modified ISA methodology as defined in WCAP-11082, Revision 5, previously approved by the NRC in LA 122/120 for the 24-month fuel cycle surveillance extensions. This setpoint is a nominal setting at 10% turbine load that provides an input to the P-7 interlock. The calculation determines only the channel uncertainty and the allowable value. This calculation does not determine the 10% setting. The allowable value calculation, as described in WCAP-11082, Revision 5 (a modified ISA S67.04.02, Method 3), consists of rack drift plus rack measuring and testing equipment uncertainty, which was used in the channel uncertainty calculation.

The P-13 interlock does not have a specific analytical limit, and a check calculation as described in ISA S67.04 cannot be performed. The DCPP safety analyses do not credit the P-13 Turbine Low Power Permissive for the mitigation of any accidents. The P-13 function is one of two protection permissives, along with the P-10 Power Range at Power Permissive, that enable the P-7 Low Power Permissive. If either the P-13 indication exceeds a nominal setpoint of 10% turbine load, or the P-10 indication exceeds a nominal setpoint of 10% rated thermal power (RTP), the P-7 protection permissive is automatically actuated and enables five reactor trips; pressurizer low pressure, pressurizer high level, reactor coolant pump (RCP) breaker open, RCP bus undervoltage or underfrequency, and reactor coolant system (RCS) loop low flow. While it is a prudent design feature to automatically enable these reactor trips when power exceeds 10%, this function is not assumed or credited for any safety analysis. The RCP breaker open and pressurizer high level reactor trips are not credited in the DCPP safety analyses, and the other three reactor trips are only credited for events which occur at full power conditions since this is more limiting than low power conditions at which P-13 and P-7 would actuate. Consequently, neither the P-13 nor the P-7 protection permissive functions have an allowable value that must be bounded by the safety analyses. The P-10 protection permissive is modeled in the DCPP safety analyses, but not based on an input into P-7.

During the development of this response, it was discovered that there was an oversight in the proposed change to the P-13 Interlock Allowable Value in Table 3.3.1-1 of the TS. The proposed change in the DCL-02-125 LAR submittal, requested that the Allowable Value and the units for that value be revised to 10.3% and Turbine Power, respectively. However, although the change in the units is correct, the TS Allowable Value (proposed at 10.3%) should have remained at 10.2%. This oversight was the result of a failure to consider the differences in the setpoint scales for turbine power versus RTP. This correction is shown in the marked-up TS pages in Enclosure 2 and the retyped TS pages provided in Enclosure 4.

PG&E Response:

PG&E uses a modified ISA methodology as defined in WCAP-11082, Revision 5, previously approved by the NRC in LA 122/120 for the 24-month fuel cycle surveillance extensions. This setpoint is a nominal setting at 10% turbine load that provides an input to the P-7 interlock. The calculation determines only the channel uncertainty and the allowable value. This calculation does not determine the 10% setting. The allowable value calculation, as described in WCAP-11082, Revision 5 (a modified ISA S67.04.02, Method 3), consists of rack drift plus rack measuring and testing equipment uncertainty, which was used in the channel uncertainty calculation.

The P-13 interlock does not have a specific analytical limit, and a check calculation as described in ISA S67.04 cannot be performed. The DCPP safety analyses do not credit the P-13 Turbine Low Power Permissive for the mitigation of any accidents. The P-13 function is one of two protection permissives, along with the P-10 Power Range at Power Permissive, that enable the P-7 Low Power Permissive. If either the P-13 indication exceeds a nominal setpoint of 10% turbine load, or the P-10 indication exceeds a nominal setpoint of 10% rated thermal power (RTP), the P-7 protection permissive is automatically actuated and enables five reactor trips; pressurizer low pressure, pressurizer high level, reactor coolant pump (RCP) breaker open, RCP bus undervoltage or underfrequency, and reactor coolant system (RCS) loop low flow. While it is a prudent design feature to automatically enable these reactor trips when power exceeds 10%, this function is not assumed or credited for any safety analysis. The RCP breaker open and pressurizer high level reactor trips are not credited in the DCPP safety analyses, and the other three reactor trips are only credited for events which occur at full power conditions since this is more limiting than low power conditions at which P-13 and P-7 would actuate. Consequently, neither the P-13 nor the P-7 protection permissive functions have an allowable value that must be bounded by the safety analyses. The P-10 protection permissive is modeled in the DCPP safety analyses, but not based on an input into P-7.

During the development of this response, it was discovered that there was an oversight in the proposed change to the P-13 Interlock Allowable Value in Table 3.3.1-1 of the TS. The proposed change in the DCL-02-125 LAR submittal, requested that the Allowable Value and the units for that value be revised to 10.3% and Turbine Power, respectively. However, although the change in the units is correct, the TS Allowable Value (proposed at 10.3%) should have remained at 10.2%. This oversight was the result of a failure to consider the differences in the setpoint scales for turbine power versus RTP. This correction is shown in the marked-up TS pages in Enclosure 2 and the retyped TS pages provided in Enclosure 4.

NRC Question 4:

The Licensee has requested to remove from the TS and relocate the turbine trip portion of the ESFAS Turbine Trip and Feedwater Isolation function. The licensee should address the relationship between the Turbine Trip and Feedwater Isolation functions, addressing any impact Turbine Trip has on Feedwater Isolation. The licensee should identify any existing precedent for this proposed separation of functions and removal of Turbine Trip from the TS.

PG&E Response:

As stated in PG&E's DCL-02-125 submittal, an evaluation using the10 CFR 50.36.c criteria determined that the turbine trip function does not meet the requirements for items that must be included in the TS. The following is additional information supporting the determination that this function is not required to be in the TS and that it can be moved to other owner-controlled documents.

The turbine trip and the feedwater isolation functions are physically separate and independent functions. While a feedwater isolation signal, as a result of the SG Water Level-High High permissive (P-14) exceeding 75% SG narrow range level, or a safety injection signal will generate a turbine trip signal, an independently generated turbine trip signal has no impact on the feedwater isolation signal. Similarly, these two functions are treated differently in the DCPP safety analyses. The feedwater isolation signal is explicitly modeled and credited for the mitigation of several events in the DCPP safety analyses. However, only the functions related to the isolation of feedwater flow are credited. The turbine trip function is not credited for the mitigation of any event in the DCPP safety analyses. For those events in which continued steam flow is more limiting, only the main steam isolation signal is credited for stopping steam flow downstream of the main steam isolation valves. The turbine trip is only modeled in the DCPP safety analyses as a conservative initiating event if it would make the event more limiting, such as for a loss of secondary heat sink. In summary, the turbine trip function does not have any impact on the feedwater isolation function listed in TS Table 3.3.2-1, nor is it credited for mitigation of any event in the DCPP safety analyses.

As precedence for this submittal, PG&E notes that both Indian Point 2 and 3, which are Westinghouse pressurized water reactor plants, only include the feedwater isolation trip function in Table 3.3.2-1 of their TS.

ENCLOSURE 2
MARKED-UP TECHNICAL SPECIFICATION PAGES

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
E. One channel inoperable.	----------NOTE---------- The inoperable channel, or one additional channel for functions 6, 7, and 8.b may be bypassed for up to 4 hours for surveillance testing of other channels. For functions 2.b, 3.a, 3.b, and 14.a only the inoperable channel may be bypassed for surveillance testing of other channels. ----------	
	E.1 Place channel in trip.	6 hours
	OR	
	E.2 Be in MODE 3.	12 hours
F. One Intermediate Range Neutron Flux channel inoperable.	F.1 Reduce THERMAL POWER to < P-6.	24 hours
	OR	
	F.2 Increase THERMAL POWER to > P-10.	24 hours
G. Two Intermediate Range Neutron Flux channels inoperable.	G.1 ----------NOTE---------- Limited boron concentration changes associated with RCS inventory control or limited plant temperature changes are allowed. ---------- Suspend operations involving positive reactivity additions.	Immediately
	AND	
	G.2 Reduce THERMAL POWER to < P-6.	2 hours
H. Not used		

(continued)

Insert 1 –

For functions 6, 7 and 8.b, the inoperable channel and/or one additional channel may be surveillance tested with one channel in bypass and one channel in trip for up to 4 hours, or both the inoperable and the additional channel may be surveillance tested in bypass for up to 4 hours.

Insert 2 –

For function 14.a, the inoperable channel and/or one additional channel may be surveillance tested with one channel in bypass and one channel in trip for up to 4 hours.

Insert 13 –

This note is not intended to allow simultaneous testing of coincident channels on a routine basis.

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
K. One Source Range Neutron Flux channel inoperable.	K.1 Restore channel to OPERABLE status. OR K.2.1 Initiate action to fully insert all rods. AND K.2.2 Place the Control Rod System in a condition incapable of rod withdrawal.	48 hours 48 hours 49 hours
L. Required Source Range Neutron Flux channel inoperable.	L.1 ----------NOTE---------- Plant temperature changes are allowed provided the temperature change is accounted for in the calculated SDM. ---------- Suspend operations involving positive reactivity additions. AND L.2 Perform SR 3.1.1.1.	 Immediately 1 hour AND Once per 12 hours thereafter
M. One channel inoperable.	----------NOTE---------- The inoperable channel or one additional channel for function 8.a may be bypassed for up to 4 hours for surveillance testing of other channels. For functions 9, 10, 12 and 13, only the inoperable channel may be bypassed for surveillance testing of other channels. ---------- M.1 Place channel in trip. OR M.2 Reduce THERMAL POWER to < P-7.	 6 hours 12 hours
N. Not used		

INSERT 3

INSERT 4

INSERT 13

(continued)

Insert 3 –

For function 8.a, the inoperable channel and/or one additional channel may be surveillance tested with one channel in bypass and one channel in trip for up to 4 hours, or both the inoperable and the additional channel may be surveillance tested in bypass for up to 4 hours.

Insert 4 –

For functions 9 and 10, the inoperable channel and/or one additional channel may be surveillance tested with one channel in bypass and one channel in trip for up to 4 hours.

Insert 13 –

This note is not intended to allow simultaneous testing of coincident channels on a routine basis.

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
X. One or more SG Water Level Low - Low Trip Time Delay channel(s) inoperable.	----------NOTE---------- The inoperable channel or one additional channel may be bypassed for up to 4 hours for surveillance testing of other channels. ----------	e INSERT 5
	X.1 Set the Trip Time Delay to zero seconds.	6 hours
	OR	
	X.2 Place the affected SG Water Level Low - Low channel(s) in trip.	6 hours
	OR	
	X.3 Be in MODE 3.	12 hours

Insert 5 –

For function 14.b, the inoperable TTD channel (processor) and/or one additional TTD channel (processor) may be surveillance tested with the affected steam generator low-low water level channels for one TTD channel (processor) in bypass and the affected SG low-low water level channels for the other TTD channel (processor) in trip for up to 4 hours. This note is not intended to allow simultaneous testing of multiple TTD channels (processors) on a routine basis.

Table 3.3.1-1 (page 4 of 7)
Reactor Trip System Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	CONDITIONS	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE	NOMINAL[a] TRIP SETPOINT
16. Turbine Trip						
a. Low Auto-Stop Oil Pressure	1[(j)]	3	O	SR 3.3.1.10 SR 3.3.1.15	≥ 46.5 psig	50 psig
b. Turbine Stop Valve Closure	1[(j)]	4	P	~~SR 3.3.1.10~~ SR 3.3.1.15	≥ 1% open	1% open
17. Safety Injection (SI) Input from Engineered Safety Feature Actuation System (ESFAS)	1,2	2 trains	Q	SR 3.3.1.14	NA	NA
18. Reactor Trip System Interlocks						
a. Intermediate Range Neutron Flux, P-6	2[(e)]	2	S	SR 3.3.1.11 SR 3.3.1.13	≥ 8E-11 amp	1E-10 amp
b Low Power Reactor Trips Block, P-7	1	1 per train	T	SR 3.3.1.5	NA	NA
c. Power Range Neutron Flux, P-8	1	4	T	SR 3.3.1.11 SR 3.3.1.13	≤ 36.2% RTP	35% RTP

(continued)

(a) A channel is OPERABLE with an actual Trip Setpoint value outside its calibration tolerance band provided the Trip Setpoint value is conservative with respect to its associated Allowable Value and the channel is re-adjusted to within the established calibration tolerance band of the Nominal Trip Setpoint. A Trip Setpoint may be set more conservative than the Nominal Trip Setpoint as necessary in response to plant conditions.
(e) Below the P-6 (Intermediate Range Neutron Flux) interlocks.
(j) Above the P-9 (Power Range Neutron Flux) interlock.

Table 3.3.1-1 (page 5 of 7)
Reactor Trip System Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	CONDITIONS	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE	NOMINAL[a] TRIP SETPOINT
18. Reactor Trip System Interlocks (cont)						
d. Power Range Neutron Flux, P-9	1	4	T	SR 3.3.1.11 SR 3.3.1.13	≤ 51.2% RTP	50% RTP
e. Power Range Neutron Flux, P-10	1,2	4	S	SR 3.3.1.11 SR 3.3.1.13	≥ 8.8% RTP and ≤ 11.2% RTP	10% RTP
f. Turbine Impulse Chamber Pressure, P-13	1	2	T	SR 3.3.1.10 SR 3.3.1.13	≤ 10.2% RTP turbine impulse pressure equivalent	10% RTP turbine impulse pressure equivalent
19. Reactor Trip Breakers[k] (RTBs)	1,2	2 trains	R	SR 3.3.1.4	NA	NA
	3[b], 4[b], 5[b]	2 trains	C	SR 3.3.1.4	NA	NA
20. Reactor Trip Breaker Undervoltage and Shunt Trip Mechanisms [k]	1,2	1 each per RTB	U	SR 3.3.1.4	NA	NA
	3[b], 4[b], 5[b]	1 each per RTB	C	SR 3.3.1.4	NA	NA
21. Automatic Trip Logic	1,2	2 trains	Q	SR 3.3.1.5	NA	NA
	3[b], 4[b], 5[b]	2 trains	C	SR 3.3.1.5	NA	NA
22. Seismic Trip	1,2	3 directions (x,y,z) in 3 locations	W	SR 3.3.1.5 SR 3.3.1.12 SR 3.3.1.14	≤ 0.43g	0.35g

(a) A channel is OPERABLE with an actual Trip Setpoint value outside its calibration tolerance band provided the Trip Setpoint value is conservative with respect to its associated Allowable Value and the channel is re-adjusted to within the established calibration tolerance band of the Nominal Trip Setpoint. A Trip Setpoint may be set more conservative than the Nominal Trip Setpoint as necessary in response to plant conditions.

(b) With Rod Control System capable of rod withdrawal or one or more rods not fully inserted.

(k) Including any reactor trip bypass breakers that are racked in and closed for bypassing an RTB.

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
D. One channel inoperable.	----------NOTE---------- The inoperable channel or one additional channel for Function 1.d may be bypassed for up to 4 hours for surveillance testing of other channels. For Functions 1.e, 4.d(1), 4.d(2) and 6.d(1), only the inoperable channel may be bypassed for surveillance testing of the other channels. ----------	INSERT 6 INSERT 7 INSERT 13
	D.1 Place channel in trip.	6 hours
	OR	
	D.2.1 Be in MODE 3.	12 hours
	AND	
	D.2.2 Be in MODE 4.	18 hours
E. One Containment Pressure channel inoperable.	----------NOTE---------- One additional channel may be bypassed for up to 4 hours for surveillance testing. ----------	INSERT 8 INSERT 13
	E.1 Place channel in bypass.	6 hours
	OR	
	E.2.1 Be in MODE 3.	12 hours
	AND	
	E.2.2 Be in MODE 4.	18 hours

(continued)

Insert 6 –

For function 1.d, the inoperable channel and/or one additional channel may be surveillance tested with one channel in bypass and one channel in trip for up to 4 hours, or both the inoperable and the additional channel may be surveillance tested in bypass for up to 4 hours.

Insert 7 –

For functions 1.e(1), 4.d(1), 4.d(2), and 6.d(1), the inoperable channel and/or one additional channel may be surveillance tested with one channel in bypass and one channel in trip for up to 4 hours.

Insert 8 –

The inoperable channel and one additional channel may be surveillance tested in bypass for up to 4 hours only if any function 1.c channel associated with the inoperable channel is in trip.

Insert 13 –

This note is not intended to allow simultaneous testing of coincident channels on a routine basis.

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
I. One channel inoperable.	----------NOTE---------- The inoperable channel may be bypassed for up to 4 hours for surveillance testing of other channels. ----------	
	I.1 Place channel in trip.	6 hours
	OR	
	I.2. Be in MODE 2.	12 hours
J. One channel inoperable	----------NOTE---------- The inoperable channel may be bypassed for up to 4 hours for surveillance testing of other channels. ---------- INSERT 9 INSERT 13	
	J.1 Place channel in trip.	6 hours
	OR	
	J.2. Be in MODE 3.	12 hours
K. One channel inoperable	K.1.1 Place the channel in cut-out.	6 hours
	AND	
	K.1.2 Return the inoperable channel to an OPERABLE status	48 hours
	OR	
	K.2.1 Be in MODE 3.	54 hours
	AND	
	K.2.2 Be in MODE 5	84 hours

(continued)

Insert 9 –

The inoperable channel and/or one additional channel may be surveillance tested with one channel in bypass and one channel in trip for up to 4 hours.

Insert 13 –

This note is not intended to allow simultaneous testing of coincident channels on a routine basis.

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
L. One or more channels or trains inoperable.	L.1 Verify interlock is in required state for existing unit condition. OR	1 hour
	L.2.1 Be in MODE 3. AND	7 hours
	L.2.2 Be in MODE 4.	13 hours
M. One or more SG Water Level - Low Low Trip Time Delay channel(s) inoperable.	----------NOTE---------- The inoperable channel or one additional channel may be bypassed for up to 4 hours for surveillance testing of other channels. ----------	
	M.1 Set the Trip Time Delay to zero seconds. OR	6 hours
	M.2 Place the affected SG Water Level - Low Low channel(s) in trip. OR	6 hours
	M.3.1 Be in MODE 3. AND	12 hours
	M.3.2 Be in MODE 4.	18 hours

INSERT 10

(continued)

Insert 10

The inoperable TTD channel (processor) and/or one additional TTD channel (processor) may be surveillance tested with the affected steam generator low-low water level channels for one TTD channel (processor) in bypass and the affected SG low-low water level channels for the other TTD channel (processor) in trip for up to 4 hours. This note is not intended to allow simultaneous testing of multiple TTD channels (processors) on a routine basis.

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
N. One channel inoperable.	N.1 Restore channel to OPERABLE status. OR N.2 Declare the associated AFW pump or MSIV inoperable.	48 hours Immediately
O. One channel inoperable	----------NOTE---------- The inoperable channel may be bypassed for up to 4 hours for surveillance testing of other channels. ← INSERT 11 ← INSERT 13 --- O.1 Place channel in trip. OR O.2.1 Be in MODE 3 AND O.2.2 Be in MODE 5.	 6 hours * 12 hours 42 hours
P. One channel inoperable.	----------NOTE---------- One additional channel may be bypassed for up to 4 hours for surveillance testing. ← INSERT 12 * ← INSERT 13 * --- P.1 Place channel in bypass. OR P.2.1 Be in MODE 3 AND P.2.2 Be in MODE 5.	 6 hours 12 hours 42 hours

Insert 11 –

The inoperable channel may be surveillance tested in bypass for up to 4 hours, or with the inoperable channel in trip, one additional channel may be surveillance tested in bypass for up to 4 hours.

Insert 12 –

The inoperable channel and one additional channel may be surveillance tested in bypass for up to 4 hours only if any function 1.c channel associated with the inoperable channel is in trip.

Insert 13 –

This note is not intended to allow simultaneous testing of coincident channels on a routine basis.

Table 3.3.2-1 (page 4 of 7)
Engineered Safety feature Actuation System Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	CONDITIONS	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE	NOMINAL [a] TRIP SETPOINT
4. Steam Line Isolation (continued)						
d. Steam Line Pressure						
(1) Low	1,2[i], 3[b][i]	3 per steam line	D	SR 3.3.2.1 SR 3.3.2.5 SR 3.3.2.9 SR 3.3.2.10	≥ 597.6[c] psig	600[c] psig
(2) Negative Rate-High	3[g][i]	3 per steam line	D	SR 3.3.2.1 SR 3.3.2.5 SR 3.3.2.9 SR 3.3.2.10	≤ 102.4 [h] psi/sec	100 [h] psi/sec
e. Not used.						
f. Not used						
g. Not used						
h. Not used						
5. Turbine Trip and Feedwater Isolation						
a. Automatic Actuation Logic and Actuation Relays	1,2[i]	2 trains	H	SR 3.3.2.2 SR 3.3.2.4 SR 3.3.2.6	NA	NA

(continued)

(a) A channel is OPERABLE with an actual Trip Setpoint value outside its calibration tolerance band provided the Trip Setpoint value is conservative with respect to its associated Allowable Value and the channel is re-adjusted to within the established calibration tolerance band of the Nominal Trip Setpoint. A Trip Setpoint may be set more conservative than the Nominal Trip Setpoint as necessary in response to plant conditions.
(b) Above the P-11 (Pressurizer Pressure) interlock and below the P-11 interlock unless the Function is blocked.
(c) Time constants used in the lead/lag compensator are t_1 = 50 seconds and t_2 =5 seconds
(g) Below the P-11 (Pressurizer Pressure). However, may be blocked below P-11 when Safety Injection on Steam Line Pressure-Low is not blocked.
(h) Time constant utilized in the rate/lag compensator are t_3 = 50 sec and t_4 = 50 sec.
(i) Except when all MSIVs are closed and de-activated.
(j) Except when all MFIVs, MFRVs, and associated bypass valves are closed and de-activated or isolated by a closed manual valve.

Table 3.3.2-1 (page 5 of 7)
Engineered Safety feature Actuation System Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	CONDITIONS	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE	NOMINAL [a] TRIP SETPOINT
5. ~~Turbine Trip and~~ Feedwater Isolation (continued)						
b. SG Water Level-High High (P-14)	1,2[j]	3 per SG	J	SR 3.3.2.1 SR 3.3.2.5 SR 3.3.2.9 SR 3.3.2.10	≤ 75.2%	75%
c. Safety Injection	Refer to Function 1 (Safety Injection) for all initiation functions and requirements.					
6. Auxiliary Feedwater						
a. Manual	1,2,3	1 sw/pp	N	SR 3.3.2.13	NA	NA
b. Automatic Actuation Logic and Actuation Relays (Solid State Protection System)	1,2,3	2 trains	G	SR 3.3.2.2 SR 3.3.2.4 SR 3.3.2.6	NA	NA
c. Not used						
d.1 SG Water Level-Low Low	1,2,3	3 per SG	D	SR 3.3.2.1 SR 3.3.2.5 SR 3.3.2.9 SR 3.3.2.10	≥ 7.0%	7.2%

(continued)

(a) A channel is OPERABLE with an actual Trip Setpoint value outside its calibration tolerance band provided the Trip Setpoint value is conservative with respect to its associated Allowable Value and the channel is re-adjusted to within the established calibration tolerance band of the Nominal Trip Setpoint. A Trip Setpoint may be set more conservative than the Nominal Trip Setpoint as necessary in response to plant conditions.

(j) Except when all MFIVs, MFRVs, and associated bypass valves are closed and de-activated or isolated by a closed manual valve.

ENCLOSURE 3
MARKED-UP TECHNICAL SPECIFICATION BASES PAGES

BASES

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY

14. Steam Generator Water Level —Low Low (continued)

b. The signals to actuate reactor trip and start auxiliary feedwater pumps may be delayed through the use of a Trip Time Delay (TTD) system for reactor power levels below 50% of RTP. Low-low water level in any protection set in any steam generator will generate a signal which starts an elapsed time trip delay timer.

INSERT A →

The allowable trip time delay is based upon the prevailing power level at the time the low-low level trip setpoint is reached. The Time Delay value used is determined as directed under Note 3. If power level rises after the trip time delay setpoints have been determined, the trip time delay is re-determined (i.e., decreased) according to the increase in power level. However, the trip time delay is not changed if the power level decreases after the delay has been determined. The use of this delay allows added time for natural steam generator level stabilization or operator intervention to avoid an inadvertent protection system actuation.

15. Steam Generator Water Level —Low, Coincident With Steam Flow/Feedwater Flow Mismatch - Not used.

16. Turbine Trip

a. Turbine Trip—Low Auto Stop Oil Pressure

The Turbine Trip—Low Auto Stop Oil Pressure trip Function anticipates the loss of heat removal capabilities of the secondary system following a turbine trip. This trip Function acts to minimize the pressure/temperature transient on the reactor. Any turbine trip from a power level below the P-9 setpoint, less than or equal to 50% power, will not actuate a reactor trip. Three pressure switches monitor the trip oil pressure in the Turbine Control System. A low pressure condition sensed by two-out-of-three pressure switches will actuate a reactor trip. These pressure switches do not provide any input to the control system. The unit is designed to withstand a complete loss of load and not sustain core damage or challenge the RCS pressure limitations. Core protection is provided by the Pressurizer Pressure—High trip Function and RCS integrity is ensured by the pressurizer safety valves.

(continued)

Insert A

Table 3.3.1-1 uses the term channel when designating the required number instrument channels to meet the LCO for a function. In the case of the TTD system, each channel is not actually an instrument channel, but imbedded software which acts as a processor.

Two of the four TTD processors provide an output to each of the four-steam generators low-low level trip functions. The other two TTD processors each provide inputs to the low-low level steam generators trip functions for two of the four steam generators.

The steam generator water level-low low trip requires two trip signals from any one steam generator. Together the four TTD processors provide the low power time delay for the three outputs to each of the four steam generator low-low level trip functions.

BASES

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY (continued)

f. Turbine Impulse Chamber Pressure, P-13

The Turbine Impulse Chamber Pressure, P-13 interlock is actuated when the pressure in the first stage of the high pressure turbine is greater than 10% of ~~the rated thermal power pressure equivalent~~. The interlock is determined by one-out-of-two pressure detectors. The LCO requirement for this Function ensures that one of the inputs to the P-7 interlock is available.

TURBINE POWER

The LCO requires two channels of Turbine Impulse Chamber Pressure, P-13 interlock to be OPERABLE in MODE 1 (1-out-of-2-coincidence).

The Turbine Impulse Chamber Pressure, P-13 interlock must be OPERABLE when the turbine generator is operating. The interlock Function is not required OPERABLE in MODE 2, 3, 4, 5, or 6 because the turbine generator is not operating.

19. Reactor Trip Breakers

This trip Function applies to the RTBs exclusive of individual trip mechanisms. The LCO requires two OPERABLE trains of trip breakers. A trip breaker train consists of, the trip logic, and all trip breakers associated with a single RTS logic train that are racked in, closed, and capable of supplying power to the Rod Control System. Thus, the train may consist of the main breaker, bypass breaker, or main breaker and bypass breaker, depending upon the system configuration. Two OPERABLE trains ensure no single random failure can disable the RTS trip capability.

These trip Functions must be OPERABLE in MODE 1 or 2 when the reactor is critical (1-out-of-2 coincidence). In MODE 3, 4, or 5, these RTS trip Functions must be OPERABLE when the Rod Control System is capable of rod withdrawal or one or more rods are not fully inserted.

20. Reactor Trip Breaker Undervoltage and Shunt Trip Mechanisms

The LCO requires both the Undervoltage and Shunt Trip Mechanisms to be OPERABLE for each RTB that is in service. The trip mechanisms are not required to be OPERABLE for trip breakers that are open, racked out, incapable of supplying power to the Rod Control System, or declared inoperable under Function 19 above. OPERABILITY of both trip mechanisms on each breaker ensures that no single trip mechanism failure will prevent opening any breaker on a valid signal.

(continued)

BASES

ACTIONS (continued)

E.1 and E.2

Condition E applies to the following reactor trip Functions:

- Power Range Neutron Flux—Low;
- Overtemperature ΔT;
- Overpower ΔT;
- Power Range Neutron Flux—High Positive Rate;
- Power Range Neutron Flux—High Negative Rate;
- Pressurizer Pressure—High; and
- SG Water Level—Low Low.

A known inoperable channel must be placed in the tripped condition within 6 hours. Placing the channel in the tripped condition results in a partial trip condition requiring only one-out-of-two logic for actuation of the two-out-of-three trips and one-out-of-three logic for actuation of the two-out-of-four trips. The 6 hours allowed to place the inoperable channel in the tripped condition is justified in Reference 7.

If the operable channel cannot be placed in the trip condition within the specified Completion Time, the unit must be placed in a MODE where these Functions are not required OPERABLE. An additional 6 hours is allowed to place the unit in MODE 3. Six hours is a reasonable time, based on operating experience, to place the unit in MODE 3 from full power in an orderly manner and without challenging unit systems.

INSERT B

~~The Required Actions have been modified by a Note that allows placing the inoperable channel, or one additional channel in the bypassed condition for Functions 6, 7, and 8b for up to 4 hours while performing routine surveillance testing of the other channels. The NOTE allows only the inoperable channel for FUNCTIONS 2b, 3a, 3b and 14.a to be bypassed for surveillance testing of other channels.~~ In accordance with WCAP 10271, very specific circumstances are related to the use of this bypass condition for RTS Functions 2.b, 3.a, and 3.b.

(continued)

Insert B:

The Required Actions have been modified by a Note for Functions 6, 7 and 8.b, that allows an inoperable channel and/or one additional channel to be tested with one channel in bypass and the other channel in trip for up to 4 hours for performing surveillance testing. Additionally, for Function 6, 7 and 8b, both the inoperable and the additional channel maybe placed in bypass for up to 4 hours for surveillance testing. The Note allows only the inoperable channel for Functions 2.b, 3.a, and 3.b, to be bypassed for up to 4 hours for surveillance testing of other channels. This note is not intended to allow simultaneous testing of coincident channels on a routine basis.

BASES

ACTIONS

E.1 and E.2 (continued)

Since these channels are not designed with Bypass-capable logic that meets the requirements of IEEE 279, the provisions for bypass only apply to a specific type of channel failure. To apply, the channel must fail in such a way that it does not trip the bistables. With this type of failure, the channel may be returned to service and considered "bypassed" under this Note. Specifically, the bypass condition is the state when a failed channel is taken out of the forced "tripped" state and placed in operation. Due to the failed nature of the channel, the channel cannot be assumed to be OPERABLE, and is therefore considered to be in a state of bypass when the channel failure is such that its bistables are not tripped. The provisions of WCAP 10271 specifically prohibit the use of jumpers or lifted leads to bypass these channels. In this configuration, a second channel can be tested with the channel in the tripped mode without completing reactor trip logic. The 4 hour time limit is justified in Reference 7.

INSERT C.2

F.1 and F.2

Condition F applies to the Intermediate Range Neutron Flux trip when THERMAL POWER is above the P-6 setpoint and below the P-10 setpoint and one channel is inoperable. Above the P-6 setpoint and below the P-10 setpoint, the NIS intermediate range detector performs the monitoring Functions. If THERMAL POWER is greater than the P-6 setpoint but less than the P-10 setpoint, 24 hours is allowed to reduce THERMAL POWER below the P-6 setpoint or increase to THERMAL POWER above the P-10 setpoint. The NIS Intermediate Range Neutron Flux channels must be OPERABLE when the power level is above the capability of the source range, P-6, and below the capability of the power range, P-10. If THERMAL POWER is greater than the P-10 setpoint, the NIS power range detectors perform the monitoring and protection functions and the intermediate range is not required. The Completion Times allow for a slow and controlled power adjustment above P-10 or below P-6 and take into account the redundant capability afforded by the redundant OPERABLE channel, the overlap of the power range detectors, and the low probability of its failure during this period. This action does not require the inoperable channel to be tripped because the Function uses one-out-of-two logic. Tripping one channel would trip the reactor. Thus, the Required Actions specified in this Condition are only applicable when channel failure does not result in reactor trip.

(continued)

Insert C:

The Note for Function 14.a, allows the inoperable channel and/or one additional channel to be tested with one channel in bypass and the other in trip for up to 4 hours for surveillance testing. Functions 6,7, and 8.b are two-out-of-four trip logic, and 14.a is two-out-of-three trip logic and the allowed testing configurations provide flexibility for testing, while assuring that during testing no configuration will cause an inadvertent trip of the reactor or keep a valid signal from tripping the reactor as it was designed. This note is not intended to allow simultaneous testing of coincident channels on a routine basis.

BASES

ACTIONS

M.1 and M.2 (continued)

INSERT D 2 →

The Required Actions have been modified by a Note that allows placing the inoperable channel, or one additional channel for Function 8a, in the bypassed condition for up to 4 hours while performing routine surveillance testing of the other channels. The Note allows only the inoperable channel for Functions 9, 10, 12 and 13 to be bypassed for surveillance testing of other channels. Function 11 may not be bypassed since its logic is not 2 of 4 or 2 of 3, therefore, single failure would not be maintained. In accordance with WCAP 10271, very specific circumstances are related to the use of this bypass condition for RTS Functions 12 and 13. Since these channels are not designed with Bypass-capable logic that meets the requirements of IEEE 279, the provisions for bypass only apply to a specific type of channel failure. To apply, the channel must fail in such a way that it does not trip the bistables. With this type of failure, the channel may be returned to service and considered "bypassed" under this Note. Specifically, the bypass condition is the state when a failed channel is taken out of the forced "tripped" state and placed in operation. Due to the failed nature of the channel, the channel cannot be assumed to be OPERABLE, and is therefore considered to be in a state of bypass when the channel failure is such that its bistables are not tripped. The provisions of WCAP 10271 specifically prohibit the use of jumpers or lifted leads to bypass these channels. In this configuration, a second channel can be tested with the channel in the tripped mode without completing reactor trip logic. The 4 hour time limit is justified in Reference 7.

INSERT E ←

N.1 and N.2 - Not used

(continued)

Insert D:

The Required Actions have been modified by a Note for Function 8.a, that allows the inoperable channel and/or one additional channel to be tested with one channel in bypass and the other in trip, or with both the inoperable channel and the additional channel in bypass for up to 4 hours while performing surveillance testing of those channels. The Note for Function 9 and 10 the inoperable channel and/or one additional channel to be tested with one channel in bypass and the other channel in trip for up to 4 hours for surveillance testing. The Note allows only the inoperable channel for Functions 12 and 13 to be bypassed for surveillance testing of other channels. This note is not intended to allow simultaneous testing of coincident channels on a routine basis.

Insert E:

Function 11 may not be bypassed since its logic is not 2 of 4 or 2 of 3, therefore, single failure would not be maintained. Function 8.a is a two-out-of-four trip logic and Functions 9 and 10 are two-out-of-three logic trip logics. The allowed testing configurations provide flexibility for testing, while assuring that during testing no configuration will cause an inadvertent trip of the reactor or keep a valid signal from tripping the reactor as it was designed. This note is not intended to allow simultaneous testing of coincident channels on a routine basis.

BASES

ACTIONS (continued)

W.1 and W.2

Condition W applies to the Seismic Trip, in MODES 1 and 2. With one of the channels inoperable, START UP and/or POWER OPERATION may proceed provided the inoperable channel is placed in trip within the next 6 hours. If a direction is inoperable, then the channel must be considered inoperable. Placing the channel in the tripped condition creates a partial trip condition requiring only one out of two logic from the remaining locations for reactor trip actuation.

The Required Actions have been modified by a Note that allows placing the inoperable channel in the bypassed condition for up to 72 hours while performing surveillance testing or maintenance. The allowed 72 hour bypass time is reasonable based on the low probability of an event occurring while the channel is bypassed and on the time required to perform the required surveillance testing.

X.1, X.2 and X.3

~~Condition X applies to the Trip Time Delay (TTD) circuitry for the SG Water Level Low Low trip function in MODES 1 and 2. With one or more TTD circuitry delay timers inoperable or the RSG delta T equivalent power input inoperable, 6 hours are allowed to adjust the threshold power level for no time delay to 0% RTP. This sets the TTD timer to zero seconds and effectively removes its input from the SG water level circuit. If the TTD timer cannot be set to zero seconds for a single SG water level control, then the affected SG water level low low channel must be placed in trip. Only one SG water level low low channel can be placed in the trip position without tripping the plant. The Completion Time of 6 hours is reasonable considering the nature of these functions and the low probability of an event occurring during this interval as justified in Reference 7.~~

INSERT F

~~If the TTD threshold power for no time delay cannot be adjusted to 0% RTP (zero seconds time delay) or the single SG water level channel cannot be placed in the trip condition within the specified Completion Time, the unit must be placed in a MODE where these Functions are not required OPERABLE. The 12 hour allowed to place the unit in MODE 3 is a reasonable time, based on operating experience, to place the unit in MODE 3 from full power in an orderly manner and without challenging unit systems.~~

~~The Required Actions have been modified by a note that allows placing the SG water level channel or one additional channel in the bypassed condition for up to 4 hours while performing routine surveillance testing of the other channels.~~

(continued)

Insert F

Condition X applies to the Trip Time Delay (TTD) channels (processors) for the SG Water Level-Low Low trip function in MODES 1 and 2. With one or more TTD channels (processors) inoperable or the RCS delta-T equivalent power input inoperable, 6 hours are allowed to adjust the threshold power level for no time delay to 0% RTP. This sets the TTD processor timer to zero seconds and effectively removes its time delay input from the affected SG water level circuits. If the TTD processor timer cannot be set to zero seconds then the affected SG water level low-low output channels must be placed in trip. Only one SG water level low-low output channel per generator can be placed in the trip position without tripping the plant. The Completion Time of 6 hours is reasonable considering the nature of these functions and the low probability of an event occurring during this interval as justified in Reference 7.

If the TTD threshold power for no time delay cannot be adjusted to 0% RTP (zero seconds time delay) or the single SG water level output channel cannot be placed in the trip condition within the specified Completion Time, the unit must be placed in a MODE where these Functions are not required OPERABLE. The 12 hours allowed to place the unit in MODE 3 is a reasonable time, based on operating experience, to place the unit in MODE 3 from full power in an orderly manner and without challenging unit systems.

The Required Actions have been modified by a note that allows the inoperable TTD channel (processor) and/or one additional TD channel (processor) to be surveillance tested with the affected SG low-low water level channels for one TTD channel (processor) in bypass and the affected SG low-low water level channels for the other TTD channel (processor) in trip for up to 4 hours. This note is not intended to allow simultaneous testing of multiple TTD channels (processors) on a routine basis.

If Required Action X.1 is completed for an inoperable TTD processor, the affected SG low-low water level channels would still be operable in that a valid SG low-low water level trip function would not be delayed. With the inoperable TTD processor meeting this required action, the above note will still apply for the inoperable TTD processor and/or one additional TTD processor.

BASES

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY

(2) Steam Line Pressure-Negative Rate-High (continued)

there is insufficient energy in the primary and secondary sides to have an SLB or other accident that would result in a release of significant enough quantities of energy to cause a cooldown of the RCS.

While the transmitters may experience elevated ambient temperatures due to an SLB, the trip function is based on rate of change, not the absolute accuracy of the indicated steam pressure. Therefore, the Trip Setpoint reflects only steady state instrument uncertainties.

e, f. Not used

g. Not used

h. Not used

5. ~~Turbine Trip and~~ Feedwater Isolation

The primary functions of the ~~Turbine Trip and~~ Feedwater Isolation signals are ~~to prevent damage to the turbine due to water in the steam lines, and to~~ stop the excessive flow of feedwater into the SGs. ~~These~~ Functions ~~are~~ necessary to mitigate the effects of a high ~~water level~~ in the SGs, which could result in carryover of water into the steam lines and excessive cooldown of the primary system. The SG high water level is due to excessive feedwater flows.

The Function is actuated when the level in any SG exceeds the high high setpoint, and performs the following functions:

- ~~Trips the main turbine;~~
- Trips the MFW pumps;
- Initiates feedwater isolation; and
- Shuts the MFW regulating valves and the bypass feedwater regulating valves coincident with P-4.

This Function is actuated by SG Water Level-High High or by an SI signal. ~~The RTS also initiates a turbine trip signal whenever a reactor trip (P-4) is generated.~~ In the event of SI, the unit is taken off line and the ~~turbine generator must be tripped.~~ The MFW System is also taken out of operation and the AFW System is automatically started. The SI signal was discussed previously.

(continued)

BASES

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY (continued)

a. ~~Turbine Trip and~~ Feedwater Isolation-Automatic Actuation Logic and Actuation Relays

Automatic Actuation Logic and Actuation Relays consist of the same features and operate in the same manner as described for ESFAS Function 1.b.

b. ~~Turbine Trip and~~ Feedwater Isolation-Steam Generator Water Level-High High (P-14)

This signal provides protection against excessive feedwater flow. The ESFAS SG water level instruments provide input to the SG Water Level Control System. Therefore, the actuation logic must be able to withstand both an input failure to the control system (which may then require the protection function actuation) and a single failure in the other channels providing the protection function actuation. Thus, three OPERABLE channels (narrow range instrument span for each generator) are required to satisfy the requirements with a two-out-of- three logic and a median signal selector is provided to prevent control and protection function interactions.

The transmitters (d/p cells) are located inside containment. However, the events that this Function protects against cannot cause a severe environment in containment. Therefore, the Trip Setpoint reflects only steady state instrument uncertainties.

c. ~~Turbine Trip and~~ Feedwater Isolation-Safety Injection

~~Turbine Trip and~~ Feedwater Isolation is also initiated by all Functions that initiate SI. The Feedwater Isolation Function requirements for these Functions are the same as the requirements for their SI function. Therefore, the requirements are not repeated in Table 3.3.2-1. Instead Function 1, SI, is referenced for all initiating functions and requirements.

~~Turbine Trip and~~ Feedwater Isolation Functions must be OPERABLE in MODES 1 and 2 except when all MFIVs, MFRVs, and associated bypass valves are closed and de-activated or isolated by a closed manual valve when the MFW System is in operation and the turbine generator may be in operation. In MODES 3, 4, 5, and 6, the MFW System and the turbine generator are not in service and this Function is not required to be OPERABLE.

(continued)

BASES

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY

d.1) Auxiliary Feedwater-Steam Generator Water Level-Low Low (continued)

detected in two or more steam generators, a signal is generated to start the turbine driven auxiliary feedwater pump as well.

With the transmitters (d/p cells) located inside containment and thus possibly experiencing adverse environmental conditions (feed line break), the Trip Setpoint reflects the inclusion of both steady state and adverse environmental instrument uncertainties.

d.2) SG Water Level - Low Low Trip Time Delay (TTD)

The signals to start auxiliary feedwater pumps are delayed through the use of a Trip Time Delay (TTD) system for reactor power levels below 50.7% of RTP. Low-low water level in any protection set in any steam generator will generate a signal which starts an elapsed time trip delay timer. The allowable trip time delay is based upon the prevailing power level at the time the low-low level trip setpoint is reached. If power level rises after the trip time delay setpoints have been determined, the trip time delay is re-determined (i.e., decreased) according to the increase in power level. However, the trip time delay is not changed if the power level decreases after the delay has been determined. The use of this delay allows added time for natural steam generator level stabilization or operator intervention to avoid an inadvertent protection system actuation.

INSERT G

e. Auxiliary Feedwater-Safety Injection

An SI signal starts the motor driven AFW pumps. The AFW initiation functions are the same as the requirements for their SI function. Therefore, the requirements are not repeated in Table 3.3.2-1. Instead, Function 1, SI, is referenced for all initiating functions and requirements.

f. Not used

Functions 6.a, 6.b, and 6.d must be OPERABLE in MODES 1, 2, and 3 to ensure that the SGs remain the heat sink for the reactor. SG Water Level-Low Low in any operating SG will cause the motor driven AFW pumps to start.

(continued)

Insert G

Table 3.3.2-1 uses the term channel when designating the required number instrument channels to meet the LCO for a function. In the case of the TTD system, each channel is not actually an instrument channel, but imbedded software, which acts as a processor.

Two of the four TTD processors provide an output to each of the four-steam generators low-low level trip functions. The other two TTD processors each provide inputs to the low-low level steam generators trip functions for two of the four steam generators.

The steam generator water level-low low trip requires two trip signals from any one steam generator. Together the four TTD processors provide the low power time delay for the three outputs to each of the four steam generator low-low level trip functions.

BASES

ACTIONS

D.1, D.2.1, and D.2.2 (continued)

Failure to restore the inoperable channel to OPERABLE status or place it in the tripped condition within 6 hours requires the unit be placed in MODE 3 within the following 6 hours and MODE 4 within the next 6 hours.

The allowed Completion Times are reasonable, based on operating experience, to reach the required unit conditions from full power conditions in an orderly manner and without challenging unit systems. In MODE 4, these Functions are no longer required OPERABLE.

INSERT H

~~The Required Actions are modified by a Note that allows the inoperable channel or one additional channel for Function 1.d to be bypassed for up to 4 hours for surveillance testing of other channels. For Functions 1.e, 4.d(1), 4.d(2) and 6.d(1) only the inoperable channel may be bypassed for surveillance testing of the other channels. The 6 hours allowed to restore the channel to OPERABLE status or to place the inoperable channel in the tripped condition, and the 4 hours allowed for testing, are justified in Reference 8.~~

E.1, E.2.1, and E.2.2

Condition E applies to:

- Steam Line Isolation - Containment Pressure - High-high

This signal does not input to a control function. Thus, two-out-of-three logic is necessary to meet acceptable protective requirements. However, a two-out-of-three design would require tripping a failed channel. This is undesirable because a single failure of the Containment Pressure input would then cause spurious containment spray initiation. Spurious spray actuation is undesirable because of the cleanup problems presented. Therefore, these channels are designed with two-out-of-four logic so that a failed channel may be bypassed rather than tripped. Note that one channel may be bypassed and still satisfy the single failure criterion. Furthermore, with one channel bypassed, a single instrumentation channel failure will not spuriously initiate containment spray.

(continued)

Insert H:

The Required Actions are modified by a Note for Function 1.d that allows the inoperable channel and/or one additional channel to be tested with one channel in bypass and one channel in trip, or with both the inoperable and the additional channel in bypass for up to 4 hours for surveillance testing. For Functions 1.e, 4.d(1), 4.d(2) and 6.d(1), the Note allows the inoperable channel and/or one additional channel to be tested with one channel in bypass and one channel in trip for up to 4 hours for surveillance testing. Function 1.d is a two-out-of-four trip logic and Functions 1.e, 4.d(1), 4.d(2) and 6.d(1) are two-out-of-three logic actuation logics. The allowed testing configurations provide flexibility for testing, while assuring that during testing no configuration will cause an inadvertent actuation of the function or keep a valid signal from actuating the function as it was designed. The 6 hours allowed to restore the channel to OPERABLE status or to place the inoperable channel in the tripped condition, and the 4 hours allowed for testing, are justified in Reference 8. This note is not intended to allow simultaneous testing of coincident channels on a routine basis.

BASES

ACTIONS

E.1, E.2.1, and E.2.2 (continued)

To avoid the inadvertent actuation of containment spray and Phase B containment isolation, the inoperable channel should not be placed in the tripped condition. Instead it is bypassed. Restoring the channel to OPERABLE status, or placing the inoperable channel in the bypass condition within 6 hours, is sufficient to assure that the Function remains OPERABLE and minimizes the time that the Function may be in a partial trip condition (assuming the inoperable channel has failed high). The Completion Time is further justified based on the low probability of an event occurring during this interval. Failure to restore the inoperable channel to OPERABLE status, or place it in the bypassed condition within 6 hours, requires the unit be placed in MODE 3 within the following 6 hours and MODE 4 within the next 6 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required unit conditions from full power conditions in an orderly manner and without challenging unit systems. In MODE 4, these Functions are no longer required OPERABLE.

INSERT J

~~The Required Actions are modified by a Note that allows one additional channel to be bypassed for up to 4 hours for surveillance testing. Placing a second channel in the bypass condition for up to 4 hours for testing purposes is acceptable based on the results of Reference 8.~~

F.1, F.2.1, and F.2.2

Condition F applies to the P-4 Interlock.

For the P-4 Interlock Function, this action addresses the train orientation of the SSPS. If a train is inoperable, 48 hours is allowed to return it to OPERABLE status. The specified Completion Time is reasonable considering the nature of this Function, the available redundancy, and the low probability of an event occurring during this interval. If the Function cannot be returned to OPERABLE status, the unit must be placed in MODE 3 within the next 6 hours and MODE 4 within the following 6 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required unit conditions from full power in an orderly manner and without challenging unit systems. In MODE 4, the unit does not have any analyzed transients or conditions that require the explicit use of the protection function noted above.

(continued)

Insert J:

The Required Actions are modified by a Note that allows the inoperable channel to be tested in bypass for up to 4 hours for surveillance testing. In addition, the Note allows the inoperable channel and one additional channel to be tested in bypass for up to 4 hours for surveillance testing **only** if the Function 1.c channel associated with the inoperable channel is in trip during the testing.

This function is a two-out-of-four actuation logic and three of its channels are contained on common control channels with three other functions and the fourth channel is on a common control channel with two other functions. As a result, if a common control channel is inoperable then one channel from each of its contained functions is inoperable. Three of the common control channels each contain a channel from the Safety Injection Containment Pressure – High (Function. 1.c). Function 1.c, is a two-out-of-three logic, which requires an inoperable channel to be placed in trip to continue operability and only one channel at a time is allowed to be bypassed for testing. As a result, for the three common control channels that include a Function 1.c channel the testing of a second common control channel in bypass requires verification that the Function 1.c channel on the inoperable common control channel is in trip. Otherwise no second common control channel can be tested in bypass. However, if the fourth common control channel is the inoperable channel, then with that common control channel in bypass, any one of the other three common control channels may be tested in bypass without placing the associated Function 1.c, channel in trip. Placing a second channel in the bypass condition for up to 4 hours for testing purposes is acceptable based on Reference 8. The allowed testing configurations provide flexibility for testing, while assuring that during testing no configuration will cause an inadvertent actuation of the function or keep a valid signal from actuating the function or an associated function as designed. This note is not intended to allow simultaneous testing of coincident channels on a routine basis.

BASES

ACTIONS (continued)

G.1, G.2.1 and G.2.2

Condition G applies to the automatic actuation logic and actuation relays for the Steam Line Isolation and AFW actuation Functions.

The action addresses the train orientation of the SSPS and the master and slave relays for these functions. If one train is inoperable, 6 hours are allowed to restore the train to OPERABLE status. The Completion Time for restoring a train to OPERABLE status is reasonable considering that there is another train OPERABLE, and the low probability of an event occurring during this interval. If the train cannot be returned to OPERABLE status, the unit must be brought to MODE 3 within the next 6 hours and MODE 4 within the following 6 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required unit conditions from full power conditions in an orderly manner and without challenging unit systems. Placing the unit in MODE 4 removes all requirements for OPERABILITY of the protection channels and actuation functions. In this MODE, the unit does not have analyzed transients or conditions that require the explicit use of the protection functions noted above.

The Required Actions are modified by a Note that allows one train to be bypassed for up to 4 hours for surveillance testing provided the other train is OPERABLE. This allowance is based on the reliability analysis (Ref. 8) assumption that 4 hours is the average time required to perform channel surveillance.

H.1 and H.2

Condition H applies to the Automatic Actuation Logic and Actuation Relays for the ~~Turbine Trip and~~ Feedwater Isolation Function.

This action addresses the train orientation of the SSPS and the master and slave relays for this Function. If one train is inoperable, 6 hours are allowed to restore the train to OPERABLE status or the unit must be placed in MODE 3 within the following 6 hours. The Completion Time for restoring a train to OPERABLE status is reasonable considering that there is another train OPERABLE, and the low probability of an event occurring during this interval. The allowed Completion Time of 6 hours is reasonable, based on operating experience, to reach MODE 3 from full power conditions in an orderly manner and without challenging unit systems. These Functions are no longer required in MODE 3. Placing the unit in MODE 3 removes all requirements for OPERABILITY of the protection channels and actuation functions. In this MODE, the unit does not have analyzed transients or conditions that require the explicit use of the protection functions noted above.

(continued)

BASES

ACTIONS (continued)

J.1 and J.2

Condition J applies to the ~~Turbine Trip and~~ Feedwater Isolation Actuation signal resulting ~~from Steam Generator~~ Level - High-High (P-14).

If one channel is inoperable, 6 hours are allowed to restore one channel to OPERABLE status or to place it in the tripped condition. If placed in the tripped condition, the Function is then in a partial trip condition where one-out-of-two logic will result in actuation. The 6-hour Completion Time is justified in Reference 8. Failure to restore the inoperable channel to OPERABLE status or place in the tripped condition within 6 hours requires the unit to be placed in MODE 3 within 12 hours. The allowed Completion time of 12 hours is reasonable, based on operating experience, to reach MODE 3 from full power conditions in an orderly manner and without challenging unit systems. In MODE 3, this Function is no longer required OPERABLE.

INSERT K-2

~~The Required Actions are modified by a Note that allows the inoperable channel to be bypassed for up to 4 hours for surveillance testing of other channels. The 6 hours allowed to place the inoperable channel in the tripped condition, and the 4 hours allowed for a second channel to be in the bypassed condition for testing, are justified in Reference 8.~~

K.1.1, K.1.2, K.2.1 and K.2.2

Condition K applies to the Residual Heat Removal Pump Trip on RWST Level - Low. Restoring the channel to OPERABLE status or placing the inoperable channel in the bypass (cut-out) condition within 6 hours is sufficient to ensure that the Function remains OPERABLE and minimizes the time that the Function may be in a partial trip condition (assuming the inoperable channel has failed low). Placing the out-of-service channel in cut-out removes that channel from the trip logic, similar to a bypass function. This provides a two-out-of-two trip logic from the remaining channels. The 6 hour Completion Time is justified in Reference 8. If the channel cannot be placed in the cut-out condition within 6 hours, and returned to an OPERABLE status within 48 hours, the unit must be brought to MODE 3 within 54 hours and MODE 5 within 84 hours. The allowed Completion Times for shutdown are reasonable, based on operating experience, to reach the required unit conditions from full power conditions in an orderly manner and without challenging unit systems. In MODE 5, the unit does not have any analyzed transients or conditions that require the explicit use of the pump trip function noted above.

(continued)

Insert K:

The Required Actions are modified by a Note that allows the inoperable channel and/or one additional channel to be tested with one channel in bypass and one channel in trip for up to 4 hours for surveillance testing. This Function is a two-out-of-three actuation logic and the allowed testing configurations provide flexibility for testing, while assuring that during testing no configuration will cause an inadvertent actuation of the function or keep a valid signal from actuating the function as it was designed. The 6 hours allowed to place the inoperable channel in the tripped condition, and the 4 hours allowed for a second channel to be in the bypassed condition for testing, are justified in Reference 8. This note is not intended to allow simultaneous testing of coincident channels on a routine basis.

BASES

ACTIONS (continued)

L.1, L.2.1 and L.2.2

Condition L applies to the P-11 interlock.

With one or more channels inoperable, the operator must verify that the interlock is in the required state for the existing unit condition. This action manually accomplishes the function of the interlock. Determination must be made within 1 hour. The verification determination can be made by observation of the associated annunciator window(s). The 1 hour Completion Time is equal to the time allowed by LCO 3.0.3 to initiate shutdown actions in the event of a complete loss of ESFAS function. If the interlock is not in the required state (or placed in the required state) for the existing unit condition, the unit must be placed in MODE 3 within the next 6 hours and MODE 4 within the following 6 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required unit conditions from full power conditions in an orderly manner and without challenging unit systems. Placing the unit in MODE 4 removes all requirements for OPERABILITY of these interlocks.

M.1, M.2, M.3.1 and M.3.2

~~Condition M applies to the Trip Time Delay (TTD) circuitry for the SG Water Level-Low Low actuation of the turbine-driven AFW pump and is required to be OPERABLE in MODES 1, 2 and 3. With one or more TTD circuitry delay timers inoperable or the RSC ΔT equivalent power input inoperable, 6 hours are allowed to adjust the threshold power level for no time delay to 0% RTP. This sets the TTD timer to zero seconds and effectively removes its input for the SG water level circuit. If the TTD timer cannot be set to zero seconds for a single SG water level control, then the affected SG water level low-low channel must be placed in trip. Only one SG water level low-low channel can be placed in trip position without tripping the plant. The Completion Time of 6 hours is reasonable considering the nature of these functions and the low probability of an event occurring during this interval as justified in Reference 8.~~

~~If the TTD threshold power for no time delay cannot be adjusted to 0% RTP (zero seconds time delay) or the single SG water level channel cannot be placed in the trip condition within the specified Completion Time, the unit must be placed in MODE 4 where these Functions are not required OPERABLE. A completion time of 12 hours is allowed to place the unit in MODE 3 and 18 hours for MODE 4. These completion times are reasonable time, based on operating experience, to place the unit in MODE 4 from full power in an orderly manner and without challenging unit systems. In MODE 4 there are no analyzed transients requiring the use of the turbine-driven AFW pump.~~

INSERT 2

(continued)

Insert L

Condition M applies to the Trip Time Delay (TTD) channels (processors) for the SG Water Level-Low Low actuation of the turbine-driven AFW pump and is required to be OPERABLE in MODES 1, 2 and 3. With one or more TTD channels (processors) inoperable or the RSC ΔT equivalent power input inoperable, 6 hours are allowed to adjust the threshold power level for no time delay to 0% RTP. This sets the TTD processor timer to zero seconds and effectively removes its input for the SG water level circuit. If the TTD timer processor cannot be set to zero seconds for a single SG water level control, then the affected SG water level low-low channel must be placed in trip. Only one SG water level low-low channel per generator can be placed in trip position without tripping the plant. The Completion Time of 6 hours is reasonable considering the nature of these functions and the low probability of an event occurring during this interval as justified in Reference 8.

If the TTD threshold power for no time delay cannot be adjusted to 0% RTP (zero seconds time delay) or the single SG water level output channel cannot be placed in the trip condition within the specified Completion Time, the unit must be placed in MODE 4 where these Functions are not required OPERABLE. A completion time of 12 hours is allowed to place the unit in MODE 3 and 18 hours for MODE 4. These completion times are reasonable time, based on operating experience, to place the unit in MODE 4 from full power in an orderly manner and without challenging unit systems. In MODE 4 there are no analyzed transients requiring the use of the turbine-driven AFW pump.

The Required Actions have been modified by a note that allows the inoperable TTD channel (processor) and/or one additional TD channel (processor) to be surveillance tested with the affected SG low-low water level channels for one TTD channel (processor) in bypass and the affected SG low-low water level channels for the other TTD channel (processor) in trip for up to 4 hours. This note is not intended to allow simultaneous testing of multiple TTD channels (processors) on a routine basis.

If Required Action M.1 is completed for an inoperable TTD processor, the affected SG low-low water level channels would still be operable in that a valid SG low-low water level trip function would not be delayed. With the inoperable TTD processor meeting this required action, the above note will still apply for the inoperable TTD processor and/or one additional TTD processor.

BASES

ACTIONS

M.1, M.2, M.3.1 and M.3.2 (continued)

~~The Required Actions have been modified by a note that allows placing the SG water level channel or one additional channel in the bypassed condition for up to 4 hours while performing routine surveillance testing of the other channels.~~

N.1 or N.2

Condition N applies to:

- Manual Initiation of Steam Line Isolation; and
- Manual Initiation of Auxiliary Feedwater.

If a channel is inoperable, 48 hours is allowed to return the channel to an OPERABLE status. The specified Completion Time is reasonable considering the nature of these functions, the available redundancy, and the low probability of an event occurring during this interval. If the Function cannot be returned to OPERABLE status, the associated pump or valve shall be declared inoperable immediately and the REQUIRED ACTION of 3.7.5 or 3.7.2 as applicable complied with immediately.

O.1 or O.2.1 and O.2.2

Condition O applies to Safety Injection resulting from Containment Pressure - High.

If one channel is inoperable, 6 hours are allowed to restore the channel to OPERABLE status or to place it in the tripped condition. Failure of one channel places the function in a two-out-of-two configuration since the trip coincidence is two-out-of-three. The inoperable channel must be tripped to place the Function in a one-out-of-two configuration that satisfies redundancy requirements.

Failure to restore the inoperable channel to OPERABLE status or place it in the tripped condition within 6 hours requires the unit be placed in MODE 3 within 12 hours and MODE 5 in 42 hours.

The allowed Completion Times are reasonable, based on operating experience, to reach the required unit conditions from full power conditions in an orderly manner and without challenging unit systems. In MODE 5, these functions are no longer required OPERABLE.

INSERT M

~~The Required Actions are modified by a Note that allows the inoperable channel to be bypassed for up to 4 hours for surveillance testing of other channels. The 6 hours allowed to restore the channel to OPERABLE status or to place the inoperable channel in the tripped condition, and the 4 hours allowed for testing, are justified in Reference 8.~~

(continued)

Insert M:

The Required Actions are modified by a Note that allows the inoperable channel to be tested in bypass or with the inoperable channel in trip, one additional channel maybe tested in bypass for up to 4 hours while performing surveillance testing. This function is a two-out-of-three trip logic and the allowed testing configurations provide flexibility for testing, while assuring that during testing no configuration will cause an inadvertent actuation of the function or keep a valid signal from actuating the function as it was designed. The 6 hours allowed to restore the channel to operable status or to place the inoperable channel in the tripped condition, and the 4 hours allowed for testing, are justified in Reference 8. This note is not intended to allow simultaneous testing of coincident channels on a routine basis.

BASES

ACTIONS (continued)

P.1 or P.2.1 and P.2.2

Condition P applies to:

Containment Spray - Containment Pressure - High-High.

Containment Isolation - Phase B Isolation - Containment Pressure - High-High

Neither of these signals has input to a control function. Thus, two-out-of-three logic is necessary to meet acceptable protective requirements. However, a two-out-of-three design would require tripping a failed channel. This is undesirable because a single failure would then cause spurious containment spray initiation. Spurious spray actuation is undesirable because of the cleanup problems presented. Therefore, these channels are designed with two-out-of-four logic so that a failed channel may be bypassed rather than tripped. Note that one channel may be bypassed and still satisfy the single failure criterion. Furthermore, with one channel bypassed, a single instrumentation channel failure will not spuriously initiate containment spray. The containment spray signal is also interlocked with SI and will not initiate without simultaneous SI and containment spray signals.

To avoid the inadvertent actuation of containment spray and Phase B containment isolation, the inoperable channel is bypassed. Restoring the channel to OPERABLE status, or placing the inoperable channel in the bypass condition within 6 hours, is sufficient to assure that the Function remains OPERABLE and minimizes the time that the Function may be in a partial trip condition (assuming the inoperable channel has failed high). The Completion Time is further justified based on the low probability of an event occurring during this interval.

Failure to restore the inoperable channel to OPERABLE status or place it in the tripped condition within 6 hours requires the unit be placed in MODE 3 within 12 hours, and MODE 5 in 42 hours.

The allowed Completion Times are reasonable, based on operating experience, to reach the required unit conditions from full power conditions in an orderly manner and without challenging unit systems. In MODE 5, these Functions are no longer required OPERABLE.

INSERT N

~~The Required Actions are modified by a Note that allows one additional channel to be bypassed for up to 4 hours for surveillance testing. The 6 hours allowed to restore the channel to OPERABLE status or to place the inoperable channel in the tripped condition, and the 4 hours allowed for testing, are justified in Reference 8.~~

(continued)

Insert N:

The Required Actions are modified by a Note that allows the inoperable channel to be tested in bypass for up to 4 hours for surveillance testing. In addition, the Note allows the inoperable channel and one additional channel to be tested in bypass for up to 4 hours for surveillance testing **only** if the Function 1.c channel associated with the inoperable channel is in trip during the testing.

This function is a two-out-of-four actuation logic and three of its channels are contained on common control channels with three other functions and the fourth channel is on a common control channel with two other functions. As a result, if a common control channel is inoperable then one channel from each of its contained functions is inoperable. Three of the common control channels each contain a channel from the Safety Injection Containment Pressure – High (Function. 1.c). Function 1.c, is a two-out-of-three logic, which requires an inoperable channel to be placed in trip to continue operability and only one channel at a time is allowed to be bypassed for testing. As a result, for the three common control channels that include a Function 1.c channel the testing of a second common control channel in bypass requires verification that the Function 1.c channel on the inoperable common control channel is in trip. Otherwise no second common control channel can be tested in bypass. However, if the fourth common control channel is the inoperable channel, then with that common control channel in bypass, any one of the other three common control channels may be tested in bypass without placing the associated Function 1.c, channel in trip. Placing a second channel in the bypass condition for up to 4 hours for testing purposes is acceptable based on Reference 8. The allowed testing configurations provide flexibility for testing, while assuring that during testing no configuration will cause an inadvertent actuation of the function or keep a valid signal from actuating the function or an associated function as designed. This note is not intended to allow simultaneous testing of coincident channels on a routine basis.

ENCLOSURE 4
RETYPED TECHNICAL SPECIFICATION PAGES

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
E. One channel inoperable.	----------NOTE---------- For functions 6, 7, and 8.b, the inoperable channel and/or one additional channel may be surveillance tested with one channel in bypass and one channel in trip for up to 4 hours, or both the inoperable and the additional channel may be surveillance tested in bypass for up to 4 hours. For functions 2.b, 3.a, and 3.b, only the inoperable channel may be bypassed for surveillance testing of other channels. For function 14.a, the inoperable channel and/or one additional channel may be surveillance tested with one channel in bypass and one channel in trip for up to 4 hours. This note is not intended to allow simultaneous testing of coincident channels on a routine basis. ---------- E.1 Place channel in trip. OR E.2 Be in MODE 3.	 6 hours 12 hours
F. One Intermediate Range Neutron Flux channel inoperable.	F.1 Reduce THERMAL POWER to < P-6. OR F.2 Increase THERMAL POWER to > P-10.	24 hours 24 hours

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION		COMPLETION TIME
G. Two Intermediate Range Neutron Flux channels inoperable.	G.1	----------NOTE---------- Limited boron concentration changes associated with RCS inventory control or limited plant temperature changes are allowed. ---------- Suspend operations involving positive reactivity additions.	Immediately
	AND		
	G.2	Reduce THERMAL POWER to < P-6.	2 hours
H. Not used			
I. One Source Range Neutron Flux channel inoperable.	I.1	----------NOTE---------- Limited boron concentration changes associated with RCS inventory control or limited plant temperature changes are allowed. ---------- Suspend operations involving positive reactivity additions.	Immediately
J. Two Source Range Neutron Flux channels inoperable.	J.1	Open reactor trip breakers (RTBs).	Immediately

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
K. One Source Range Neutron Flux channel inoperable.	K.1 Restore channel to OPERABLE status. OR K.2.1 Initiate action to fully insert all rods. AND K.2.2 Place the Control Rod System in a condition incapable of rod withdrawal.	48 hours 48 hours 49 hours
L. Required Source Range Neutron Flux channel inoperable.	L.1 ----------NOTE---------- Plant temperature changes are allowed provided the temperature change is accounted for in the calculated SDM. ---------- Suspend operations involving positive reactivity additions. AND L.2 Perform SR 3.1.1.1.	 Immediately 1 hour AND Once per 12 hours thereafter

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
M. One channel inoperable.	----------NOTE---------- For function 8.a, the inoperable channel and/or one additional channel may be surveillance tested with one channel in bypass and one channel in trip for up to 4 hours, or both the inoperable and the additional channel may be surveillance tested in bypass for up to 4 hours. For functions 9 and 10, the inoperable channel and/or one additional channel may be surveillance tested with one channel in bypass and one channel in trip for up to 4 hours. For functions 12 and 13, only the inoperable channel may be bypassed for surveillance testing of other channels. This note is not intended to allow simultaneous testing of coincident channels on a routine basis. ---------- M.1 Place channel in trip. OR M.2 Reduce THERMAL POWER to < P-7.	 6 hours 12 hours
N. Not used		

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
X. One or more SG Water Level Low - Low Trip Time Delay channel(s) inoperable.	----------NOTE---------- For function 14.b, the inoperable TTD channel (processor) and/or one additional TTD channel (processor) may be surveillance tested with the affected steam generator low-low water level channels for one TTD channel (processor) in bypass and the affected SG low-low water level channels for the other TTD channel (processor) in trip for up to 4 hours. This note is not intended to allow simultaneous testing of multiple TTD channels (processors) on a routine basis. ----------	
	X.1 Set the Trip Time Delay to zero seconds.	6 hours
	OR	
	X.2 Place the affected SG Water Level Low - Low channel(s) in trip.	6 hours
	OR	
	X.3 Be in MODE 3.	12 hours

Table 3.3.1-1 (page 4 of 7)
Reactor Trip System Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	CONDITIONS	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE	NOMINAL[a] TRIP SETPOINT
16. Turbine Trip						
a. Low Auto-Stop Oil Pressure	1[(j)]	3	O	SR 3.3.1.10 SR 3.3.1.15	≥ 46.5 psig	50 psig
b. Turbine Stop Valve Closure	1[(j)]	4	P	SR 3.3.1.15	≥ 1% open	2% open
17. Safety Injection (SI) Input from Engineered Safety Feature Actuation System (ESFAS)	1,2	2 trains	Q	SR 3.3.1.14	NA	NA
18. Reactor Trip System Interlocks						
a. Intermediate Range Neutron Flux, P-6	2[(e)]	2	S	SR 3.3.1.11 SR 3.3.1.13	≥ 8E-11 amp	1E-10 amp
b Low Power Reactor Trips Block, P-7	1	1 per train	T	SR 3.3.1.5	NA	NA
c. Power Range Neutron Flux, P-8	1	4	T	SR 3.3.1.11 SR 3.3.1.13	≤ 36.2% RTP	35% RTP

(continued)

(a) A channel is OPERABLE with an actual Trip Setpoint value outside its calibration tolerance band provided the Trip Setpoint value is conservative with respect to its associated Allowable Value and the channel is re-adjusted to within the established calibration tolerance band of the Nominal Trip Setpoint. A Trip Setpoint may be set more conservative than the Nominal Trip Setpoint as necessary in response to plant conditions.
(e) Below the P-6 (Intermediate Range Neutron Flux) interlocks.
(j) Above the P-9 (Power Range Neutron Flux) interlock.

Table 3.3.1-1 (page 5 of 7)
Reactor Trip System Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	CONDITIONS	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE	NOMINAL[a] TRIP SETPOINT
18. Reactor Trip System Interlocks (cont)						
d. Power Range Neutron Flux, P-9	1	4	T	SR 3.3.1.11 SR 3.3.1.13	≤ 51.2% RTP	50% RTP
e. Power Range Neutron Flux, P-10	1,2	4	S	SR 3.3.1.11 SR 3.3.1.13	≥ 8.8% RTP and ≤ 11.2% RTP	10% RTP
f. Turbine Impulse Chamber Pressure, P-13	1	2	T	SR 3.3.1.10 SR 3.3.1.13	≤ 10.2% turbine power	10% turbine power
19. Reactor Trip Breakers[k] (RTBs)	1,2	2 trains	R	SR 3.3.1.4	NA	NA
	3[b], 4[b], 5[b]	2 trains	C	SR 3.3.1.4	NA	NA
20. Reactor Trip Breaker Undervoltage and Shunt Trip Mechanisms [k]	1,2	1 each per RTB	U	SR 3.3.1.4	NA	NA
	3[b], 4[b], 5[b]	1 each per RTB	C	SR 3.3.1.4	NA	NA
21. Automatic Trip Logic	1,2	2 trains	Q	SR 3.3.1.5	NA	NA
	3[b], 4[b], 5[b]	2 trains	C	SR 3.3.1.5	NA	NA
22. Seismic Trip	1,2	3 directions (x,y,z) in 3 locations	W	SR 3.3.1.5 SR 3.3.1.12 SR 3.3.1.14	≤ 0.43g	0.35g

(a) A channel is OPERABLE with an actual Trip Setpoint value outside its calibration tolerance band provided the Trip Setpoint value is conservative with respect to its associated Allowable Value and the channel is re-adjusted to within the established calibration tolerance band of the Nominal Trip Setpoint. A Trip Setpoint may be set more conservative than the Nominal Trip Setpoint as necessary in response to plant conditions.

(b) With Rod Control System capable of rod withdrawal or one or more rods not fully inserted.

(k) Including any reactor trip bypass breakers that are racked in and closed for bypassing an RTB.

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
D. One channel inoperable.	----------NOTE---------- For function 1.d, the inoperable channel and/or one additional channel may be surveillance tested with one channel in bypass and one channel in trip for up to 4 hours, or both the inoperable and the additional channel may be surveillance tested in bypass for up to 4 hours. For functions 1.e(1), 4.d(1), 4.d(2), and 6.d(1), the inoperable channel and/or one additional channel may be surveillance tested with one channel in bypass and one channel in trip for up to 4 hours. This note is not intended to allow simultaneous testing of coincident channels on a routine basis. ----------	
	D.1 Place channel in trip.	6 hours
	OR	
	D.2.1 Be in MODE 3.	12 hours
	AND	
	D.2.2 Be in MODE 4.	18 hours

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
E. One Containment Pressure channel inoperable.	----------NOTE---------- The inoperable channel and one additional channel may be surveillance tested in bypass for up to 4 hours only if any function 1.c channel associated with the inoperable channel is in trip. This note is not intended to allow simultaneous testing of coincident channels on a routine basis. ----------	
	E.1 Place channel in bypass.	6 hours
	OR	
	E.2.1 Be in MODE 3.	12 hours
	AND	
	E.2.2 Be in MODE 4.	18 hours

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
I. One channel inoperable.	----------NOTE---------- The inoperable channel may be bypassed for up to 4 hours for surveillance testing of other channels. ----------	
	I.1 Place channel in trip.	6 hours
	OR	
	I.2. Be in MODE 2.	12 hours
J. One channel inoperable	----------NOTE---------- The inoperable channel and/or one additional channel may be surveillance tested with one channel in bypass and one channel in trip for up to 4 hours. This note is not intended to allow simultaneous testing of coincident channels on a routine basis. ----------	
	J.1 Place channel in trip.	6 hours
	OR	
	J.2. Be in MODE 3.	12 hours
K. One channel inoperable	K.1.1 Place the channel in cut-out.	6 hours
	AND	
	K.1.2 Return the inoperable channel to an OPERABLE status	48 hours
	OR	
	K.2.1 Be in MODE 3.	54 hours
	AND	
	K.2.2 Be in MODE 5	84 hours

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
L. One or more channels or trains inoperable.	L.1 Verify interlock is in required state for existing unit condition. OR	1 hour
	L.2.1 Be in MODE 3. AND	7 hours
	L.2.2 Be in MODE 4.	13 hours
M. One or more SG Water Level - Low Low Trip Time Delay channel(s) inoperable.	----------NOTE---------- The inoperable TTD channel (processor) and/or one additional TTD channel (processor) may be surveillance tested with the affected steam generator low-low water level channels for one TTD channel (processor) in bypass and the affected SG low-low water level channels for the other TTD channel (processor) in trip for up to 4 hours. This note is not intended to allow simultaneous testing of multiple TTD channels (processors) on a routine basis. ----------	
	M.1 Set the Trip Time Delay to zero seconds. OR	6 hours
	M.2 Place the affected SG Water Level - Low Low channel(s) in trip. OR	6 hours
	M.3.1 Be in MODE 3. AND	12 hours
	M.3.2 Be in MODE 4.	18 hours

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
N. One channel inoperable.	N.1 Restore channel to OPERABLE status. OR N.2 Declare the associated AFW pump or MSIV inoperable.	48 hours Immediately
O. One channel inoperable	----------NOTE---------- The inoperable channel may be surveillance tested in bypass for up to 4 hours, or with the inoperable channel in trip, one additional channel may be surveillance tested in bypass for up to 4 hours. This note is not intended to allow simultaneous testing of coincident channels on a routine basis. ---------- O.1 Place channel in trip. OR O.2.1 Be in MODE 3 AND O.2.2 Be in MODE 5.	 6 hours 12 hours 42 hours

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
P. One channel inoperable.	----------NOTE---------- The inoperable channel and one additional channel may be surveillance tested in bypass for up to 4 hours only if any function 1.c channel associated with the inoperable channel is in trip. This note is not intended to allow simultaneous testing of coincident channels on a routine basis. ----------	
	P.1 Place channel in bypass. OR	6 hours
	P.2.1 Be in MODE 3 AND	12 hours
	P.2.2 Be in MODE 5.	42 hours

Table 3.3.2-1 (page 4 of 7)
Engineered Safety feature Actuation System Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	CONDITIONS	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE	NOMINAL [a] TRIP SETPOINT
4. Steam Line Isolation (continued)						
d. Steam Line Pressure						
(1) Low	1,2[i], 3[b][i]	3 per steam line	D	SR 3.3.2.1 SR 3.3.2.5 SR 3.3.2.9 SR 3.3.2.10	≥ 597.6[c] psig	600[c] psig
(2) Negative Rate-High	3[g][i]	3 per steam line	D	SR 3.3.2.1 SR 3.3.2.5 SR 3.3.2.9 SR 3.3.2.10	≤ 102.4 [h] psi/sec	100 [h] psi/sec
e. Not used.						
f. Not used						
g. Not used						
h. Not used						
5. Feedwater Isolation						
a. Automatic Actuation Logic and Actuation Relays	1,2[j]	2 trains	H	SR 3.3.2.2 SR 3.3.2.4 SR 3.3.2.6	NA	NA

(continued)

(a) A channel is OPERABLE with an actual Trip Setpoint value outside its calibration tolerance band provided the Trip Setpoint value is conservative with respect to its associated Allowable Value and the channel is re-adjusted to within the established calibration tolerance band of the Nominal Trip Setpoint. A Trip Setpoint may be set more conservative than the Nominal Trip Setpoint as necessary in response to plant conditions.
(b) Above the P-11 (Pressurizer Pressure) interlock and below the P-11 interlock unless the Function is blocked.
(c) Time constants used in the lead/lag compensator are t_1 = 50 seconds and t_2 =5 seconds
(g) Below the P-11 (Pressurizer Pressure). However, may be blocked below P-11 when Safety Injection on Steam Line Pressure-Low is not blocked.
(h) Time constant utilized in the rate/lag compensator are t_3 = 50 sec and t_4 = 50 sec.
(i) Except when all MSIVs are closed and de-activated.
(j) Except when all MFIVs, MFRVs, and associated bypass valves are closed and de-activated or isolated by a closed manual valve.

Table 3.3.2-1 (page 5 of 7)
Engineered Safety feature Actuation System Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	CONDITIONS	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE	NOMINAL [a] TRIP SETPOINT
5. Feedwater Isolation (continued)						
b. SG Water Level-High High (P-14)	1,2[j]	3 per SG	J	SR 3.3.2.1 SR 3.3.2.5 SR 3.3.2.9 SR 3.3.2.10	≤ 75.2%	75%
c. Safety Injection	Refer to Function 1 (Safety Injection) for all initiation functions and requirements.					
6. Auxiliary Feedwater						
a. Manual	1,2,3	1 sw/pp	N	SR 3.3.2.13	NA	NA
b. Automatic Actuation Logic and Actuation Relays (Solid State Protection System)	1,2,3	2 trains	G	SR 3.3.2.2 SR 3.3.2.4 SR 3.3.2.6	NA	NA
c. Not used						
d.1 SG Water Level-Low Low	1,2,3	3 per SG	D	SR 3.3.2.1 SR 3.3.2.5 SR 3.3.2.9 SR 3.3.2.10	≥ 7.0%	7.2%

(continued)

(a) A channel is OPERABLE with an actual Trip Setpoint value outside its calibration tolerance band provided the Trip Setpoint value is conservative with respect to its associated Allowable Value and the channel is re-adjusted to within the established calibration tolerance band of the Nominal Trip Setpoint. A Trip Setpoint may be set more conservative than the Nominal Trip Setpoint as necessary in response to plant conditions.

(j) Except when all MFIVs, MFRVs, and associated bypass valves are closed and de-activated or isolated by a closed manual valve.