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August 10, 2001

U. S. Nuclear Regulatory Commission  
Attention: Document Control Desk  
Washington, D. C. 20555

Subject: Grand Gulf Nuclear Station  
Docket No. 50-416  
License No. NPF-29  
End of Cycle Recirculation Pump Trip (EOC-RPT) Instrumentation  
Emergency Technical Specification Change Request LDC 2001-128

References: 1. Standard Technical Specifications General Electric Plants,  
BWR/6-NUREG-1434 Vol. 1, Rev. 2

GNRO-2001/00062

Gentlemen:

The requested emergency change to the Technical Specifications (TS) for the End of Cycle Recirculation Pump Trip (EOC-RPT) requirements is necessary. The requested change will provide an alternative method for complying with the Limiting Conditions of Operations (LCO) requirements of Technical Specification 3.3.4.1 and require that an additional REQUIRED ACTION be added to CONDITION B as REQUIRED ACTION B.2. The proposed change is consistent with revision 2 of NUREG-1434 (Reference 1).

This letter contains one new commitment to update the Core Operating Limits Report with the full compliment of Minimum Critical Power Ratio values within 30 days of granting this emergency Technical Specification change.

The proposed change has been evaluated in accordance with 10CFR50.91(a)(1) using criteria in 10CFR50.92(c) and it has been determined that this change involves no significant hazards considerations. The bases for this determination are included in the attached submittal.

A 001

Entergy Operations requests that the effective date for this TS change to be upon issuance of the approved amendment. This is an emergency request, your prompt review is requested. Should you require additional information please contact Lonnie F. Daughtery at (601) 437-2334.

I declare under penalty of perjury that the foregoing is true and correct. Executed on August 10, 2001.

Very truly yours,



WAE/lfd  
Attachments

cc: Mr. T. L. Hoeg, GGNS Senior Resident Inspector (w/a)  
Mr. L. J. Smith (Wise Carter) (w/a)  
Mr. G. J. Taylor (ECH) (w/a)  
Mr. H. L. Thomas (w/o)

Mr. E. W. Merschoff, NRC Region IV Regional Administrator  
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**ATTN: ADDRESSEE ONLY**  
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LICENSEE-IDENTIFIED COMMITMENTS

Letter #: GNRO 2001/00062

COMMITMENT	TYPE		SCHEDULED COMPLETION DATE
	ONE-TIME ACTION	CONTINUING COMPLIANCE	
Complete necessary analysis and update the Core Operating Limits Report	Yes		30 Days from TS Amendment

PROPOSED TECHNICAL SPECIFICATION

AND

RESPECTIVE SAFETY ANALYSES

IN THE MATTER OF AMENDING

LICENSE NO. NPF-29

ENTERGY OPERATIONS, INC.

GRAND GULF NUCLEAR STATION

DOCKET NO. 50-416

## **DESCRIPTION OF PROPOSED CHANGES**

Entergy Operations, Inc. is requesting this revision to the Grand Gulf Nuclear Station (GGNS) Technical Specifications (TS), which govern the End of Cycle Recirculation Pump Trip (EOC-RPT) instrumentation. Technical Specification 3.3.4.1 currently requires that the EOC-RPT instrumentation be OPERABLE when thermal power is greater than or equal to 40% rated thermal power (RTP). The proposed change will affect the Limiting Condition for Operation (LCO) by incorporating an additional provision that allows the alternative of taking a Minimum Critical Power Ratio (MCPR) penalty when the EOC RPT instrumentation is inoperable. An additional action that addresses the new provision in the LCO is being added to CONDITION B. as REQUIRED ACTION B.2. The new action invokes requirements to adjust the MCPR limit within 2 hours of finding the instrumentation inoperable. The proposed change is consistent with NUREG-1434, "*Standard Technical Specifications General Electric Plants, BWR/6.*" The revised TS will require that either the EOC-RPT instrumentation be OPERABLE or that MCPR limits for inoperable EOC-RPT be placed in effect as specified in the Core Operating Limit Report (COLR).

## **EMERGENCY CIRCUMSTANCES**

On August 7, 2001 GGNS had an unplanned shutdown and is currently prohibited from exceeding 40% RTP due to LCO 3.3.4.1 restrictions. This restriction prevents the return of GGNS to full power operations. Emergency circumstances exist as provided in 10CFR50.91(a)(5). GGNS could not have anticipated the extent of the apparent design deficiency between Siemens design of its turbine controls and the General Electric EOC-RPT instrumentation. Therefore, GGNS could not have foreseen this problem, and has not failed to make timely application for this amendment.

## **BACKGROUND**

The EOC-RPT Instrumentation was declared inoperable on August 8, 2001. With inoperable EOC-RPT Instrumentation TS 3.3.4.1 requires that RTP be maintained less than 40%. The initial probable cause for the inoperable instrumentation was an apparent design deficiency between Siemens design of its turbine controls and the General Electric EOC-RPT instrumentation. There appears to be a family of grid disturbances where the response of the circuit does not allow the logic to be completely satisfied and thus not actuate the EOC-RPT instrumentation.

The need for opting to take the alternative compliance method was not previously deemed appropriate because of the penalty to the operating MCPR limit. When GGNS initially adopted the Improved Technical Specifications (NUREG-1434) as a pilot plant, the analysis necessary to adopt this option was not completed and the decision was made to not adopt the MCPR option.

Design Engineering initiated action with the fuel vendor to commence the analysis necessary to support adopting the MCPR option after the event described above occurred. The analysis uses approved methodology that is licensed for applicability to GGNS.

## **BASIS FOR PROPOSED CHANGE**

As discussed in the TS Bases, the EOC-RPT instrumentation initiates a RPT to reduce the peak reactor pressure and power resulting from turbine trip or generator load rejection transients to provide additional margin to core thermal MCPR Safety Limits (SLs). The need for the additional negative reactivity in excess of that normally inserted on a scram reflects end of cycle reactivity considerations. Flux shapes at the end of cycle are such that the control rods may not be able to ensure that thermal limits are maintained by inserting sufficient negative reactivity during the first few feet of rod travel upon a scram caused by Turbine Control Valve (TCV) Fast Closure, Trip Oil Pressure-Low or Turbine Stop Valve (TSV) Closure, Trip Oil Pressure-Low. The proposed change establishes MCPR limits that in effect ensure plant operation compensates for the increased pressurization transient that results from no EOC-RPT. The proposed change is consistent with NUREG-1434.

The EOC-RPT feature was introduced by General Electric to provide additional MCPR operating margin. As the fuel designs used at GGNS have evolved to be more critical power ratio (CPR) tolerant, the benefits of the EOC-RPT feature have diminished. Therefore, fuel thermal limits developed without credit for the EOC-RPT function will have a minor impact on plant operation over the operating cycle. Because of reliability concerns associated with the EOC-RPT function as implemented in the GGNS design, Entergy intends to implement more restrictive core operating limits that do not credit the EOC-RPT function. Utilization of these limits negates the need for the EOC - RPT function to protect MCPR safety limits. Note that the EOC-RPT function is not being disabled and actuation of this feature is expected for turbine trip and load reject events. The effect of EOC-RPT actuation will be to lessen the severity of any plant transient.

The cycle specific fuel operating limits based on the design function of the EOC-RPT are currently implemented by and documented in the GGNS COLR. Operating limits for the entire cycle are based on an operable EOC-RPT function. The proposed change will allow the COLR to contain operating limits that are applicable when the EOC-RPT function is not operable. The additional restrictions imposed by the revised set of operating limits essentially offset the impact of losing the EOC-RPT function. Therefore, there are no safety consequences associated with the proposed changes.

Core damage risk and other risk measures are unaffected by the proposed change since implementation of revised core operating limits provides equivalent protection for anticipated transients.

### **Additional Justification**

The EOC-RPT out-of-service condition has been reanalyzed by the GGNS current cycle fuel supplier, Framatome ANP Richland, Inc., to assess the overall impact of this condition and to develop new Cycle 12 core operating limits. The limiting events impacted by this proposed change (*i.e.*, those limiting events that would normally initiate an EOC-RPT on either a turbine control valve fast closure or turbine stop valve closure) are the turbine trip without bypass (TTNB) and the feedwater controller failure (FWCF). The load reject event has previously been shown to be bounded by the turbine trip transient. An evaluation of the impact of the EOC-RPT function out-of-service condition

on all other events concluded that those events did not change the bounding nature of the TTNB and FWCF events in establishing the core operating limits.

These analyses were performed with the same NRC-approved methods used in the GGNS Cycle 12 analysis (Reference 1). COTRANSA2 (Reference 2), XCOBRA-T (Reference 3), XCOBRA (Reference 4) and CASMO-4/MICROBURN-B2 (Reference 5) are the major codes used in the thermal limits analyses as described in the THERMEX methodology report (Reference 4) and the neutronics methodology report (Reference 5). COTRANSA2 is a system transient simulation code, which includes an axial one-dimensional neutronics model that captures the effects of axial power shifts associated with the system transients. XCOBRA-T is a transient thermal-hydraulics code used in the analysis of thermal margins for the limiting fuel assembly. XCOBRA is used in steady-state analyses. The SPCB critical power correlation (Reference 6) is used to evaluate the thermal margin of the ATRIUM-10 fuel assemblies. The edge form of the ANFB-10 critical power correlation (Reference 7) is used to evaluate the critical power performance of the GE11 assemblies with the fuel dependent parameters obtained using the direct approach methodology discussed in Reference 8. Fuel pellet-to-cladding gap conductance values are determined using RODEX2 (Reference 9).

The previous GGNS Cycle 12 results demonstrate that the TTNB and FWCF event results are potentially limiting only in the 70% to 100% power range and below 40% power. The base case analysis results below 40% power (performed in Reference 1) do not credit the EOC-RPT and therefore remain applicable. The results of the TTNB and FWCF analyses with no EOC-RPT are presented in Table 1. The results presented for 40% power illustrate that with the EOC-RPT out-of-service, the TTNB and FWCF results remain non-limiting in the 40 to 70% power range.

A comparison of the results presented in Table 1 with the MOC limiting transient analysis results (Reference 1) demonstrate that the EOC-RPT out-of-service MCPR results are more severe. As a result, adjustments to the MOC base case MCPR limits are necessary to support operation with no EOC-RPT. Tables 2 and 3 present EOC-RPT out-of-service MCPR<sub>p</sub> limits for ATRIUM-10 and GE11 fuel. These limits show a MCPR<sub>p</sub> increase of 0.02 for the ATRIUM-10 fuel and an increase of 0.02 to 0.04 for the GE11 fuel. The results of these analyses concluded that the LHGRFAC<sub>p</sub> and MAPFAC<sub>p</sub>/LHGRFAC<sub>p</sub> multipliers for ATRIUM-10 and GE11 fuel are unchanged from the original base case values. The single-loop operation limits presented in Reference 1 also remain applicable for operation with the EOC-RPT function out-of-service.

It should be noted that the current EOC-RPT out-of-service operating limits presented in Tables 1, 2, and 3 are applicable under the following conditions:

1. Cycle 12 exposures from BOC (core average exposure of 19,658 MWd/MTU) to MOC (core average exposure 30,840 MWd/MTU) and rated power operation of 3833 MWt. The MOC to EOC COLR changes will be implemented in association with the planned "App. K power uprate" COLR changes expected to occur at near the MOC conditions (pending NRC approval of that submittal currently scheduled for review beginning in January of 2002).

2. The limits support a reduction in feedwater temperature of less than or equal to 10°F from the nominal feedwater temperature. The new limits will not support feedwater temperature reductions greater than 10°F (*i.e.*, operation with FHOOS) until analysis and COLR changes are implemented for this specific operational restriction (will be completed within 30 days).

#### References

1. EMF-2552(P) Revision 2, *Grand Gulf Nuclear Station Cycle 12 Plant Transient Analyses*, Framatome ANP Richland, Inc., June 2001.
2. ANF-913(P)(A) Volume 1 Revision 1 and Volume 1 Supplements 2, 3 and 4, *COTRANSA2: A Computer Program for Boiling Water Reactor Transient Analyses*, Advanced Nuclear Fuels Corporation, August 1990.
3. XN-NF-84-105(P)(A) Volume 1 and Volume 1 Supplements 1 and 2, *XCOBRA-T: A Computer Code for BWR Transient Thermal-Hydraulic Core Analysis*, Exxon Nuclear Company, February 1987.
4. XN-NF-80-19(P)(A) Volume 3 Revision 2, *Exxon Nuclear Methodology for Boiling Water Reactors, THERMEX: Thermal Limits Methodology Summary Description*, Exxon Nuclear Company, January 1987.
5. EMF-2158(P)(A), *Siemens Power Corporation Methodology for Boiling Water Reactors: Evaluation and Validation of CASMO-4/MICROBURN-B2*, Siemens Power Corporation, October 1999.
6. EMF-2209(P)(A) Revision 1, *SPCB Critical Power Correlation*, Siemens Power Corporation, July 2000.
7. EMF-1997(P)(A), *ANFB-10 Critical Power Correlation*, Siemens Power Corporation, July 1998.
8. EMF-2245(P)(A), *Application of Siemens Power Corporation's Critical Power Correlations to Co-Resident Fuel*, Siemens Power Corporation, August 2000.
9. XN-NF-81-58(P)(A) Revision 2 and Supplements 1 and 2, *RODEX2 Fuel Rod Thermal-Mechanical Response Evaluation Model*, Exxon Nuclear Company, March 1984.

Table 1 MOC Limiting Pressurization Transient Results with EOC-RPT Out-of-Service

Event	Power (% of 3833 MWt)	ATRIUM-10 Fuel	GE11 Fuel
		$\Delta$ CPR	$\Delta$ CPR
	101.7	0.13	0.17
	91.5	0.15	0.18
TTNB	81.4	0.15	0.18
	71.2	0.16	0.18
	40	0.12	0.14
	101.7	0.11	0.13
FWCF	91.5	0.14	0.16
	81.4	0.16	0.18
	71.2	0.19	0.20
	40	0.31	0.31

Table 2 EOC-RPT Out-of-Service Power-Dependent MCPR Limit for ATRIUM-10 Fuel at MOC

Power (% of 3833 MWt)	MCPR <sub>p</sub> Limit
101.7	1.21
71.2	1.27
70	1.42
40	1.59
40 Core Flow $\leq$ 50% of rated	1.76
25 Core Flow $\leq$ 50% of rated	1.98
40 Core flow > 50% of rated	1.85
25 Core flow > 50% of rated	2.00

Table 3 EOC-RPT Out-of-Service Power-Dependent MCPR Limit for GE11 Fuel at MOC

Power (% of 3833 MWt)	MCPR <sub>p</sub> Limit
101.7	1.25
71.2	1.29
70	1.42
40	1.54
40 Core Flow $\leq$ 50% of rated	1.61
25 Core Flow $\leq$ 50% of rated	1.80
40 Core flow > 50% of rated	1.80
25 Core flow > 50% of rated	1.91

### Determination of No Significant Hazards Considerations

Entergy Operations, Inc. is requesting this revision to the Grand Gulf Nuclear Station (GGNS) Technical Specifications (TSs), which govern the End of Cycle Recirculation Pump Trip (EOC-RPT) instrumentation. Technical Specification 3.3.4.1 currently requires that the EOC-RPT instrumentation be OPERABLE when thermal power is greater than or equal to 40% rated

thermal power (RTP). The proposed change allows the option of taking a Minimum Critical Power Ratio (MCPR) penalty when the instrumentation is inoperable. The proposed change includes adding an additional action to CONDITION B. as REQUIRED ACTION B.2 to invoke action to implement the MCPR limit within 2 hours of finding the EOC-RPT instrumentation inoperable. The change is consistent with NUREG-1434, "*Standard Technical Specifications General Electric Plants BWR/6.*" The revised TSs will require either the EOC-RPT instrumentation be OPERABLE or that MCPR limits for inoperable EOC-RPT be applied as specified in the Core Operating Limit Report (COLR).

An evaluation of the proposed change has been performed in accordance with 10CFR50.91(a)(1) regarding no significant hazards considerations using the standards in 10CFR50.92(c). A discussion of these standards as they relate to this amendment request follows:

**1. Will operation of the facility in accordance with this proposed change involve a significant increase in the probability or consequences of an accident previously evaluated?**

The EOC-RPT functions to insert negative reactivity in response to certain anticipated transients. The EOC-RPT is a mitigation function and not the initiator of any evaluated accident or transient. Operation with inoperable EOC-RPT instrumentation and compliance with new restrictive MCPR operating limits establishes the same margin to core thermal MCPR safety limit (SL) as would be the case with operable EOC-RPT instrumentation and existing MCPR operating limits.

Therefore, this change does not involve a significant increase in the probability or consequences of an accident previously evaluated.

**2. Will operation of the facility in accordance with the proposed change create the possibility of a new or different kind of accident from any previously analyzed?**

The requested change will not create any new modes of plant or equipment operation. The proposed change allows the option to apply an additional penalty factor to the MCPR when the EOC-RPT is inoperable. With the addition of the penalty factor, the margin to the MCPR SL is maintained. Therefore, operating the plant with the proposed change will not create the possibility of a new or different kind of accident from any previously analyzed.

**3. Will operation of the facility in accordance with the proposed change involve a significant reduction in a margin of safety?**

By establishing a new restrictive MCPR operating limit, there are no changes to the plant design and safety analysis. There are no changes to the reactor core design instrument setpoints. The margin of safety assumed in the safety analysis is not affected. Applicable regulatory requirements will continue to be met and adequate defense-in-depth will be maintained. Sufficient safety margins will be maintained.

The analytical methods used to determine the revised core operating limits were reviewed and approved by the NRC, and are described in Technical Specification 5.6.5. Specific analyses were prepared by the GGNS fuel vendor to develop core operating limits without crediting the EOC-RPT. Therefore, implementation of the proposed changes will not involve a significant reduction in the margin of safety.

Therefore, based on the reasoning presented above and the previous discussion of the amendment request, Entergy Operations has determined that the requested change does not involve a significant hazards consideration.

### **ENVIRONMENTAL IMPACT EVALUATION**

Pursuant to 10CFR51.22(b), an evaluation of the proposed amendment has been performed to determine whether or not it meets the criteria for categorical exclusion set forth in 10CFR 51.22 (c) (9) of the regulations. The basis for this determination is as follows:

1. The proposed license amendment does not involve a significant hazards consideration as described previously in the evaluation.
2. As concluded from the significant hazards evaluation, this change does not result in a significant change or significant increase in the radiological doses for any Design Basis Accident. The proposed license amendment does not result in a significant change in the types or a significant increase in the amounts of any effluents that may be released off-site.
3. The proposed license amendment does not result in a significant increase to the individual or cumulative occupational radiation exposure because this change only provides an alternative method for complying with the Technical Specifications and does not alter plant equipment.

**Mark-up  
Of  
Affected  
Technical Specification Pages**

3.3 INSTRUMENTATION

3.3.4.1 End of Cycle Recirculation Pump Trip (EOC-RPT) Instrumentation

LCO 3.3.4.1 <sup>9.</sup> Two channels per trip system for each EOC-RPT instrumentation Function listed below shall be OPERABLE:

- 1. a. Turbine Stop Valve (TSV) Closure, Trip Oil Pressure—Low; and
- 2. b. Turbine Control Valve (TCV) Fast Closure, Trip Oil Pressure—Low.

INSERT "A"

APPLICABILITY: THERMAL POWER  $\geq$  40% RTP with any recirculation pump in fast speed.

ACTIONS

-----NOTE-----  
Separate Condition entry is allowed for each channel.  
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CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more required channels inoperable.	A.1 Restore channel to OPERABLE status.	72 hours
	<p style="text-align: center;"><u>OR</u></p> <p style="text-align: center;">A.2 -----NOTE----- Not applicable if inoperable channel is the result of an inoperable breaker. -----</p> <p style="text-align: center;">Place channel in trip.</p>	72 hours

(Continued)

  

(continued)

ACTIONS ~~(continued)~~

CONDITION	REQUIRED ACTION	COMPLETION TIME
B. One or more Functions with EOC-RPT trip capability not maintained.	B.1 Restore EOC-RPT trip capability.	2 hours
<del>INSERT "B"</del>		
C. Required Action and associated Completion Time not met.	C.1 Remove the associated recirculation pump fast speed breaker from service.	4 hours
	<p><u>OR</u></p> <p>C.2 Reduce THERMAL POWER to &lt; 40% RTP.</p>	4 hours

TECHNICAL SPECIFICATION 3.3.4.1 INSERT

**INSERT A**

OR

b. LCO 3.2.2, "MINIMUM CRITICAL POWER RATIO (MCPR)," limits for inoperable EOC-RPT as specified in the COLR are made applicable.

**INSERT B**

<p>AND</p> <p>MCPR limit for inoperable EOC-RPT not made applicable.</p>	<p>OR</p> <p>B.2 Apply the MCPR limit for inoperable EOC-RPT as specified in the COLR.</p>	<p>2 hours</p>
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**Mark-up  
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Affected  
Technical Specification Bases Pages**

BASES

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BACKGROUND  
(continued)

system trips one of the two EOC-RPT breakers for each recirculation pump and the second trip system trips the other EOC-RPT breaker for each recirculation pump.

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APPLICABLE  
SAFETY ANALYSES,  
LCO, and  
APPLICABILITY

The TSV Closure, Trip Oil Pressure—Low and the TCV Fast Closure, Trip Oil Pressure—Low Functions are designed to trip the recirculation pumps from fast speed operation in the event of a turbine trip or generator load rejection to mitigate the neutron flux, heat flux, and pressure transients, and to increase the margin to the MCPRL SL. The analytical methods and assumptions used in evaluating the turbine trip and generator load rejection, as well as other safety analyses that assume EOC-RPT, are summarized in References 2, 3, and 4.

To mitigate pressurization transient effects, the EOC-RPT must trip the recirculation pumps from fast speed operation after initiation of initial closure movement of either the TSVs or the TCVs. The combined effects of this trip and a scram reduce fuel bundle power more rapidly than does a scram alone, resulting in an increased margin to the MCPRL SL. The EOC-RPT function is automatically disabled when turbine first stage pressure is < 40% RTP.

INSERT "A"

EOC-RPT instrumentation satisfies Criterion 3 of the NRC Policy Statement.

The OPERABILITY of the EOC-RPT is dependent on the OPERABILITY of the individual instrumentation channel Functions. Each Function must have a required number of OPERABLE channels in each trip system, with their setpoints within the specified Allowable Value of SR 3.3.4.1.3. The actual setpoint is calibrated consistent with applicable setpoint methodology assumptions. Channel OPERABILITY also includes the associated EOC-RPT breakers. Each channel (including the associated EOC-RPT breakers) must also respond within its assumed response time.

Allowable Values are specified for each EOC-RPT Function specified in the LCO. Nominal trip setpoints are specified in the setpoint calculations. A channel is inoperable if its actual trip setpoint is not within its required Allowable Value. The nominal setpoints are selected to ensure the setpoints do not exceed the Allowable Value between successive CHANNEL CALIBRATIONS. Operation with a

(continued)

BASES

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APPLICABLE  
SAFETY ANALYSES,  
LCO, and  
APPLICABILITY  
(continued)

trip setpoint less conservative than the nominal trip setpoint, but within its Allowable Value, is acceptable. Trip setpoints are those predetermined values of output at which an action should take place. The setpoints are compared to the actual process parameter (e.g., TSV electrohydraulic control (EHC) pressure), and when the measured output value of the process parameter exceeds the setpoint, the associated device (e.g., trip unit) changes state. The analytic limits are derived from the limiting values of the process parameters obtained from the safety analysis. The Allowable Values are derived from the analytic limits, corrected for calibration, process, and some of the instrument errors. The trip setpoints are then determined accounting for the remaining instrument errors (e.g., drift). The trip setpoints derived in this manner provide adequate protection because instrumentation uncertainties, process effects, calibration tolerances, instrument drift, and severe environment errors (for channels that must function in harsh environments as defined by 10 CFR 50.49) are accounted for.

The specific Applicable Safety Analysis, LCO, and Applicability discussions are listed below on a Function by Function basis.

INSERT "b"

Turbine Stop Valve Closure, Trip Oil Pressure—Low

Closure of the TSVs and a main turbine trip result in the loss of a heat sink that produces reactor pressure, neutron flux, and heat flux transients that must be limited. Therefore, an EOC-RPT is initiated on TSV Closure, Trip Oil Pressure—Low in anticipation of the transients that would result from closure of these valves. EOC-RPT decreases reactor power and aids the reactor scram in ensuring the MCPR SL is not exceeded during the worst case transient.

Closure of the TSVs is determined by measuring the EHC fluid pressure at each stop valve. There is one pressure transmitter associated with each stop valve, and the signal from each transmitter is assigned to a separate trip channel. The logic for the TSV Closure, Trip Oil Pressure—Low Function is such that two or more TSVs must be closed to produce an EOC-RPT. This Function must be enabled at THERMAL POWER  $\geq$  40% RTP. This is normally accomplished automatically by pressure transmitters sensing turbine

(continued)

BASES

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ACTIONS  
(continued)

channels. As such, a Note has been provided that allows separate Condition entry for each inoperable EOC-RPT instrumentation channel.

A.1 and A.2

With one or more channels inoperable, but with EOC-RPT trip capability maintained (refer to Required Action B.1 Bases), the EOC-RPT System is capable of performing the intended function. However, the reliability and redundancy of the EOC-RPT instrumentation is reduced such that a single failure in the remaining trip system could result in the inability of the EOC-RPT System to perform the intended function. Therefore, only a limited time is allowed to restore compliance with the LCO. Because of the diversity of sensors available to provide trip signals, the low probability of extensive numbers of inoperabilities affecting all diverse Functions, and the low probability of an event requiring the initiation of an EOC-RPT, 72 hours is allowed to restore the inoperable channels (Required Action A.1). Alternately, the inoperable channels may be placed in trip (Required Action A.2) since this would conservatively compensate for the inoperability, restore capability to accommodate a single failure, and allow operation to continue. As noted in Required Action A.2, placing the channel in trip with no further restrictions is not allowed if the inoperable channel is the result of an inoperable breaker, since this may not adequately compensate for the inoperable breaker (e.g., the breaker may be inoperable such that it will not open). If it is not desired to place the channel in trip (e.g., as in the case where placing the inoperable channel in trip would result in an EOC-RPT), or if the inoperable channel is the result of an inoperable breaker, Condition C must be entered and its Required Actions taken.

OR apply  
the EOC-RPT  
inoperable  
MC PR Limit.

B.1 and B.2

Actions B.1 and B.2 are

Required Action B.1 is intended to ensure that appropriate actions are taken if multiple, inoperable, untripped channels within the same Function result in the Function not maintaining EOC-RPT trip capability. A Function is considered to be maintaining EOC-RPT trip capability when

(continued)

and B.2

BASES

ACTIONS

B.1 (continued)

sufficient channels are OPERABLE or in trip, such that the EOC-RPT System will generate a trip signal from the given Function on a valid signal and both recirculation pumps can be tripped from fast speed operation. This requires two channels of the Function, in the same trip system, to be OPERABLE or in trip, and the associated EOC-RPT fast speed breakers to be OPERABLE or in trip.

INSERT C

The 2 hour Completion Time is sufficient for the operator to take corrective action, and takes into account the likelihood of an event requiring actuation of the EOC-RPT instrumentation during this period. It is also consistent with the 2 hour Completion Time provided in LCO 3.2.2, Required Action A:1, since this instrumentation's purpose is to preclude a MCPR violation.

C.1 and C.2

With any Required Action and associated Completion Time not met, THERMAL POWER must be reduced to < 40% RTP within 4 hours. Alternately, the associated recirculation pump fast speed breaker may be removed from service since this performs the intended function of the instrumentation. The allowed Completion Time of 4 hours is reasonable, based on operating experience, to reduce THERMAL POWER to < 40% RTP from full power conditions in an orderly manner and without challenging plant systems.

SURVEILLANCE  
REQUIREMENTS

The Surveillances are modified by a Note to indicate that when a channel is placed in an inoperable status solely for performance of required Surveillances, entry into associated Conditions and Required Actions may be delayed for up to 6 hours, provided the associated Function maintains EOC-RPT trip capability. Upon completion of the Surveillance, or expiration of the 6 hour allowance, the channel must be returned to OPERABLE status or the applicable Condition entered and Required Actions taken. This Note is based on the reliability analysis (Ref. 5) assumption of the average time required to perform channel surveillance. That analysis demonstrated that the 6 hour testing allowance does not significantly reduce the probability that the recirculation pumps will trip when necessary.

(continued)

## **TECHNICAL SPECIFICATION BASES 3.3.4.1 INSERT**

### **INSERT A**

Alternatively, MCPR limits for an inoperable EOC-RPT as specified in the COLR are sufficient to mitigate pressurization transient effects.

### **INSERT B**

Alternately, since this instrumentation protects against a MCPR SL violation with the instrumentation inoperable, modifications to the MCPR limits (LCO 3.2.2) may be applied to allow this LCO to be met. The MCPR penalty for the Condition EOC-RPT inoperable is specified in the COLR.

### **INSERT C**

Alternatively, Required Action B.2 requires the MCPR limit for inoperable EOC-RPT, as specified in the COLR, to be applied. This also restores the margin to MCPR assumed in the safety analysis.

**Clean, Incorporated  
Technical Specification  
Amendment Pages**

3.3 INSTRUMENTATION

3.3.4.1 End of Cycle Recirculation Pump Trip (EOC-RPT) Instrumentation

- LCO 3.3.4.1 a. Two channels per trip system for each EOC-RPT instrumentation Function listed below shall be OPERABLE:
1. Turbine Stop Valve (TSV) Closure, Trip Oil Pressure - Low; and
  2. Turbine Control Valve (TCV) Fast Closure, Trip Oil Pressure - Low.
- OR
- b. LCO 3.2.2, "MINIMUM CRITICAL POWER RATIO (MCPR)," limits for inoperable EOC-RPT as specified in the COLR are made applicable.

APPLICABILITY: THERMAL POWER  $\geq$  40% RTP with any recirculation pump in fast speed.

ACTIONS

-----NOTE-----  
Separate Condition entry is allowed for each channel.  
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CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more required channels inoperable.	A.1 Restore channel to OPERABLE status.  <u>OR</u>	72 hours  (continued)

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. (continued)	<p>A.2 -----NOTE----- Not applicable if inoperable channel is the result of an inoperable breaker. ----- Place channel in trip.</p>	72 hours
<p>B. One or more Functions with EOC-RPT trip capability not maintained.</p> <p><u>AND</u></p> <p>MCPR limit for inoperable EOC-RPT not made applicable.</p>	<p>B.1 Restore EOC-RPT trip capability.</p> <p><u>OR</u></p> <p>B.2 Apply the MCPR Limit for inoperable EOC-RPT as specified in the COLR.</p>	<p>2 hours</p> <p>2 hours</p>
C. Required Action and associated Completion Time not met.	<p>C.1 Remove the associated recirculation pump fast speed breaker from service.</p> <p><u>OR</u></p> <p>C.2 Reduce THERMAL POWER to &lt; 40% RTP.</p>	<p>4 hours</p> <p>4 hours</p>