

Industry/TSTF Standard Technical Specification Change Traveler

Revise Main Turbine Bypass System to address adjustments to APLHGR limits

Classification: 1) Correct Specifications

NUREGs Affected: ☐ 1430 ☐ 1431 ☐ 1432 ☒ 1433 ☒ 1434

Description:

The Main Turbine Bypass System LCO is revised to require the Main Turbine Bypass System to be OPERABLE or the APLHGR and MCPR limits be adjusted.

Justification:

The ISTS requires the Main Turbine Bypass System to be OPERABLE or the MCPR limits for an inoperable Main Turbine Bypass System must be applied. The allowance to apply the MCPR limits for an inoperable Main Turbine Bypass System is included in brackets.

Reviews of the Turbine Bypass Valve Out-Of-Service (TBV-OOS) analysis for Peach Bottom Atomic Power Station Units 2 and 3 and Brunswick Nuclear Power Plant Units 1 and 2 have indicated the need to also apply an APLHGR penalty when the Main Turbine Bypass System is inoperable to ensure thermal margins are maintained. Based on discussions with General Electric representatives, some BWRs that implement the Main Turbine Bypass System Specification and include the allowance to make MCPR limits for an inoperable Main Turbine Bypass System applicable will likely require an APLHGR penalty to also be applied in this condition. Therefore, the ISTS LCO for the Main Turbine Bypass System is modified to require both an APLHGR and MCPR limit to be applied when the Main Turbine Bypass System is inoperable. Commensurate changes to the associated Bases are also proposed.

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Revision History

OG Revision 0

Revision Status: Closed

Revision Proposed by: Brunswick

Revision Description:

Original Issue

Owners Group Review Information

Date Originated by OG: 13-Aug-97

Owners Group Comments
(No Comments)

Owners Group Resolution: Approved Date: 11-Feb-98

TSTF Review Information

TSTF Received Date: 11-Feb-98 Date Distributed for Review

OG Review Completed: ☐ BWOG ☐ WOG ☐ CEOG ☐ BWROG

TSTF Comments:
(No Comments)

TSTF Resolution: Superseded Date:

12/10/98

OG Revision 1**Revision Status: Active****Next Action: NRC**

Revision Proposed by: BWROG

Revision Description:

Brackets were added in BWR/4 LCO Item "A" markup.

Owners Group Review Information

Date Originated by OG: 19-May-98

Owners Group Comments

(No Comments)

Owners Group Resolution: Approved Date: 19-May-98

TSTF Review Information

TSTF Received Date: 10-Aug-98

Date Distributed for Review 12-Oct-98

OG Review Completed: ☒ BWOG ☒ WOG ☒ CEOG ☒ BWROG

TSTF Comments:

BWROG only.

TSTF Resolution: Approved Date: 20-Nov-98

NRC Review Information

NRC Received Date: 15-Dec-98

NRC Comments:

(No Comments)

Final Resolution: NRC Action Pending

Final Resolution Date:

Incorporation Into the NUREGs

File to BBS/LAN Date:

TSTF Informed Date:

TSTF Approved Date:

NUREG Rev Incorporated:

Affected Technical Specifications

S/A 3.7.7 Bases	Main Turbine Bypass System	NUREG(s)- 1433 Only
LCO 3.7.7	Main Turbine Bypass System	NUREG(s)- 1433 Only
LCO 3.7.7 Bases	Main Turbine Bypass System	NUREG(s)- 1433 Only
Appl. 3.7.7 Bases	Main Turbine Bypass System	NUREG(s)- 1433 Only
Action 3.7.7.A Bases	Main Turbine Bypass System	NUREG(s)- 1433 Only
Action 3.7.7.B Bases	Main Turbine Bypass System	NUREG(s)- 1433 Only
S/A 3.7.6 Bases	Main Turbine Bypass System	NUREG(s)- 1434 Only

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LCO 3.7.6	Main Turbine Bypass System	NUREG(s)- 1434 Only
LCO 3.7.6 Bases	Main Turbine Bypass System	NUREG(s)- 1434 Only
Appl. 3.7.6 Bases	Main Turbine Bypass System	NUREG(s)- 1434 Only
Action 3.7.6.A Bases	Main Turbine Bypass System	NUREG(s)- 1434 Only
Action 3.7.6.B Bases	Main Turbine Bypass System	NUREG(s)- 1434 Only

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Main Turbine Bypass System

The following limits are made applicable:
 a. LCO 3.2.1, "AVERAGE PLANAR LINEAR HEAT GENERATION RATE (APLHGR)," limits for an inoperable Main Turbine Bypass System, as specified in the [COLR]; and

3.7 PLANT SYSTEMS

3.7.7 The Main Turbine Bypass System

LCO 3.7.7 The Main Turbine Bypass System shall be OPERABLE.

OR

b. LCO 3.2.2, "MINIMUM CRITICAL POWER RATIO (MCPR)," limits for an inoperable Main Turbine Bypass System, as specified in the [COLR], are made applicable.

APPLICABILITY: THERMAL POWER \geq 25% RTP.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. [Requirements of the LCO not met or Main Turbine Bypass System inoperable.]	A.1 [Satisfy the requirements of the LCO or restore Main Turbine Bypass System to OPERABLE status.]	2 hours
B. Required Action and associated Completion Time not met.	B.1 Reduce THERMAL POWER to < 25% RTP.	4 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
SR 3.7.7.1 Verify one complete cycle of each main turbine bypass valve.	31 days

(continued)

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B 3.7 PLANT SYSTEMS

B 3.7.7 Main Turbine Bypass System

BASES

BACKGROUND

The Main Turbine Bypass System is designed to control steam pressure when reactor steam generation exceeds turbine requirements during unit startup, sudden load reduction, and cooldown. It allows excess steam flow from the reactor to the condenser without going through the turbine. The bypass capacity of the system is [25]% of the Nuclear Steam Supply System rated steam flow. Sudden load reductions within the capacity of the steam bypass can be accommodated without reactor scram. The Main Turbine Bypass System consists of three valves connected to the main steam lines between the main steam isolation valves and the turbine stop valve bypass valve chest. Each of these three valves is operated by hydraulic cylinders. The bypass valves are controlled by the pressure regulation function of the Turbine Electro Hydraulic Control System, as discussed in the FSAR, Section [7.7.4] (Ref. 1). The bypass valves are normally closed, and the pressure regulator controls the turbine control valves that direct all steam flow to the turbine. If the speed governor or the load limiter restricts steam flow to the turbine, the pressure regulator controls the system pressure by opening the bypass valves. When the bypass valves open, the steam flows from the bypass chest, through connecting piping, to the pressure breakdown assemblies, where a series of orifices are used to further reduce the steam pressure before the steam enters the condenser.

APPLICABLE SAFETY ANALYSES

The Main Turbine Bypass System is assumed to function during the turbine generator load rejection transient, as discussed in the FSAR, Section [15.1.1] (Ref. 2). Opening the bypass valves during the pressurization event mitigates the increase in reactor vessel pressure, which affects the MCPR during the event. An inoperable Main Turbine Bypass System may result in ~~an MCPR penalty~~ *penalties*.

(APLHGR and)
The Main Turbine Bypass System satisfies Criterion 3 of the NRC Policy Statement.

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BASES (continued)

LCO

APLHGR limits
(LCO 3.2.1, "AVERAGE
PLANAR LINEAR HEAT
GENERATION RATE
(APLHGR)") and the

The Main Turbine Bypass System is required to be OPERABLE to limit peak pressure in the main steam lines and maintain reactor pressure within acceptable limits during events that cause rapid pressurization, so that the Safety Limit MCPR is not exceeded. [With the Main Turbine Bypass System inoperable, modifications to the MCPR limits (LCO 3.2.2, "MINIMUM CRITICAL POWER RATIO (MCPR)") may be applied to allow this LCO to be met.] The MCPR limits for the inoperable Main Turbine Bypass System are specified in the COLR. An OPERABLE Main Turbine Bypass System requires the bypass valves to open in response to increasing main steam line pressure. This response is within the assumptions of the applicable analysis (Ref. 2).

APLHGR
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APPLICABILITY

The Main Turbine Bypass System is required to be OPERABLE at $\geq 25\%$ RTP to ensure that the fuel cladding integrity Safety Limit and the cladding 1% plastic strain limit are not violated during the turbine generator load rejection transient. As discussed in the Bases for LCO 3.2.1, "AVERAGE PLANAR LINEAR HEAT GENERATION RATE (APLHGR)", and LCO 3.2.2, sufficient margin to these limits exists at $< 25\%$ RTP. Therefore, these requirements are only necessary when operating at or above this power level.

ACTIONS

A.1

If the Main Turbine Bypass System is inoperable (one or more bypass valves inoperable), or the MCPR limits for an inoperable Main Turbine Bypass System, as specified in the COLR, are not applied, the assumptions of the design basis transient analysis may not be met. Under such circumstances, prompt action should be taken to restore the Main Turbine Bypass System to OPERABLE status or adjust the MCPR limits accordingly. The 2 hour Completion Time is reasonable, based on the time to complete the Required Action and the low probability of an event occurring during this period requiring the Main Turbine Bypass System.

APLHGR and

APLHGR and

(continued)

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BASES

ACTIONS
(continued)

B.1

APLHGR and

If the Main Turbine Bypass System cannot be restored to OPERABLE status or the MCPR limits for an inoperable Main Turbine Bypass System are not applied, THERMAL POWER must be reduced to < 25% RTP. As discussed in the Applicability section, operation at < 25% RTP results in sufficient margin to the required limits, and the Main Turbine Bypass System is not required to protect fuel integrity during the turbine generator load rejection transient. The 4 hour Completion Time is reasonable, based on operating experience, to reach the required unit conditions from full power conditions in an orderly manner and without challenging unit systems.

SURVEILLANCE
REQUIREMENTS

SR 3.7.7.1

Cycling each main turbine bypass valve through one complete cycle of full travel demonstrates that the valves are mechanically OPERABLE and will function when required. The 31 day Frequency is based on engineering judgment, is consistent with the procedural controls governing valve operation, and ensures correct valve positions. Operating experience has shown that these components usually pass the SR when performed at the 31 day Frequency. Therefore, the Frequency is acceptable from a reliability standpoint.

SR 3.7.7.2

The Main Turbine Bypass System is required to actuate automatically to perform its design function. This SR demonstrates that, with the required system initiation signals, the valves will actuate to their required position. The [18] month Frequency is based on the need to perform this Surveillance under the conditions that apply during a unit outage and because of the potential for an unplanned transient if the Surveillance were performed with the reactor at power. Operating experience has shown the [18] month Frequency, which is based on the refueling cycle, is acceptable from a reliability standpoint.

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3.7 PLANT SYSTEMS

3.7.6 Main Turbine Bypass System

LCO 3.7.6 The Main Turbine Bypass System shall be OPERABLE.

The following limits are made applicable:
a. LCO 3.2.1, "AVERAGE PLANTER LINEAR HEAT GENERATION RATE (APLHGR)," limits for an inoperable Main Turbine Bypass System, as specified in the [COLR]; and

OR

b. LCO 3.2.2, "MINIMUM CRITICAL POWER RATIO (MCPR)," limits for an inoperable Main Turbine Bypass System, as specified in the [COLR], are made applicable.

APPLICABILITY: THERMAL POWER \geq 25% RTP.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. [Requirements of the LCO not met or Main Turbine Bypass System inoperable.]	A.1 [Satisfy the requirements of the LCO or restore Main Turbine Bypass System to OPERABLE status.]	2 hours
B. Required Action and associated Completion Time not met.	B.1 Reduce THERMAL POWER to < 25% RTP.	4 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
SR 3.7.6.1 Verify one complete cycle of each main turbine bypass valve.	31 days

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B 3.7 PLANT SYSTEMS

B 3.7.6 Main Turbine Bypass System

BASES

BACKGROUND

The Main Turbine Bypass System is designed to control steam pressure when reactor steam generation exceeds turbine requirements during unit startup, sudden load reduction, and cooldown. It allows excess steam flow from the reactor to the condenser without going through the turbine. The bypass capacity of the system is [35]% of the Nuclear Steam Supply System rated steam flow. Sudden load reductions within the capacity of the steam bypass can be accommodated without reactor scram. The Main Turbine Bypass System consists of a two valve chest connected to the main steam lines between the main steam isolation valves and the turbine stop valves. Each of these valves is sequentially operated by hydraulic cylinders. The bypass valves are controlled by the pressure regulation function of the Turbine Electro Hydraulic Control System, as discussed in the FSAR, Section [7.7.1.5] (Ref. 1). The bypass valves are normally closed, and the pressure regulator controls the turbine control valves, directing all steam flow to the turbine. If the speed governor or the load limiter restricts steam flow to the turbine, the pressure regulator controls the system pressure by opening the bypass valves. When the bypass valves open, the steam flows from the bypass chest, through connecting piping, to the pressure breakdown assemblies, where a series of orifices are used to further reduce the steam pressure before the steam enters the condenser.

APPLICABLE SAFETY ANALYSES

The Main Turbine Bypass System is assumed to function during the design basis feedwater controller failure, maximum demand event, described in the FSAR, Section [15.1.2] (Ref. 2). Opening the bypass valves during the pressurization event mitigates the increase in reactor vessel pressure, which affects the MCPR during the event. An inoperable Main Turbine Bypass System may result in an MCPR ~~penalty~~ penalties.

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The Main Turbine Bypass System satisfies Criterion 3 of the NRC Policy Statement.

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BASES (continued)

LCO

APLHGR limits
(LCO 3.2.1, "AVERAGE
PLANAR LINEAR HEAT
GENERATION RATE
(APLHGR)") and the

The Main Turbine Bypass System is required to be OPERABLE to limit peak pressure in the main steam lines and maintain reactor pressure within acceptable limits during events that cause rapid pressurization, such that the Safety Limit MCPR is not exceeded. [With the Main Turbine Bypass System inoperable, modifications to the MCPR limits (LCO 3.2.2, "MINIMUM CRITICAL POWER RATIO (MCPR)") may be applied to allow continued operation.]

An OPERABLE Main Turbine Bypass System requires the bypass valves to open in response to increasing main steam line pressure. This response is within the assumptions of the applicable analysis (Ref. 2). The MCPR limit for the inoperable Main Turbine Bypass System is specified in the COLR.

APLHGR and

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APPLICABILITY

The Main Turbine Bypass System is required to be OPERABLE at $\geq 25\%$ RTP to ensure that the fuel cladding integrity Safety Limit and the cladding 1% plastic strain limit are not violated during the feedwater controller failure, maximum demand event. As discussed in the Bases for LCO 3.2.1, ~~"AVERAGE PLANAR LINEAR HEAT GENERATION RATE (APLHGR)"~~ and LCO 3.2.2, sufficient margin to these limits exists $< 25\%$ RTP. Therefore, these requirements are only necessary when operating at or above this power level.

ACTIONS

A.1

If the Main Turbine Bypass System is inoperable (one or more bypass valves inoperable), or the MCPR limits for an inoperable Main Turbine Bypass System, as specified in the COLR, are not applied, the assumptions of the design basis transient analysis may not be met. Under such circumstances, prompt action should be taken to restore the Main Turbine Bypass System to OPERABLE status or adjust the MCPR limits accordingly. The 2 hour Completion Time is reasonable, based on the time to complete the Required Action and the low probability of an event occurring during this period requiring the Main Turbine Bypass System.

APLHGR and

APLHGR and

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BASES

ACTIONS
(continued)

B.1

APLHGR and

If the Main Turbine Bypass System cannot be restored to OPERABLE status or the MCPR limits for an inoperable Main Turbine Bypass System are not applied, THERMAL POWER must be reduced to < 25% RTP. As discussed in the Applicability section, operation at < 25% RTP results in sufficient margin to the required limits, and the Main Turbine Bypass System is not required to protect fuel integrity during the feedwater controller failure, maximum demand event. The 4 hour Completion Time is reasonable, based on operating experience, to reach the required unit conditions from full power conditions in an orderly manner and without challenging unit systems.

SURVEILLANCE
REQUIREMENTS

SR 3.7.6.1

Cycling each main turbine bypass valve through one complete cycle of full travel demonstrates that the valves are mechanically OPERABLE and will function when required. The 31 day Frequency is based on engineering judgment, is consistent with the procedural controls governing valve operation, and ensures correct valve positions. Therefore, the Frequency is acceptable from a reliability standpoint.

SR 3.7.6.2

The Main Turbine Bypass System is required to actuate automatically to perform its design function. This SR demonstrates that, with the required system initiation signals, the valves will actuate to their required position. The [18] month Frequency is based on the need to perform this Surveillance under the conditions that apply during a unit outage and because of the potential for an unplanned transient if the Surveillance were performed with the reactor at power. Operating experience has shown the [18] month Frequency, which is based on the refueling cycle, is acceptable from a reliability standpoint.

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