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THE FOLLOWING CHANGES HAVE OCCURRED TO THE HARDCOPY OR ELECTRONIC MANUAL ASSIGNED TO YOU:

TSB2 - TECHNICAL SPECIFICATIONS BASES UNIT 2 MANUAL

REMOVE MANUAL TABLE OF CONTENTS DATE: 01/03/2005

ADD MANUAL TABLE OF CONTENTS DATE: 01/17/2005

ADMIN CHANGE ONLY!

NO UPDATE INCLUDED FOR TEXT 3.3.1.3

CATEGORY: DOCUMENTS TYPE: TSB2
ID: TEXT 3.3.1.3
ADD: REV: 0

CATEGORY: DOCUMENTS TYPE: TSB2
ID: TEXT 3.7.6
REMOVE: REV:0

ADD: REV: 1

CATEGORY: DOCUMENTS TYPE: TSB2
ID: TEXT LOES
REMOVE: REV:52

ADD: REV: 53

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A001

Manual Name: TSB2

Manual Title: TECHNICAL SPECIFICATIONS BASES UNIT 2 MANUAL

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TSB2 LOES
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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 full bypass capacity of the system is approximately 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 five valves connected to the main steam lines between the main steam isolation valves and the turbine stop valve bypass valve chest. Each of these five 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 7.7.1.5 (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 has two modes of operation. A fast opening mode is assumed to function during the turbine generator load rejection, turbine trip, and feedwater controller failure transients as discussed in FSAR Sections 15.2.2, 15.2.3, and 15.1.2 (Refs. 2, 3, and 4). A pressure regulation mode is assumed to function during the control rod withdrawal error and recirculation flow controller failure transients as discussed in FSAR Sections 15.4.2 and 15.4.5 (Refs. 5 and 6). Both modes of operation are assumed to function for all bypass valves assumed in the applicable safety analyses. Opening the bypass valves during the above transients mitigates the increase in reactor vessel pressure, which affects both MCPR and LHGR during the event. An inoperable Main Turbine Bypass System may result in a MCPR and / or LHGR penalty.

The Main Turbine Bypass System satisfies Criterion 3 of the NRC Policy Statement. (Ref. 7)

(continued)

BASES (continued)

LCO

The Main Turbine Bypass System fast opening and pressure regulation modes are required to be OPERABLE to limit the pressure increase in the main steam lines and reactor pressure vessel during transients that cause a pressurization so that the Safety Limit MCPR and LHGR are not exceeded. With the Main Turbine Bypass System inoperable, modifications to the MCPR limits (LCO 3.2.2, "MINIMUM CRITICAL POWER RATIO (MCPR)") and LHGR limits (LCO 3.2.3, "LINEAR HEAT GENERATION RATE (LHGR)") may be applied to allow this LCO to be met. The MCPR and LHGR 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. Licensing analyses credit an OPERABLE Main Turbine Bypass System as having both the bypass valve fast opening mode and pressure regulation mode. The fast opening mode is required for transients initiated by a turbine control valve or turbine stop valve closure. The pressure regulation mode is required for transients where the power increase exceeds the capability of the turbine control valves.

The cycle specific safety analyses assume a certain number of OPERABLE main turbine bypass valves as an input (i.e., one through five). Therefore, the Main Turbine Bypass System is considered OPERABLE when the number of OPERABLE bypass valves is greater than or equal to the number assumed in the safety analyses. The number of bypass valves assumed in the safety analyses is specified in the COLR. This response is within the assumptions of the applicable analysis (Refs. 2 – 6).

APPLICABILITY

The Main Turbine Bypass System is required to be OPERABLE at $\geq$ 25% RTP to ensure that the fuel cladding integrity Safety Limit is not violated during all applicable transients. As discussed in the Bases for LCOs 3.2.2 and 3.2.3, 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 and the MCPR and LHGR 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.

(continued)

BASES

ACTIONS

A.1 (continued)

Under such circumstances, prompt action should be taken to restore the Main Turbine Bypass System to OPERABLE status or adjust the MCPR and LHGR 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.

B.1

If the Main Turbine Bypass System cannot be restored to OPERABLE status or the MCPR and LHGR 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 applicable transients. 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 required main turbine bypass valve through one complete cycle of full travel (including the fast opening feature) 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 3.7.6.2

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 (simulate automatic actuation), the valves will actuate to their required position. The 24 month Frequency is based on the need to

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.7.6.2 (continued)

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 24-month Frequency, which is based on the refueling cycle, is acceptable from a reliability standpoint.

SR 3.7.6.3

This SR ensures that the TURBINE BYPASS SYSTEM RESPONSE TIME is in compliance with the assumptions of the appropriate safety analysis. The response time limits are specified in unit specific documentation. The 24-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 24-month Frequency, which is based on the refueling cycle, is acceptable from a reliability standpoint.

REFERENCES

1. FSAR, Section 7.7.1.5.
2. FSAR, Section 15.2.2.
3. FSAR, Section 15.2.3
4. FSAR, Section 15.1.2
5. FSAR, Section 15.4.2
6. FSAR, Section 15.4.5
7. Final Policy Statement on Technical Specifications Improvements, July 22, 1993 (58 FR 39132).