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TSB2 - TECHNICAL SPECIFICATIONS BASES UNIT 2 MANUAL

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A001
NRK

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REMOVE: REV:2

ADD: REV: 3

CATEGORY: DOCUMENTS TYPE: TSB2
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SSES MANUAL

Manual Name: TSB2

Manual Title: TECHNICAL SPECIFICATIONS BASES UNIT 2 MANUAL

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SUSQUEHANNA STEAM ELECTRIC STATION
LIST OF EFFECTIVE SECTIONS (TECHNICAL SPECIFICATIONS BASES)

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B 3.4 REACTOR COOLANT SYSTEM (RCS)

B 3.4.3 Safety/Relief Valves (S/RVs)

BASES

BACKGROUND The ASME Boiler and Pressure Vessel Code requires the reactor pressure vessel be protected from overpressure during upset conditions by self-actuated safety valves. As part of the nuclear pressure relief system, the size and number of S/RVs are selected such that peak pressure in the nuclear system will not exceed the ASME Code limits for the reactor coolant pressure boundary (RCPB).

The S/RVs are located on the main steam lines between the reactor vessel and the first isolation valve within the drywell. There are a total of 16 S/RVs of which any 14 are required to be OPERABLE. The S/RVs can actuate by either of two modes: the safety mode or the relief mode. In the safety mode (or spring mode of operation), the valve opens when steam pressure at the valve inlet overcomes the spring force holding the valve closed. This satisfies the Code requirement.

Each S/RV discharges steam through a discharge line to a point below the minimum water level in the suppression pool. Six S/RVs also serve as the Automatic Depressurization System (ADS) valves. The ADS requirements are specified in LCO 3.5.1, "ECCS-Operating."

**APPLICABLE
SAFETY
ANALYSES**

The overpressure protection system must accommodate the most severe pressurization transient. Evaluations have determined that the most severe transient is the closure of all main steam isolation valves (MSIVs), followed by reactor scram on high neutron flux (i.e., failure of the direct scram associated with MSIV position) (Ref. 1). For the purpose of the analyses, 14 of the 16 S/RVs are assumed to operate in the safety mode. The analysis results demonstrate that the design S/RV capacity is capable of maintaining reactor pressure below the ASME Code limit of 110% of vessel design pressure (110% x 1250 psig = 1375 psig). This LCO helps to ensure that the acceptance limit of 1375 psig is met during the Design Basis Event.

(continued)

BASES

APPLICABLE
SAFETY
ANALYSES
(continued)

From an overpressure standpoint, the design basis events are bounded by the MSIV closure with flux scram event described above. Reference 2 discusses additional events that are expected to actuate the S/RVs.

S/RVs satisfy Criterion 3 of the NRC Policy Statement (Ref. 4).

LCO

The safety function of 14 of the 16 S/RVs are required to be OPERABLE to satisfy the assumptions of the safety analysis (Refs. 1 and 2). The requirements of this LCO are applicable only to the capability of the S/RVs to mechanically open to relieve excess pressure when the lift setpoint is exceeded (safety function).

The S/RV setpoints are established to ensure that the ASME Code limit on peak reactor pressure is satisfied. The ASME Code specifications require the lowest safety valve setpoint to be at or below vessel design pressure (1250 psig) and the highest safety valve to be set so that the total accumulated pressure does not exceed 110% of the design pressure for overpressurization conditions. The transient evaluations in the FSAR are based on these setpoints, but also include the additional uncertainty of + 3%, - 5 % of the nominal setpoint to provide an added degree of conservatism.

Operation with fewer valves OPERABLE than specified, or with setpoints outside the ASME limits, could result in a more severe reactor response to a transient than predicted, possibly resulting in the ASME Code limit on reactor pressure being exceeded.

APPLICABILITY

In MODES 1, 2, and 3, all required S/RVs must be OPERABLE, since considerable energy may be in the reactor core and the limiting design basis transients are assumed to occur in these MODES. The S/RVs may be required to provide pressure relief to discharge energy from the core until such time that the Residual Heat Removal (RHR) System is capable of dissipating the core heat.

In MODE 4 reactor pressure is low enough that the overpressure limit is unlikely to be approached by assumed

(continued)

BASES

APPLICABILITY (continued) operational transients or accidents. In MODE 5, the reactor vessel head is unbolted or removed and the reactor is at atmospheric pressure. The S/RV function is not needed during these conditions.

ACTIONS A.1 and A.2

With less than the minimum number of required S/RVs OPERABLE, a transient may result in the violation of the ASME Code limit on reactor pressure. If the safety function of one or more required S/RVs is inoperable, the plant must be brought to a MODE in which the LCO does not apply. To achieve this status, the plant must be brought to MODE 3 within 12 hours and to MODE 4 within 36 hours. The allowed Completion Times are reasonable, based on operating experience, to reach required plant conditions from full power conditions in an orderly manner and without challenging plant systems.

SURVEILLANCE REQUIREMENT SR 3.4.3.1

The Surveillance requires that the required S/RVs will open at the pressures assumed in the safety analysis of Reference 1. The demonstration of the S/RV safe lift settings must be performed during shutdown, since this is a bench test, to be done in accordance with the Inservice Testing Program. The lift setting pressure shall correspond to ambient conditions of the valves at nominal operating temperatures and pressures. The S/RV setpoint is + 3%, - 5% of the nominal setpoint for OPERABILITY. Requirements for accelerated testing are established in accordance with the Inservice Test Program. Any of the 16 S/RVs, identified in this Surveillance Requirement, with their associated setpoints, can be designated as the 14 required S/RVs. This maintains the assumptions in the overpressure analysis.

A Note is provided to allow up to two of the required 14 S/RVs to be physically replaced with S/RVs with lower setpoints until the next refueling outage. This provides operational flexibility which maintains the assumptions in the over-pressure analysis.

(continued)

BASES

SURVEILLANCE
REQUIREMENTS SR 3.4.3.1 (continued)

The Frequency of this Surveillance is established in accordance with the Inservice Testing Program.

REFERENCES

1. FSAR, Section 5.2.2.1.4.
 2. FSAR, Section 15.
 3. ASME Operation and Maintenance Code.
 4. Final Policy Statement on Technical Specifications Improvements, July 22, 1993 (58 FR 39132).
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