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REACTOR COOLANT SYSTEM

OVERPRESSURE PROTECTION SYSTEMS

LIMITING CONDITION FOR OPERATION

3.4.9.3 At least one of the following Overpressure Protection Systems shall be OPERABLE:

INSERT 1 -

- a. Two power-operated relief valves (PORVs) with lift settings which do not exceed the limit established in Figure 3.4-4, or
- b. The Reactor Coolant System (RCS) depressurized with an RCS vent of greater than or equal to 2.0 square inches.

APPLICABILITY: MODES 4 and 5, and MODE 6 when the head is on the reactor vessel.

INSERT2

- With one PORV inoperable in MODE 4, restore the inoperable PORV to
 OPERABLE status within 7 days or depressurize and vent the RCS through at least a 2.0 square inch vent within the next 8 hours.
- b. With one PORV inoperable in MODES 5 or 6 with the head on the reactor d. vessel, restore the inoperable PORV to OPERABLE status within 24 hours, or complete depressurization and venting of the RCS through at least a 2 square inch vent within the next 8 hours.
- e. With both PORVs inoperable, depressurize and vent the RCS through e. at least a 2.0 square inch vent within 8 hours.

d. In the event either the PORVs or the RCS vent(s) are used to mitigate an RCS pressure transient, a Special Report shall be prepared and submitted to the Commission pursuant to Specification 6.9.2 within 30 days. The report shall describe the circumstances initiating the transient, the effect of the PORVs or RCS vent(s) on the transient, and any corrective action necessary to prevent recurrence.

- F. The provisions of Specification 3.0.4 are not applicable.
- 3. This ACTION may be suspended for up to 7 days to allow functional testing to verify PORV operability. During this test period, operation of systems or components which could result in an RCS mass or temperature increase will be administratively controlled. During the ASME stroke testing of two inoperable PORVs, cold overpressurization mitigation will be provided by two RHR discharge relief valves associated with two OPERABLE and operating RHR loops which have the auto closure interlock bypassed [or deleted]. If one PORV is inoparable, cold overpressure mitigation will be provided by the OPERABLE PORV and one RHR discharge relief valve associated with an OPERABLE and operating RHR loop which has the auto closure interlock bypassed [or deleted].

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FIGURE 3.4-4

NOMINAL MAXIMUM ALLOWABLE PORV SETPOINT FOR THE COLD OVERPRESSURE SYSTEM

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MAXIMUM ALLOWABLE PORV SETPOINT



REPLACEMENT DRAWING FOR FIGURE 3.4-4 ON PAGE 3/4 4-37

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REACTOR COOLANT SYSTEM

* * *

OVERPRESSURE PROTECTION SYSTEMS

SURVEILLANCE REQUIREMENTS

4.4.9.3.1 Each PORV shall be demonstrated OPERABLE by:

- a. Performance of an ANALOG CHANNEL OPERATIONAL TEST on the PORV actuation channel, but excluding valve operation, within 31 days prior to entering a condition in which the PORV is required OPERABLE and at least once per 31 days thereafter when the PORV is required OPERABLE:
- Performance of a CHANNEL CALIBRATION on the PORV actuation channel 5. at least once per 18 months; and
- Verifying the PORV block valve is open at least once per 72 hours C. when the PORV is being used for overpressure protection.

4.4.9.3.2 The RCS vent(s) shall be verified to be open at least once per 12 hours' when the vent(s) is being used for overpressure protection.

4.4.9.3.3 The positive displacement pump shall be demonstrated inoperable at least once per 31 days, except when the reactor vessel head is removed 2 or when both centrifugal charging pumps are inoperable and secured, by verifying that the motor circuit breakers are secured in the open position.***

INSERT 3

INSERT 4 -

INSERT 5-

SPECIFICATION NOTATIONS

Except when the vent pathway is provided with a valve which is locked, sealed, "or otherwise secured in the open position, then verify these valves open at least once per 31 days. The provisions of 3.0.4 and 4.0.4 are not applicable for entry into MODE 4

from MODE 3, for the positive displacement pump declared inoperable pursuant INSERT6 to Specification 4.4.9.3.3 provided that the positive displacement pump is - INSERT 7 declared [INOPERABLE] within 4 hours after entry into MODE 4 from MODE 3 or CASE

prior to the temperature of one or more of the RCS cold legs decreasing 2. below 325°F, whichever comes first. The positive displacement pump may be energized for testing provided the

INSERT 8 discharge of the pump has been isolated from the RCS by a closed isolation valve with power removed from the valve operator, or by a manual isolation valve secured in the closed position. +

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ATTACHMENT 5

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TECHNICAL SPECIFICATION

BASES

MARKED-UP PAGES

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REACTOR COOLANT SYSTEM

BASES

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PRESSURE/TEMPERATURE LIMITS (Continued)

increase with increasing heatup rate, a lower bound curve cannot be defined. Rather, each heatup rate of interest must be analyzed on an individual basis.

Following the generation of pressure-temperature curves for both the steady-state and finite heatup rate situations, the final limit curves are produced as follows. A composite curve is constructed based on a point-bypoint comparison of the steady-state and finite heatup rate data. At any given temperature, the allowable pressure is taken to be the lesser of the three values taken from the curves under consideration.

The use of the composite curve is necessary to set conservative heatup limitations because it is possible for conditions to exist such that over the course of the heatup ramp the controlling condition switches from the inside to the outside and the pressure limit must at all times be based on analysis of the most critical criterion.

Finally, the composite curves for the heatup rate data and the cooldown rate data are adjusted for possible errors in the pressure and temperature sensing instruments by the values indicated on the respective curves.

Although the pressurizer operates in temperature ranges above those for which there is reason for concern of nonductile failure, operating limits are provided to assure compatibility of operation with the fatigue analysis performed in accordance with the ASME Code requirements.

LOW TEMPERATURE OVERPRESSURE PROTECTION

The OPERABILITY of two PORVs or an RCS vent opening of at least 2.0 square inches ensures that the RCS will be protected from pressure transients which could exceed the limits of Appendix G to 10 CFR Part 50 when one or more of the RCS cold legs are less than or equal to 350°F. Either PORV has adequate relieving capability to protect the RCS from overpressurization when the transient is limited to either: (1) the start of an idle RCP with the secondary water temperature of the steam generator less than or equal to 50°F above the RCS cold leg temperatures, or (2) the maximum credible mass injection flow rate due to the startup of a single HHSI pump plus 100 gpm net charging flow, while the RCS is in a water solid condition and the RCS temperature is between 350°F and 200°F.

For RCS temperatures less than 200°F, the maximum overpressure event consists of operating a centrifugal charging pump with complete termination of letdown and a failure of the charging flow control valve to the full flow condition.

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REACTOR COOLANT SYSTEM

BASES

LOW TEMPERATURE OVERPRESSURE PROTECTION (Continued)

The design mass input transient in MODE 4 assumes that, with failure of one PORV to open, a safety injection signal will start one High Head Safety Injection pump. The normal charging and letdown flow paths would be isolated by a containment isolation phase "A" signal, but a Reactor Coolant Pump seal flow rate of 100 gpm would be maintained (normal seal flow is 20 gpm). The capacity of each PORV is sufficient to discharge the combined High Head Safety Injection and Reactor Coolant Pump seal flow rate at RCS pressure below the present maximum allowable PORV setpoint pressure for 200°F. In MODE 5, the mass input transient assumes the operation of one Centrifugal Charging Pump (CCP) with letdown isolated and the charging flow control valve full open. In each case the letdown is isolated allowing only the path through the RCP seals with a maximum CCP flow of 100 gpm. Whether one or both CCPs are lined up to the RCP seal flow path, the credible flow through the RCP seals can only be 20 gpm with letdown isolated unless a seal failure occurs. Therefore, by positioning the charging isolation valve closed during a pump testing or switching process, assurance is provided that a mass additional pressure transient, which exceeds the relief capacity of a single PORV, will not occur.

The Maximum Allowed PORV Setpoint for the Cold Overpressure Mitigation System (COMS) is derived by analysis which models the performance of the COMS assuming various mass input and heat input transients. Operation with a PORV Setpoint less than or equal to the maximum Setpoint ensures that Appendix G criteria will not be violated with consideration for a maximum pressure

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REACTOR COOLANT SYSTEM

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BASES

LOW TEMPERATURE OVERPRESSURE PROTECTION (Continued)

overshoot beyond the PORV Setpoint which can occur as a result of time delays in signals processing and valve opening, instrument uncertainties, and single failure. To ensure that mass and heat input transients more severe than those assumed cannot occur. Technical Specifications require lockout of all high head safety injection pumps while in MODE 5 and MODE 6 with the reactor vessel head on. All but one high head safety injection pump are required to be locked out in MODE 4. Technical Specifications also require lockout of the positive displacement pump and all but one charging pump while in MODES 4, 5, and 6 with the reactor vessel head installed and disallow start of an RCP if secondary temperature is more than 50°F above primary temperature.

Administrative controls and two RHR relief valves will be used to provide cold overpressure protection (COMS) during the ASME stroke testing of two administratively declared inoperable PORVs. During the performance of the PORV function test, two RHR trains will be OPERABLE and in operation with the auto closure interlock bypasses (or deleted) to provide COMS.

With one PORV inoperable, COMS will be provided during the ASME test by the OPERABLE PORV and one RHR relief valve associated with an OPERABLE and operating RHR train which has the auto closure interlock bypassed (or deleted). Each RHR relief valve provides sufficient capacity to relieve the flow resulting from the maximum charging flow with concurrent loss of letdown. Analysis conservatively demonstrates that the RHR relief valves limit RCS pressure to approximately 590 psig.

Therefore two OPERABLE and operating RHR trains <u>or</u> one OPERABLE PORV and one OPERABLE and operating RHR train will provide adequate and redundant overpressure protection. Use of the RHR relief valves will maintain the RCS pressure below the low temperature limits of ASME Section III, Appendix G.

With regard to the MODE 6 applicability of this Technical Specification. the statement "with the head on the reactor vessel" means any time the head is installed with or without tensioning the RPV studs.

The Maximum Allowed PORV Setpoint for the COMS will be updated based on the results of examinations of reactor vessel material irradiation surveillance specimens performed as required by 10 CFR Part 50, Appendix H.

3/4.4.10 STRUCTURAL INTEGRITY - BASES

The inservice inspection and testing programs for ASME Code Class 1. 2. and 3 components ensure that the structural integrity and operational readiness of these components will be maintained at an acceptable level

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ATTACHMENT 6

TECHNICAL SPECIFICATION

RECONSTITUTED PAGES

[Note: These pages represent the Technical Specification with amendments incorporated, and are provided for the reviewer's convenience.]

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REACTOR COOLANT SYSTEM OVERPRESSURE PROTECTION SYSTEMS LIMITING CONDITION FOR OPERATION

- An Overpressure Protection System shall be OPERABLE with a maximum of 3.4.9.3 one centrifugal charging pump capable of injecting into the RCS and the emergency core cooling system (ECCS) accumulators isolated and either a. or b. below:
 - Two power-operated relief valves (PORVs) with lift settings a. which do not exceed the limit established in Figure 3.4-4, or
 - b. The Reactor Coolant System (RCS) depressurized with an RCS vent of greater than or equal to 2.0 square inches.
- APPLICABILITY: MODES 4 and 5, and MODE 6 when the head is on the reactor vessel1.

ACTION:

- a. With one or more ECCS accumulators not isolated, isolate the ECCS accumulator(s) within 1 hour.
- b. With more than one centrifugal charging pump capable of injecting into the RCS, immediately initiate action to render all but one centrifugal charging pump incapable of injecting into the RCS^2 .
- c. With one PORV inoperable in MODE 4, restore the inoperable PORV to OPERABLE status within ? days or depressurize and vent the RCS through at least a 2.0 square inch vent within the next 8 hours.
- d. With one PORV inoperable in MODES 5 or 6 with the head on the reactor vessel, restore the inoperable PORV to OPERABLE status within 24 hours, or complete depressurization and venting of the RCS through at least a 2.0 square inch vent within the next 8 hours3.
- e. With both PORVs inoperable, depressurize and vent the RCS through at least a 2.0 square inch vent within 8 hours3.
- f. In the event either the PORVs or the RCS vent(s) are used to mitigate an RCS pressure transient, a Special Report shall be prepared and submitted to the Commission pursuant to Specification 6.9.2 within 30 days. The report shall describe the circumstances initiating the transient, the effect of the PORVs or RCS vent(s) on the transient, and any corrective action necessary to prevent recurrence.
- g. The provisions of Specification 3.0.4 are not applicable.

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FIGURE 3.4-4

NOMINAL MAXIMUM ALLOWABLE PORV SETPOINT FOR THE COLD OVERPRESSURE SYSTEM

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REACTOR COOLANT SYSTEM OVERPRESSURE PROTECTION SYSTEMS SURVEILLANCE REQUIREMENTS

4.4.9.3.1 Each PORV shall be demonstrated OPERABLE by:

- a. Performance of an ANALOG CHANNEL OPERATIONAL TEST on the PORV actuation channel, but excluding valve operation, within 31 days prior to entering a condition in which the PORV is required OPERABLE and at least once per 31 days thereafter when the PORV is required OPERABLE;
- b. Performance of a CHANNEL CALIBRATION on the PORV actuation channel at least once per 18 months; and
- c. Verifying the PORV block valve is open at least once per 72 hours when the PORV is being used for overpressure protection.
- 4.4.9.3.2 The RCS vent(s) shall be verified to be open at least once per 12 hours⁴ when the vent(s) is being used for overpressure protection.
- 4.4.9.3.3 The positive displacement pump shall be demonstrated inoperable⁵ at least once per 31 days, except when the reactor vessel head is removed or when both centrifugal charging pumps are inoperable and secured, by verifying that the motor circuit breakers are secured in the open position.²
- 4.4.9.3.4 Verify at least once every 31 days that only one centrifugal charging pump is capable of injecting into the RCS², except when the reactor vessel head is removed, by verifying that the motor circuit breakers are secured in the open position.²
- 4.4.9.3.5 Verify at least once every 12 hours that each ECCS accumulator is isolated.

SPECIFICATION NOTATIONS

- ² An inoperable centrifugal charging pump(s) and/or positive displacement charging pump may be energized for testing or pump switching provided the discharge of the pump(s) has been isolated from the RCS by a closed isolation valve with power removed from the valve operator, or by a manual isolation valve secured in the closed position. Reactor coolant pump seal injection flow may be maintained during the RCS isolation process.
- ³ This ACTION may be suspended for up to 7 days to allow functional testing to verify PORV operability. During this test period, operation of systems or components which could result in an RCS mass or temperature increase will be administratively controlled. During the ASME stroke testing of two inoperable PORVS, cold overpressurization mitigation will be provided by two RHR discharge relief valves associated with two OPERABLE and operating RHR loops which have the auto closure interlock bypassed [or deleted]. If one PORV is inoperable, cold overpressure mitigation will be provided by the OPERABLE PORV and one RHR discharge relief valve associated with an OPERABLE and operating RHR loop which has the auto closure interlock bypassed [or deleted].
- ⁴ Except when the vent pathway is provided with a valve that is locked, sealed, or otherwise secured in the open position, then verify these valves open at least once per 31 days.

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¹ ECCS accumulator isolation is required only when ECCS accumulator pressure is greater than or equal to the maximum RCS pressure for the existing RCS cold leg temperature allowed by Figures 3.4-2 and 3.4-3.

⁵ The provisions of 3.0.4 and 4.0.4 are not applicable for entry into MODE 4 from MODE 3 while making all but one centrifugal charging pump incapable of injecting into the RCS pursuant to Specification 4.4.9.3.4, and for the positive displacement pump declared inoperable pursuant to Specification 4.4.9.3.3 provided that all but one centrifugal charging pump is made incapable of injecting into the RCS, and the positive displacement pump is declared inoperable within 4 hours after entry into MODE 4 from MODE 3 or prior to the temperature of one or more of the RCS cold legs decreasing below 325°F, whichever comes first.