PRESSURE/TEMPERATURE LIMITS (Continued)

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-by-point 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.

COLD OVERPRESSURE PROTECTION

The OPERABILITY of two PORVs or two RHR suction relief valves or one PORV and one RHR suction relief valve or an RCS vent opening of at least 5.4 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° above the RCS cold leg temperature, or (2) the start of a charging pump and its injection into a water-solid RCS. The relieving capacity of each RHR suction relief valve is more than adequate to relieve the combined flow of two centrifugal charging pumps. The RHR suction relief valves provides this protection only when the RHR suction valves are open.

The Maximum Allowed PORV Setpoint for the Cold Overpressure Protection System (COPS) is derived by analysis which models the performance of the COPS 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 overshoot beyond the PORV Setpoint which can occur as a result of time delays in signal 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~~ THE COPS ~~Specifications~~ ANALYSIS requires lockout of all but one centrifugal charging pump AND ALL SAFETY INJECTION PUMPS

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° above primary temperature.

SEE INSERT 1 →

The Maximum Allowed PORV Setpoint for the COPS 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, and in accordance with the schedule in Table 4.4-5.

3/4.4.10 STRUCTURAL INTEGRITY

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 throughout the life of the plant. These programs are in accordance with Section XI of the ASME Boiler and Pressure Vessel Code and applicable Addenda as required by 10 CFR 50.55a(g) except where specific written relief has been granted by the Commission pursuant to 10 CFR 50.55a(g)(6)(i).

Components of the Reactor Coolant System were designed to provide access to permit inservice inspections in accordance with Section XI of the ASME Boiler and Pressure Vessel Code, 80 Edition and Addenda through Winter except where specific written relief has been granted pursuant to 10 CFR 50.55a(g)(6)(i).

3/4.4.11 REACTOR COOLANT SYSTEM VENTS

Reactor Coolant System vents are provided to exhaust noncondensible gases and/or steam from the Reactor Coolant System that could inhibit natural circulation core cooling. The OPERABILITY of least one Reactor Coolant System vent path from the reactor vessel head and the pressurizer steam space ensures that the capability exists to perform this function. The reactor vessel head vent path consists of two parallel flow paths with redundant isolation valves (3RCS*SV8095A, 3RCS*SV8096A and 3RCS*SV8095B, 3RCS*SV8096B) in each flow path. The pressurizer steam space vent path consists of two parallel paths with a power operated relief valve (PORV) and PORV block valve in series (3RCS*PCV455A, 3RCS*MV8000A and 3RCS*PCV456, 3RCS*MV8000B).

The valve redundancy of the Reactor Coolant System vent paths serves to minimize the probability of inadvertent or irreversible actuation while ensuring that a single failure of a vent valve, power supply, or control system does not prevent isolation of the vent path.

The function, capabilities, and testing requirements of the Reactor Coolant System vents are consistent with the requirements of Item II.B.1 of NUREG-0737, "Clarification of TMI Action Plant Requirements," November 1980.

INSERT 1

The requirement to lockout the safety injection pumps and all but one CENTRIFUGAL Charging pump can be met by ensuring that a single failure or single action will not result in an injection into the RCS. This can be accomplished by employing at least two independent means to prevent a mass injection. The following are five examples of acceptable actions which meet the requirement for locking out a pump: 1) racking down the pump breaker, 2) placing the pump in PTL and pulling its UC fuses, 3) placing the pump in PTL and closing the pump discharge valve(s) to the injection line, 4) closing the pump discharge valve(s) to the injection line and either removing the power from the valve operator(s) or locking manual valve(s) closed and 5) closing the valve(s) from the injection source and either removing the power from the valve operator(s) or locking manual valve(s) closed.

A safety injection pump that is rendered incapable of injecting into the RCS by at least two independent means may be energized for testing or for filling the Accumulators.

Docket No. 50-423
B16246

Attachment 3

Millstone Nuclear Power Station, Unit No. 3
Retyped Bases Pages

February 1997

PRESSURE/TEMPERATURE LIMITS (Continued)

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 -by -point 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.

COLD OVERPRESSURE PROTECTION

The OPERABILITY of two PORVs or an RHR suction relief valves or one PORV and one RHR suction relief valve or an RCS vent opening of at least 5.4 square inches ensures that the RCS will be protection 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° above the RCS cold temperatures, or (2) the start of a charging pump and its injection into a water-solid RCS. The relieving capacity of each RHR suction relief valve is more than adequate to relieve the combined flow of two centrifugal charging pumps. The RHR suction relief valves provides this protection only when the RHR suction valves are open.

The Maximum Allowed PORV Setpoint for the Cold Overpressure Protection System (COPS) is derived by analysis which models the performance of the COPS assuming various mass input and heat 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 overshoot beyond the PORV Setpoint which can occur as a result of time delays in signal processing and valve opening, instrument uncertainties, and single failure. To ensure that mass and heat input transients more severe than those assumed cannot occur, the COPS analysis requires lockout of all but one centrifugal charging pump and all safety injection pumps 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° above primary temperature.

The requirement to lockout the safety injection pumps and all but one centrifugal charging pump can be met by ensuring that a single failure or single action will not result in an injection into the RCS. This can be accomplished by employing at least two independent means to prevent a mass injection. The following are five examples of acceptable actions which meet the requirement for locking out a pump: 1) racking down the pump breaker, 2) placing the pump in PTL and pulling its UC fuses, 3) placing the pump in PTL and closing the pump discharge valve(s) to the injection line, 4) closing the pump discharge valve(s) to the injection line and either removing the power from the valve operator(s) or locking manual valve(s) closed, and 5) closing the valve(s) from the injection source and either removing the power from the valve operator(s) or locking manual valve(s) closed.

A safety injection pump that is rendered incapable of injecting into the RCS by at least two independent means may be energized for testing or for filling the Accumulators.

The Maximum Allow PORV Setpoint for the COPS 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, and in accordance with the schedule in Table 4.4-5.

3/4.4.10 STRUCTURAL INTEGRITY

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 throughout the life of the plant. These programs are in accordance with Section XI of the ASME Boiler and Pressure Vessel Code and applicable Addenda as required by 10 CFR 50.55a(g) except where specific written relief has been granted by the Commission pursuant to 10 CFR 50.55a(g)(6)(i).

Components of the Reactor Coolant System were designed to provide access to permit inservice inspections in accordance with Section XI of the ASME Boiler and Pressure Vessel Code, 80 Edition and Addenda through Winter except where specific written relief has been granted pursuant to 10 CFR 50.55a(g)(6)(i).

3/4.4.11 REACTOR COOLANT SYSTEM VENTS

Reactor Coolant System vents are provided to exhaust noncondensible gases and/or steam from the Reactor Coolant System that could inhibit natural circulation core cooling. The OPERABILITY of least one Reactor Coolant System vent path from the reactor vessel head and the pressurizer

steam space ensures that the capability exists to perform this function. The reactor vessel head vent path consists of two parallel flow paths with redundant isolation valves (3RCS*SV8095A, 3RCS*SV8096A and 3RCS*SV8095B, 3RCS*SV80965B) in each flow path. The pressurizer steam space vent path consists of two parallel paths with a power operated relief valve (PORV) and PORV block valve in series (3RCS*PCV455A, 3RCS*MV800A and 3RCS*PCV456, 3RCS*MV8000B).

The valve redundancy of the Reactor Coolant System vent paths serves to minimize the probability of inadvertent or irreversible actuation while ensuring that a single failure of a vent valve, power supply, or control system does not prevent isolation of the vent path.

The function, capabilities, and testing requirements of the Reactor Coolant System vents are consistent with the requirements of Item II.B.1 of NUREG-0737, "Clarification of TMI Action Plant Requirements," November 1980.