ENCLOSURE 6
H. B. ROBINSON STEAM ELECTRIC PLANT, UNIT NO. 2
NRC DOCKET NO. 50-261/LICENSE NO. DPR-23
REQUEST FOR TECHNICAL SPECIFICATIONS CHANGE
SUPPLEMENTAL RESPONSE TO GENERIC LETTER 90-06,
"RESOLUTION OF GENERIC ISSUE 70, 'POWER-OPERATED
RELIEF VALVE AND BLOCK VALVE RELIABILITY,' AND GENERIC
ISSUE 94, 'ADDITIONAL LOW-TEMPERATURE OVERPRESSURE
PROTECTION FOR LIGHT-WATER REACTORS,' PURSUANT TO 10 CFR 50.54(f)"

TECHNICAL SPECIFICATIONS PAGES

d. With one or both block valves inoperable[1]:

1. Within 1 hour restore the block valve(s) to OPERABLE status or place the associated PORV(s) in manual control; and

2. Restore at least one block valve to OPERABLE status within the next hour if both block valves are inoperable; and

3. Restore any remaining inoperable block valve to operable status within 72 hours; or

4. Be in at least HOT SHUTDOWN condition using normal operating procedures within the next 12 hours and cool down the RCS below a T_{avg} of 350°F within the following 12 hours.

e. For this specification, reactor startup, heatup and entry into operational conditions with T_{avg} greater than or equal to 350°F may continue so long as the limits of the associated action statements are met.

f. During performance of the required surveillance testing of the PORVs and their associated Block Valves, the respective valve train need not be declared inoperable nor the associated action statements performed unless the associated valves are determined to be inoperable via this testing. Testing of no more than one train at a time may be performed and the time in the out of normal test configuration shall not exceed 24 hours.

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1 PORV block valves shall not be considered inoperable solely because either their normal or emergency power source is inoperable.

subsequently opened to allow the PORV to be used to control reactor coolant system pressure. Closure of the block valve(s) establishes reactor coolant pressure boundary integrity for a PORV that has leakage resulting in excessive RCS leakage. (Reactor coolant pressure boundary integrity takes priority over the capability of the PORV to mitigate an overpressure event.) The PORVs should normally be available for automatic mitigation of overpressure events and should be returned to OPERABLE status prior to exceeding cold shutdown following the associated refueling outage.

The OPERABILITY of the PORVs and block valves at the conditions noted above is based on their being capable of performing the following functions:

1. Maintaining the RCS pressure boundary,

2. Manual control of PORVs to control RCS pressure as required for SGTR mitigation,

3. Manual closing of a block valve to isolate a stuck open PORV,

4. Manual closing of a block valve to isolate a PORV with excessive seat leakage, and

5. Manual opening of a block valve to unblock an isolated PORV to allow it to be used to control RCS pressure for SGTR mitigation.

{ INSERT ATTACHED PARAGRAPH }

A PORV is defined as leaking with up to and including one (1) gpm of seat leakage, but is not inoperable and is not experiencing "excessive" seat leakage as identified within Specification 3.1.1.5.a. With leakage up to and including ten (10) gpm, the PORV would be considered to have "excessive" seat leakage and would be subject to the compensatory actions described within Specification 3.1.1.5.a. This condition would continue to require block valve testing on a 92 day interval as required by Surveillance Requirement 4.2.4.2. Finally, with PORV leakage exceeding ten (10) gpm, the PORV is considered inoperable in accordance with Specifications 3.1.1.5.b. and c., and block valve testing is not required.

2. Heatup the RCS to above 350°F

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e. Operation of the overpressure protection system to relieve a pressure transient must be reported as a Special Report to the NRC within 30 days of operation.

3.1.2.2 The secondary side of the steam generator must not be pressurized above 200 psig if the temperature of the vessel is below 120°F.

3.1.2.3 The pressurizer shall neither exceed a maximum heatup rate of 100°F/hr nor a cooldown rate of 200°F/hr. The spray shall not be used if the temperature difference between the pressurizer and the spray fluid is greater than 320°F.

3.1.2.4 Figures 3.1-1 and 3.1-2 shall be updated periodically in accordance with the following criteria and procedures before the calculated exposure of the vessel exceeds the exposures for which the figures apply.

a. At least 60 days before the end of the integrated power period for which Figures 3.1-1 and 3.1-2 apply, the limit lines on the figures shall be updated for a new integrated power period utilizing methods derived from the ASME Boiler and Pressure Vessel Code, Section III, Appendix G and in accordance with applicable appendices of 10CFR50. These limit lines shall reflect any changes in predicted vessel neutron fluence over the integrated power period or changes resulting from the irradiation specimen measurement program.

b. The results of the examinations of the irradiation specimens and the updated heatup and cooldown curves shall be reported to the Commission within 90 days of completion of the examinations.

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 two values taken from the curves under consideration. The composite curve is then adjusted to allow for possible errors in the pressure and temperature sensing instruments.

The use of the composite curve is mandatory in setting heatup limitations because it is possible for conditions to exist such that over the course of the heatup ramp the controlling analysis switches from the O.D. to the I.D. location; and the pressure limit must, at all times, be based on the most conservative case. The cooldown analysis proceeds in the same fashion as that for heatup, with the exception that the controlling location is always at the I.D. position. The thermal gradients induced during cooldown tend to produce tensile stresses at the I.D. location and compressive stresses at the O.D. position. Thus, the I.D. flaw is clearly the worst case.

As in the case of heatup, allowable pressure temperature relations are generated for both steady state and finite cooldown rate situations. Composite limit curves are then constructed for each cooldown rate of interest. Again adjustments are made to account for pressure and temperature instrumentation error.

The overpressure protection system consists of two operable pressurizer Power-Operated Relief Valves (PORVs) connected to the station instrument air system, a backup nitrogen supply, and the associated electronics.

The TS requirements for LTOP apply when T_{avg} is less than 350°F and the RCS is not vented to the containment. During these conditions, one train (or channel) of the LTOP system is capable of mitigating an LTOP event that is bounded by the largest mass addition to the RCS or by the largest increase in RCS temperature that can occur. The largest mass addition to the RCS is limited based upon the assumption that no more than a fixed number of pumps are capable of providing makeup or injection into the RCS. Hence, this is a matter important to safety that pumps in excess of this design basis assumption for LTOP not be capable of providing makeup or injection to the

3.1.3 Minimum Conditions for Criticality

3.1.3.1 Except during low power physics tests, the reactor shall not be made critical at any temperature, at which the moderator temperature coefficient is outside the limits specified in the CORE OPERATING LIMITS REPORT (COLR). The maximum upper limits shall be less than or equal to:

a) +5.0 pcm/°F at less than 50% of rated power, or

b) 0 pcm/°F at 50% of rated power and above.

3.1.3.2 In no case shall the reactor be made critical above and to the left of the criticality limit shown on Figure 3.1-1a ~~or 3.1-1b (as appropriate per 3.1.2.1)~~.

3.1.3.3 When the reactor coolant temperature is in a range where the moderator temperature coefficient is outside the limits specified in the COLR, the reactor shall be made subcritical by an amount equal to or greater than the potential reactivity insertion due to depressurization.

3.1.3.4 The reactor shall be maintained subcritical by at least 1% until normal water level is established in the pressurizer.

Basis

During the early part of fuel cycle, the moderator temperature coefficient may be slightly positive at low power levels. The moderator temperature coefficient at low temperatures or powers will be most positive at the beginning of the fuel cycle, when the boron concentration in the coolant is the greatest. At all times, the moderator temperature coefficient is calculated to be negative in the high power operating range, and after a very brief period of power operation, the coefficient will be negative in all circumstances due to the reduced boron concentration as Xenon and fission products build into the core. The requirement that the reactor is not to be made critical when the moderator temperature coefficient outside the limits specified in the COLR has been imposed to prevent any unexpected power excursion during normal operations as a result of either an increase in moderator temperature or decrease in coolant pressure. This requirement is

c. Operating the solenoid air control valves and check valves for their associated accumulators in PORV control systems through one complete cycle of full travel or function testing of individual components.

4.2.4.2 Each block valve shall be demonstrated OPERABLE at least once per 92 days by operating the valve through one complete cycle of full travel unless the block valve is closed in order to meet the requirements of Specification 3.1.1.5.a, b, or c.

4.2.4.3 The accumulator for the PORVs shall be demonstrated OPERABLE at each refueling by isolating the normal air and nitrogen supplies and operating the valves through a complete cycle of full travel.

4.2.5 Low-Temperature Overpressure Protection

4.2.5.1 Each PORV shall be demonstrated OPERABLE by:

a. Performance of an ANALOG CHANNEL OPERATIONAL TEST on the 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; and

b. Performance of a CHANNEL CALIBRATION at each refueling shutdown; and

c. Verifying the PORV Block Valve is open at least once per 72 hours when the PORV is being used for overpressure protection.

Basis

The OPERABILITY of two PORVs for low-temperature overpressure protection or an RCS vent 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 50°F above the RCS cold leg temperatures, or (2) the start of three charging pumps with injection into a water-solid RCS.

The maximum allowed PORV setpoint for the Low Temperature Overpressure Protection system (LTOP) is derived by analyses which model the performance of the LTOP 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 over-shoot 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 Specifications require the power supply breakers of all three safety injection pumps be racked out while in hot shutdown and below 350°F with the reactor vessel head installed and the RCS is not vented to containment and disallow start of an RCP if secondary temperature is more than 50°F above primary temperature.

The maximum allowed PORV setpoint for the LTOP 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.

Surveillance Requirements provide the assurance that the PORVs and Block Valves can perform their required functions. Specification 4.2.4.1 addresses PORVs, 4.2.4.2 the Block Valves, and 4.2.4.3 the independent pneumatic power source. Specification 4.2.5.1 addresses the PORV overpressure protection functions and 4.2.5.2 addresses RCS vent pathways.

Surveillance Requirement 4.2.4.1.a. provides assurance the actuation instrumentation for automatic PORV actuation is calibrated such that the automatic PORV actuation signal is within the required pressure range even though automatic actuation capability of the PORV is not necessary for the PORV to be OPERABLE in the power operating and hot shutdown conditions greater than 350°F.

Surveillance Requirement 4.2.4.1.b. provides assurance the PORV is capable of opening and closing. The associated block valve should be closed prior to stroke testing a PORV to preclude depressurization of the RCS. This test will be done at hot shutdown with T_{avg} greater than 350°F before the PORV is required for overpressure protection in Technical Specification 3.1.2.1.d.

Surveillance Requirement 4.2.4.1.c. provides assurance that the mechanical and electrical aspects of the control system are functional.

Surveillance Requirement 4.2.4.2 addresses the block valves. The block valves are exempt from the surveillance requirements to cycle the valves when they have been closed to comply with Technical Specification 3.1.1.5.a, b, or c. This precludes the need to cycle the valves with a full system differential pressure or when maintenance is being performed to restore an inoperable PORV to OPERABLE status. Also, this limits the challenges to the primary function of the Block Valve which is to provide an RCS pressure boundary for a degraded PORV.

Surveillance Requirement 4.2.4.3 provides assurance of operability of the accumulators and that the accumulators are capable of supplying sufficient Nitrogen to operate the PORV(s) if they are needed for RCS pressure control and normal Nitrogen and the backup Instrument Air systems are not available. Backup Instrument Air is supplied when the accumulator reaches its low pressure setpoint.

Surveillance Requirement 4.2.5.1 provides assurance that the instrumentation for the actuation of the LTOP function of PORVs is calibrated to provide

d. With one or both block valves inoperable[1]:

   1. Within 1 hour restore the block valve(s) to OPERABLE status or place the associated PORV(s) in manual control; and

   2. Restore at least one block valve to OPERABLE status within the next hour if both block valves are inoperable; and

   3. Restore any remaining inoperable block valve to operable status within 72 hours; or

   4. Be in at least HOT SHUTDOWN condition using normal operating procedures within the next 12 hours and cool down the RCS below a T_{avg} of 350°F within the following 12 hours.

e. For this specification, reactor startup, heatup and entry into operational conditions with T_{avg} greater than or equal to 350°F may continue so long as the limits of the associated action statements are met.

f. During performance of the required surveillance testing of the PORVs and their associated block valves, the respective valve train need not be declared inoperable nor the associated action statements performed unless the associated valves are determined to be inoperable via this testing. Testing of no more than one train at a time may be performed and the time in the out of normal test configuration shall not exceed 24 hours.

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1 PORV block valves shall not be considered inoperable solely because either their normal or emergency power source is inoperable.

subsequently opened to allow the PORV to be used to control reactor coolant system pressure. Closure of the block valve(s) establishes reactor coolant pressure boundary integrity for a PORV that has leakage resulting in excessive RCS leakage. (Reactor coolant pressure boundary integrity takes priority over the capability of the PORV to mitigate an overpressure event.) The PORVs should normally be available for automatic mitigation of overpressure events and should be returned to OPERABLE status prior to exceeding cold shutdown following the associated refueling outage.

The OPERABILITY of the PORVs and block valves at the conditions noted above is based on their being capable of performing the following functions:

1. Maintaining the RCS pressure boundary,

2. Manual control of PORVs to control RCS pressure as required for SGTR mitigation,

3. Manual closing of a block valve to isolate a stuck open PORV,

4. Manual closing of a block valve to isolate a PORV with excessive seat leakage, and

5. Manual opening of a block valve to unblock an isolated PORV to allow it to be used to control RCS pressure for SGTR mitigation.

A PORV is defined as leaking with up to and including one (1) gpm of seat leakage, but is not inoperable and is not experiencing "excessive" seat leakage as identified within Specification 3.1.1.5.a. With leakage up to and including ten (10) gpm, the PORV would be considered to have "excessive" seat leakage and would be subject to the compensatory actions described within Specification 3.1.1.5.a. This condition would continue to require block valve testing on a 92 day interval as required by Surveillance Requirement 4.2.4.2. Finally, with PORV leakage exceeding ten (10) gpm, the PORV is considered inoperable in accordance with Specifications 3.1.1.5.b. and c., and block valve testing is not required.

2. Heatup the RCS to above 350°F.

3.1.2.2 The secondary side of the steam generator must not be pressurized above 200 psig if the temperature of the vessel is below 120°F.

3.1.2.3 The pressurizer shall neither exceed a maximum heatup rate of 100°F/hr nor a cooldown rate of 200°F/hr. The spray shall not be used if the temperature difference between the pressurizer and the spray fluid is greater than 320°F.

3.1.2.4 Figures 3.1-1 and 3.1-2 shall be updated periodically in accordance with the following criteria and procedures before the calculated exposure of the vessel exceeds the exposures for which the figures apply.

a. At least 60 days before the end of the integrated power period for which Figures 3.1-1 and 3.1-2 apply, the limit lines on the figures shall be updated for a new integrated power period utilizing methods derived from the ASME Boiler and Pressure Vessel Code, Section III, Appendix G and in accordance with applicable appendices of 10CFR50. These limit lines shall reflect any changes in predicted vessel neutron fluence over the integrated power period or changes resulting from the irradiation specimen measurement program.

b. The results of the examinations of the irradiation specimens and the updated heatup and cooldown curves shall be reported to the Commission within 90 days of completion of the examinations.

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 two values taken from the curves under consideration. The composite curve is then adjusted to allow for possible errors in the pressure and temperature sensing instruments.

The use of the composite curve is mandatory in setting heatup limitations because it is possible for conditions to exist such that over the course of the heatup ramp the controlling analysis switches from the O.D. to the I.D. location; and the pressure limit must, at all times, be based on the most conservative case. The cooldown analysis proceeds in the same fashion as that for heatup, with the exception that the controlling location is always at the I.D. position. The thermal gradients induced during cooldown tend to produce tensile stresses at the I.D. location and compressive stresses, at the O.D. position. Thus, the I.D. flaw is clearly the worst case.

As in the case of heatup, allowable pressure temperature relations are generated for both steady state and finite cooldown rate situations. Composite limit curves are then constructed for each cooldown rate of interest. Again adjustments are made to account for pressure and temperature instrumentation error.

The overpressure protection system consists of two operable pressurizer power-operated relief valves (PORVs) connected to the station instrument air system, a backup nitrogen supply, and the associated electronics.

The TS requirements for low-pressure overprotection (LTOP) apply when T_{avg} is less than 350°F and the RCS is not vented to the containment. During these conditions, one train (or channel) of the LTOP system is capable of mitigating an LTOP event that is bounded by the largest mass addition to the RCS or by the largest increase in RCS temperature that can occur. The largest mass addition to the RCS is limited based upon the assumption that no more than a fixed number of pumps are capable of providing makeup or injection into the RCS. Hence, this is a matter important to safety that pumps in excess of this design basis assumption for LTOP not be capable of providing makeup or injection to the

3.1.3 Minimum Conditions for Criticality

3.1.3.1 Except during low power physics tests, the reactor shall not be made critical at any temperature, at which the moderator temperature coefficient is outside the limits specified in the CORE OPERATING LIMITS REPORT (COLR). The maximum upper limits shall be less than or equal to:

a) +5.0 pcm/°F at less than 50% of rated power, or

b) 0 pcm/°F at 50% of rated power and above.

3.1.3.2 In no case shall the reactor be made critical above and to the left of the criticality limit shown on Figure 3.1-1.

3.1.3.3 When the reactor coolant temperature is in a range where the moderator temperature coefficient is outside the limits specified in the COLR, the reactor shall be made subcritical by an amount equal to or greater than the potential reactivity insertion due to depressurization.

3.1.3.4 The reactor shall be maintained subcritical by at least 1% until normal water level is established in the pressurizer.

Basis

During the early part of fuel cycle, the moderator temperature coefficient may be slightly positive at low power levels. The moderator temperature coefficient at low temperatures or powers will be most positive at the beginning of the fuel cycle, when the boron concentration in the coolant is the greatest. At all times, the moderator temperature coefficient is calculated to be negative in the high power operating range, and after a very brief period of power operation, the coefficient will be negative in all circumstances due to the reduced boron concentration as Xenon and fission products build into the core. The requirement that the reactor is not to be made critical when the moderator temperature coefficient outside the limits specified in the COLR has been imposed to prevent any unexpected power excursion during normal operations as a result of either an increase in moderator temperature or decrease in coolant pressure. This requirement is

c. Operating the solenoid air control valves and check valves for their associated accumulators in PORV control systems through one complete cycle of full travel or function testing of individual components.

4.2.4.2 Each block valve shall be demonstrated OPERABLE at least once per 92 days by operating the valve through one complete cycle of full travel unless the block valve is closed in order to meet the requirements of Specification 3.1.1.5.b. or c.

4.2.4.3 The accumulator for the PORVs shall be demonstrated OPERABLE at each refueling by isolating the normal air and nitrogen supplies and operating the valves through a complete cycle of full travel.

4.2.5 Low-Temperature Overpressure Protection

4.2.5.1 Each PORV shall be demonstrated OPERABLE by:

a. Performance of an ANALOG CHANNEL OPERATIONAL TEST on the 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; and

b. Performance of a CHANNEL CALIBRATION at each refueling shutdown; and

c. Verifying the PORV block valve is open at least once per 72 hours when the PORV is being used for overpressure protection.

Basis

The OPERABILITY of two PORVs for low-temperature overpressure protection (LTOP) or an RCS vent 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 50°F above the RCS cold leg temperatures, or (2) the start of three charging pumps with injection into a water-solid RCS.

The maximum allowed PORV setpoint for the LTOP system is derived by analyses which model the performance of the LTOP 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 over-shoot 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 Specifications require the power supply breakers of all three safety injection pumps be racked out while in hot shutdown and below 350°F with the reactor vessel head installed and the RCS is not vented to containment and disallow start of an RCP if secondary temperature is more than 50°F above primary temperature.

The maximum allowed PORV setpoint for the LTOP 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.

Surveillance Requirements provide the assurance that the PORVs and block valves can perform their required functions. Specification 4.2.4.1 addresses PORVs, 4.2.4.2 the block valves, and 4.2.4.3 the independent pneumatic power source. Specification 4.2.5.1 addresses the PORV overpressure protection functions and 4.2.5.2 addresses RCS vent pathways.

Surveillance Requirement 4.2.4.1.a. provides assurance the actuation instrumentation for automatic PORV actuation is calibrated such that the automatic PORV actuation signal is within the required pressure range even though automatic actuation capability of the PORV is not necessary for the PORV to be OPERABLE in the power operating and hot shutdown conditions greater than 350°F.

Surveillance Requirement 4.2.4.1.b. provides assurance the PORV is capable of opening and closing. The associated block valve should be closed prior to stroke testing a PORV to preclude depressurization of the RCS. This test will be done at hot shutdown with T_{avg} greater than 350°F before the PORV is required for overpressure protection in Technical Specification 3.1.2.1.d.

Surveillance Requirement 4.2.4.1.c. provides assurance that the mechanical and electrical aspects of the control system are functional.

Surveillance Requirement 4.2.4.2 addresses the block valves. The block valves are exempt from the surveillance requirements to cycle the valves when they have been closed to comply with Technical Specification 3.1.1.5.b. or c. This precludes the need to cycle the valves with a full system differential pressure or when maintenance is being performed to restore an inoperable PORV to OPERABLE status. Also, this limits the challenges to the primary function of the block valve which is to provide an RCS pressure boundary for a degraded PORV.

Surveillance Requirement 4.2.4.3 provides assurance of operability of the accumulators and that the accumulators are capable of supplying sufficient Nitrogen to operate the PORV(s) if they are needed for RCS pressure control and normal Nitrogen and the backup Instrument Air systems are not available. Backup Instrument Air is supplied when the accumulator reaches its low pressure setpoint.

Surveillance Requirement 4.2.5.1 provides assurance that the instrumentation for the actuation of the LTOP function of PORVs is calibrated to provide