ATTACHMENT A

Beaver Valley Power Station, Unit No. 1
Proposed Technical Specification Change No. 176 Revision 1

Revise the Technical Specification as follows:

Remove Pages	Insert Pages
3/4 1-12	3/4 1-12
B 3/4 1-2a	B 3/4 1-2a
3/4 4-4a	3/4 4-4a
3/4 4-27a	3/4 4-27a
B 3/4 4-10	B 3/4 4-10
3/4 5-6	3/4 5-6
3/4 5-7a	3/4 5-7a
B 3/4 5-1	B 3/4 5-1

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REACTIVITY CONTROL SYSTEMS

CHARGING PUMPS - OPERATING

LIMITING CONDITION FOR OPERATION

3.1.2.4 At least two charging pumps shall be OPERABLE.

APPLICABILITY: MODES 1, 2, 3, and 4*

ACTION:

With only one charging pump OPERABLE, restore at least two charging pumps to OPERABLE status within 72 hours or be in at least HOT STANDBY and borated to a SHUTDOWN MARGIN equavalent to at least 1% Δk/k at 200 °F within the next 6 hours; restore at least two charging pumps to OPERABLE status within the next 7 days or be in COLD SHUTDOWN within the next 30 hours.

SURVEILLANCE REQUIREMENTS

4.1.2.4.1 At least two charging pumps shall be demonstrated OPERABLE by verifying, on recirculation flow, that each pump develops a discharge pressure greater than or equal to 2402 psig when tested pursuant to Specification 4.0.5.

4.1.2.4.2 All charging pumps, except the above required OPERABLE pump, shall be demonstrated inoperable at least once per 12 hours whenever the temperature of one or more of the inservice RCS cold legs is ≤ 275°F by verifying that the control switches are placed in the PULL-TO-LOCK position and tagged.

the enable temperature set forth in specification 3.4.9.3

*A maximum of one centrifugal charging pump shall be OPERABLE whenever the temperature of one or more of the non-isolated RCS cold legs is ≤ 275° F.

PROPOSED

3/4.1.2 BORATION SYSTEMS (Continued)

The required volume of water in the refueling water storage tank for reactivity considerations while operating is 424,000 gallons. The associated technical specification limit on the refueling water storage tank has been established at 441,100 gallons to account for reactivity considerations and the NPSH requirements of the ECCS system.

The OPERABILITY of the RWST as part of the ECCS ensures that a sufficient supply of borated water is available for injection by the ECCS in the event of a LOCA. The limits on RWST minimum volume and boron concentration ensure that 1) sufficient water is available within containment to permit recirculation cooling flow to the core, and 2) the reactor will remain subcritical in the cold condition following mixing of the RWST and the RCS water volumes with all control rods inserted except for the most reactive control assembly. These assumptions are consistent with the LOCA analysis.

The limitations for a maximum of one centrifugal charging pump to be OPERABLE and the Surveillance Requirement to verify all charging pumps except the required OPERABLE pump to be inoperable ~~below~~ 75°F provides assurance that a mass addition pressure transient can be relieved by the operation of a single PORV. Substituting a Low Head Safety Injection pump for a charging pump in Modes 5 and 6 will not increase the probability of an overpressure event since the shutoff head of the Low Head Safety Injection pumps is ~~below~~ the setpoint of the overpressure protection system.

the enable temperature setforth in specification 3.4.9.3

≤

PROPOSED

REACTOR COOLANT SYSTEM

REACTOR COOLANT PUMP STARTUP

LIMITING CONDITION FOR OPERATION

3.4.1.6 If both OPPS PORV's are not OPERABLE, an idle reactor coolant pump in a non-isolated loop shall not be started, unless:

1. The actual pressurizer water level is less than 60 percent (840 ft^3), or
2. The secondary water temperature* of each steam generator is less than 25°F above each of the in-service RCS cold leg temperatures.

APPLICABILITY: When the temperature of one or more of the non-isolated loop cold legs is ≤ 275°F. (the enable temperature setforth in specification 3.4.9.3)

ACTION:

With the pressurizer water level greater than 60 percent or the temperature of the steam generator in the loop associated with the reactor coolant pump being started greater than 25° above the cold leg temperature of the other non-isolated loops, suspend the startup of the reactor coolant pump.

SURVEILLANCE REQUIREMENTS:

4.4.1.6.1 The pressurizer water volume or the secondary water temperature of the non-isolated steam generators shall be determined within ten minutes prior to starting a reactor coolant pump.

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* The secondary water temperature is to be verified by direct measurement of the fluid temperature, or contact temperature readings on the steam generator secondary, or blowdown piping after purging of stagnant water within the piping.

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:

a. Two power operated relief valves (PORVs) with a nominal trip setpoint of ≤ 350 psig, or
444

b. A reactor coolant system vent of ≥ 3.14 square inches.

APPLICABILITY: When the temperature of one or more of the non-isolated RCS cold legs is ≤ 275°F.
292
an enable temperature of

ACTION:

a. With one PORV inoperable, either restore the inoperable PORV to OPERABLE status within 7 days or depressurize and vent the RCS through a 3.14 square inch vent(s) within the next 12 hours; maintain the RCS in a vented condition until both PORVs have been restored to OPERABLE status. Refer to Technical Specification 3.4.1.6 for further limitations.

b. With both PORV's inoperable, depressurize and vent the RCS through a 3.14 square inch vent(s) within 12 hours; maintain the RCS in a vented condition until both PORVs have been restored to OPERABLE status.

c. The provisions of Specification 3.0.4 are not applicable.

SURVEILLANCE REQUIREMENT

4.4.9.3.1 Each PORV shall be demonstrated OPERABLE BY:

PROPOSED

vessel inside radius are essentially identical, the measured transition shift for a sample can be applied with confidence to the adjacent section of the reactor vessel. The heatup and cooldown curves must be recalculated when the ΔRT_{NDT} determined from the surveillance capsule is different from the calculated ΔRT_{NDT} for the equivalent capsule radiation exposure.

The pressure-temperature limit lines shown on Figure 3.4-2 for reactor criticality and for inservice leak and hydrostatic testing have been provided to assure compliance with the minimum temperature requirements of Appendix G to 10 CFR 50 for reactor criticality and for inservice leak and hydrostatic testing.

The number of reactor vessel irradiation surveillance specimens and the frequencies for removing and testing these specimens are provided in UFSAR Table 4.5-3 to assure compliance with the requirements of Appendix H to 10 CFR 50.

The limitations imposed on the pressurizer heatup and cooldown rates and spray water temperature differential are provided to assure that the pressurizer is operated within the design criteria assumed for the fatigue analysis performed in accordance with the ASME Code requirements.

The OPERABILITY of two PORV's or an RCS vent opening of greater than 3.14 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 ≤ 275°F. Either PORV has adequate relieving capability to protect the RCS from over-pressurization when the transient is limited to either (1) the start of an idle RCP with the secondary water temperature of the steam generator ≤ 25°F above the RCS cold leg temperature or (2) the start of a charging pump and its injection into a water solid RCS.

INSERT 1

the enable temperature

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 Part 50.55a(g) except where specific written relief has been granted by the Commission pursuant to 10 CFR Part 50.55a(g)(6)(i).

3/4.4.11 RELIEF VALVES

The relief valves have remotely operated block valves to provide a positive shutoff capability should a relief valve become inoperable. The electrical power for both the relief valves and the block valves is capable of being supplied from an emergency power source to ensure the ability to seal this possible RCS leakage path.

INSERT 1

The enable temperature is defined in Standard Review Plan Section 5.2.2 Branch Technical Position RSB 5-2 as the water temperature corresponding to a metal temperature of at least RT(NDT) + 90 deg F. The OPPS setpoint is determined from an assessment of steady-state pressure-temperature limits as described in UFSAR Section 4.2.

EMERGENCY CORE COOLING SYSTEMS

ECCS SUBSYSTEMS T_{avg} <350F

LIMITING CONDITION FOR OPERATION

3.5.3 As a minimum, one ECCS subsystem comprised of the following shall be OPERABLE:

a. One OPERABLE centrifugal charging pump,#

b. One OPERABLE Low Head Safety Injection Pump, and

c. An OPERABLE flow path capable of taking suction from the refueling water storage tank upon being manually realigned and transferring suction to the containment sump during the recirculation phase of operation.

APPLICABILITY: MODE 4

ACTION:

a. With no ECCS subsystem OPERABLE because of the inoperability of either the centrifugal charging pump or the flow path from the refueling water storage tank, restore at least one ECCS subsystem to OPERABLE status within 1 hour or be in COLD SHUTDOWN within the next 20 hours.

b. In the event the ECCS is actuated and injects water into the Reactor Coolant System, a Special Report shall be prepared and submitted to the Commission pursuant to Specification 6.9.2 within 30 days describing the circumstances of the actuation and the total accumulated actuation cycles to date.

SURVEILLANCE REQUIREMENTS

4.5.3.1 The ECCS subsystem shall be demonstrated OPERABLE per the applicable Surveillance Requirements of 4.5.2.

4.5.3.2 All charging pumps except the above required OPERABLE pumps, shall be demonstrated inoperable at least once per 12 hours whenever the temperature of one or more of the non-isolated RCS cold legs is ≤ 275°F by verifying that the control switches are placed in the PULL-TO-LOCK position and tagged.

the enable temperature setforth in specification 3.4.9.3

\# A maximum of one centrifugal charging pump shall be OPERABLE whenever the temperature of one or more of the non-isolated RCS cold legs is ≤ 275°F.

PROPOSED

EMERGENCY CORE COOLING SYSTEMS

3/4.5.4 BORON INJECTION SYSTEM

BORON INJECTION TANK <350°F

LIMITING CONDITION FOR OPERATION

3.5.4.1.2 The boron injection tank flow path shall be isolated and power removed from the inlet or outlet valves.

APPLICABILITY: When the temperature of one or more of the non-isolated RCS cold legs is ≤ 275°F.

the enable temperature set forth in specification 3.4.9.3

ACTION:

With the boron injection tank not isolated, isolate the tank flow path and remove power from the inlet or outlet valves.

SURVEILLANCE REQUIREMENTS

4.5.4.1.2 The boron injection tank flow path shall be verified isolated by verifying at least once per 7 days that the Boron Injection Tank inlet or outlet valves are closed and de-energized except for purposes of flow testing or valve stroke testing.

PROPOSED

3/4.5.1 ACCUMULATORS

The OPERABILITY of each of the RCS accumulators ensures that a sufficient volume of borated water will be immediately forced into the reactor core through each of the cold legs in the event the RCS pressure falls below the pressure of the accumulators. This initial surge of water into the core provides the initial cooling mechanism during large RCS pipe ruptures.

The limits on accumulator volume, boron concentration and pressure ensure that the assumptions used for accumulator injection in the accident analysis are met. The limit of one hour for operation with an inoperable accumulator minimizes the time exposure of the plant to a LOCA event occurring concurrent with failure of an additional accumulator which may result in unacceptable peak cladding temperatures.

The RCS accumulators are isolated when RCS pressure is reduced to 1000 ± 100 psig to prevent borated water from being injected into the RCS during normal plant cooldown and depressurization conditions and also to prevent inadvertent overpressurization of the RCS at reduced RCS temperature. With the accumulator pressure reduced to less than the reactor vessel low temperature overpressure protection setpoint, the accumulator pressure cannot challenge the cold overpressure protection system or exceed the 10 CFR 50 Appendix G limits. Therefore, the accumulator discharge isolation valves may be opened to perform the accumulator discharge check valve testing specified in the IST program.

3/4.5.2 and 3/4.5.3 ECCS SUBSYSTEMS

The OPERABILITY of two separate and independent ECCS subsystems ensures that sufficient emergency core cooling capability will be available in the event of a LOCA assuming the loss of one subsystem through any single failure consideration. Either subsystem operating in conjunction with the accumulators is capable of supplying sufficient core cooling to limit the peak cladding temperatures within acceptable limits for all postulated break sizes ranging from the double-ended break of the largest RCS cold leg pipe downward. In addition, each ECCS subsystem provides long-term core cooling capability in the recirculation mode during the accident recovery period.

The Surveillance Requirements provided to ensure OPERABILITY of each component ensure that at a minimum, the assumptions used in the accident analyses are met and that subsystem OPERABILITY is maintained.

The limitation for a maximum of one charging pump to be OPERABLE and the Surveillance Requirement to verify ≤ all charging pumps except the required OPERABLE pump to be inoperable ~~below~~ 275°F provides assurance that a mass addition pressure transient can be relieved by the operation of a single PORV.

3/4.5.4 BORON INJECTION SYSTEM

The OPERABILITY of the boron injection system as part of the ECCS ensures that sufficient negative reactivity is injected into the core to limit any positive increase in reactivity caused by RCS system cooldown. RCS cooldown can be caused by inadvertent depressurization, a loss-of-coolant accident or a steam line rupture.

the enable temperature set forth in specification 3.4.9.3

The boron injection tank is required to be isolated when RCS temperature is ~~less than~~ ≤ 275°F to prevent a potential overpressurization due to an inadvertent safety injection signal.

PROPOSED

ATTACHMENT B

Beaver Valley Power Station, Unit No. 1
Proposed Technical Specification Change No. 176 Revision 1
Revision of Technical Specification 3.4.9.1 and 3.4.9.3
OPPS SETPOINT

A. DESCRIPTION OF AMENDMENT REQUEST

The proposed amendment would revise our previous submittal which proposed to incorporate an overpressure protection system (OPPS) setpoint curve based on temperature. This revision replaces the current OPPS setpoint with a new single setpoint and replaces the current OPPS enable temperature.

B. BACKGROUND

The changes proposed here resulted from discussions with the NRC to incorporate applicable criteria addressed in the Standard Review Plan (SRP). The plant does not have a system installed which automatically follows a pressure/temperature curve, therefore, a single OPPS pressure setpoint will be used in a manner similar to the current method. The SRP provides guidance for determining the OPPS enable temperature. This enable temperature is addressed throughout the Technical Specifications (TS) and Bases, therefore, the following specifications have been modified to replace the current 275°F enable temperature with reference to the new 292°F enable temperature setforth in specification 3.4.9.3; 3.1.2.4, 3.4.1.6, 3.5.3, 3.5.4.1.2, B 3/4.1.2, B 3/4.5.3, B 3/4.5.4 and B 3/4.4.9.

C. JUSTIFICATION

During a normal plant cooldown the OPPS is manually armed as the reactor coolant temperature is decreased ≤ the enable temperature. The new 292°F enable temperature is based on the criteria provided in SRP Section 5.2.2 Branch Technical Position RSB 5-2. The Branch Technical Position states that "the low temperature overpressure protection system should be operable during startup and shutdown conditions ≤ the enable temperature. This is defined as the water temperature corresponding to a metal temperature of at least RT_{NDT} + 90°F at the beltline location (1/4t or 3/4t) that is controlling in the Appendix G limit calculations." As shown on the current heatup and cooldown curves the limiting RT_{NDT} is at the 1/4t location and is 202°F, therefore, the new enable temperature is 202°F + 90°F = 292°F. Reference to the new enable temperature has been incorporated into those specifications required to address the functions applicable to overpressure protection. Specification 3.1.2.4 limits the number of charging pumps operable when the plant is ≤ the enable temperature. Bases 3/4.1.2 describes why the number

of charging pumps must be limited in accordance with Specification 3.1.2.4. Specification 3.4.1.6 provides pressurizer and steam generator water level criteria when ≤ the enable temperature. Specification 3.4.9.3 provides the OPPS requirements including the enable temperature. Bases 3/4.4.9 describes the OPPS and the basis for the enable temperature. Specification 3.5.3 limits the number of charging pumps operable when the plant is ≤ the enable temperature. Specification 3.5.4.1.2 requires isolation of the boron injection tank flow path when ≤ the enable temperature. Bases 3/4.5.2 and 3/4.5.3 describe why the number of charging pumps must be limited in accordance with specification 3.5.3. Bases 3/4.5.4 describes why the boron injection tank must be isolated in accordance with specification 3.5.4.1.2.

D. SAFETY ANALYSIS

The proposed revisions are in response to NRC comments resulting from review of our previous submittal. Our initial submittal proposed an OPPS curve to be used in determining applicable setpoints based on current plant pressure and temperature conditions. The NRC felt the curve was more applicable to a plant with an installed system which could automatically follow the plant pressure and temperature conditions, therefore, we modified the proposed changes to incorporate a single setpoint. The functional limit used as a basis for setpoint selection that provides the greatest operational flexibility is the steady-state pressure-temperature limit. We selected the lowest point on the curve (85° RCS Temperature) which identifies acceptable OPPS setpoint ranges vs RCS temperature. This curve was provided in our original submittal. An additional NRC comment identified the SRP Criteria for defining the OPPS enable temperature, therefore, we changed the enable temperature from 275°F to 292°F based on the limiting RT_{NDT} specified on the current heatup and cooldown curves. The OPPS enable temperature was also referenced in other related specifications and in order to reduce future TS changes and ensure the correct temperature would be consistently applied in all cases reference to the enable temperature was replaced with reference to the enable temperature set forth in specification 3.4.9.3. Therefore, in the future when the enable temperature is revised, reference to specification 3.4.9.3 will ensure the correct temperature is applied.

Based on the above considerations, these changes reflect the application of methodologies recognized by the NRC and the industry as providing a sufficient margin of safety. These changes are consistent with the applicability of the heatup and cooldown curves, therefore, these changes are considered to be safe and will not reduce the safety of the plant.

E. NO SIGNIFICANT HAZARDS EVALUATION

The no significant hazard considerations involved with the proposed amendment have been evaluated, focusing on the three standards set forth in 10 CFR 50.92(c) as quoted below:

> The Commission may make a final determination, pursuant to the procedures in paragraph 50.91, that a proposed amendment to an operating license for a facility licensed under paragraph 50.21(b) or paragraph 50.22 or for a testing facility involves no significant hazards consideration, if operation of the facility in accordance with the proposed amendment would not:
>
> (1) Involve a significant increase in the probability or consequences of an accident previously evaluated; or
>
> (2) Create the possibility of a new or different kind of accident from any accident previously evaluated; or
>
> (3) Involve a significant reduction in a margin of safety.

The following evaluation is provided for the no significant hazards consideration standards.

1. Does the change involve a significant increase in the probability or consequences of an accident previously evaluated?

   The proposed changes incorporate a new OPPS setpoint and a new OPPS enable temperature. These changes result from discussions with the NRC staff where concerns were identified related to control of the OPPS setpoint when it is based on a curve. Therefore, it was determined that a bounding single setpoint of 444 psig would satisfy this concern.

   Section 5.2.2 of the Standard Review Plan includes Branch Technical Position RSB 5-2 which provides guidance for determining the OPPS enable temperature. This method was used and results in effectively increasing the range over which the OPPS is active by changing the temperature from 275°F to 292°F.

   These changes were determined in accordance with the methodology set forth in the regulations to provide an adequate margin of safety to ensure the reactor vessel will withstand the effects of normal cyclic loads due to temperature and pressure changes as well as the loads associated with postulated faulted events. Therefore, the proposed changes will not significantly increase the probability or consequences of an accident previously evaluated.

2. Does the change create the possibility of a new or different kind of accident from any accident previously evaluated?

   The OPPS is provided to prevent brittle fracture of the reactor vessel at temperatures $\leq$ the temperature at which the OPPS is made active. This new enable temperature provides a wider range over which the OPPS is active and was determined in accordance with the regulations. The new OPPS pressure setpoint was selected from the most conservative position on the low temperature overpressure protection setpoint curve to ensure sufficient margin is available to prevent violation of the pressure-temperature limits due to anticipated mass and heat input transients.

   These changes are consistent with the regulations and will not affect the reliability of the reactor vessel or the plant heatup and cooldown procedures. Therefore, the proposed changes will not create the possibility of a new or different kind of accident from any accident previously evaluated.

3. Does the change involve a significant reduction in a margin of safety?

   The revised OPPS setpoint, enable temperature, and heatup and cooldown curves will continue to ensure the reactor coolant system will be protected from pressure transients at low temperature. The proposed changes will not reduce the reliability of the OPPS, nor will they increase the likelihood of vessel damage or failure in the event of an overpressure transient. These changes are established in accordance with current regulations and the latest regulatory guidance. Plant operation will be within the required limits, therefore, the reactor vessel materials will behave in a nonbrittle manner to remain within the plant design basis. Therefore, the proposed changes do not involve a significant reduction in a margin of safety.

F. NO SIGNIFICANT HAZARDS CONSIDERATION DETERMINATION

Based on the considerations expressed above, it is concluded that the activities associated with this license amendment request satisfies the no significant hazards consideration standards of 10 CFR 50.92(c) and, accordingly, a no significant hazards consideration finding is justified.

G. ENVIRONMENTAL EVALUATION

The proposed changes have been evaluated and it has been determined that the changes do not involve (i) a significant hazards consideration, (ii) a significant change in the types or significant increase in the amounts of any effluents that may be released offsite, or (iii) a significant increase in individual

or cumulative occupational radiation exposure. Accordingly, the proposed changes meet the eligibility criterion for categorical exclusion set forth in 10 CFR 51.22(c)(9). Therefore, pursuant to 10 CFR 51.22 (b), an environmental assessment of the proposed changes is not required.

H. UFSAR CHANGES

A change to UFSAR Section 4.2 is provided in Attachment D to incorporate a discussion of the OPPS.

ATTACHMENT C

Beaver Valley Power Station, Unit No. 1
Proposed Technical Specification Change No. 176 Revision 1

Typed Pages:	3/4	1-12
	B 3/4	1-2a
	3/4	4-4a
	3/4	4-27a
	B 3/4	4-10
	B 3/4	4-11
	3/4	5-6
	3/4	5-7a
	B 3/4	5-1
	B 3/4	5-2

CHARGING PUMPS - OPERATING

LIMITING CONDITION FOR OPERATION

3.1.2.4 At least two charging pumps shall be OPERABLE.

APPLICABILITY: MODES 1, 2, 3, and 4*

ACTION:

With only one charging pump OPERABLE, restore at least two charging pumps to OPERABLE status within 72 hours or be in at least HOT STANDBY and borated to a SHUTDOWN MARGIN equivalent to at least 1% $\Delta k/k$ at 200°F within the next 6 hours; restore at least two charging pumps to OPERABLE status within the next 7 days or be in COLD SHUTDOWN within the next 30 hours.

SURVEILLANCE REQUIREMENTS

4.1.2.4.1 At least two charging pumps shall be demonstrated OPERABLE by verifying, on recirculation flow, that each pump develops a discharge pressure greater than or equal to 2402 psig when tested pursuant to Specification 4.0.5.

4.1.2.4.2 All charging pumps, except the above required OPERABLE pump, shall be demonstrated inoperable at least once per 12 hours whenever the temperature of one or more of the inservice RCS cold legs is $\leq$ the enable temperature set forth in Specification 3.4.9.3 by verifying that the control switches are placed in the PULL-TO-LOCK position and tagged.

*A maximum of one centrifugal charging pump shall be OPERABLE whenever the temperature of one or more of the non-isolated RCS cold legs is $\leq$ the enable temperature setforth in Specification 3.4.9.3.

3/4.1.2 BORATION SYSTEMS (Continued)

The required volume of water in the refueling water storage tank for reactivity considerations while operating is 424,000 gallons. The associated technical specification limit on the refueling water storage tank has been established at 441,100 gallons to account for reactivity considerations and the NPSH requirements of the ECCS system.

The OPERABILITY of the RWST as part of the ECCS ensures that a sufficient supply of borated water is available for injection by the ECCS in the event of a LOCA. The limits on RWST minimum volume and boron concentration ensure that 1) sufficient water is available within containment to permit recirculation cooling flow to the core, and 2) the reactor will remain subcritical in the cold condition following mixing of the RWST and the RCS water volumes with all control rods inserted except for the most reactive control assembly. These assumptions are consistent with the LOCA analysis.

The limitations for a maximum of one centrifugal charging pump to be OPERABLE and the Surveillance Requirement to verify all charging pumps except the required OPERABLE pump to be inoperable ≤ the enable temperature setforth in specification 3.4.9.3 provides assurance that a mass addition pressure transient can be relieved by the operation of a single PORV. Substituting a Low Head Safety Injection pump for a charging pump in Modes 5 and 6 will not increase the porbability of an overpressure event since the shutoff head of the Low Head Safety Injection pumps is ≤ the setpoint of the overpressure protection system.

REACTOR COOLANT PUMP STARTUP

LIMITING CONDITION FOR OPERATION

3.4.1.6 If both OPPS PORV's are not OPERABLE, an idle reactor coolant pump in a non-isolated loop shall not be started, unless:

1. The actual pressurizer water level is less than 60 percent (840 ft^3), or

2. The secondary water temperature * of each steam generator is less than 25°F above each of the in-service RCS cold leg temperatures.

APPLICABILITY: When the temperature of one or more of the non-isolated loop cold legs is ≤ the enable temperature setforth in Specification 3.4.9.3

ACTION:

With the pressurizer water level greater than 60 percent or the temperature of the steam generator in the loop associated with the reactor coolant pump being started greater than 25° above the cold leg temperature of the other non-isolated loops, suspend the startup of the reactor coolant pump.

SURVEILLANCE REQUIREMENTS:

4.4.1.6.1 The pressurizer water volume or the secondary water temperature of the non-isolated steam generators shall be determined within ten minutes prior to starting a reactor coolant pump.

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* The secondary water temperature is to be verified by direct measurement of the fluid temperature, or contact temperature readings on the steam generator secondary, or blowdown piping after purging of stagnant water within the piping.

OVERPRESSURE PROTECTION SYSTEMS

LIMITING CONDITION FOR OPERATION

3.4.9.3 At least one of the following overpressure protection systems shall be OPERABLE:

a. Two power operated relief valves (PORVs) with a nominal trip setpoint of ≤ 444 psig, or

b. A reactor coolant system vent of ≥ 3.14 square inches.

APPLICABILITY: When the temperature of one or more of the non-isolated RCS cold legs is ≤ an enable temperature of 292°F.

ACTION:

a. With one PORV inoperable, either restore the inoperable PORV to OPERABLE status within 7 days or depressurize and vent the RCS through a 3.14 square inch vent(s) within the next 12 hours; maintain the RCS in a vented condition until both PORVs have been restored to OPERABLE status. Refer to Technical Specification 3.4.1.6 for further limitations.

b. With both PORV's inoperable, depressurize and vent the RCS through a 3.14 square inch vent(s) within 12 hours; maintain the RCS in a vented condition until both PORVs have been restored to OPERABLE status.

c. The provisions of Specification 3.0.4 are not applicable.

SURVEILLANCE REQUIREMENT

4.4.9.3.1 Each PORV shall be demonstrated OPERABLE BY:

vessel inside radius are essentially identical, the measured transition shift for a sample can be applied with confidence to the adjacent section of the reactor vessel. The heatup and cooldown curves must be recalculated when the RT_{NDT} determined from the surveillance capsule is different from the calculated RT_{NDT} for the equivalent capsule radiation exposure.

The pressure-temperature limit lines shown on Figure 3.4-2 for reactor criticality and for inservice leak and hydrostatic testing have been provided to assure compliance with the minimum temperature requirements of Appendix G to 10 CFR 50 for reactor criticality and for inservice leak and hydrostatic testing.

The number of reactor vessel irradiation surveillance specimens and the frequencies for removing and testing these specimens are provided in UFSAR Table 4.5-3 to assure compliance with the requirements of Appendix H to 10 CFR 50.

The limitations imposed on the pressurizer heatup and cooldown rates and spray water temperature differential are provided to assure that the pressurizer is operated within the design criteria assumed for the fatigue analysis performed in accordance with the ASME Code requirements.

The OPERABILITY of two PORV's or an RCS vent opening of greater than 3.14 square inches ensures that the RCS will be protected form 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 ≤ the enable temperature. The enable temperature is defined in Standard Review Plan Section 5.2.2 Branch technical Position RSB 5-2 as the water temperature corresponding to a metal temperature of at least RT_{NDT} + 90 deg F. The OPPS setpoint is determined from an assessment of steady-state pressure-temperature limits as described in UFSAR Section 4.2. Either PORV has adequate relieving capability to protect the RCS from over-pressurization when the transient is limited to either (1) the start of an idle RCP with the secondary water temperature of the steam generator ≤ 25°F above the RCS cold leg temperature or (2) the start of a charging pump and its injection into a water solid RCS.

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 Part 50.55a(g) except where specific written relief has been granted by the Commission pursuant to 10 CFR Part 50.55a(g) (6) (i).

3/4.4.11 RELIEF VALVES

The relief valves have remotely operated block valves to provide a positive shutoff capability should a relief valve become inoperable. The electrical power for both the relief valves and the block valves is capable of being supplied from an emergency power source to ensure the ability to seal this possible RCS leakage path.

3/4.4.12 REACTOR COOLANT SYSTEM VENTS

Reactor Coolant System Vents are provided to exhaust noncondensible gases and/or steam from the primary system that could inhibit natural circulation core cooling. The OPERABILITY of at least one reactor coolant system vent path from the reactor vessel head and the pressurizer steam space, ensures the capability exists to perform this function.

The valve redundancy of the reactor coolant system vent paths serve 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 vent systems are consistent with the requirements of Item II.B.1 of NUREG-0737, "Clarification of TMI Action Plan Requirements," November 1980.

ECCS SUBSYSTEMS T_{AVG} <350°F

LIMITING CONDITION FOR OPERATION

3.5.3 As a minimum, one ECCS subsystem comprised of the following shall be operable:

a. One OPERABLE centrifugal charging pump, #
b. One OPERABLE Low Head Safety Injection Pump, and
c. An OPERABLE flow path capable of taking suction from the refueling water storage tank upon being manually realigned and transferring suction to the containment sump during the recirculation phase of operation.

APPLICABILITY: MODE 4

ACTION:

a. With no ECCS subsystem OPERABLE because of the inoperability of either the centrifugal charging pump or the flow path from the refueling water storage tank, restore at least one ECCS subsystem to OPERABLE status within 1 hour or be in COLD SHUTDOWN within the next 20 hours.

b. In the event the ECCS is actuated and injects water into the Reactor Coolant System, a Special Report shall be prepared and submitted to the Commission pursuant to Specification 6.9.2 within 30 days describing the circumstances of the actuation and the total accumulated actuation cycles to date.

SURVEILLANCE REQUIREMENTS

4.5.3.1 The ECCS subsystem shall be demonstrated OPERABLE per the applicable Surveillance Requirements of 4.5.2.

4.5.3.2 All charging pumps except the above required OPERABLE pumps, shall be demonstrated inoperable at least once per 12 hours whenever the temperature of one or more of the non-isolated RCS cold legs is ≤ the enable temperature setforth in specification 3.4.9.3 by verifying that the control switches are placed in the PULL-TO-LOCK position and tagged.

A maximum of one centrifugal charging pump shall be OPERABLE whenever the temperature of one or more of the non-isolated RCS cold legs is ≤ the enable temperature setforth in specification 3.4.9.3.

3/4.5.4 BORON INJECTION SYSTEM

BORON INJECTION TANK ≤350°F

LIMITING CONDITION FOR OPERATION

3.5.4.1.2 The boron injection tank flow path shall be isolated and power removed from the inlet or outlet valves.

APPLICABILITY: When the temperature of one or more of the non-isolated RCS cold legs is ≤ the enable temperature setforth in specification 3.4.9.3.

ACTION:

With the boron injection tank not isolated, isolate the tank flow path and remove power from the inlet or outlet valves.

SURVEILLANCE REQUIREMENTS

4.5.4.1.2 The boron injection tank flow path shall be verified isolated by verifying at least once per 7 days that the Boron Injection Tank inlet or outlet valves are closed and de-energized except for purposes of flow testing.

3/4.5.1 ACCUMULATORS

The OPERABILITY of each of the RCS accumulators ensures that a sufficient volume of borated water will be immediately forced into the reactor core through each of the cold legs in the event the RCS pressure falls below the pressure of the accumulators. This initial surge of water into the core provides the initial cooling mechanism during large RCS pipe ruptures.

The limits on accumulator volume, boron concentration and pressure ensure that the assumptions used for accumulator injection in the accident analysis are met. The limit of one hour for operation with an inoperable accumulator minimizes the time exposure of the plant to a LOCA event occurring concurrent with failure of an additional accumulator which may result in unacceptable peak cladding temperatures.

The RCS accumulators are isolated when RCS pressure is reduced to 1000 $\pm$ 100 psig to prevent borated water from being injected into the RCS during normal plant cooldown and depressurization conditions and also to prevent inadvertent overpressurization of the RCS at reduced RCS temperature. With the accumulator pressure reduced to less than the reactor vessel low temperature overpressure protection setpoint, the accumulator pressure cannot challenge the cold overperssure protection system or exceed the 10 CFR 50 Appendix G limits. Therefore, the accumulator discharge isolation vavles may be opened to perform the accumulator discharge check valve testing specified in the IST program.

3/4.5.2 and 3/4.5.3 ECCS SUBSYSTEMS

The OPERABILITY of two separate and independent ECCS subsystems ensures that sufficient emergency core cooling capability will be available in the event of a LOCA assuming the loss of one subsystem through any single failure consideration. Either subsystem operating in conjunction with the accumulators is capable of supplying sufficient core cooling to limit the peak cladding temperatures within acceptable limits for all postulated break sizes ranging from the double-ended break of the largest RCS cold leg pipe downward. In addition, each ECCS subsystem provides long-term core cooling capability in the recirculation mode during the accident recovery period.

The Surveillance Requirements provided to ensure OPERABILITY of each component ensure that at a minimum, the assumptions used in the accident analyses are met and that subsystem OPERABILITY is maintained.

The limitation for a maximum of one charging pump to be OPERABLE and the Surveillance Requirement to verify all charging pumps except the required OPERABLE pump to be inoperable $\leq$ the enable temperature set forth in specification 3.4.9.3 provides assurance that a mass addition pressure transient can be relieved by the oepration of a single PORV.

3/4.5.4 BORON INJECTION SYSTEM

The OPERABILITY of the boron injection system as part of the ECCS ensures that sufficient negative reactivity is injected into the core to limit any positive increase in reactivity caused by RCS system cooldown. RCS cooldown can be caused by inadvertent depressurization, a loss-of-coolant accident or a steam line rupture.

The boron injection tank is required to be isolated when RCS temperature is ≤ the enable temperature setforth in specification 3.4.9.3 to prevent a potential overpressurization due to an inadvertent safety injection signal.

The analysis of a main steam pipe rupture is performed to demonstrate that the following criteria are satisfied:

1. Assuming a stuck rod cluster control assembly, with or without offsite power, and assuming a single failure in the engineered safeguards, there is no consequential damage to the primary system and the core remains in place and intact.

2. Energy release to containment from the worst steam pipe break does not cause failure of the containment structure.

3. Radiation doses are not expected to exceed the guidelines of the 10 CFR 100.

The limits on injection tank minimum volume and boron concentration ensure that the assumptions used in the steam line break analysis are met.

Verification of 120°F in the injection flow path assures an 8-hour margin to the time at which precipitation of a 7700 ppm boric acid solution would occur without benefit of the building heating system.

Verifying the recirculation flow path and stagnant piping temperatures, when the Boron Injection Flow Path temperature is less than 120°F and greater than 65°F, by monitoring the ambient air temperatures in the building areas containing that piping provides assurance that boron precipitation will not occur.

ATTACHMENT D

Beaver Valley Power Station, Unit No.1

Proposed Technical Specification Change No. 176, Revision 1

UFSAR Section 4.2 Changes

a temperature indicator in the safety valve discharge manifolds alert the operator to the passage of steam due to leakage or valves lifting. These pressure switches monitor the pilot valve chamber for leakage which could lift the safety valve below setpoint.

The pressurizer safety valve support is designed to withstand seismic, thermal, and dead weight forces in addition to the valve discharge reactions. The supports consist of:

1. Two circumferential anchor straps placed around the pressurizer vessel, and held in place by the forces of pressure and friction

2. Two built-up box sections which are welded to each other and are bolted to the straps

3. A flange welded to the box sections and bolted to the safety valve flange.

Power Relief Valves

The pressurizer is equipped with power-operated relief valves which limit system pressure for a large power mismatch and thus prevent actuation of the fixed high-pressure reactor trip. The relief valves are operated automatically or by remote manual control. The operation of these valves also limits the undesirable opening of the spring-loaded safety valves. Remotely operated stop valves are provided to isolate the power-operated relief valves if excessive leakage occurs.

The relief valves are designed to limit the pressurizer pressure to a value below the high-pressure trip setpoint for all design transients up to and including the design percent step load decrease with steam dump but without reactor trip. In addition, the relief valves have a low pressure setpoint which is used when the reactor coolant system is cold and solid. The design basis for the low pressure setpoint is preventing over pressurization during the inadvertent starting of a high head safety injection pump and assumes no operator action for ten minutes.

Design parameters for the pressurizer spray control, safety, and power relief valves are given in Table 4.1-8.

Valve Operability Tests

Full size proof tests to show that the pressurizer safety and relief valves and block valves would perform their intended function were performed. See Reference 6 for details.

Loop Stop Valves

The reactor coolant loop stop valves shown in Figure 4.2-9 are remotely controlled motor operated gate valves which permit any

INSERT 1

INSERT 1

Overpressure Protection System (OPPS)

The allowable system pressure is significantly less than the design pressure of 2485 psig, necessitating additional means to prevent brittle fracture of the reactor vessel at temperatures < the enable temperature. The enable temperature is given in the technical specifications. Therefore, overpressure mitigation provisions for the reactor vessel, as provided by the OPPS, must be available when the RCS and the reactor vessel are at temperatures < the enable temperature.

During a normal plant heatup, the RCS is open to the RHRS and may be operated for a short period of time in a water solid mode until a steam bubble is formed in the pressurizer. The RHRS is provided with self-actuated water relief valves to prevent overpressure caused either within the system itself or from transients transmitted from the RCS. During these low-temperature, low-pressure operating conditions, the OPPS is armed and in a ready status to mitigate pressure transients. In determining the OPPS setpoints, no credit is taken for RHR relief valve operation. When the reactor coolant temperature has increased above the enable temperature the OPPS is manually disarmed.

During a normal plant cooldown, the OPPS is manually armed as the reactor coolant temperature is decreased < the enable temperature. Note that at this time there is a steam bubble in the pressurizer and the water level is at the normal level for no-load operation. The RHRS is normally placed in service by opening the suction isolation valves prior to the OPPS being placed in service. When the coolant temperature has decreased to about 160 deg F, the steam bubble may be quenched and the reactor coolant pumps stopped. From this point on in the cooldown, the OPPS will be in an active status ready to mitigate pressure transients which might occur.

Potential overpressurization transients to the RCS can be caused by either of two types of events to the RCS, mass input or heat input. Both types result in more rapid pressure changes when the RCS is water solid. Specifically, the OPPS design bases transients are defined as: 1) the mass input transient caused by a normal charging/letdown flow mismatch after the termination of letdown flow and 2) the heat input transient caused by the restart of a RCP when a temperature asymmetry exists within the RCS due to the continued injection of cold seal injection water.

For a particular mass input transient to the RCS, the relief valve will be signalled to open at a specific pressure setpoint. However, there will be a pressure overshoot during the delay time before the valve starts to move and during the time the valve is moving to the full open position. This overshoot is dependent on the dynamics of the system and the input parameters and results in a maximum system pressure somewhat higher than the set pressure. Similarly, there will be a pressure undershoot, while the valve is relieving, both due to the reset pressure being below the setpoint and to the delay in stroking the valve closed. The maximum and minimum pressures reached in the transient are a function of the selected setpoint and must fall within the acceptable pressure range. Note that the pressure overshoot and undershoot for the mass input case is greatest at low temperatures. Thus, the overshoot calculation is limited to the most restrictive low temperature condition only. Whereas, the heat input evaluation calculates the pressure overshoot for a range of reactor coolant temperatures.

The range of allowable setpoints for the OPPS is determined by superimposing the results of the several mass input and heat input cases evaluated and selecting setpoints that will satisfy both types of transients. The selection of the pressure setpoint for the PORV's is based on the use of nominal upper and lower limits.The OPPS is considered to be a mitigation system, as opposed to a protection system, and the use of nominal limits is understood and approved by the NRC. The steady-state pressure-temperature limit is used as the basis for setpoint selection to provide the greatest operational flexibility. This limit has been accepted by the NRC with the justification that "most transients occur during isothermal metal conditions."

The development of the reactor coolant system heatup and cooldown curves is accomplished by following the guidance provided by Regulatory Guide 1.99, Revision 2. These curves represent operational limitations to be followed during heatup or cooldown transitions and are not utilized by themselves for determining the OPPS setpoint since they do not represent steady-state pressure-temperature conditions.

Thus, the OPPS is designed to provide the capability, during relatively low temperature RCS operation, to prevent the RCS pressure from exceeding allowable limits. The OPPS is designed with redundant components to assure it will perform its function assuming any single active component failure. It is provided in addition to the administrative controls to reduce the likelihood that pressure transients will exceed the technical specification pressure/temperature limits.