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L-00-140

U. S. Nuclear Regulatory Commission
Attention: Document Control Desk
Washington, DC 20555-0001

Subject: Beaver Valley Power Station, Unit No. 2
Docket No. 50-412, License No. NPF-73
Requested Correction of Safety Evaluation Report

FENOC requests that a correction be made to the NRC's safety evaluation report (SER) related to Amendment 113 to the Beaver Valley Power Station (BVPS) Unit 2 operating license. On September 6, 2000, the NRC issued Amendment 113 to the BVPS Unit 2 operating license. Amendment 113 consisted of changes to the Unit 2 technical specifications in response to the BVPS License Amendment Request Number 127 dated June 17, 1999, and supplemented by letters dated September 15, 1999, February 15, 2000, and June 29, 2000. The amendment approved new low temperature over-pressure protection setpoints and new heatup and cooldown pressure/temperature limit curves for 15 effective full power years.

Following receipt of Amendment 113, BVPS personnel verbally notified the NRC of a discrepancy in the SER. The discrepancy in the SER was subsequently discussed on several conference calls between members of the BVPS staff and the NRC staff. On November 14, 2000, the NRC and BVPS staff reached agreement that BVPS would document a request to revise the SER and include supporting information in a letter to the NRC. The attachment to this letter summarizes the BVPS concern with the SER and subsequent NRC concerns, points out how the concerns were addressed in the BVPS submittal, and provides additional relevant background material.

If there are any questions concerning this matter, please contact Mr. Thomas S. Cosgrove, Manager, Licensing at 724-682-5203.

Sincerely,

Lew W. Myers

c: Mr. L. J. Burkhart, Project Manager
Mr. D. M. Kern, Sr. Resident Inspector
Mr. H. J. Miller, NRC Region I Administrator
Mr. D. A. Allard, Director BRP/DEP
Mr. L. E. Ryan (BRP/DEP)

A001

Attachment

Request to Correct the Safety Evaluation (SER) For
Beaver Valley Power Station (BVPS) Unit 2
Issued On September 6, 2000

SER Statement of Concern

The SER statement of concern is on page 6 of the SER in Section 3.2.3, "Reactor Coolant Pump Seal Limit." The SER section in question discusses the adequacy of the pressurizer power operated relief valve (PORV) setpoints in relation to the minimum pressure necessary for proper operation of the reactor coolant pump (RCP) number one seal. The following excerpt contains the text of SER Section 3.2.3 (for context) with the statement of concern underlined:

> "During a mass or heat addition transient, should two PORVs actuate simultaneously, it is estimated that the pressure undershoot will be greater than the allowable ΔP across the number one RCP seal. For this reason, the PORV settings are staggered. However, it is possible for an RHR relief valve and a pressurizer PORV to be activated simultaneously resulting in a pressure undershoot. For this reason, the RHR system is isolated from the RCS when the overpressure protection system is armed. The above results are from the licensee's design basis calculation, which is the analysis of record. The NRC staff finds this to be acceptable since it provides adequate protection for the number one RCP seal."

BVPS Position

The BVPS low temperature over-pressure protection setpoints for the PORVs proposed in the June 17, 1999, submittal of License Amendment Request No. 127 were determined by Westinghouse in accordance with NRC approved WCAP-14040, "Methodology Used To Develop Cold Overpressure Mitigating System Setpoints And RCS Heatup And Cooldown Limit Curves." The Westinghouse methodology used to determine the PORV setpoints conservatively assumes that RHR is isolated from the RCS so that the RHR relief valves are not available for low temperature overpressure protection. This assumption is utilized to maximize the effect of the analyzed transients on the operation of the PORVs in their capacity to provide over-pressure protection at low temperature conditions. However, the RHR system is the primary means for core cooling during shutdown conditions and will normally be in service during plant conditions when the PORVs are utilized for low temperature over-pressure protection. This mode of operation during shutdown conditions is not specific to BVPS and is typical of most Westinghouse designed plants. The normal operation of the RHR system, including the value of the RHR relief valve setpoint was described on page B-4 of Attachment B in the

BVPS June 17, 1999, submittal. The NRC SER statement that the RHR is isolated from the RCS when the over-pressure protection system is armed is inconsistent with the normal operation of the RHR system as described in the June 17, 1999, submittal and should be corrected.

Subsequent NRC Concern

The SER Section in question (3.2.3) discusses the adequacy of the PORV setpoints in relation to the minimum pressure necessary for proper operation of the reactor coolant pump (RCP) number one seal. The SER statement in question justified the adequacy of the PORV setpoints to ensure operation within the minimum pressure required for proper RCP operation.

BVPS Response

The BVPS low temperature over-pressure protection setpoints for the PORVs proposed in the June 17, 1999, submittal were determined by Westinghouse in accordance with NRC approved WCAP-14040. As stated in the Westinghouse WCAP-14040, the pressure range from which the PORV setpoints are selected is bounded by two limits. The limits consist of the upper limit (based on 10 CFR 50 Appendix G requirements) that protects the reactor vessel from brittle fracture and the lower limit which is based on an operational consideration for the minimum pressure requirements for the RCP number one seal. The lower RCP seal limit is typically a concern as a result of relief valve pressure undershoot from a single or multiple PORV relief, and, as stated in the SER for Amendment 113, simultaneous relief from an RHR relief valve and a PORV. Although not specifically analyzed, at the lowest RCS temperatures on the BVPS PORV setpoint curve the difference between the PORV setpoint and the RHR relief valve setpoint may not be sufficient to preclude simultaneous relief from both systems. However, Westinghouse WCAP-14040 and the NRC SER for that WCAP recognize that there might not be sufficient range between the two pressure limits to select PORV setpoints that would provide protection for both limits. As stated in Westinghouse WCAP-14040 and the associated NRC SER for that WCAP,

> "Where there is insufficient range between the upper and lower pressure limits to select PORV setpoints to provide protection against violation of both limits, setpoint selection to provide protection against the upper pressure limit violation shall take precedence."

On page B-9 of the June 17, 1999, BVPS submittal it was identified that the potential existed at the lowest RCS temperatures to violate the minimum pressure requirement for the RCP seal along with the provision that "Where there is insufficient range between the upper and lower pressure limits to select PORV setpoints to provide protection against violation of both limits, setpoint selection to provide protection against the upper pressure limit violation shall take precedence." This same information was also included in

Section G "Margin to the Reactor Coolant Pump Number One Seal Limit" of the Westinghouse PORV Setpoint Review Report For BVPS 15 EFPY. This Westinghouse report was included in Attachment D to the June 17, 1999, submittal and was later updated in the February 15, 2000, supplemental submittal. Both the BVPS June submittal and the Westinghouse Report also detailed the incorporation of instrument uncertainties in the calculation of the BVPS PORV setpoints and explained how the PORV setpoints were reduced accordingly.

WCAP-14040 Background Information

During the original NRC review of WCAP-14040 and the associated Watts Bar submittal in 1995 the NRC identified the concern that pressure and temperature instrument uncertainties should be addressed when calculating PORV low temperature over-pressure protection setpoints. In a letter to the NRC (OG-95-54) dated June 16, 1995, the Westinghouse Owners Group (WOG) responded to the NRC request that instrument uncertainties be included in the WCAP-14040 methodology for calculating the PORV setpoints. The WOG letter contained a Westinghouse Report that attempted to justify the exclusion of instrument uncertainties from the WCAP-14040 methodology. The report contained the following reasons for excluding instrument uncertainties:

- "The methodology of WCAP-14040 incorporates adequate conservatisms that considerably override the need to incorporate additional margins for random temperature and pressure uncertainties,

- Incorporating additional margins for random temperature and pressure uncertainties unnecessarily reduces operating flexibility, particularly at lower temperatures, between the Appendix G limit and the minimum pressure necessary for proper operation of reactor coolant pump seals, without a commensurate increase in protection of the reactor vessel integrity, and

- By reducing operating flexibility, the likelihood of COMS [Cold Overpressure Mitigation System] actuation is increased."

In discussing the justifications above, the Westinghouse report further elaborated on the impact the inclusion of instrument uncertainties would have on the resulting PORV setpoints. The report stated that "At lower temperatures particularly, only a narrow window is available for operation between the Appendix G limit and the minimum pressure required in order to assure proper operation of the pump seals. Reducing the maximum allowable setpoint further in order to incorporate instrument uncertainty reduces this available margin further, and in extreme cases, can decrease the maximum allowable PORV setpoint below the pump seal limit."

Following the WOG letter, the NRC responded in a letter to R. A. Newton (Chairman of the WOG) from C. I. Grimes on July 11, 1995. In item 9 of Enclosure 1 to that letter the NRC found it unacceptable to omit pressure and temperature instrument uncertainties

from the WCAP-14040 methodology. In item 5 of Enclosure 1 to the letter, the NRC requested that WCAP-14040 Section 3.2.2 be modified "to indicate that in the case where the available range is insufficient to concurrently accommodate the upper and lower pressure limits, the upper pressure limits are given preference."

The correspondence associated with the approval of the WCAP indicates the NRC has evaluated and accepted the consequences of including instrument uncertainties in the setpoint methodology and provided the provision in the WCAP that allows for cases where only the upper or Appendix G limits can be adequately protected. The acceptance of the reduction of margin available to protect the lower limit in order to assure adequate protection of the upper limit at low RCS temperatures is further illustrated in Table 3.1-1 of Appendix A to WCAP-14040. This Table contains PORV setpoint data approved by the NRC for Watts Bar. In the Table, several PORV setpoints are clearly annotated to identify that they violate the RCP seal limit. The NRC SER for WCAP-14040, issued October 16, 1995, acknowledges that the lower limit of the RCS pressure during a transient is based on an operational consideration for maintaining a normal pressure differential across the RCP number one seal. The SER goes on to explain that "when there is insufficient range between the upper and lower pressure limits to select PORV setpoints to provide protection against violation of both limits, setpoint selection to provide protection against the upper pressure limit violation shall take precedence."

The provision of WCAP-14040 and the associated SER that gives precedence to the protection of the upper or Appendix G limits is consistent with the technical specification bases for the low temperature over-pressure protection system contained in NUREG-1431, Rev. 1, "Improved Standard Technical Specifications for Westinghouse Plants." In the standard technical specification bases, (B 3.4.12) the only pressure limit referenced for PORV low temperature over-pressure protection is the upper limit of 10 CFR 50 Appendix G. The RCP pump seal pressure limit is not discussed as part of the bases for this technical specification requirement. The SER statement in question is applicable to the BVPS low temperature over-pressure protection system technical specification.

Conclusions

The BVPS low temperature over-pressure protection setpoints for the PORVs proposed in the June 17, 1999, submittal were determined by Westinghouse in accordance with NRC approved WCAP-14040, "Methodology Used To Develop Cold Overpressure Mitigating System Setpoints And RCS Heatup And Cooldown Limit Curves." The application of that methodology has yielded the expected results that reflect the additional conservatisms used to ensure that adequate protection is afforded the 10 CFR 50 Appendix G limits.

The inclusion of instrument uncertainties in the calculation of the BVPS PORV setpoints has reduced those setpoints by approximately 100 psig. At the lowest RCS temperatures, the BVPS margin available to ensure protection of the lower pressure limit is therefore reduced. However, as stated in the BVPS June 17, 1999, submittal and consistent with

the specific NRC recommendations included in WCAP-14040, the BVPS PORV setpoints were chosen to assure protection for the 10 CFR 50 Appendix G limits which are the stated bases for the technical specification being revised.

Based on the documentation discussed in the background information above, the reduction of margin available to protect the lower limit that results from implementing the approved methodology in WCAP-14040 is not a plant-specific issue that requires additional justification. In approving WCAP-14040, the NRC staff has reviewed this issue and found the reduction in the margin available to protect the lower pressure limit acceptable in order to ensure the Appendix G limits are adequately protected. The NRC SER for WCAP-14040 does not specify that additional plant-specific justification is required for the provision of the WCAP that gives precedence to the protection of the Appendix G limits when determining PORV setpoints. In addition, the NRC SER for WCAP-14040 acknowledges that the lower limit of RCS pressure during a transient is based on an operational consideration and the standard technical specification bases contained in NUREG-1431 does not include the lower pressure limit in the bases of the affected technical specification.

Based on the information presented above, SER section 3.2.3 should not be required for the technical specification change in question. However, if the SER section must be retained, the following relevant points should be considered:

1. The basis for the technical specification being revised is the protection of the upper or 10 CFR 50 Appendix G limits,

2. The lower limit of the RCS pressure during a transient is based on an operational consideration for maintaining a normal pressure differential across the RCP number one seals for proper RCP operation,

3. In the case where the available range is insufficient to concurrently accommodate the upper and lower pressure limits, the upper pressure limits shall be given preference,

4. The reduction of the margin available to protect the lower pressure limit has been found to be acceptable by the NRC staff where that margin is needed to ensure the upper pressure limit of 10 CFR 50 Appendix G is adequately protected, and

5. The BVPS PORV setpoints were selected consistent with the NRC approved methodology of WCAP-14040 and incorporate the required conservatisms to ensure adequate protection is afforded the 10 CFR 50 Appendix G limits.