April 3, 2001

Mr. L. W. Myers
Senior Vice President
FirstEnergy Nuclear Operating company
Beaver Valley Power Station
Post Office Box 4
Shippingport, PA 15077

SUBJECT: BEAVER VALLEY POWER STATION, UNIT 2 - CORRECTION TO SAFETY EVALUATION (SE) RELATED TO AMENDMENT NO. 113 REGARDING REVISED PRESSURE-TEMPERATURE LIMITS (TAC NO. MB0049, AMENDMENT NO. 113 WAS ISSUED UNDER TAC NO. MA5988)

Dear Mr. Myers:

The Nuclear Regulatory Commission (NRC) issued Amendment No. 113 to Facility Operating License No. NPF-73 for the Beaver Valley Power Station, Unit No. 2 (BVPS-2) on September 6, 2000 (ADAMS Accession No. ML003729649), in response to your application dated June 17, 1999 (Accession No. 990629027, available from the NRC Public Document Room(PDR)), as supplemented on September 15, 1999 (Accession No. 9909280316, available from the NRC PDR), and February 15 (ADAMS Accession No. ML003685823) and June 29, 2000 (ADAMS Accession No. ML003731257). The amendment approved revised low temperature over-pressure protection setpoints and new heatup and cooldown pressure/temperature (P/T) limit curves.

Following receipt of Amendment No. 113, licensee personnel verbally notified the NRC of a discrepancy in the SE regarding the description of operation of the residual heat removal (RHR) system. Section 3.2.3 of the SE, which was enclosed with the September 6, 2000, amendment, states, in part, that "...the RHR system is isolated from the RCS [reactor coolant system] when the overpressure protection system is armed." The licensee stated that this description does not reflect current practice at BVPS-2 and other Westinghouse plants. The licensee stated that although the overpressure analysis was performed with the RHR system isolated to ensure conservatism, it is common practice to use the RHR system as the primary means of shutdown cooling. The licensee documented its position regarding this matter in a letter dated December 19, 2000 (ADAMS Accession No. ML010020054).

With respect to its estimation of P/T limit curves and the low temperature overpressure (LTOP) limits, the licensee used a methodology that is described in WCAP-14040, "Methodology Used to Develop Cold Overpressure Mitigating System Setpoints and RCS Heatup and Cooldown Limit Curves." The NRC had previously reviewed and approved WCAP-14040 for application at Westinghouse plants. The current regulatory position for establishing satisfactory LTOP protection concludes that the power-operated relief valve (PORV) setpoints (LTOP limits) must satisfy an upper pressure limit based on Title 10 of the *Code of Federal Regulations* (10 CFR) Appendix G requirements to protect the reactor vessel from brittle fracture and a lower limit to protect the lower reactor coolant pump (RCP) 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 for simultaneous relief from an RHR relief valve and a PORV. WCAP-14040 states that there may be occasions when the available pressure range between the upper and lower pressure limits may not be adequate to satisfy both limits. For such instances, WCAP-14040 recommends that the upper limit (10 CFR Appendix G) be protected. This is the approach that the licensee has taken.

The NRC staff finds that the licensee meets the terms, conditions and recommendations of the approved WCAP-14040. For the purpose of correcting the discrepancy between the description in the SE with regard to the operation of the RHR system and the actual operation of the RHR system, the NRC staff modifies the SE by deleting the following sentences from Section 3.2.3, "Reactor Coolant Pump Seal Limit," on page 6 of the SE dated September 6, 2000: "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."

Please contact me with any questions or comments regarding this issue. I may be reached at (301) 415-3053 or ljb@nrc.gov.

Sincerely,

/RA/

Lawrence J. Burkhart, Project Manager, Section 1
Project Directorate I
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Docket No. 50-412

Enclosure: Page 6 of SE for Amendment No. 113
dated September 6, 2000, for BVPS-2

cc w/encl: See next page

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The NRC staff has reviewed the licensee's evaluation and finds that it results in conservative PORV setpoints that will protect the RCS from exceeding the limits of 10 CFR Part 50, Appendix G, during mass and heat addition transients. Therefore the maximum allowable nominal PORV setpoints for the LTOP system are acceptable.

3.2.3 Reactor Coolant Pump Seal Limit

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.

3.2.4 Enable Temperature

The initial submittal did not include a discussion of the enable temperature. Additional information submitted in DLC's September 15, 1999, letter clarified that the enable temperature remained at 350 °F. However, the licensee's supplemental submittal dated February 15, 2000, indicated a revised administrative LTOP enable temperature of 367 °F. The enable temperature could have been lowered, however, the licensee opted not to do so. The higher LTOP enable temperature is conservative and, therefore, acceptable.

3.2.5 RCS Passive Vent

The RCS has a 3.14 square inch passive vent that is capable of mitigating the assumed overpressure transient. The flow capacity of the vent is greater than the limiting transient of the overpresssure protection system; with the operable charging actuated, the RCS pressure will remain bellow the P/T limit curve. Therefore, the size of the passive RCS vent is acceptable.

3.3 Pressure/Temperature Limit Methodology and Use of Code Case N-640

3.3.1 Licensee Evaluation

The licensee submitted ART calculations and P/T limit curves valid for up to 15 EFPYs. For the BVPS-2 reactor vessel, the licensee determined that the most limiting material at the 1/4T and 3/4T locations is the intermediate shell plate B9004-1 that was fabricated using plate heat number C0544-1. The licensee calculated an ART of 140 °F at the 1/4T location and 128 °F at the 3/4T location at 15 EFPYs. The neutron fluence used in the ART calculation is 1.13×10^{19} n/cm^2 at the 1/4T location and 0.44×10^{19} n/cm^2 at the 3/4T location. The ΔRT_{NDT} values at the 1/4T and 3/4T locations are 45.5 °F and 33.9 °F, respectively. The initial RT_{NDT} for the limiting plate is 60 °F. The margin term used in calculating the ART for the limiting plate is 34 °F at the 1/4T and 3/4T locations, as permitted by Position 1.1 of RG 1.99, Revision 2.