

**Mark B. Bezilla**  
Site Vice President724-682-5234  
Fax: 724-643-8069September 3, 2002  
L-02-080U. S. Nuclear Regulatory Commission  
Attention: Document Control Desk  
Washington, DC 20555-0001**Subject: Beaver Valley Power Station, Unit No. 1  
Docket No. 50-334, License No. DPR-66  
Supplemental Information in Support of LAR No. 301  
Positive Moderator Temperature Coefficient**

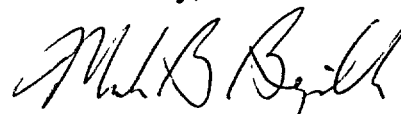
This letter provides the FirstEnergy Nuclear Operating Company (FENOC) response to a verbal NRC request for supplemental information on July 29, 2002, pertaining to FENOC letter L-02-065 dated May 31, 2002.

FENOC letter L-02-065 submitted License Amendment Request (LAR) No. 301 that proposed changes to the Beaver Valley Power Station (BVPS), Unit No. 1, to allow operation of the reactor core with a positive moderator temperature coefficient (PMTc) for NRC review and approval. Supplemental information is provided in Attachment A of this letter.

This information does not change the evaluations or conclusions presented in FENOC letter L-02-065. If there are any questions concerning this matter, please contact Mr. Larry R. Freeland, Manager, Regulatory Affairs/Corrective Action at 724-682-5284.

I declare under penalty of perjury that the foregoing is true and correct. Executed on September 3, 2002.

Sincerely,



Mark B. Bezilla

Attachments

A001

Beaver Valley Power Station, Unit No. 1  
Supplemental Information in Support of LAR No. 301  
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c: Mr. D. S. Collins, NRR Project Manager  
Mr. D. M. Kern, NRC Sr. Resident Inspector  
Mr. H. J. Miller, NRC Region I Administrator  
Mr. D. A. Allard, Director BRP/DEP  
Mr. L. E. Ryan (BRP/DEP)

Letter L-02-080 - ATTACHMENT A

Supplemental Information in Support of  
Positive Moderator Temperature Coefficient  
for Beaver Valley Power Station, Unit No. 1  
(License Amendment Request No. 301)

NRC Supplemental Information Request No. 1

Describe how the RAIs from the previous positive moderator temperature coefficient (PMTc) submittal for Beaver Valley Power Station (BVPS) Unit No. 2 (L-01-089, dated June 28, 2001) were addressed in the BVPS Unit No. 1 submittal supplied in FirstEnergy Nuclear Operating Company's (FENOC) letter L-02-065, dated May 31, 2002. Note where this information is located in the BVPS Unit No. 1 application. Also address what applicable BVPS Unit No. 1 Technical Specification amendments have been incorporated that were previously pending during the review and approval of the BVPS Unit No. 2 PMTC amendment.

FENOC Response

The "Standard Format For Operating License Amendment Requests From Commercial Reactor Licensees," that is contained in the NEI White Paper, dated August 2001, was used for the Beaver Valley Unit 1 PMTC License Amendment Request (LAR). The Beaver Valley Unit 2 PMTC LAR was presented in the LAR format that was previously used by FENOC prior to implementing the NEI standard LAR format.

The Beaver Valley Unit 1 safety analysis is contained in UFSAR Chapter 14. The Beaver Valley Unit 2 safety analysis is contained in UFSAR Chapter 15.

The Beaver Valley Unit 2 PMTC LAR was contingent upon approval of the Revised Thermal Design Procedure (RTDP) and 1.4% power uprate LARs, which have been approved by the NRC for both units (see References 1 and 2 on page 17 in the Beaver Valley Unit 1 PMTC LAR).

The Table below provides the location of the applicable BVPS 2 RAI responses within the BVPS 1 LAR.

FENOC Letter L-02-065, dated May 31, 2002 - Beaver Valley Unit 1 PMTC LAR	FENOC letter L-01-112, dated September 13, 2001 - Beaver Valley Unit 2 PMTC RAI Response No. 1	FENOC Letter L-01-146, dated December 19, 2001 - Beaver Valley Unit 2 PMTC RAI Response No. 2
Table 1 (Pages 5-8)		Table 1 (Response to RAI 3)
Table 2-6 (Pages 8-10)	Tables 1-5 (Response to RAI 1)	
ATWS Discussion (Pages 10-12)		RAIs 4, 5, 6, and 7 Responses

With regard to the response to RAI 8 in FENOC letter L-01-146, dated December 19, 2001 (Beaver Valley Unit 2 PMTC RAI Response No. 2), the potential effect of the proposed change to implement a PMTC on other Technical Specifications was evaluated for Beaver Valley Unit 1. It was determined that the proposed change to implement a PMTC does not impact any other Technical Specifications. With respect to the NRC's specific concern regarding boron concentration, there are no boron concentration changes required to implement the proposed PMTC. Changes to the RWST, Accumulator, BIT and Mode 6 boron concentration requirements were proposed and approved to address higher reactivity levels associated with reactor core operation at higher plant capacity factors. Fuel cycle designs would have been restricted by imposing less than full power operating limitations during future operating cycles if operating margins for these boron concentration requirements were not increased. These boron concentration changes were requested by LAR No. 288 for BVPS Unit No. 1, which was submitted for NRC approval by FENOC letter L-01-036, on March 28, 2001. The NRC approved the changes by Amendment No. 242, "Beaver Valley Power Station, Unit No. 1 - Issuance of Amendment RE: Change in Technical Specification Boron Concentration Limits (TAC No. MB1575)," which was issued on September 24, 2001, and implemented on September 28, 2001.

In addition, the following applicable BVPS Unit No. 1 Technical Specification amendments have been implemented.

Subject	BVPS Unit 1 Amendment No.	Date Implemented
Revised Thermal Design Procedure (RTDP)	239	August 6, 2001
Increased Boron Requirements	242	September 28, 2001
1.4% Uprate	243	October 8, 2001

NRC Supplemental Information Request No. 2

Discuss the reason for the difference in the limit at the end of Table 2 on page 9 versus the limit at the end of Table 3 on page 9. (i.e., why is it 2748.5 psia for one and 2997 psia for the other?)

FENOC Response

For Beaver Valley Unit 1, the primary pressure limit for a complete loss of flow event is 110% of the design pressure or  $1.1 * 2485.3 \text{ psig} + 14.7 = 2748.5 \text{ psia}$ , and the primary pressure limit for a locked rotor event is 120% of the design pressure of  $1.2 * 2485.3 \text{ psig} + 14.7 = 2997.5 \text{ psia}$ . These are the same limits that have always been used for both Beaver Valley Unit 1 and Beaver Valley Unit 2.

NRC Supplemental Information Request No. 3

Describe the analysis of the Control Systems Margin to Trip Evaluation. (addressed in the top paragraph on page 13 of the submittal)

FENOC Response

The following Condition I transients were analyzed to assess the margin to trip and P-9 setpoint associated with the planned 2,900 MWt power uprate for Beaver Valley Unit 1.

- 50% load rejection from 100% power
- 10% step load increase from 90% power
- 5%/minute ramp load increase from 15% to 100% power
- Turbine trip without reactor trip from the P-9 setpoint

The results of these analyses are discussed below.

The transient that produces the limiting challenge to the OT $\Delta$ T and OP $\Delta$ T trip functions is the 50% load rejection from 100% power. The analysis determined a minimum margin of 6.4% of nominal  $\Delta$ T for the OT $\Delta$ T trip function and 5.8% of nominal  $\Delta$ T for the OP $\Delta$ T trip function for Beaver Valley Unit 1. Therefore, sufficient margins are available to the OT $\Delta$ T and OP $\Delta$ T setpoints.

The load increase transients that could challenge the steam line low pressure setpoint are the 10% step load increase from 90% power and the 5%/minute ramp load increase from 15% to 100% power. The minimum compensated steam pressure was determined to be 568 psig (with the full power nominal steam pressure  $\geq 700 \text{ psia}$  at the 2,900 MWt power uprate conditions) for the 10% step load increase from 90% power transient for Beaver Valley Unit 1. The minimum compensated steam pressure was determined to be 594 psig for the 5%/minute ramp load increase from 15% to 100% power transient for Beaver Valley Unit 1. Therefore, sufficient margin to the low steam line pressure

setpoint of 500 psig exists, provided that the nominal full power steam pressure is  $\geq 700$  psia at the 2,900 MWt power uprate conditions.

The turbine trip without reactor trip from the P-9 setpoint transient analysis, which credited revised steam dump setpoints and available steam dump valves determined a peak pressurizer pressure less than 2330 psig, which is below the pressurizer PORV setpoint.

Therefore, the pressurizer PORVs would not be challenged during this transient.

The margin to trip and P-9 setpoint analyses results discussed above that were performed for Beaver Valley Unit 1 for the power uprate to 2,900 MWt considered a core designed with a PMTC.

#### Applicability of 2,900 MWt Margin to Trip and P-9 Setpoint Analyses to Current Power Operation at 2,689 MWt

The margin to trip and P-9 setpoint analyses performed for the planned 2,900 MWt power uprate bound current power operation at 2,689 MWt with the proposed PMTC core design for Beaver Valley Unit 1. No changes to the control and protection systems setpoints/time constants are required for the proposed PMTC core design for current power operation at 2,689 MWt for Beaver Valley Unit 1. The following discussion provides an evaluation of the applicability of the 2,900 MWt power uprate margin to trip and P-9 setpoint analyses to current power operation at 2,689 MWt with a PMTC.

#### Margin to Trip Analysis

The limiting transient for the margin to trip analysis is the 50% load rejection from 100% power transient. The primary plant parameters associated with the analysis of this transient are: 1) nominal plant conditions, 2) control and protection systems setpoints and time constants, 3) steam dump capacity, and 4) best estimate nuclear parameters.

The full power nominal conditions, such as the NSSS power level, and the primary and secondary conditions for the margin to trip analysis are more limiting at the 2,900 MWt power uprate conditions, than for the current power conditions at 2,689 MWt. Except for the changes to the steam dump and pressurizer level control systems setpoints, there are no changes to the control systems setpoints for the planned 2,900 MWt power uprate. The steam dump and pressurizer level control setpoints will be revised for the planned 2,900 MWt power uprate primarily to address a Tav<sub>g</sub> window of 566.2°F to 580°F. Since the current full power Tav<sub>g</sub> of 576.2°F for operation at 2,689 MWt is within the Tav<sub>g</sub> window for the 2,900 MWt power uprate, the 2,900 MWt power uprate margin to trip analysis bounds the current control system setpoints at 2,689 MWt. The steam dump capacity for current power operation at 2,689 MWt is higher than the capacity at the 2,900 MWt power uprate conditions. A lower steam dump capacity is conservative for

the margin to trip analysis, and therefore, bounds current operation at 2,689 MWt. The OT $\Delta$ T and OP $\Delta$ T setpoints and time constants will be revised to maximize the operating margins for the planned 2,900 MWt power uprate. The revised K1 and K4 setpoints associated with the 2,900 MWt power uprate are lower than the current K1 and K4 setpoints for operation at 2,689 MWt. Except for a change to the filter time constant for the  $\Delta$ T channel, there are no other changes to the OT $\Delta$ T and OP $\Delta$ T time constants for the planned 2,900 MWt power uprate for Beaver Valley Unit 1. A lower filter time constant is conservative for the margin to trip analysis, and is therefore bounded by the 2,900 MWt power uprate margin to trip analysis. The effect of a larger  $\Delta$ T filter associated with the 2,900 MWt power uprate on the margin to trip analysis is insignificant, and would be offset by the margin gained due to the higher K1 and K4 setpoints associated with current power operation at 2,689 MWt.

Based on the above evaluation, the margin to trip analysis for the planned 2,900 MWt power uprate bounds current power operation at 2,689 MWt with the proposed PMTC at Beaver Valley Unit 1.

#### P-9 Setpoint Analysis

The P-9 setpoint analysis determines whether the pressurizer PORVs will be challenged on a turbine trip without a reactor trip transient from the P-9 setpoint. The primary plant parameters associated with the analysis of this transient are: 1) nominal plant conditions, 2) control and protection systems setpoints and time constants, 3) steam dump capacity, and 4) best estimate nuclear parameters.

The full power nominal conditions, such as the NSSS power level, and the primary and secondary conditions for the P-9 setpoint analysis are more limiting at the planned 2,900 MWt power uprate conditions, than for the current power conditions at 2,689 MWt. Therefore, the 2,900 MWt power uprate P-9 setpoint analysis bounds current power conditions at 2,689 MWt. The current P-9 setpoint of 49% at the current rated thermal power (RTP) of 2,689 is, therefore, acceptable. The steam dump capacity for current power operation at 2,689 MWt is higher than the capacity at 2,900 MWt power uprate conditions, and is sufficient to support a P-9 setpoint of 49% RTP with a PMTC. Therefore, the current P-9 setpoint of 49% RTP at 2,689 MWt for Beaver Valley Unit 1 is acceptable with a PMTC.

#### NRC Supplemental Information Request No. 4

Provide a quantitative and qualitative explanation for why the margin of Hot Full Power with a 0 MTC is more limiting than the part power margin with a +2 PMTC mentioned on page 9 in footnote 2 at the top of the page.

FENOC Response

The response to RAI No. 3 for the previous BVPS Unit No. 2 PMTC License Amendment Request (L-02-005, dated January 21, 2002) provided the results of the analyses for Unit No. 2 to confirm that a 0 MTC at Hot Full Power is more limiting than a +2 PMTC at 70% power. The results of these analyses are applicable to BVPS Unit No. 1.



Letter L-02-080 - ATTACHMENT B

Commitment List

The following list identifies those actions committed to by FirstEnergy Nuclear Operating Company (FENOC) for Beaver Valley Power Station (BVPS) Unit No. 1 in this document. Any other actions discussed in the submittal represent intended or planned actions by Beaver Valley. These other actions are described only as information and are not regulatory commitments. Please notify Mr. Larry R. Freeland, Manager, Regulatory Affairs/Corrective Actions, at Beaver Valley on (724) 682-5284 of any questions regarding this document or associated regulatory commitments.

Commitment

None

Due Date

None