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February 20, 2001
L-01-024

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

Subject: Beaver Valley Power Station, Unit No. 1 and No. 2
BV-1 Docket No. 50-334, License No. DPR-66
BV-2 Docket No. 50-412, License No. NPF-73
Response to a Request for Additional Information
In Support of LAR Nos. 289 and 161

This letter provides the FirstEnergy Nuclear Operating Company (FENOC) response to a NRC Request for Additional Information (RAI) in support of License Amendment Requests (LAR) 289 and 161; transmits Revision 3 of Caldon, Inc. Engineering Report-157P and Engineering Report-157N; adds a reference to Caldon, Inc. Engineering Report-160P; documents completion of the grid stability study; and provides supplemental information to Section G of LARs 289 and 161; i.e., Environmental Impact Considerations.

The LARs were submitted by FENOC letter L-01-006 dated January 18, 2001. The proposed changes contained in the LARs propose a 1.4% power uprate for both Beaver Valley Power Station (BVPS) units. A NRC letter dated February 7, 2001, transmitted a Request for Additional Information (RAI). The RAI contains three items requiring a response. Attachment A provides the FENOC response to each RAI item and documentation of the completion of the grid stability study.

This letter also transmits Revision 3 of Caldon, Inc. Engineering Report-157P, "Supplement to Topical Report ER-80P: Basis for a Power Uprate With the LEFM✓™ or LEFM CheckPlus™ System," dated February 2001. This letter is also transmitting Revision 3 of Caldon, Inc. Engineering Report-157N. This is the non-proprietary version of Engineering Report-157P. Revision 3 of Engineering Report-157P and Engineering Report-157N supercede Revision 2 in their entirety. Therefore, Revision 2 of the Engineering Reports should be destroyed and NRC review of LARs 289 and 161 should reflect Revision 3.

Attachment B contains Caldon Engineering Report ER-157P. As this report contains information proprietary to Caldon, it is supported by Affidavit CAW-01-03 signed by Caldon, the owner of the information. Accordingly, the Caldon Affidavit and Application for Withholding Proprietary Information from Public Disclosure is included

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as Attachment C to this letter. The affidavit set forth the basis on which the requested information may be withheld from public disclosure by the Commission, and addresses with specificity the considerations listed in paragraph (b)(4) of 10 CFR 2.790 of the Commission's regulations. Accordingly, FENOC requests that the information, which is proprietary to Caldon, be withheld from public disclosure in accordance with 10 CFR 2.790. Correspondence regarding the proprietary aspects of the attached Caldon report, or the supporting affidavit, should reference Caldon letter CAW-01-03 and be addressed to Calvin R. Hastings, President and CEO, Caldon Incorporated, 1070 Banksville Avenue, Pittsburgh, PA 15216.

Caldon, Inc. Engineering Report-160P, "Supplement to Topical Report ER-80P: Basis for a Power Uprate With the LEFM✓™," Revision 0, May 2000, has been added to the LAR list of references and to the reports listed in Section 6.9.5(b) for both BVPS units. This reference is being added to comply with the NRC recommendation that amendment requests for a 1.4 percent power uprate base their justification on Caldon Topical Report ER-160P. The NRC staff approved this report by its January 19, 2001, safety evaluation for a similar Watts Bar License Amendment Request.

Attachment D contains revised Technical Specification pages reflecting the incorporation of Caldon Engineering Reports 160P, Revision 0, and 157P, Revision 3. These pages replace what was transmitted by L-01-006. The addition of reference to Engineering Report-160P affects the description of the proposed changes appearing in Section E, No Significant Hazards Evaluation, of LARs 289 and 161. Therefore, a completely revised No Significant Hazards Evaluation is provided in Attachment E. Revision bars identify the areas of change. This revised No Significant Hazards Evaluation replaces, in its entirety, that which was transmitted by FENOC letter L-01-006, but does alter the conclusions drawn in the No Significant Hazards Consideration Determination section.

Following FENOC receipt of the RAI, the NRC made a verbal request to supplement the Environmental Impact Considerations section of the LAR. Attachment G contains a completely revised Environmental Impact Considerations. The requested supplemental information is contained in the revised Environmental Impact Considerations. Revision bars identify the areas of change. This revised Environmental Impact Considerations replaces, in its entirety, that which was transmitted by FENOC letter L-01-006, but does alter the conclusions drawn.

As stated in letter L-01-006, FENOC requests NRC approval of this License Amendment Request by June 1, 2001 to support implementation of the power uprate for the summer of 2001. An implementation period of up to 60 days is requested following the effective date of this amendment.

This information does not change the evaluations or conclusions presented in FENOC letter L-01-006. If there are any questions concerning this matter, please contact Mr. Thomas S. Cosgrove, Manager Regulatory Affairs at 724-682-5203.

Sincerely,

Lew W. Myers

Attachment

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)

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I, Lew W. Myers, being duly sworn, state that I am Senior Vice President of FirstEnergy Nuclear Operating Company (FENOC), that I am authorized to sign and file this submittal with the Nuclear Regulatory Commission on behalf of FENOC, and that the statements made and the matters set forth herein pertaining to FENOC are true and correct to the best of my knowledge and belief.

FirstEnergy Nuclear Operating Company

Lew W. Myers
Senior Vice President - FENOC

COMMONWEALTH OF PENNSYLVANIA

COUNTY OF BEAVER

Subscribed and sworn to me, a Notary Public, in and for the County and State above named, this 20 th day of February, 2001.

Notarial Seal
Sheila M. Fattore, Notary Public
Shippingport Boro, Beaver County
My Commission Expires Feb. 9, 2002
Member, Pennsylvania Association of Notaries

My Commission Expires:

Letter L-01-024 - Attachment A

Response to a Request for Additional Information In Support of LAR Nos. 289 and 161

The three items contained in the February 7, 2001 NRC Request for Additional Information (RAI) and the FirstEnergy Nuclear Operating Company (FENOC) responses are presented below.

1. In your submittal dated January 18, 2001, you enclosed the Caldon, Inc. Engineering Report, ER-157P, "Supplement to Topical report ER-80P: Basis for a Power Uprate With LEFM✓™ or CheckPlus™ System, Revision 2," dated December 2000. It is the NRC staff's understanding that Caldon has decided to revise this topical report. With respect to those units utilizing the LEFM✓™ system, it is recommended that amendment requests for a 1.4 percent power uprate should base their justification on Caldon Topical Report ER-160P, which the NRC staff approved by its January 19, 2001, Safety Evaluation (SE) for Watts Bar (ADAMS accession number ML010260074).

   Response to RAI Item 1.
   The subject LARs for Beaver Valley Power Station (BVPS) (Nos. 289 and 161) are revised to reference Caldon Engineering Report ER-160P, "Supplement to Topical Report ER-80P: Basis for a Power Uprate With the LEFM✓™," Revision 0, May 2000. The NRC staff approved Caldon Engineering Report ER-160P by its January 19, 2001 Safety Evaluation for a similar Watts Bar License Amendment Request. Included in Attachment D are marked up Technical Specification pages for both units reflecting the reference to Caldon Engineering Report ER-160P. The Caldon Engineering Report has been reviewed by BVPS personnel and found as acceptable justification for the proposed 1.4% power uprate. The addition of reference to Engineering Report-160P affects the description of the proposed changes appearing in Section E, No Significant Hazards Evaluation, of LARs 289 and 161. Therefore, a completely revised No Significant Hazards Evaluation is provided in Attachment E. Revision bars identify the areas of change. This revised No Significant Hazards Evaluation replaces, in its entirety, that which was transmitted by FENOC letter L-01-006, but does alter the conclusions drawn in the No Significant Hazards Consideration Determination section.

2. The NRC staff has not approved a topical report for the use of the CheckPlus™ system. In light of the pending revisions to ER-157P please provide justification for the use of the CheckPlus™ system in support of the 1.4 percent power uprate request (i.e., please provide justification that the CheckPlus™ system is at least as good as the LEFM✓™ system).

   Response to RAI Item 2.
   The Beaver Valley Power Station Unit 2 is being equipped with the CheckPlus™ system. Justification that the CheckPlus™ system is at least as good as the LEFM✓™ system described in Caldon Engineering Report ER-160P is provided in the enclosed Revision 3 of Caldon, Inc. Engineering Report-157P, "Supplement to Engineering Report ER-80P: Basis for a Power Uprate With the LEFM✓™ or LEFM CheckPlus™ System." Engineering Report-157N, the non-proprietary version of Engineering Report-157P, is also provided. These reports are being submitted as justification for the use of the LEFM✓™ or LEFM CheckPlus™ Systems and supercede, in their entirety, Revision 2 of ER-157P and ER-157N. Consequently, all copies of Revision 2 of ER-157P and ER-157N should be destroyed. The

staff is requested to review ER-157P, Revision 3 for its applicability to the BVPS 1.4% power uprate request. ER-157P characterizes the performance of both the LEFM✓™ or LEFM CheckPlus™ Systems using measured data for systems in service. Therefore, the performances of LEFM systems are slightly better than that reported in ER-80P. Included in Attachment D are marked up Technical Specification pages for both units reflecting the reference to Caldon Engineering Report ER-157P, Revision 3, in place of Revision 2. BVPS personnel have reviewed ER-157P, Revision 3, and found it acceptable and applicable to the proposed power uprate for both BVPS Unit 1 and Unit 2.

3. The staff SE on Caldon Topical Report ER-80P, "Improving Thermal Power Accuracy and Plant Safety While Increasing Operating Power Level Using the LEFM System," dated March 8, 1999 (accession number 9903190053), included 4 additional criteria to be addressed by a licensee requesting power uprate (see page 5 of March 8, 1999, SE). Your submittal did not address all of these criteria. Please address each of the four criteria.

Response to RAI Item 3.
The four criteria contained in ER-80P are listed below, followed by the FENOC response.

Criterion 1
The licensee should discuss maintenance and calibration procedures that will be implemented with the incorporation of the LEFM. These procedures should include processes and contingencies for an inoperable LEFM and the effect on thermal power measurement and plant operation.

Response to Criterion 1
As stated in Item 1 of LAR 289/161 Attachment C, implementation of the power uprate license amendment will include developing the necessary procedures and documents required for operation, maintenance, calibration, testing, and training at the uprated power level with the new LEFM system. Applicable plant maintenance and calibration procedures will be revised to incorporate Caldon's maintenance and calibration requirements prior to declaring the LEFM system operable and raising power above 2652 MWt. As stated in Item 6 of LAR 289/161 Attachment C, the LEFM software will be maintained under Caldon's verification and validation program. This includes a requirement that Caldon notify FENOC of any deficiency that could affect the design basis accuracy of the LEFM. The incorporation of, and continued adherence to, these requirements will assure that the LEFM system is properly maintained and calibrated.

Item 2 of LAR 289/161 Attachment C states that LEFM operability requirements will be contained in the BVPS Licensing Requirements Manuals (LRM). A Licensing Requirement (LR) has been drafted for inclusion in each unit's LRM stating that an operable Leading Edge Flow Meter (LEFM) shall be used in the performance of the daily calorimetric heat balance measurements whenever power is greater than 98.6% RTP (i.e., the pre-uprate level of 2652 MWt). If the LEFM is not operable, the LR requires that either the LEFM is restored to operable status or power shall be reduced to ≤ 98.6% RTP and subsequent required heat balance measurements shall be taken using the feedwater flow venturis. The LR also requires that power shall be maintained ≤ 98.6% RTP until the LEFM is restored to

operable status and the measurements have been performed using the LEFM. These requirements assure that an operable LEFM shall be used whenever power is greater than the pre-uprate RTP level of 2652 MWt. With these requirements in place the effect on plant operations is that power will be reduced and maintained to the pre-uprate level of 2652 MWt or lower, and that the venturis will be used until the LEFM is returned to operable status. These requirements return the measurement techniques, and maximum steady state power level to pre-uprate conditions.

Criterion 2
For plants that currently have LEFM installed, the licensee should provide an evaluation of the operational and maintenance history of the installation and confirm that the installed instrumentation is representative of the LEFM system and bounds the analysis and assumptions set forth in topical report ER-80P.

Response to Criterion 2
This Criterion is not considered applicable to BVPS. Both BVPS units currently use venturis to obtain the daily calorimetric heat balance measurements. In 1979 a different LEFM system was installed in BVPS Unit 1. The performance of this system, however, was found to be inadequate and it was never used. This system was retired, and is being replaced with the Caldon LEFM✓™ for Unit 1. Since the originally installed LEFM was never used, there is no operational or maintenance history for comparison to the Caldon LEFM✓™ system. Unit 2 never had an LEFM installed; therefore, there is no operational and maintenance history for this unit either. Consequently, Criterion 2 is not applicable to BVPS.

Criterion 3
The licensee should confirm that the methodology used to calculate the uncertainty of the LEFM in comparison to the current feed water instrumentation is based on accepted plant setpoint methodology (with regard to the development of instrument uncertainty). If an alternative approach is used, the application should be justified and applied to both venturi and ultrasonic flow measurement instrumentation installation for comparison.

Response to Criterion 3
As stated on page B-7 of LAR 289/161 the proposed power uprate is being made in concert with LARs 286 and 158. These LARs, and the Westinghouse reports they reference, document the Westinghouse Revised Thermal Design Procedure (RTDP), which is an alternative approach to the currently accepted plant setpoint methodology regarding the development of instrument uncertainties. Specifically, the referenced reports, WCAP-15264, Rev. 3 and WCAP- 15265, Rev. 2 describe the proposed Westinghouse methodology for determining the uncertainties in calorimetric thermal power measurements and reactor coolant system flow measurements. These reports calculate the total power calorimetric measurement error, both with and without the LEFM, for the two BVPS units. This methodology complies with the recommendations of ANSI/ISA-67.04, and Regulatory Guide 1.105, Rev. 2. The RTDP methodology has been previously reviewed and approved by the NRC for use in Westinghouse PWRs.

Criterion 4
Licensees for plant installations where the ultrasonic meter (including the LEFM) was not installed and flow elements calibrated to a site-specific piping configuration (flow profiles and meter factors not representative of the plant-specific installation), should provide additional justification for use. The justification should show either that the meter installation is independent of the plant-specific flow profile for the stated accuracy or that the installation can be shown to be equivalent to known calibrations and the plant configuration for the specific installation, including the propagation of flow profile effects at higher Reynolds numbers. Additionally, for previously installed calibrated elements, the licensee should confirm that the piping configuration remains bounding for the original LEFM installation and calibration assumptions.

Response to Criterion 4
Because the BVPS flow elements were calibrated to a site-specific piping configuration, Criterion 4 does not apply to either BVPS unit.

Calibration tests were performed at Alden Research Laboratory in July of 1978 on the spool piece installed in BVPS Unit 1. These tests included a test in a model of the Unit 1 hydraulic geometry and a test in straight pipe for reference purposes. The tested BVPS Unit 1 piping configuration remains consistent with the original LEFM installation and calibration assumptions. The Alden data report for these tests and a Westinghouse report evaluating the test data are on file. The Unit 1 spool was designed and provided by Westinghouse Electric Corporation, the original developer of the LEFM technology. Caldon based the calibration factor used for the LEFM✓™ in Unit 1 on these reports. Caldon's determination of the uncertainty in the calibration factor for the Unit 1 spool piece also draws on the data in these reports. Caldon's final review of the Westinghouse and Alden reports will be documented, along with the basis for other uncertainty elements, in a site-specific uncertainty analysis for Unit 1. This document will be maintained on file as part of the technical basis for the Unit 1 uprate.

The calibration factor for the Unit 2 spool piece was established by tests of that spool at Alden Research Laboratory in September 2000. These tests included tests in a full scale model of the Unit 2 hydraulic geometry and tests in a straight pipe. An Alden data report for these tests and a Caldon engineering report evaluating the test data are on file. The calibration factor used for the LEFM CheckPlus™ in Unit 2 is based on these reports. The uncertainty in the calibration factor for the Unit 2 spool is based on the Caldon engineering report. The site specific uncertainty analysis for Unit 2 will document these analyses. This document will be maintained on file as part of the technical basis for the Unit 2 uprate.

Final acceptance of the site-specific uncertainty analyses will occur after the completion of the commissioning process. The commissioning process verifies bounding calibration test data from spool piece rotation, embracing the uncertainty in profile factor vs Reynolds number fit (See Appendix F of ER-80P). This step provides final positive confirmation that actual performance in the field meets the uncertainty bounds established for the instrumentation as described in WCAP-15264, Rev. 3 and WCAP-15265, Rev. 2.

Closure of Grid Stability Study

Item 9 of LAR 289/161 Attachment C states that a grid stability study will be completed prior to increasing power above 2652 MWt for either BVPS unit. The study was being performed to update the model with system changes that have occurred since 1997. The new study incorporates the 1.4% power uprate to determine if any stability issues require resolution to support the proposed power uprate. This new study has been completed and shows that stability of the grid supplying offsite power to the BVPS units is unaffected by the proposed 1.4 percent uprate. The commitment is therefore considered closed.

Letter L-01-024 – Attachment B

Revision 3 of Caldon, Inc. Engineering Report-157P.

and

Revision 3 of Caldon, Inc. Engineering Report-157N.