May 28, 2008

Mr. Peter P. Sena III
Site Vice President
FirstEnergy Nuclear Operating Company
Mail Stop A-BV-SEB-1
P.O. Box 4, Route 168
Shippingport, PA 15077

SUBJECT: REQUEST FOR ADDITIONAL INFORMATION FOR THE REVIEW OF THE BEAVER VALLEY POWER STATION, UNITS 1 AND 2, LICENSE RENEWAL APPLICATION (TAC NOS. MD6593 AND MD6594)

Dear Mr. Sena:

By letter dated August 27, 2007, FirstEnergy Nuclear Operating Company submitted an application pursuant to 10 *Code of Federal Regulations* Part 54 (10 CFR Part 54), to renew the operating licenses for Beaver Valley Power Station, Units 1 and 2, for review by the U.S. Nuclear Regulatory Commission (NRC or the staff). The staff is reviewing the information contained in the license renewal application and has identified, in the enclosure, areas where additional information is needed to complete the review. Further requests for additional information may be issued in the future.

Items in the enclosure were discussed with Mr. Cliff Custer of your staff, and a mutually agreeable date for the response is within 30 days from the date of this letter. If you have any questions, please contact me at 301-415-2989 or e-mail Kent.Howard@nrc.gov.

Sincerely,

\RA

Kent L. Howard, Sr., Project Manager
Projects Branch 2
Division of License Renewal
Office of Nuclear Reactor Regulation

Docket Nos. 50-334 and 50-412

Enclosure:
As stated

cc w/encl: See next page

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BEAVER VALLEY POWER STATION, UNITS 1 AND 2
LICENSE RENEWAL APPLICATION
REQUEST FOR ADDITIONAL INFORMATION
SECTIONS B.2.27 AND 4.3, 4.7.4

Section B.2.27

RAI B.2.27-1

License renewal application (LRA) B.2.27 states "Critical transients are the subset of the design transients that are expected to approach or exceed the number of design cycles during the sixty year operating life of the units." Please provide the list of the critical transients, and explain the basis for the selection of these transients, including the selection criteria.

RAI B.2.27-2

Please provide the alert value (or triggering point) for transient cycle monitored of each component under the "Metal Fatigue of Reactor Coolant Pressure Boundary Program" and describe the follow-up actions or corrective actions when a triggering point is approached. Please explain how the process is incorporated into the current plant procedure.

RAI B.2.27-3

During the on-site audit, the applicant stated "the surge line to hot leg nozzle, for [Beaver Valley Power Station (BVPS)] units 1 and 2, is included in a stress and fatigue model to be used in an on-line monitoring system (WESTEMS)"

a. Please explain the purpose of the WESTEMS in the management of components subject to metal fatigue including NUREG/CR-6260 components for the period of extended operation.

b. Please provide the benchmarking results for the WESTEMS software using relevant transient data, and proper 3-D model. Please justify the use of WESTEMS to update the cumulative usage factors (CUF) calculation by using the monitored or projected transient data (cycles) and discuss the conservatisms in the calculation on a plant specific basis.

RAI B.2.27-4

During the audit, the staff noted element 10 of Table 6.0-1 of license renewal basis document (FMP Program Document LRBV-PED-X.M1) states that, "The design transient assumed by original design analysis will be sufficient for 60-year operation." LRA B.2.27 states that, "Fatigue monitoring to date indicates that the number of design transient events assumed in the original design analysis will be sufficient for a 60-year operating period." Please provide a basis for statements given that project 60-year cycles of residual heat removal system piping that are expected to exceed the design cycles by 50 percent, which is provided in the annotation (a) of Table 4.3-1.

ENCLOSURE

RAI B.2.27-5

Provide a comparison of the design transients in the LRA Table 4.3-2 with basis document (ADM 2115) and the transients in the latest associated piping design specification for BVPS Unit 2. Please justify any discrepancy between the LRA Table and plant documents (ADM 2115 and design specification).

RAI B.2.27-6

The LRA does not provide sufficient detail for the staff to determine whether "Metal Fatigue of Reactor Coolant Pressure Boundary Program" is adequate for the period of extended operation. Please provide sufficient detail in LRA Section B.2.27 (such as the scope of the program, method how to monitor the critical and thermal transients, periodic updates of fatigue usage calculation, and how to address environmentally assisted fatigue (EAF)).

RAI B.2.27-7

LRA B.2.27 states, "Supplemental transients were also identified by the program for monitoring" (Unit 2 only)

a. Specify the major components affected by these transients. Confirm that the fatigue analysis of these components has been updated to include these transients.

b. Please justify the consistency between those supplemental transients and design transients specified in the design specification.

c. Explain how these supplemental transients will be monitored for the period of extended operation. Please provide the number of design cycles for the supplemental transients and indicate whether these design cycles will remain valid for the period of extended operation.

RAI B.2.27-8

LRA Section B.2.27 provides the operating experience for BVPS Unit 2 letdown, charging, and excess letdown piping. Please explain why no further evaluation was required for letdown or excess letdown piping. Please provide the results of the re-analysis of the charging piping, including the evaluation of EAF for the period of extended operation.

RAI B.2.27-9

During the audit, the staff noted that FMP Basis Document (ADM 2115) indicates the design transient, RHR actuation, of Unit 1 is not required to be monitored. For the period of extended operation, please provide the basis considering the ASME Section III analysis and EAF analysis for nozzle are affected by this transient.

RAI B.2.27-10

LRA Section 4.3.2.2 indicates the Metal Fatigue of Reactor Coolant Pressure Boundary Program monitors the transients associated with non-regenerative (letdown) heat exchanger,

regenerative heat-exchanger, and RHR heat exchangers. However, LRA Section B.2.27 did not indicate that monitoring for the relevant transients will be provided by this aging management program (AMP).

a. Please the list transients associated with these heat exchangers, and indicate which transients are monitored by the program.

b. Please explain the corrective action when current fatigue analyses of these heat exchangers are not bounding for 60 years of operation.

Section 4.3

RAI 4.3-1

In responses to NRC Bulletin 88-08 (Letter to NRC, Beaver Valley Power Station, Unit No. 1, BV-1 Docket No. 50-334, License No. DPR-66, NRC Bulletin 88-08, 2/7/1990) and Letter to NRC, Beaver Valley Power Station, Unit No. 2, BV-2 Docket No. 50-412, License No. NPF-73, NRC Bulletin 88-08, 7/14/1989), the applicant stated "temperature monitoring will be continue until a long term solution is implemented" to address the thermal stress in piping connected to reactor coolant system. Please explain the follow-up actions in the above response letters to the NRC Bulletin 88-08 and indicate whether the temperature monitoring program will be maintained to address the thermal stratification issue for the period of extended operation.

RAI 4.3-2

LRA Section 4.3.1.2 indicates that BVPS will perform a reanalysis, repair, or replacement of the affected unit 2 steam generator manway bolts and tubes components as part of an AMP. However, the AMP description in Appendix B did not indicate this. Explain the discrepancy.

RAI 4.3-3

LRA Section 4.3.3.3 discusses the effects of primary coolant environment on fatigue life. During the audit, the applicant indicated that it will refine the analysis for NUREG/CR-6260 components in the near future. To assist the staff it its review:

a. Please provide the schedule for refining the analysis for the EAF of the NUREG/CR-6260 locations in which the cumulative usage factor includes environmental effects (Uenv) exceed the design code allowable value of 1.0.

b. Please explain how the calculations for the fatigue life correction factor (Fen), used to express the effects of the reactor coolant environment, will be performed. Specifically, how the transient pairs will be considered in the calculations.

c. Please describe the criteria and methodology that will be performed for the additional analyses in calculating the CUF, including environmental effects, for the components where the CUF exceeds the design code allowable value of 1.0.

RAI 4.3-4

LRA Section 4.3.1.3 describes the Pressurizer Weld Overlay Project on BVPS Unit 2 only. Indicate whether the Pressurizer Weld Overlay Project will be performed for BVPS Unit 1. Explain the impact of the weld overlay on the fatigue usage for the period of extended operation for both units.

RAI 4.3-5

Please clarify the sentence at the end of first paragraph in LRA Section 4.3.2.2, "For components where there is no required fatigue analysis, cracking due to fatigue is not an aging effect requiring management."

RAI 4.3-6

LRA Section 4.3.3.2 states, "Therefore, the Unit 1 and Unit 2 pressurizer surge line fatigue time-limited aging analyses (TLAAs) have been dispositioned in accordance with 10 CFR 54.21(c)(1)(i)." Please provide the basis for this statement and for Unit 2 indicate whether the design specification was updated and certified to incorporate changes to the design transients.

RAI 4.3-7

LRA Section 4.3.3.1 states, "Typical cycle periods for thermal stratification events on the Unit 2 RHR lines were 6 to 8 days, which equated to approximately 2000 cycles for a 40-year plant life (assuming the stratification occurred continuously)". Discuss the technical basis or analyses supporting this statement and provide the supporting documentation.

RAI 4.3-8

The U60 for the Unit 2 RHR system piping in the LRA Table 4.3-1 is higher than Unit 1. In addition, Unit 2 RHR system piping is dispositioned in accordance with 10CFR54.21(c)(1)(iii). The applicant indicated that U60 analysis will be refined during the audit. Please explain in detail how the RHR system piping will be managed for aging effects.

RAI 4.3-9

LRA Table 4.3-1 and LRA Section 4.3.3.3 provides the TLAA disposition for BVPS Units 1 and 2 to address EAF. The staff noted the TLAAs for some of the locations appeared to be dispositioned in accordance with 10 CFR 54.21(c)(1)(i), but LRA Section 4.3.3.3 indicated that these components were to be dispositioned under 10 CFR 54.21(c)(1)(ii). Please clarify the TLAA dispositions for the each location.

RAI 4.3-10

Various line items in Table 2 of the LRA Chapter 3 indicate TLAA as the AMP for its component type. Please indicate the AMP for these items.

RAI 4.3-11

The 60-year projected operational cycles for operational basis earthquakes (OBE) is not provided in LRA Table 4.3-2. Please explain how many OBE occurrences or stress cycles will be included in the 60-year EAF.

RAI 4.3-12

LRA Section 4.3.2.1 states that for the Unit 2 emergency diesel generator air start system,"BVPS will perform an assessment to determine whether the full-temperature cycles limit will be exceeded for 60 years of operation." Provide the estimated temperature cycles expected for 60 years of operation and please explain how these temperature cycles will be monitored during the period of extended operation.

RAI 4.3-13

During the audit, it was found that U60 value, as well as, the environmental CUF value in Table 4.3-1 of the LRA for the Unit 2 safety injection system, are not correct. These values in the LRA do not represent the result for injection nozzle to the cold leg. Please provide the U60 and EAF results for this location.

RAI 4.3-14

Note (d) of the LRA Table 4.3-2 states the number of the design cycles for OBE are 400 for nuclear steam supply system (NSSS) equipment and 50 for the piping. During the audit, the staff noted that Table 6-1 of the basis document (WCAP-16173-P, "Beaver Valley Units 1 and 2 Design Basis Transient Evaluation for License Renewal," March 2004, including Errata dated 8/11/2004) shows the design cycles of OBE are 50 for several NSSS equipments of BVPS Unit 1, including the reactor vessel and pressurizer. Please explain the discrepancy between LRA Table 4.3-2 and Table 6-1 from WCAP-16173-P and how the design cycles for OBE will be considered in the CUF evaluation.

RAI 4.3-15

LRA Section 4.3.3.3.2 states that three of the NUREG/CR-6260 locations of BVPS Unit 1 were re-evaluated in accordance with ASME Section III, 1989 Edition with 1989 addenda to determine the U60. Please provide the design basis transients and the associated cycles used to calculate the U60 in LRA Table 4.3-1.

RAI 4.3-16

LRA Section 4.3.4 states that histograms were developed based on the last ten years in order to perform an extrapolation for the number of transients that will be accumulated in 60 years of operation for plant heatup and cooldown, and pressurizer cooldown. Please provide the histograms that were developed and describe the method used to extrapolate these cycles to 60 years of operation.

Section 4.7.4

RAI 4.7.4-1

LRA section 4.7.4 states, “The cycle assumptions used in the fatigue crack growth analyses are conservative compared to the BVPS original design cycles”, and “Since the 60-year projected operational cycles were used in determining that fatigue crack growth analyses remains valid for 60 years, the Metal Fatigue of Reactor Pressure Boundary Program must continue to be used to validate the assumptions used in the evaluations.” Please explain why fatigue crack growth analyses are evaluated for the High Energy Line Break Postulation TLAA Evaluation.

RAI 4.7.4-2

Please clarify whether there any Class 1 high energy piping locations with a CUF less than 0.1 by the current design basis where the CUF may exceed 0.1 during the period of extended operation.

Letter to P. Sena from K. Howard, dated May 28, 2008

DISTRIBUTION:

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DWerkheiser, RI

Beaver Valley Power Station
Units 1 and 2

cc:

Joseph J. Hagan
President and Chief Nuclear Officer
FirstEnergy Nuclear Operating Company
Mail Stop A-GO-19
76 South Main Street
Akron, OH 44308

James H. Lash
Senior Vice President of Operations
and Chief Operating Officer
FirstEnergy Nuclear Operating Company
Mail Stop A-GO-14
76 South Main Street
Akron, OH 44308

Danny L. Pace
Senior Vice President, Fleet Engineering
FirstEnergy Nuclear Operating Company
Mail Stop A-GO-14
76 South Main Street
Akron, OH 44308

Jeannie M. Rinckel
Vice President, Fleet Oversight
FirstEnergy Nuclear Operating Company
Mail Stop A-GO-14
76 South Main Street
Akron, OH 44308

David W. Jenkins, Attorney
FirstEnergy Nuclear Operating Company
Mail Stop A-GO-15
76 South Main Street
Akron, OH 44308

Manager, Fleet Licensing
FirstEnergy Nuclear Operating Company
Mail Stop A-GO-2
76 South Main Street
Akron, OH 44308

Ohio EPA-DERR
ATTN: Zack A. Clayton
P.O. Box 1049
Columbus, OH 43266-0149

Peter P. Sena III
Site Vice President
FirstEnergy Nuclear Operating Company
Beaver Valley Power Station
Mail Stop A-BV-SEB-1
P.O. Box 4, Route 168
Shippingport, PA 15077

Director, Fleet Regulatory Affairs
FirstEnergy Nuclear Operating Company
Mail Stop A-GO-2
76 South Main Street
Akron, OH 44308

Manager, Site Regulatory Compliance
FirstEnergy Nuclear Operating Company
Beaver Valley Power Station
Mail Stop A-BV-A
P.O. Box 4, Route 168
Shippingport, PA 15077

Commissioner James R. Lewis
West Virginia Division of Labor
749-B, Building No. 6
Capitol Complex
Charleston, WV 25305

Director, Utilities Department
Public Utilities Commission
180 East Broad Street
Columbus, OH 43266-0573

Director, Pennsylvania Emergency
Management Agency
2605 Interstate Drive
Harrisburg, PA 17110-9364

Dr. Judith Johnsrud
Environmental Coalition on Nuclear Power
Sierra Club
433 Orlando Avenue
State College, PA 16803

cc:

Director
Bureau of Radiation Protection
Pennsylvania Department of
Environmental Protection
Rachel Carson State Office Building
P.O. Box 8469
Harrisburg, PA 17105-8469

Mayor of the Borough of Shippingport
P.O. Box 3
Shippingport, PA 15077

Regional Administrator, Region I
U.S. Nuclear Regulatory Commission
475 Allendale Road
King of Prussia, PA 19406

Resident Inspector
U.S. Nuclear Regulatory Commission
P.O. Box 298
Shippingport, PA 15077

Cliff Custer
FirstEnergy Nuclear Operating Company
Beaver Valley Power Station
P.O. Box 4, Route 168
Shippingport, PA 15077

Mike Banko
FirstEnergy Nuclear Operating Company
Beaver Valley Power Station
P.O. Box 4, Route 168
Shippingport, PA 15077

Julie Firestone
FirstEnergy Nuclear Operating Company
Beaver Valley Power Station
P.O. Box 4, Route 168
Shippingport, PA 15077