FENOC

FirstEnergy Nuclear Operating Company

5501 North State Route 2
Oak Harbor, Ohio 43449

Mark B. Bezilla
Vice President - Nuclear

419-321-7676
Fax: 419-321-7582

Docket Number 50-346

License Number NPF-3

Serial Number 3376

January 15, 2008

United States Nuclear Regulatory Commission
Document Control Desk
Washington, D. C. 20555-0001

Subject: Supplemental Information to Response to Request for Additional Information Regarding License Amendment Request for Measurement Uncertainty Recapture (MUR) Power Uprate (License Amendment Request No. 05-0007) (TAC No. MD5240)

Ladies and Gentlemen:

By letter dated April 12, 2007, the FirstEnergy Nuclear Operating Company (FENOC) requested an amendment to the Technical Specifications for Davis-Besse Nuclear Power Station (DBNPS), Unit No. 1, to accommodate an increase in the Rated Thermal Power from 2772 megawatts thermal (MWt) to 2817 MWt. By letter dated July 25, 2007, the Nuclear Regulatory Commission (NRC) requested additional information to aid in the review of the request. FENOC's response to the Request for Additional Information (RAI) was submitted to the NRC in correspondence dated September 18, 2007. During a teleconference on September 27, 2007, the NRC expressed that FENOC's responses to questions 34, 35, and 36 were not sufficient to complete their review. During a teleconference on October 30, 2007, the NRC questioned FENOC's future plans regarding the Material Reliability Program initiatives as specified in question 11. Attachment 1 contains supplemental information relevant to the issues discussed in the aforementioned teleconferences.

Attachment 2 contains a new commitment established in this submittal.

If there are any questions or if additional information is required, please contact Mr. Thomas A. Lentz, Manager – FENOC Fleet Licensing, at (330) 761-6071.

A001

NRR

I declare under penalty of perjury that the foregoing is true and correct.

Executed on JAN 15, 2008

By: [signature]
Mark B. Bezilla, Vice President-Nuclear

Attachments
1. Supplement to Response to Request for Additional Information
2. Commitment List

cc: Regional Administrator, NRC Region III
NRC/NRR Project Manager
Executive Director, Ohio Emergency Management Agency,
State of Ohio (NRC Liaison)
NRC Senior Resident Inspector
Utility Radiological Safety Board

Supplement to Response to Request for Additional Information

Davis-Besse Nuclear Power Station, Unit No. 1

Docket No. 50-346

To aid in the NRC staff's review of the license amendment application for the measurement uncertainty recapture power uprate, the following supplemental information is provided relative to questions 11, 34, 35, and 36 of FENOC's correspondence dated September 18, 2007.

Question 11

Original Question – Enclosure 2 to the submittal provides very little information regarding your reactor vessel (RV) internals structural evaluation. Table Matrix-1 of NRC RS-001, Revision 0, "Review Standard for Extended Power Uprates," provides the NRC staff's basis for evaluating the potential for extended power uprates to induce aging effects on RV internals. Depending on the magnitude of the projected RV internals fluence, Table Matrix-1 may be applicable to the MUR application. In the Notes to Table Matrix-1, the NRC staff states that guidance on the neutron irradiation-related threshold for irradiation-assisted stress corrosion cracking (SCC) for PWR [Pressurized Water Reactor] RV internal components are given in BAW-2248A, "Demonstration of the Management of Aging Effects for the Reactor Vessel Internals." The Notes to Table Matrix-1 state that for thermal and neutron embrittlement of cast austenitic stainless steel, SCC, and void swelling, licensees will need to provide plant-specific degradation management programs or participate in industry programs to investigate degradation effects and determine appropriate management programs. Discuss your management of the above-mentioned aging effects on RV internals in light of the guidance in BAW-2248A and WCAP-14577, Revision 1-A. Please also confirm whether you have established an inspection plan to manage the age-related degradation in the DBNPS RV internals, or whether you have participated in the industry's initiatives on age-related degradation of PWR RV internals.

Additional Information Requested During Teleconference – Provide a commitment regarding FENOC's intended actions regarding the Material Reliability Program initiatives.

Supplemental Response

The Electric Power Research Institute's (EPRI's) Material Reliability Program (MRP) initiatives have included the following items:

- Material testing of baffle/former bolts removed from Point Beach, Farley, and Ginna nuclear power plants and determination of bolt operating parameters.

- Evaluation of the effects of irradiation, which include irradiation-assisted stress cracking corrosion, swelling, and stress relaxation in pressurized water reactors.
- Evaluation of irradiated material properties.
- Void swelling assessment including available data and effects on reactor vessel internals.
- Development of a long-term reactor vessel internals aging management strategy.

As appropriate, FENOC commits to incorporate recommendations from EPRI's MRP inspection guidelines into the reactor vessel internals program at Davis-Besse Nuclear Power Station, Unit, No.1.

Question 34

Original Question - Does the power uprate affect any ac distribution system loads? If so, provide a list of loads affected by the power uprate change.

Additional Information Requested During Teleconference - Describe the impact/increase in kW load for each affected component.

Supplemental Response

AC Power System Analysis for Davis-Besse Nuclear Power Station (DBNPS) is performed by calculations utilizing the Electrical Transient Analysis Program (ETAP) PowerStation Software. The calculations have not been revised at this time; however, a preliminary analysis was performed to show that adequate margin exists in the AC Power System Analysis to accommodate the minor load increases due to the power uprate.

The load increases are as follows:

- Condensate Pump Motor = +14HP per motor
- Heater Drain Pump Motor = +6HP per motor
- Reactor Coolant Pump Motor = +4HP per motor
- Stator Water Cooling Pump Motor = +2.5HP per motor

Per formula $HP = \frac{V\sqrt{3} \times A \times PF \times \%}{746}$ (whereas V = rated voltage, A = amperes, PF = power factor, and % = efficiency), the conservatively estimated increase in kilowatts (kW) for each motor is as follows:

- Condensate Pump Motor = +14HP (192.6A – 190.9A = 1.7A increase)
  kW = 10.6kW per motor, approximately a 0.9% increase (10.6kW / 1190.3kW)
  There are 3 total Condensate Pump Motors (3 x 10.6 = 31.8kW)
- Heater Drain Pump Motor = +6HP (39.8A – 39A = 0.8A increase)

kW = 4.9kW per motor, approximately a 2% increase (4.9kW / 240.5kW)
There are 2 total Heater Drain Pump Motors (2 x 4.9 = 9.8kW)

- Reactor Coolant Pump Motor = +4HP (347.3A – 347A = 0.3A increase)
  kW = 6.2kW per motor, approximately a 0.1% increase (6.2kW / 7243.3kW)
  There are 4 total RCP Motors (4 x 6.2kW = 24.8kW)
- Stator Water Cooling Pump Motor = +2.5HP (87.9A – 85.1A = 2.8A increase)
  kW = 1.9kW per motor, approximately a 3% increase (1.9kW / 58.3kW)
  There are 2 Stator Water Cooling Pump Motors (2 x 1.9 = 3.8kW)

The estimated overall increase in kW load on the AC Power System house demand is (factor in the number of motors for each kW increase described above):

kW TOTAL = 70.2 kW or 0.0702 increase in load due to the power uprate.
(kW total = 31.8 + 9.8 + 24.8 + 3.8 = 70.2kW)

This corresponds to less than a 1.6% decrease in the overall design margin of 4500 kW (70.2 kW / 4500 kW = 1.56%).

Question 35

Original Question - Attachment A of the LAR refers to "Davis-Besse Stability Study for FirstEnergy Corporation" (ADAMS No. ML020640288). The transient stability study assumed a 10 percent increase in gross power output, which is significantly higher than the proposed increase of 1.63 percent. The study concluded that for two of the fourteen contingencies analyzed the system response varied or was unstable. A three-phase fault at the Bayshore 345 kiloVolt (kV) bus, Contingency 4, resulted in unstable system responses for the uprated system but stable conditions for the existing ratings. A three-phase fault at DBNPS circuit breaker 34564, Contingency 8, resulted in unstable system response. The study states, "if the Davis-Besse uprate occurs, additional analysis is recommended to determine methods to improve system stability [for Contingencies 4 and 8]." Have additional analyses been performed to evaluate improving system stability for Contingencies 4 and 8? If so, what actions are being taken as a result of the additional analyses?

Additional Information Requested During Teleconference -

1) **Provide additional information/descriptions on the two unstable contingencies (4 and 8) from the GE stability study.**

2) **Does the described performance, unstable for three-phase faults, comply with the latest North American Electric Reliability Corporation (NERC) standards? Provide evidence of compliance.**

Supplemental Response

Contingency 4 is a three-phase fault located on the Bayshore-Davis-Besse 345 kilovolt (kV) line on the line side of the 345 kV breaker at Bayshore substation with a simulated failure of the primary relaying at DBNPS. A three-phase fault occurs when all three phases of the three-phase transmission line are simultaneously shorted together. This type of fault is categorized as a NERC D event.

Contingency 8 is a three-phase fault located on the Lemoyne-Davis-Besse 345 kV line on the line side of the 345 kV breaker at the Davis-Besse substation with a simulated stuck breaker at Davis-Besse. This type of fault is categorized as a NERC D event.

The latest approved version of NERC standard TPL-001 does not require the system to be stable for NERC D events (such as Contingency 4 or Contingency 8). The standard does require the transmission owner to evaluate the fault. No actions are required regardless of whether the system is stable or not. The FirstEnergy system does comply with all stability standards in the NERC planning standards.

Question 36

Original Question - Provide justification that the DBNPS Stability Study completed in May 2000 bounds the current grid conditions. Specifically, since the results of the stability analysis are based on 1999/2000 summer peak load conditions, describe the impact on grid stability when using current summer peak loads.

Additional Information Requested During Teleconference -

1) Provide descriptions for the studies performed in 2005 and 2007.

2) Provide evidence that the May 2007 study bounds the uprated condition of the plant.

3) State the difference between the 2000 General Electric (GE) stability study and the uprated condition of the plant.

Supplemental Response

Descriptions of the studies performed in 2005 and 2007

The 2005 study was performed by GE and was intended to examine stability of a selected set of scenarios in the FirstEnergy (FE) – Midwest Independent Transmission System Operator (MISO) footprint. The study included several scenarios around DBNPS. All scenarios met the FE and NERC planning criteria.

The 2007 study was performed by FE Energy Delivery Planning and Protection Services department and was a comprehensive study of the FE transmission system contained in the MISO footprint. Stuck breaker and backup clearing faults were simulated on each line emanating from a power plant. In total, 260 faults were simulated including 14 associated with DBNPS. For all the simulated scenarios, the FE system met all FE and NERC criteria.

Evidence that the May 2007 study bounds the uprated condition of the plant

While the 2007 study did not specifically model the DBNPS uprate, given the accuracy of the model, the results are valid even following the uprate of the unit. The proposed uprate of 1.63% amounts to approximately 15 MW on a base of 937 MW. There are over 50 parameters that are used to model the Davis-Besse unit for dynamic simulations. While many of these parameter values are known to a modest degree of precision, others are based on either manufacturer typical or calculated data, which experience has shown can deviate by as much as 10%. Additionally, every other generator modeled in the system has a similar number of parameters with similar accuracy, and all of these generator models interact with the Davis-Besse model to varying degrees. Based on the modeling data degree of accuracy, modeling and testing a 1.63% uprate would be bounded by the May 2007 study.

As further evidence of the negligible impact of the uprate on the stability study, FE recently went through the MISO study process that is required for each new or uprated generator. Normally, as part of this study process, MISO requires that a stability study be performed. In this case, MISO recognized that a stability study would not alter the previous findings and waived that requirement.

The latest proposed NERC planning standard indicates that a study that specifically models the 1.63% uprate is not necessary. The proposed standard states that an updated dynamic stability study is only required for changes in the real power output of a generating unit by more than 10% of the existing capability or more than 20 MW whichever is greater. Neither of these criteria apply to the Davis-Besse uprate.

Difference between the 2000 GE stability study and the uprated condition of the plant

The 2000 GE stability study examined a 10% plant uprate, an increase of 94 MW while the proposed 1.63% uprate represents an increase of 15 MW.

COMMITMENT LIST

The following list identifies those actions committed to by the DBNPS in this document. Any other actions discussed in the submittal represent intended or planned actions by the DBNPS. They are described only for information and are not regulatory commitments. Please contact Mr. Thomas A. Lentz, Manager – FENOC Fleet Licensing, at (330) 761-6071 if there are any questions regarding this document or any associated regulatory commitments.

COMMITMENT	**DUE DATE**
• As appropriate, FENOC commits to incorporate recommendations from EPRI's MRP inspection guidelines into the reactor vessel internals program at Davis-Besse Nuclear Power Station, Unit, No.1.	Ongoing