FENOC
FirstEnergy Nuclear Operating Company

Beaver Valley Power Station
P.O. Box 4
Shippingport, PA 15077-0004

Lew W. Myers
Senior Vice President

412-393-5234
Fax: 724-643-8069

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U. 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
Steam Generator Cycle Leakage Criteria

References:
(1) FENOC letter, L-00-041 dated March 31, 2000, "Notification of Steam Generator Cycle Leakage Criteria"
(2) EPRI Report NP-7480-L dated November 1997.
(3) NRC letter, "Request for Additional Information Regarding NP-7480-L, Addendum 1, "Steam Generator Tubing Outside Diameter Stress Corrosion Cracking at Tube Support Plates, Database for Alternate Repair Limits," 1996 Database Update, November 1996, S. L. Magruder (NRC) to D. Modeen (NEI), January 24, 1997.
(4) NEI letter, "Steam Generator Degradation Specific Management Database, POPCD Corrections in Addendum 3," dated February 11, 2000.

FirstEnergy Nuclear Operating Company (FENOC) previously notified the NRC via Reference (1) that the Beaver Valley Power Station (BVPS) Unit No. 1 projected end-of-cycle (EOC) accident-induced steam generator leakage for Cycle 14 would exceed the site-specific permissible limit. This initial projection was performed to satisfy the requirements for implementation of the steam generator voltage-based alternate repair criteria per Generic Letter 95-05 and notification was made pursuant to Unit 1 Technical Specification 4.4.5.5.d.1. This letter provides proposed actions to address the operating limitation resulting from the projected accident-induced leakage estimates as previously discussed in Reference (1).

As was detailed in Reference (1); the number, characteristics and voltages obtained from the BVPS Unit 1 steam generator testing completed during the thirteenth refueling outage are not significantly different from those measured at the previous (twelfth) refueling outage. The reason for the adverse projected accident-induced steam generator leakage estimates is directly related to the inclusion of data from French reactors into the NRC-approved Steam Generator Degradation Specific Management (SGDSM) database

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for 7/8" diameter tubes (Reference 2, Addenda 2 and 3). This database is used to perform projected accident leakage estimates per the requirements of GL 95-05. The French data included indications with very high voltage readings of which many did not reveal evidence of leakage when subjected to a leak test. Specifically, there are 13 French data points > 15 volts of which 7 did not reveal evidence of leakage when tested at Main Steam Line Break (MSLB) conditions. This is in contrast to U.S. data which indicates leakage has occurred for all pulled tube data points > 4 volts when tested at MSLB conditions. In fact, all U.S. data points including laboratory developed specimens ≥ 8.0 volts (except for two lab samples, 8.7 and 10.8 volts) have leaked when tested at MSLB conditions. The contrast between the French and U.S. data sets is charted on the attached Figure 1. When using the LogLogistic function on the SGDSM data set to establish the Probability of Leakage (PoL) curve, the French high voltage, non-leaking indications cause the upper tail of the PoL curve to be depressed with a corresponding elevation of the lower tail of the distribution. This statistical skewing of data at the low voltage range suggests low voltage indications have a higher PoL. The skewing of the PoL curve is an artifact of statistics, is contrary to what the French data physically represent, and is further contrary to the leakage behavior of all the data in the lower voltage range. The net effect to Beaver Valley Unit 1, where the data is entirely at the lower voltage range, is a significant increase in projected EOC accident-induced leakage. This significant increase in the Beaver Valley Unit 1 projected EOC leakage is caused by the skewing effect of statistics and not by significantly higher levels of degradation in the Unit 1 steam generators nor by degradation that logically suggests that a higher PoL exists.

A potential solution to the statistical penalty imposed by the unique behavior of the high voltage French data is to explore the use of alternate curve fits other than the LogLogistic function to establish the PoL curve. It is unlikely that this potential solution could be implemented in a time frame that would resolve the Cycle 14 projected accident-induced leakage issue for Beaver Valley Unit 1; however, it is FENOC's intent to pursue this potential solution with EPRI and NEI.

Another contributing factor to the adverse EOC projected accident leakage is the 0.6 Probability of Detection (POD) imposed by GL 95-05. The 0.6 POD significantly increases the Beginning of Cycle (BOC) distribution of indications that must be considered in the projected EOC leakage analysis. The Industry has continually maintained that the GL 95-05 imposed POD is overly conservative and the NRC staff has acknowledged the potential for overly conservative results when using the GL 95-05 POD approach (Reference 3). In 1997 the Industry proposed a voltage-dependent POD approach as an alternative to the GL 95-05 approach. The Industry-proposed approach was defined as Probability of Prior Cycle Detection (POPCD) and has resulted in

continuing discussion between the NRC and Industry. The Industry recently responded to the NRC's Request for Additional Information (RAI) (Reference 4) regarding POPCD and is currently awaiting approval of the approach.

The POPCD approach to POD is a more realistic treatment of eddy current capabilities for detection of outside-diameter stress corrosion cracking (ODSCC) at tube support plates (TSP) intersections and reduces the impact of the overly conservative GL 95-05 approach to POD without reducing safety. The POPCD approach to POD would significantly benefit Beaver Valley Unit 1 and would result in an estimated 25% reduction in the EOC projected accident-induced leakage as compared to that projected using the 0.6 POD approach.

Implementation of POPCD would provide at least partial resolution to the EOC accident-induced leakage issue for Beaver Valley Unit 1. Upon NRC approval of the POPCD approach to POD, FENOC would implement POPCD to project EOC accident-induced leakage which would significantly increase the operating time of Cycle 14 prior to exceeding the permissible accident-induced leak rate limit (estimated 487 EFPD vs. 69 EFPD). In order to minimize potential operating limitations on Beaver Valley Unit 1 and to take full advantage of the POPCD benefit, approval would need to be obtained by June 1, 2000. FENOC is requesting that the NRC expedite approval of POPCD by June 1, 2000, if possible.

A third action that FENOC is pursuing is a Technical Specification amendment to lower the permissible reactor coolant activity from the present Technical Specification limit of 0.35 microcurie/gm to 0.2 microcurie/gm. The lower reactor coolant activity threshold would be factored into the radiation dose calculations that establish Beaver Valley Unit 1's permissible accident-induced leak rate. It is estimated that this revision in reactor coolant activity would sufficiently increase permissible accident-induced leakage at Beaver Valley Unit 1 such that operation during Cycle 14 could proceed to its full scheduled duration (approximately 495 EFPD).

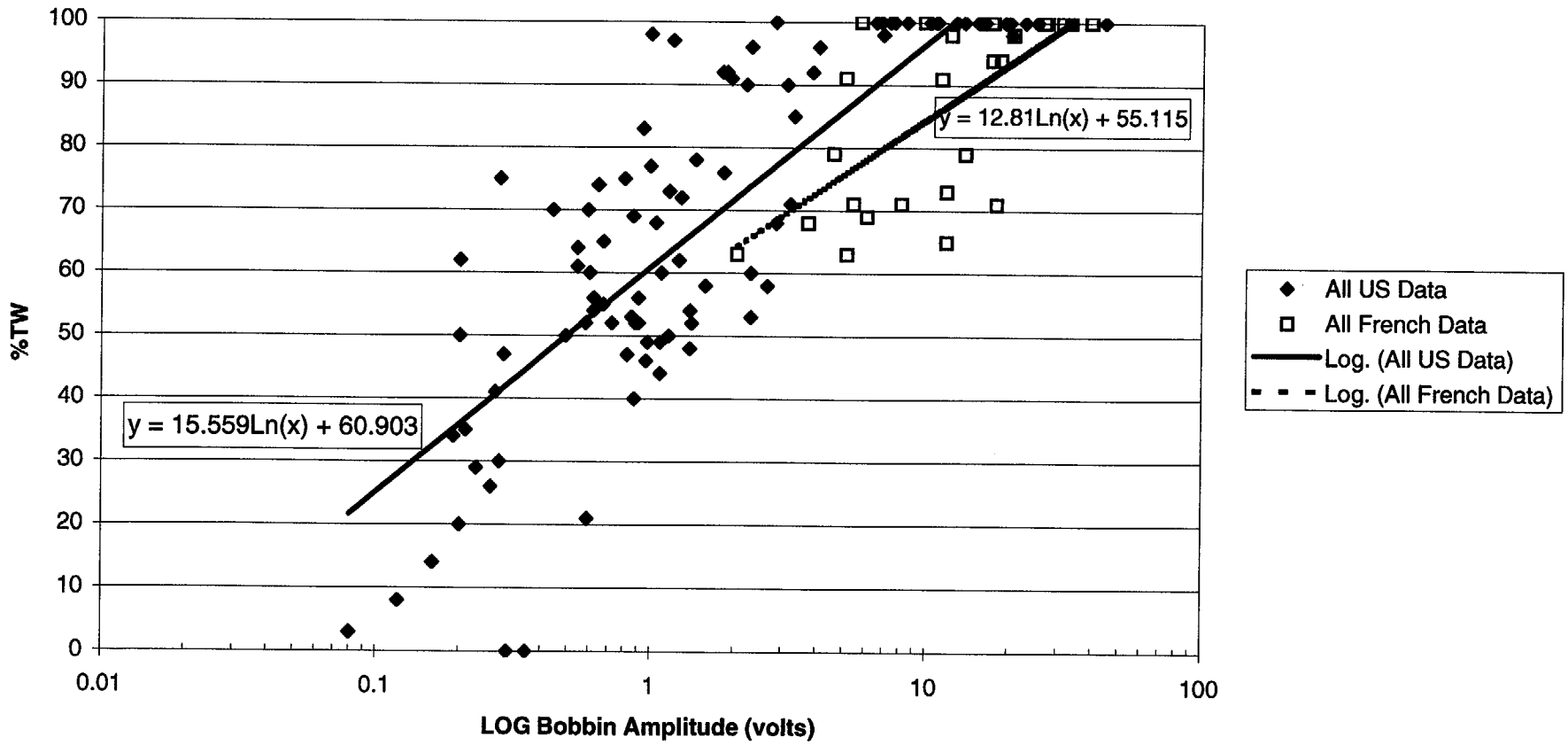
FENOC is presently preparing the above-mentioned technical specification amendment and will submit it to the NRC for approval as expeditiously as possible. If NRC approval of POPCD is not obtained by June 1, 2000, it is FENOC's intent to administratively control the reactor coolant activity to 0.2 microcurie/gm via the GL 91-18 process until such time as the technical specification amendment is approved by the NRC. If POPCD approval is obtained prior to June 1, 2000, sufficient time should exist for the Technical Specification amendment approval process, and the GL 91-18 process would not need to be invoked at the end of Cycle 14.

If you have any questions regarding this matter, please contact Mr. Thomas S. Cosgrove, Manager, Licensing at 724-682-5203.

Sincerely,

Lew W. Myers

c: Mr. D. S. Collins, 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)
Ms. M. E. O'Reilly (FirstEnergy Legal Department)

Figure 1
Bobbin Amplitude vs %TW
All US Data and All French Data Shown

Note: All US Data > 10.8 V Leaked at SLB Conditions
7 of 13 French Data Points >15V Did Not Leak