FENOC
FirstEnergy Nuclear Operating Company

James H. Lash
Site Vice President

724-682-5234
Fax: 724-643-8069

May 12, 2006
L-06-083

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

Subject: Beaver Valley Power Station, Unit Nos. 1 and 2
BV-1 Docket No. 50-334, License No. DPR-66
BV-2 Docket No. 50-412, License No. NPF-73
Supplemental Information in Support of License Amendment Request Nos. 302 and 173 (Unit No. 1 TAC No. MC4645/Unit No. 2 TAC No. MC4646)

On October 4, 2004, FirstEnergy Nuclear Operating Company (FENOC) submitted License Amendment Request (LAR) Nos. 302 and 173 Extended Power Uprate (EPU) by letter L-04-125 (Reference 1). During a phone call held on April 18, 2006, the NRC staff reviewers of LAR 302/173 requested that additional information be provided regarding the Effective Full Power Year (EFPY) and fluence projections associated with the EPU for Beaver Valley Power Station (BVPS) Unit No. 1 and Unit No. 2. Attachment 1 of this submittal provides the requested information discussed during the phone call.

The supplemental information provided by this transmittal has no impact on either the proposed Technical Specification changes or the no significant hazards consideration transmitted by Reference 1.

No new regulatory commitments are contained in this submittal. If there are any questions or if additional information is required, please contact Mr. Gregory A. Dunn, Manager – FENOC Fleet Licensing, at (330) 315-7243.

I declare under penalty of perjury that the foregoing is true and correct. Executed on May 12, 2006.

Sincerely,

James H. Lash

A001

Attachments:
1. Summary of EFPY and Fluence Projections for BVPS-1 & BVPS-2

References:
1. FENOC Letter L-04-125, License Amendment Request Nos. 302 and 173, dated October 4, 2004.

c: Mr. T. G. Colburn, NRR Senior Project Manager
Mr. P. C. Cataldo, NRC Senior Resident Inspector
Mr. S. J. Collins, NRC Region I Administrator
Mr. D. A. Allard, Director BRP/DEP
Mr. L. E. Ryan (BRP/DEP)

Attachment 1 of L-06-083

Summary of EFPY and Fluence Projections for BVPS-1 & BVPS-2

During a phone call held on April 18, 2006, the NRC staff reviewers of License Amendment Request (LAR) 302/173, Extended Power Uprate (EPU) requested that additional information be provided regarding the Effective Full Power Year (EFPY) and fluence projections associated with the EPU for Beaver Valley Power Station (BVPS) Unit No. 1 and Unit No. 2. The following provides the requested information discussed during the phone call.

The BVPS reactor vessel fluence and EFPY projections associated with the EPU have changed over the course of time since the EPU LAR was submitted in the 2004 timeframe. In the EPU LAR, assumptions were made that the 1.4% measurement uncertainty uprate would occur in June of 2001 followed in June of 2003 by the 8% power uprate. The actual timing of these events changed over time, with the 1.4% measurement uncertainty occurring in June of 2001 to be followed by the 8% power uprate (now projected in 2006). This delay in implementing the 8% power uprate coupled with improved operational capacity factors and shorter outages resulted in a change in the projected EFPY associated with the End-Of-Life (EOL) for each unit.

The BVPS-1 and BVPS-2 Reactor Vessel core design history is identified in Tables 1 and 2. As noted in the tables, both BVPS-1 and BVPS-2 have been operating using a Low-Low Leakage Core (L4P) configuration over the past five cycles and it is planned that these core designs will be maintained. The cycle fluences from these core designs are identified in WCAP 15571 (Capsule Y) for BVPS-1 and WCAP 16527 for BVPS-2. In the EPU LAR, the projected EOL for BVPS-2 was 32 EFPY based on the WCAP 15675. In WCAP 16527, the Capsule X report for BVPS-2 submitted in FENOC letter (L-06-050) dated April 7, 2006, the projected EOL is 36 EFPY. The increase in the projected EOL from 32 EFPY to 36 EFPY for BVPS-2 is a result of the improved operating capacity factor and shorter outage durations experienced to date.

The tables include the capacity factor history for each unit and outage durations. In general, capacity factors for the units have improved significantly over the years, and it is projected that capacity factors and outage durations similar to those experienced over the past three to four cycles will be maintained for the remaining licensed life for each unit. As a result of these changes in the anticipated performance, BVPS-1 is projected to reach nearly 30 EFPY at EOL. The fluence value noted in the EPU LAR for BVPS-1 remains conservative based upon the current projections, and the fluence value noted in the EPU LAR for BVPS-2 remains conservative for 32 EFPY.

Sensitivity studies have been performed to determine if and when fluence management measures may be required for BVPS-1 during an extended license period. These sensitivity studies were performed because the BVPS-1 reactor vessel has historically had to address the RT_{PTS} (Reference Temperature, Pressurized Thermal Shock) value during the period near the end of licensed life. The sensitivity analysis used the core fluences identified in WCAP 15571, adjusting the cycle fluence linearly for the projected uprate conditions. This increase coupled with expected capacity factors of between 97% and 98% and an average of 22 days per outage over the remaining licensed life of BVPS-1 would project to approximately 30 EFPY and a fluence value of approximately 3.54 E19 n/cm^2 at EOL. The projections for BVPS-1 are included in Table 3.

Table 4 identifies the WCAPs associated with the capsule evaluations and the projected fluence and RT_{PTS} for each unit. Following the issuance of the PTS Rule, BVPS-1 evaluated various fluence management approaches. In WCAP 14543, an evaluation was presented to the NRC requesting the consideration of the use of measured fluence values rather than calculated values (reducing the effective fluence by ~6.8%) and reducing the effective EOL to 27.1 EFPY resulting in an EOL RT_{PTS} value of 264.5°F. In the response to that request, the NRC issued a Safety Evaluation Report (SER) on October 7, 1997, identifying that calculated fluences are to be used and that the EOL RT_{PTS} value would be 267.8°F at 28 EFPY. At the time of these evaluations, BVPS-1 operating history appeared to support an EOL value of 28 EFPY. The Capsule Y information provided in WCAP 15571 significantly improved the projected RTpts value for BVPS-1. The value projected at 28 EFPY in WCAP 15571 (254°F) is approximately 13°F better than the value projected in the SER. This improvement in the projected RTpts value allows BVPS-1 to reach EOL without concerns for encroaching on the RTpts screening limit value of 270°F.

Table 1 - (BVPS-1)
History of Capacity Factors and Outage Durations

BVPS-1 Operating Cycles	Capacity Factor	Date	Outage Duration	Core Design
1	36.69	1976-1979	356	High Leakage
2	65.58	1980-1981	196	High Leakage
3	85.59	1982-1983	106	High Leakage
4	88.09	1983-1984	85	Moderate Leakage
5	87.49	1985-1986	100	Moderate Leakage
6	85.66	1986-1987	81	Moderate Leakage
7	82.92	1988-1989	116	Moderate Leakage
8	85.06	1989-1991	98	Moderate Leakage
9	81.76	1991-1993	84	Moderate Leakage
10	77.40	1993-1995	64	Low Leakage (L3P) w/Hf
11	92.88	1995-1996	50	Low Leakage (L3P) w/Hf
12	82.25	1996-1997	114	Low Leakage (L3P) w/Hf
13	66.14	1998-2000	52	Low Low Leakage (L4P)
14	94.24	2000-2001	38	Low Low Leakage (L4P)
15	94.25	2001-2003	53	Low Low Leakage (L4P)
16	98.27	2003-2004	28	Low Low Leakage (L4P)
17	98.63	2004-2006	65	Low Low Leakage (L4P)

Table 2 - (BVPS-2)
History of Capacity Factors and Outage Durations

BVPS-2 Operating Cycles	Capacity Factor	Date	Outage Duration	Core Design
1	77.40	1987-1989	71	High Leakage
2	79.96	1989-1990	79	Low Low Leakage (L4P)
3	94.49	1990-1992	59	Moderate Leakage
4	93.43	1992-1993	81	Moderate Leakage
5	94.99	1993-1995	46	Moderate Leakage
6	95.20	1995-1996	107	Low Leakage (L3P)
7	57.93	1996-1999	44	Low Leakage (L3P)
8	91.88	1999-2000	32	Low Low Leakage (L4P)
9	95.47	2000-2002	23	Low Low Leakage (L4P)
10	97.46	2002-2003	29	Low Low Leakage (L4P)
11	97.71	2003-2005	25	Low Low Leakage (L4P)
12		2005-2006		Low Low Leakage (L4P)

Table 3
Projected Fluence Values for Future Operating Cycles (BVPS-1)

BVPS-1	Capacity Factor	Date	Outage Duration	Effective Full Power Years	Fluence E19 n/cm^2
18	98	2006-2007	22	21.02	2.48
19	98	2007-2009	22	22.41	2.64
20	98	2009-2010	22	23.81	2.81
21	98	2010-2012	22	25.20	2.97
22	98	2012-2013	22	26.60	3.13
23	98	2013-2015	22	27.99	3.30
24	98	2015-2016	22	29.39	3.46

Note: These projections are based on a variety of assumptions, which include a cycle fluence profile similar to that experienced in Cycle 10 with linear increase due to power increases, maintaining a bounding fluence of 3.54 E19 n/cm^2, and no extension of the existing license period based upon the potential for crediting the first outage duration as non-operational.

Table 4
WCAP's Associated with Capsule Evaluations and Projected Fluence Values (BVPS-1 & 2)

BVPS-1

WCAP	Capsule	Date	EOL	Fluence (n/cm^2)	RTpts
9860	V	January, 1981	32		
10867	U	November, 1985	32		
12005	W	January, 1989	32	4.07 E19	289
14543	W	August, 1996	27.1	2.82 E19	264.5
SER		October 7, 1997	28	3.02 E19	267.8
15571	Y	March, 2001	28	3.54 E19	259

BVPS-2

WCAP	Capsule	Date	EOL	Fluence (n/cm^2)	RTpts
12406	U	February, 1990	32	6.33 E19	
14484	V	March, 1996	32	3.85 E19	
15675	W	September, 2001	32	3.85 E19	149
16527	X	April, 2006	36	4.11 E19	149