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Docket Number 50-346

10 CFR 50.12

License Number NPF-3

Serial Number 3071

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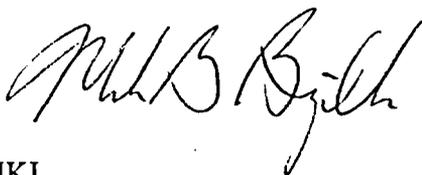
United States Nuclear Regulatory Commission
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Subject: Supplemental Information Regarding the Request to Amend the Existing Exemption from 10 CFR 50.46 and 10 CFR 50, Appendix K, for Boric Acid Precipitation Control Methodology (TAC No. MC2185)

Ladies and Gentlemen:

On February 13, 2004, the FirstEnergy Nuclear Operating Company (FENOC) submitted a request to amend an existing exemption from 10 CFR 50.46 and 10 CFR 50, Appendix K, for the Davis-Besse Nuclear Power Station (DBNPS), Unit Number 1, Operating License Number NPF-3, regarding boric acid precipitation control (BPC) methodology (DBNPS letter Serial Number 3002). By letter dated May 27, 2004, FENOC received a request for additional information (DBNPS letter Log Number 6196) regarding the request to amend the BPC exemption. Enclosure 1 provides the response to this request.

Should you have any questions or require additional information, please contact Mr. Gregory A. Dunn, Manager - Regulatory Affairs, at (419) 321-8450.



MKL

Enclosures

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cc: Regional Administrator, NRC Region III
J. B. Hopkins, NRC/NRR Senior Project Manager
C. S. Thomas, NRC Region III, DB-1 Senior Resident Inspector
Utility Radiological Safety Board

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RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION
REGARDING
REQUEST FOR AMENDED EXEMPTION
FOR
DAVIS-BESSE NUCLEAR POWER STATION
UNIT NUMBER 1

Question:

The proposed backup boron precipitation flushing emergency core cooling system (ECCS) mode would involve ECCS flow going from the suction of the low pressure injection pumps through those pumps to the suction of the high pressure injection (HPI) pumps through a crossover line, through the HPI pumps to the pressurizer spray to the pressurizer, and finally to the reactor coolant system (RCS) hot leg through the pressurizer (J-shaped) surge line. Using spray, it takes some time to fill the pressurizer and its associated surge line sufficiently to inject into the RCS hot leg. Please provide additional information to show that this backup boron flushing path will be available when and if it is needed.

DBNPS Response:

The Auxiliary Pressurizer Spray (APS) method of boric acid precipitation control (BPC) utilizes the No. 2 HPI pump to fill the pressurizer and cause relatively dilute borated water, drawn from the containment emergency sump, to flow into the outlet plenum of the reactor vessel. The APS in-flow eventually exceeds the core boiloff, causing reverse flow through the core, resulting in dilution of the boric acid that would be concentrating in the core region while boiling was occurring. Under the APS method, the initiation of flow into the core is delayed while the pressurizer and the surge line are being filled, however, this delay time was considered in the Reference 1 analysis.

During the Thirteenth Refueling Outage (13RFO), an alternative BPC method, utilizing backflow through the Decay Heat Removal (DHR) drop line, was installed in the plant. This method is referred to as the Hot Leg Injection (HLI) method. Like the APS method, the HLI method relies on flow into the outlet plenum to exceed core boiloff prior to exceeding the boric acid solubility limit. However, unlike the APS method, there is no delay time since the DHR drop line is already full.

The APS method is currently designated as the primary BPC method. Following NRC approval of the proposed amended exemption, the HLI method will become the primary BPC method, and

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the APS method will become the backup method. At issue is whether designating the APS method as the backup method could cause an unacceptable delay in completing the BPC function due to first trying the proposed primary HLI method. This issue is addressed below.

Boric acid precipitation control is only required for Cold Leg Pump Discharge breaks that result in the RCS being saturated and depressurized to less than 92 psia. Large break Loss of Coolant Accidents (LOCAs) are the limiting condition for BPC because the RCS temperature is lower when the RCS pressure is lower, and a lower temperature has a lower solubility limit. The larger the break, the lower the RCS pressure falls due to more direct, less restricted communication with the containment volume. Consequently, the timing associated with large break LOCAs is of interest. The plant emergency procedure (Reference 2) directs operators to initiate BPC flow following swap-over from the Borated Water Storage Tank to the containment emergency sump, and swapover is predicted to occur at 40 minutes after a large break LOCA (Reference 3). If the HLI method could not be established, the operators would then attempt to establish the APS method. Given that pressurizer fill could take approximately one hour, and adding time for the operators to implement and evaluate the HLI method, APS flow into the core could realistically be expected at 3 hours or less after the LOCA. According to Reference 1, with the RCS depressurized to 14.7 psia, a minimum time of at least 4.9 hours is required to reach the boric acid solubility limit. Therefore, it can be concluded that adequate time is available to attempt the HLI method and change to the APS method and still meet the BPC function, thereby satisfying the requirements of 10 CFR 50.46.

Reference 1 utilizes conservative assumptions, such as initial power operation at 102% of rated thermal power, 1.2 times the ANS 1971 decay heat curve, beginning of life boric acid concentration, and no internal recirculation of reactor vessel water. Hence, the minimum time to reach the boric acid solubility limit is very conservative and a large degree of margin exists.

References

1. Framatome ANP Document 86-5006059-02, "Post-LOCA Boron Concentration Management for DB", Revision 2, July 25, 2003.
2. DB-OP-02000, Revision 14, "RPS, SFAS, SFRCS Trip, or SG Tube Rupture".
3. Davis-Besse Nuclear Power Station Updated Safety Analysis Report, Revision 23.

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COMMITMENT LIST

THE FOLLOWING LIST IDENTIFIES THOSE ACTIONS COMMITTED TO BY THE DAVIS-BESSE NUCLEAR POWER STATION (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 NOTIFY THE MANAGER – REGULATORY AFFAIRS (419-321-8450) AT THE DBNPS OF ANY QUESTIONS REGARDING THIS DOCUMENT OR ANY ASSOCIATED REGULATORY COMMITMENTS.

COMMITMENTS	DUE DATE
None.	N/A