

November 29, 2004

Mr. Mark B. Bezilla  
Vice President-Nuclear, Davis-Besse  
FirstEnergy Nuclear Operating Company  
Davis-Besse Nuclear Power Station  
5501 North State Route 2  
Oak Harbor, OH 43449-9760

SUBJECT: DAVIS-BESSE NUCLEAR POWER STATION, UNIT 1 - AMENDMENT TO  
EXEMPTION FROM THE REQUIREMENTS OF 10 CFR 50.46 AND  
10 CFR PART 50, APPENDIX K (TAC NO. MC2185)

Dear Mr. Bezilla:

The Commission has amended the exemption issued May 5, 2000, from specific requirements of Title 10 of the *Code of Federal Regulations* (10 CFR), Part 50, Section 50.46 and 10 CFR, Part 50, Appendix K, for the Davis-Besse Nuclear Power Station. This action is in response to your letter of February 13, 2004, as supplemented by letter dated July 23, 2004. The amendment is proposed because you have made a plant modification that provides a new method for preventing boric acid precipitation within the reactor vessel core region following certain loss-of-coolant accidents.

A copy of the amended exemption has been forwarded to the Office of the Federal Register for publication.

Sincerely,

*/RA/*

Jon B. Hopkins, Senior Project Manager  
Project Directorate III, Section 2  
Division of Licensing Project Management  
Office of Nuclear Reactor Regulation

Docket No. 50-346

Enclosure: Amended Exemption

cc w/enclosure: See next page

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DISTRIBUTION:

PUBLIC	PDIII-2 R/F	LMarsh	WRuland
AMendiola	PCoates	JHopkins	OGC
GHill (2)	ACRS	SReynolds, RIII	

**ADAMS Accession Number: ML042590641**

OFFICE	LA:PDIII-2	PM:PDIII-2	SC:PDIII-2	OGC	D:PDIII-2	D:DLPM
NAME	PCoates	JHopkins	GSuh	AHodgdon	WRuland	LMarsh
DATE	10/13/04	10/13/04	10/22/04	10/8/04	10/25/04	10/26/04

**OFFICIAL RECORD COPY**

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Davis-Besse Nuclear Power Station, Unit 1 - 2 -

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UNITED STATES OF AMERICA  
NUCLEAR REGULATORY COMMISSION  
FIRSTENERGY NUCLEAR OPERATING COMPANY  
DAVIS-BESSE NUCLEAR POWER STATION  
DOCKET NO. 50-346  
AMENDED EXEMPTION

1.0 BACKGROUND

The FirstEnergy Nuclear Operating Company (the licensee) is the holder of Facility Operating License No. NPF-3, which authorizes operation of the Davis-Besse Nuclear Power Station (DBNPS). The license provides, among other things, that the facility is subject to all rules, regulations, and orders of the Nuclear Regulatory Commission (NRC, the Commission) now or hereafter in effect.

The facility consists of a pressurized-water reactor located in Ottawa County, Ohio.

2.0 REQUEST

Title 10 of the *Code of Federal Regulations* (10 CFR), Part 50, Section 50.46 provides acceptance criteria for the emergency core cooling systems (ECCS), including an option to develop the ECCS evaluation model in conformance with Appendix K requirements (10 CFR 50.46(a)(1)(ii)). 10 CFR Part 50, Appendix K, Section 1.D.1, in turn, requires that accident evaluations use the combination of ECCS subsystems assumed to be operative “after the most damaging single failure of ECCS equipment has taken place.”

An exemption issued on May 5, 2000, exempted the licensee from the single-failure requirement for the two systems (paths) for preventing boric acid precipitation (boric acid precipitation control or BPC) during the long-term cooling phase following a loss-of-coolant

accident (LOCA). Additionally, the licensee was exempted from the calculation requirements of 50.46(b)(5) and Appendix K, Section I.A.4 for the second or backup path for BPC. The proposed action would amend the existing exemption by approving a new path for BPC. This new path would become the primary path and the original primary path would become the backup path. The original backup path would no longer be credited as part of the licensing basis, although it would remain as a third option procedurally. As such, the parts of the exemption related to the calculation requirements of 50.46(b)(5) and Appendix K, Section I.A.4 are removed from the exemption as they only applied to the original backup path and are no longer needed.

Specifically, DBNPS requested the following amended exemption:

FirstEnergy Nuclear Operating Company, with respect to the Davis-Besse Nuclear Power Station, is exempt from the single-failure criterion requirement of 10 CFR 50, Appendix K, Section I.D.1, with respect to failure of either Motor Control Center E11B or Motor Control Center F11A and the resulting inability to initiate an active means of controlling core boron concentration.

In summary, the licensee has modified the plant to install a better method of post-LOCA BPC and wants to credit the new method for use.

### 3.0 DISCUSSION

Pursuant to 10 CFR 50.12, the Commission may, upon application by any interested person or upon its own initiative, grant exemptions from the requirements of 10 CFR Part 50 when (1) the exemptions are authorized by law, will not present an undue risk to public health or safety, and are consistent with the common defense and security; and (2) when special circumstances are present. Special circumstances are present whenever, according to 10 CFR 50.12(a)(2)(ii), "Application of the regulation in the particular circumstances would not

serve the underlying purpose of the rule or is not necessary to achieve the underlying purpose of the rule.”

The requirements of 10 CFR Part 50 apply to the DBNPS request to amend the existing exemption. The underlying purpose of the single-failure criterion requirement is to assure long-term cooling performance of the ECCS in the event of the most damaging single-failure of ECCS equipment.

As a licensing review tool, the single-failure criterion helps assure reliable systems as an element of defense in depth. As a design and analysis tool, it promotes reliability through enforced redundancy. Since historically only those systems or components that were judged to have a credible chance of failure were assumed to fail, the criterion has been applied to such responses as valve movement on demand, emergency diesel generator start, short circuit in an electrical bus, and fluid leakage caused by gross failure of a pump or valve seal during long-term cooling. Certain types of structural elements, when combined with other unlikely events, were not assumed to fail because the probabilities of the resulting scenarios were deemed sufficiently small that they did not need to be considered.

The single-failure criterion was developed without the benefit of numerical failure assessments. Regulatory requirements and guidance consequently were based upon categories of equipment and examples that must be covered or that are exempt, and do not allow a probabilistic consideration during routine implementation. Hence, a single failure that was not judged to be exempt would need to be addressed, whether or not there is a substantial impact upon overall system reliability. A result that does not improve safety is inconsistent with the objective of the single-failure criterion, which was not intended to force changes if essentially no benefit would accrue. This is the case with potential failure of the active means of BPC.

No U.S. plants have encountered LOCA conditions where BPC was of concern. BPC measures are not needed for hot-leg breaks because water will flow through the core, thus preventing significant boric acid buildup. Additionally, BPC measures are not needed if excore thermocouples indicate an adequate subcooling margin because there is no boiling to cause concentration of boric acid. Neither are they needed for many of the remaining pipe breaks until decay heat is low, because water will flow from the core to the upper downcomer via the reactor vessel vent valves, thus providing a mechanism to control accumulation of boric acid in the core. Active means for BPC are needed in case one of the above conditions is not satisfied.

In reviewing the proposed BPC ECCS alignments, the NRC staff used substantial improvement in reliability as its criterion for acceptance, since the existing BPC ECCS alignments were found acceptable on a probabilistic basis.

The licensee submitted information that compared the previously approved BPC alignments with the proposed alignments to show that the proposed BPC ECCS alignments are more reliable than the previously approved alignments.

The new proposed primary path takes suction from the ECCS sump through decay heat pump 1-1 to a newly installed crossover line to the decay heat removal system hot leg drop line and through decay heat system valves DH-11 and DH-12 to the reactor coolant system (RCS) hot leg, and finally to the reactor vessel to back-flush precipitated boron from the core. The NRC staff determined that this is an improvement over the previous primary alignment in that it provides a faster, higher, flushing/diluting flow to the reactor vessel from the RCS hot leg side. For RCS cold leg pipe breaks, this alignment would provide the optimal flow direction for flushing of the core.

The new proposed backup path is the previous primary path through the pressurizer spray line. This continues to be an acceptable path as was determined by the staff's review for

the exemption issued on May 5, 2000. Additionally, the new proposed backup path through the pressurizer spray line does not need additional exemptions regarding the calculation requirements of 50.46(b)(5) and Appendix K, Section I.A.4 that the original backup path needed.

The proposed new BPC primary path is significantly more reliable in terms of capacity and timeliness than the previous primary path. As stated above, the proposed new backup path is the previous primary path and does not need two additional exemptions regarding calculation requirements that the original backup path needed. Therefore, the staff concludes that the proposed backup path is significantly better than the original backup path.

Based on its review, the NRC staff has determined that the proposed BPC alignment paths are significantly more reliable than the previously approved paths and, therefore, the staff concludes that they are acceptable.

For the foregoing reasons, the NRC staff has concluded that amending the existing exemption to the requirements of Appendix K, Section I.D.1, and 10 CFR 50.46(a)(1)(ii) with respect to the revised alignment paths for active means of BPC at DBNPS is acceptable. The NRC staff has determined that there are special circumstances present, as specified in 10 CFR 50.12(a)(2)(ii), in that application of the specific regulations is not necessary in order to achieve the underlying purpose of these regulations to assure long term cooling performance of the ECCS.

Additionally, the NRC staff has concluded that the parts of the exemption related to the calculation requirements of 10 CFR 50.46(b)(5) and Appendix K, Section I.A.4 are now withdrawn as they are no longer needed.

#### 4.0 CONCLUSION

Accordingly, the Commission has determined that, pursuant to 10 CFR 50.12(a), the amendment to the exemption is authorized by law, will not present an undue risk to the public health and safety, and is consistent with the common defense and security. Also, special circumstances are present. Therefore, the Commission hereby grants FirstEnergy Nuclear Operating Company an amendment to the exemption from the requirements of 10 CFR 50.46(a)(1)(ii) and 10 CFR Part 50, Appendix K, Section 1.D.1 for Davis-Besse Nuclear Power Station.

Pursuant to 10 CFR 51.32, the Commission has determined that the granting of this exemption will not have a significant effect on the quality of the human environment (69 FR 47469).

This exemption is effective upon issuance and shall be implemented within 120 days.

Dated at Rockville, Maryland, this 29<sup>th</sup> day of November 2004.

FOR THE NUCLEAR REGULATORY COMMISSION

*/RA/*

Ledyard B. Marsh, Director  
Division of Licensing Project Management  
Office of Nuclear Reactor Regulation