



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D.C. 20555-0001

October 20, 2015

Mr. Brian D. Boles  
Site Vice President  
FirstEnergy Nuclear Operating Company  
Mail Stop A-DB-3080  
5501 North State, Route 2  
Oak Harbor, OH 43449-9760

SUBJECT: DAVIS-BESSE NUCLEAR POWER STATION, UNIT NO. 1 - ISSUANCE OF  
AMENDMENT REVISING CONTAINMENT SPRAY NOZZLE SURVEILLANCE  
REQUIREMENT (TAC NO. MF5483)

Dear Mr. Boles:

The U.S. Nuclear Regulatory Commission (the Commission) has issued the enclosed Amendment No. 289 to Facility Operating License No. NPF-3 for the Davis-Besse Nuclear Power Station, Unit No. 1. The amendment is in response to your application dated December 30, 2014 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML14365A080).

Technical specification Surveillance Requirement (SR) 3.6.6.8 requires the licensee to verify that each containment spray nozzle is unobstructed. The amendment revises the frequency for performing SR 3.6.6.8 from every 10 years to "Following maintenance that could result in nozzle blockage."

A copy of the Safety Evaluation is also enclosed. The Notice of Issuance will be included in the Commission's next biweekly *Federal Register* notice.

Sincerely,

A handwritten signature in black ink, appearing to read "Blake Purnell".

Blake Purnell, Project Manager  
Plant Licensing III-2 and  
Planning and Analysis Branch  
Division of Operating Reactor Licensing  
Office of Nuclear Reactor Regulation

Docket No. 50-346

Enclosures:

1. Amendment No. 289 to NPF-3
2. Safety Evaluation

cc w/encls: Listserv



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D.C. 20555-0001

FIRSTENERGY NUCLEAR OPERATING COMPANY

AND

FIRSTENERGY NUCLEAR GENERATION, LLC

DAVIS-BESSE NUCLEAR POWER STATION, UNIT NO. 1

AMENDMENT TO FACILITY OPERATING LICENSE

DOCKET NO. 50-346

Amendment No. 289  
License No. NPF-3

1. The U.S. Nuclear Regulatory Commission (the Commission) has found that:
  - A. The application for amendment filed by FirstEnergy Nuclear Operating Company (FENOC, the licensee) dated December 19, 2014, as supplemented by letter dated June 26, 2015, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's rules and regulations set forth in 10 CFR Chapter I;
  - B. The facility will operate in conformity with the application, the provisions of the Act, and the rules and regulations of the Commission;
  - C. There is reasonable assurance (i) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the Commission's regulations;
  - D. The issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public; and
  - E. The issuance of this amendment is in accordance with 10 CFR Part 51 of the Commission's regulations and all applicable requirements have been satisfied.
2. Accordingly, the license is amended by changes to the Technical Specifications as indicated in the attachment to this license amendment and paragraph 2.C.(2) of Facility Operating License No. NPF-3 is hereby amended to read as follows:

Enclosure 1

(2) Technical Specifications

The Technical Specifications contained in Appendix A, as revised through Amendment No. 289, are hereby incorporated in the license. FENOC shall operate the facility in accordance with the Technical Specifications.

3. This license amendment is effective as of its date of issuance and shall be implemented within 45 days of the date of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

A handwritten signature in black ink, appearing to read "Travis L. Tate", with a long horizontal flourish extending to the right.

Travis L. Tate, Chief  
Plant Licensing III-2 and  
Planning and Analysis Branch  
Division of Operating Reactor Licensing  
Office of Nuclear Reactor Regulation

Attachment: Changes to the Technical  
Specifications and Facility Operating License

Date of Issuance: October 20, 2015

ATTACHMENT TO LICENSE AMENDMENT NO. 289

FACILITY OPERATING LICENSE NO. NPF-3

DOCKET NO. 50-346

Replace the following pages of the Facility Operating License and Appendix A, Technical Specifications, with the attached revised pages. The revised pages are identified by amendment number and contain marginal lines indicating the areas of change.

Remove

Insert

License NPF-3  
Page 4

License NPF-3  
Page 4

TS pages  
3.6.6-3

TS pages  
3.6.6-3

2.C. This license shall be deemed to contain and is subject to the conditions specified in the following Commission regulations in 10 CFR Chapter I: Part 20, Section 30.34 of Part 30, Section 40.41 of Part 40, Sections 50.54 and 50.59 of Part 50, and Section 70.32 of Part 70; and is subject to all applicable provisions of the Act and to the rules, regulations, and orders of the Commission now or hereafter in effect; and is subject to the additional conditions specified or incorporated below:

(1) Maximum Power Level

FENOC is authorized to operate the facility at steady state reactor core power levels not in excess of 2817 megawatts (thermal). Prior to attaining the power level, Toledo Edison Company shall comply with the conditions identified in Paragraph (3) (o) below and complete the preoperational tests, startup tests and other items identified in Attachment 2 to this license in the sequence specified. Attachment 2 is an integral part of this license.

(2) Technical Specifications

The Technical Specifications contained in Appendix A, as revised through Amendment No. 289, are hereby incorporated in the license. FENOC shall operate the facility in accordance with the Technical Specifications.

(3) Additional Conditions

The matters specified in the following conditions shall be completed to the satisfaction of the Commission within the stated time periods following the issuance of the license or within the operational restrictions indicated.

The removal of these conditions shall be made by an amendment to the license supported by a favorable evaluation by the Commission:

- (a) FENOC shall not operate the reactor in operational Modes 1 and 2 with less than three reactor coolant pumps in operation.
- (b) Deleted per Amendment 6
- (c) Deleted per Amendment 5

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.6.6.3	Verify each containment spray pump's developed head at the flow test point is greater than or equal to the required developed head.	In accordance with the Inservice Testing Program
SR 3.6.6.4	Verify each required containment air cooling train starts automatically on an actual or simulated actuation signal.	18 months
SR 3.6.6.5	Verify each required containment air cooling train cooling water flow rate is $\geq 1150$ gpm.	24 months
SR 3.6.6.6	Verify each automatic containment spray valve in the flow path that is not locked, sealed, or otherwise secured in position, actuates to the correct position on an actual or simulated actuation signal.	24 months
SR 3.6.6.7	Verify each containment spray pump starts automatically on an actual or simulated actuation signal.	24 months
SR 3.6.6.8	Verify each spray nozzle is unobstructed.	Following maintenance that could result in nozzle blockage.



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SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION  
RELATED TO AMENDMENT NO. 289 TO FACILITY OPERATING LICENSE NO. NPF-3  
FIRSTENERGY NUCLEAR OPERATING COMPANY  
FIRSTENERGY NUCLEAR GENERATION, LLC  
DAVIS-BESSE NUCLEAR POWER STATION, UNIT NO. 1  
DOCKET NO. 50-346

1.0 INTRODUCTION

By application dated December 30, 2014 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML14365A080), FirstEnergy Nuclear Operating Company (the licensee) submitted a license amendment request for Davis-Besse Nuclear Power Station (DBNPS), Unit No. 1. Technical specification Surveillance Requirement (SR) 3.6.6.8 requires the licensee to verify that each containment spray system (CSS) nozzle is unobstructed. The proposed amendment would revise the frequency for performing SR 3.6.6.8 from every 10 years to an event-based frequency.

2.0 REGULATORY EVALUATION

2.1 System Description

The DBNPS CSS is an engineered safety feature with the purpose of controlling containment pressure, temperature, and airborne fission product iodine following a design-basis accident. Containment spray cools the containment atmosphere and condenses water vapor and steam. The CSS consists of two separate trains, each independently capable of providing the required spray flow. Each train includes a containment spray pump, a containment isolation and throttling valve, piping, instrumentation, and 90 spray nozzles installed on the spray ring header mounted to the inside of the containment dome. The CSS pump suction source is the slightly acidic contents of the borated water storage tank (BWST) and the system piping components and spray nozzles are stainless steel to minimize corrosion. The spray nozzles are spaced on the headers to provide uniform spray coverage of the containment volume above the operating floor. The upper spray ring header is at approximately 807 foot elevation while the lower ring header is at approximately 788 foot elevation.

2.2 Regulatory Review

The U.S. Nuclear Regulatory Commission (NRC or Commission) staff used the following licensing and regulatory requirements in its review of the application.

Appendix 3D of the DBNPS Updated Final Safety Analysis Report (UFSAR; ADAMS Accession No. ML14339A821) states that DBNPS meets the intent of the Appendix A, "General Design Criteria [GDC] for Nuclear Power Plants," in Title 10 of the *Code of Federal Regulations* (10 CFR) Part 50, as published in the *Federal Register* on February 20, 1971, and as amended in the *Federal Register* on July 7, 1971.

GDC 38 states, in part, the requirements for design of a containment heat removal system. GDC 40 states that the containment heat removal system design permit appropriate periodic pressure and functional testing to assure: (1) the structural and leaktight integrity of its components, (2) the operability and performance of the active components of the system, and (3) the operability of the system as a whole, and under conditions as close to the design as practical the performance of the full operational sequence that brings the system into operation, including operation of applicable portions of the protection system, the transfer between normal and emergency power sources, and the operation of the associated cooling water system.

### 3.0 TECHNICAL EVALUATION

The licensee proposes to change the frequency for performing SR 3.6.6.8 at DBNPS from every 10 years to "Following maintenance that could result in nozzle blockage." The proposed change expands on a previously approved extension to the surveillance frequency from every 5 years to every 10 years (License Amendment No. 196 issued March 21, 1995; ADAMS Accession No. ML021210194). The previous extension was based, in part, on the information contained in NRC NUREG-1366, "Improvements to Technical Specifications Surveillance Requirements," dated December 1992. NUREG-1366 documented the review of CSS operating experience throughout the industry with the conclusion that nearly all spray nozzle obstruction occurrences were related to foreign material left in the system from original construction or to accumulation of corrosion and/or coating products in the piping and/or headers.

The DBNPS UFSAR (Table 6.2-21) describes the nozzles as being designed to pass particles up to ¼-inch in size. The CSS piping and components which may be in contact with borated water are made of uncoated stainless steel which is resistant to corrosion; thus, minimizing the potential for time-based accumulation of potential nozzle obstructing corrosion deposits or coating debris in the supply piping and spray headers. If a few nozzles were completely or partially obstructed most of the spray flow that would have passed through the obstructed nozzles would instead be discharged out the unobstructed nozzles with little impact on system function.

As discussed in the application, the CSS piping is normally filled with borated water up to the normally closed containment isolation valves and with air above that elevation in the risers and spray ring headers inside containment. Therefore, the spray headers and nozzles remain dry during normal plant operation. The application states that maintenance activities could allow additional water to fill the CSS piping up to the normal BWST level elevation of about 625 feet, which would still be more than 150 feet below the elevation of the lower ring header spray nozzles. The licensee stated that limited inspection of the CSS piping above the normal water level as recently as 2014 showed minimal accumulation of boric acid crystal deposits.

The application states the design of the CSS minimizes the likelihood that foreign material could adversely affect the CSS header flow. The licensee also states that its foreign material



exclusion (FME) procedure focuses on the prevention of foreign material intrusion into plant systems and components through effective behaviors by all plant workers. The procedure provides guidelines for inspection of work areas, establishing FME control requirements, and prevents introduction of foreign material into open systems or components. It also requires that personnel performing operating, maintenance, or inspection activities on open systems or within an FME area be trained to implement the requirements of the procedure or continuously be supervised by a licensee qualified FME worker. The NRC staff agrees that introduction and accumulation of foreign material through the spray nozzles into the ring headers is unlikely due to their location at the top of the containment and downward orientation.

The application stated that the CSS spray nozzles were pre-operationally and subsequently periodically air flow tested (March 1977, June 1982, October 1988, April 1993, and February 2005) with all results demonstrating unobstructed flow. The NRC staff determined that continuing to perform calendar based nozzle tests at DBNPS is of little benefit based on these results. The application states that "[i]ndustry experience indicates maintenance activities are the most likely event that would introduce foreign material to cause nozzle blockage." Verifying that the nozzles are not obstructed following maintenance (e.g., due to a loss of FME control or inadvertent system actuation) will ensure the nozzles maintain their functional capability.

The NRC staff determined that the licensee's proposed change is acceptable since performance of SR 3.6.6.8 following maintenance that could result in nozzle blockage provides reasonable assurance that the nozzles will maintain their functional capability. The staff based this determination on: (1) the consistent DBNPS CSS spray nozzle test results since construction demonstrating unobstructed flow, (2) industry experience at other pressurized water-reactor units, and (3) the DBNPS FME control program.

#### 4.0 STATE CONSULTATION

In accordance with the Commission's regulations, the Ohio State official was notified of the proposed issuance of the amendment. The State official had no comments.

#### 5.0 ENVIRONMENTAL CONSIDERATION

This amendment changes a requirement with respect to installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20 and changes surveillance requirements. The NRC staff has determined that the amendment involves no significant increase in the amounts, and no significant change in the types, of any effluent that may be released offsite, and that there is no significant increase in individual or cumulative occupational radiation exposure. The Commission has previously issued a proposed finding that the amendment involves no significant hazards consideration (80 FR 17090; March 31, 2015). Accordingly, the amendment meets the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9). Pursuant to 10 CFR 51.22(b), no environmental impact statement or environmental assessment need be prepared in connection with the issuance of the amendment.

## 6.0 CONCLUSION

The NRC staff has concluded, based on the considerations discussed above, that: (1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, (2) there is reasonable assurance that such activities will be conducted in compliance with the Commission's regulations, and (3) the issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public.

Principal Contributors: Jerome Bettle, NRR/DSS/SCVB

Date of issuance: October 20, 2015

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Sincerely,  
*/RA/*  
Blake Purnell, Project Manager  
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Division of Operating Reactor Licensing  
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Docket No. 50-346

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cc w/encls: Listserv

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