7590-01-P

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

In the Matter of	)	
	)	Docket No. 50-346
FirstEnergy Nuclear Operating Company	)	License No. NPF-3
(Davis-Besse Nuclear Power Station, Unit 1)	)	EA-03-214

CONFIRMATORY ORDER MODIFYING LICENSE (EFFECTIVE IMMEDIATELY)

I.

FirstEnergy Nuclear Operating Company (FENOC, or the Licensee) is the holder of Facility Operating License No. NPF-3 issued on April 22, 1977, by the Nuclear Regulatory Commission (NRC or Commission) pursuant to 10 CFR Part 50. The license authorizes the operation of Davis-Besse Nuclear Power Station, Unit 1 (Davis-Besse), in accordance with conditions specified therein. The facility is located on the Licensee's site in Ottawa County, Ohio.

II.

The discovery of circumferential cracking in some of the control rod drive mechanism (CRDM) nozzles that penetrate the reactor pressure vessel (RPV) head at Oconee Nuclear Station, Unit 3, in February 2001, and Oconee Nuclear Station, Unit 2, in April 2001, raised concerns about the potential safety implications and prevalence of cracking in RPV head penetration nozzles in pressurized-water reactors (PWRs). In response to these concerns, the NRC issued NRC Bulletin 2001-01 on August 3, 2001. The bulletin required all PWR operators to report to the NRC on the structural integrity of the CRDM nozzles, including their plans to ensure that future inspections would verify structural integrity of the reactor vessel boundary. Davis-Besse was shut down on February 16, 2002, when it began its 13th refueling outage, which included an inspection of CRDM nozzles. On March 6, 2002, FENOC employees discovered a cavity in the RPV head. The cavity was the result of corrosion caused by long-term leakage of reactor coolant, which contains boric acid, from small cracks in one of the CRDM nozzles.

The NRC staff subsequently determined that FENOC's failure to properly implement its boric acid corrosion control and corrective action programs was a performance deficiency that allowed reactor coolant system pressure boundary leakage to occur undetected for a prolonged time, resulting in RPV upper head degradation. The NRC determined that the Licensee's performance deficiency had high safety significance, in the Red range, as documented in a letter to the Licensee dated May 29, 2003 (ADAMS Accession No. ML031490778).

The NRC took a series of actions in response to the discovery of the cavity in the Davis-Besse RPV head. An Augmented Inspection Team was sent to Davis-Besse on March 12, 2002, to collect facts regarding the conditions that led to the head degradation. Additionally, the NRC

issued a Confirmatory Action Letter (CAL) to the Licensee on March 13, 2002 (ML020730225), confirming the Licensee's agreement that NRC approval is required for restart of Davis-Besse. The CAL also documented a number of actions that the Licensee must implement before restart. By letter dated April 29, 2002 (ML021190661), the NRC informed FENOC that its corrective actions at Davis-Besse would receive enhanced NRC oversight, as described in NRC Inspection Manual Chapter 0350, "Oversight of Operating Reactor Facilities in a Shutdown Condition With Performance Problems." That enhanced monitoring began on May 3, 2002, and included the creation of a panel to provide the required oversight during the plant shutdown and during and after any future restart until a determination is made that the plant is ready for return to the NRC's normal reactor oversight process.

By letter dated April 18, 2002 (ML021130029), "Confirmatory Action Letter Response - Root Cause Analysis Report," the Licensee submitted to the NRC its technical root cause analysis report for the RPV head degradation, as revised by letter dated September 23, 2002 (ML022750125), "Revision 1 to Root Cause Analysis Report Regarding Reactor Pressure Vessel Head Degradation." The Licensee concluded that the probable cause of the degradation was primary water stress corrosion cracking of the nozzle. The physical factors that caused corrosion of the RPV head were the CRDM nozzle leakage associated with through-wall cracking, followed by boric acid corrosion of the RPV low-alloy steel. The Licensee further concluded that the large-scale corrosion occurred as a result of a failure to detect and arrest the leakage until advanced symptoms had appeared.

The Licensee submitted to the NRC its nontechnical root cause analysis by letter dated August 21, 2002 (ML022750405), "Management and Human Performance Root Cause Analysis Report on Failure to Identify Reactor Pressure Vessel Head Degradation." In this analysis, the Licensee concluded that "there was a lack of sensitivity to nuclear safety and the focus was to justify existing conditions. The overall conclusion is that Management ineffectively implemented processes and thus failed to detect and address plant problems as opportunities arose." The Licensee identified a number of root causes for the failure to identify boric acid corrosion of the RPV head, including:

1. Less-than-adequate nuclear safety focus - A production focus established by management, combined with minimum action to meet regulatory requirements, resulted in acceptance of degraded conditions on the RPV head and other components affected by boric acid.

2. Less-than-adequate implementation of the corrective action program, as indicated by the following:
   a. Addressing symptoms rather than causes
   b. Low categorization of conditions
   c. Less-than-adequate cause determinations
   d. Less-than-adequate corrective actions
   e. Less-than-adequate trending

3. Less-than-adequate analyses of safety implications - Failure to integrate and apply key industry information and site knowledge/experience, effectively use vendor expertise, and compare new information to baseline knowledge led to less-than-adequate analyses and decisionmaking with respect to the nuclear safety implications of boric acid on the reactor vessel head and in the containment.

4. Less-than-adequate compliance with the boric acid corrosion control and inservice test programs - Contrary to these programs, boric acid was not completely removed from the RPV head. The affected areas were not inspected for corrosion and leakage from nozzles and the sources of the leakage were not determined.

As documented in NRC Inspection Report No. 50-346/02-15 (ML030380037), dated February 6, 2003, the NRC concluded that the Licensee's management and human performance initial root cause analyses were not sufficiently broad to identify potential contributors in the engineering and corporate support areas and were not developed in an integrated manner to identify potentially systemic issues. Additional analyses were performed by the Licensee, including assessments in the areas of operations, engineering, oversight, and corporate support, and were evaluated by the NRC, as documented in NRC Inspection Report No. 50-346/02-18 (ML032050528), dated July 24, 2003. Following review of the additional FENOC analyses, the NRC concluded that the Licensee's overall nontechnical root cause assessment was of appropriate depth and breadth to develop actions to correct and prevent recurrence of the management and human performance deficiencies associated with the RPV head degradation.

Corrective actions taken by the Licensee included the development of a Return-to-Service Plan, which described FENOC's actions for Davis-Besse's safe and reliable return to service. The Return-to-Service Plan was initially submitted to the NRC on May 21, 2002 (ML021430429), and has been revised several times, most recently on April 6, 2003 (ML031000739).

The NRC Davis-Besse Oversight Panel established a Restart Checklist, which lists the essential issues requiring disposition prior to restart. The Restart Checklist was originally issued on August 16, 2002 (ML022310034), and has been revised as necessary by the Oversight Panel based on the results of NRC inspections and the Licensee's assessments. The Restart Checklist addresses those issues necessary to resolve the causes of the RPV head degradation so that the Licensee can safely restart and operate the plant. For example, issues requiring resolution before the Oversight Panel can consider a recommendation for restart include (1) the adequacy of safety-significant structures, systems, and components inside containment, (2) the adequacy of safety-significant programs, such as the corrective action program, self-assessment programs, and the boric acid corrosion management program, and (3) the adequacy of organizational effectiveness and human performance, including the effectiveness of corrective actions.

While the Restart Checklist establishes those essential actions necessary for safe restart and operation, a key element in preventing recurrence of a safety-significant event such as the RPV head degradation is effective Licensee self-assessment. Given the magnitude, scope, and duration of problems found at Davis-Besse, and that the Licensee's own self-assessments were not effective in preventing risk-significant performance deficiencies, additional assurance that the Licensee's self-assessment programs remain effective is essential.

III.

To address the issues identified above and ensure sustained safe performance in plant operation, the Licensee developed the Davis-Besse Nuclear Power Station Operational Improvement Plan - Operating Cycle 14, which was submitted to the NRC by letter dated November 23, 2003, "Integrated Report to Support Restart of the Davis-Besse Nuclear Power Station and Request for Restart Approval" (ML033360251) and most recently revised on January 27, 2004 (ML040280597). The Operational Improvement Plan provides for a managed transition

from the Return-to-Service Plan to normal plant operations and refueling outages. The purpose of the Operational Improvement Plan is to ensure that improvements realized during the extended outage remain in place and are further built upon to improve performance in the future.

On November 12, December 3, and December 10, 2003, the Licensee met with the NRC staff regarding the Davis-Besse Nuclear Power Station Operational Improvement Plan for Operating Cycle 14. Among other long-term corrective actions, the Operational Improvement Plan focuses on Licensee initiatives to measure and sustain achievements in the areas of management and human performance at Davis-Besse. The Operational Improvement Plan contains a number of key improvement initiatives, including continuing actions in the areas of operations, engineering, safety culture, and corrective actions.

As assurance that the Operational Improvement Plan initiatives are sufficient to ensure the continued integrity of the reactor coolant system and correction of the underlying management and organizational problems which led to the RPV head degradation, the Licensee also committed to the following actions. By letters dated March 31 (ML030930451) and November 14, 2003 (ML033220323), FENOC committed to conduct certain inspections every refueling outage for leakage from the RPV upper head and from pressure-retaining components above the RPV head. These include the CRDM flanges. In addition, by letter dated July 30, 2003 (ML032160384), FENOC committed to conduct similar inspections of the reactor vessel underside incore monitoring instrumentation nozzles, including during the Cycle 14 midcycle outage. As noted in the NRC staff assessment (ML032510339), the midcycle inspection will help to assure prompt identification of any significant reactor coolant system pressure boundary leakage should it develop. The midcycle outage activities will provide additional confirmation of the material status of the reactor coolant system.

Notwithstanding the corrective actions completed to address the CAL and Restart Checklist and planned by the Licensee in the Operational Improvement Plan, the NRC requires additional measures with respect to independent assessments and midcycle inspections to provide reasonable assurance that the long-term corrective actions remain effective for those conditions that resulted in risk-significant performance deficiencies. During the course of the extended shutdown of Davis-Besse beginning in February 2002, FENOC conducted a number of thorough evaluations and self-assessments. Examples include the evaluation of system design, the assessment of the completeness and accuracy of docketed information, the evaluation of operational performance deficiencies during the normal operating pressure test, and the evaluation of the failure to comply with technical specification requirements during testing of the steam and feedwater rupture control system. However, Licensee assessments of operational performance prior to both the normal operating pressure test and the NRC's Restart Readiness Assessment Team Inspection in December 2003 failed to identify a number of deficiencies. NRC inspections also discovered problems that were not originally found by the Licensee, most notably in safety culture, in the corrective action program, and in the quality of engineering calculations and analyses. These issues indicated weaknesses in the Licensee's ability to assess, find, and correct conditions adverse to quality. In addition, on November 23, 2003, the Licensee concluded that the plant, programs, and personnel were ready to support safe operation, subject to completion of a few, well-defined work activities prior to restart, and requested the NRC schedule a meeting as stated in the CAL, and then provide approval for restart. A meeting was originally scheduled for December 18, 2003, to discuss restart. However, due to self-revealing equipment and operational problems and issues from the NRC Restart Readiness Assessment and the Management and Human Performance inspection teams, the meeting was delayed. Given the Licensee's previous

conclusion that it was ready to support safe operation, these problems were additional evidence of inadequate self-assessment. Since then, the NRC recognizes that FENOC has implemented significant corrective actions resulting in improved performance and self-assessment capability. Nevertheless, considering the problems noted above and going forward, the NRC requires independent outside assessments to ensure continued effective Licensee self-assessments and sustained safe performance in the areas of operations, engineering and corrective actions at Davis-Besse.

On February 26, 2004, the Licensee executed a consent form in which it committed to implement the conditions in Section IV below with respect to future independent assessments of operations, safety culture, corrective actions, and engineering at Davis-Besse, and inspections of the reactor coolant system pressure boundary during a midcycle outage. The independent assessments will provide important confirmation of the effectiveness of the Licensee's self-assessments and long-term improvement actions. The reactor coolant system pressure boundary inspections will assure prompt identification of any leakage should it develop. The Licensee further agreed that this Order would be effective upon issuance and waived its right to a hearing.

I find that the Licensee's commitments, as set forth in Section IV, are acceptable and necessary and conclude that with these commitments, plant safety is reasonably assured. In view of the foregoing, I have determined that public health and safety require that the Licensee's commitments be confirmed by this Order. Based on the above, this Order is immediately effective upon issuance.

IV.

Accordingly, pursuant to Sections 103, 161b, 161i, 161o, 182 and 186 of the Atomic Energy Act of 1954, as amended, and the Commission's regulations in 10 CFR 2.202 and 10 CFR Part 50, IT IS HEREBY ORDERED, **EFFECTIVE IMMEDIATELY**, THAT LICENSE NO. NPF-3 IS MODIFIED AS FOLLOWS:

1. FENOC shall contract with independent outside organizations to conduct comprehensive assessments of the Davis-Besse operations performance, organizational safety culture, including safety conscious work environment, the corrective action program implementation, and the engineering program effectiveness. Ninety days prior to the assessments, FENOC shall inform the Regional Administrator, NRC Region III, in writing, of the identity of its outside assessment organizations, including the qualifications of the assessors, and the scope and depth of the assessment plans. These outside independent assessments at Davis-Besse shall be completed before the end of the 4th calendar quarter of 2004 and annually thereafter for 5 years. Within 45 days of completion of the assessments, the Licensee shall submit by letter to the Regional Administrator, NRC Region III, all assessment results and any action plans necessary to address issues raised by the assessment results.

2. FENOC shall conduct a visual examination of the reactor pressure vessel upper head bare metal surface, including the head-to-penetration interfaces; the reactor pressure vessel lower head bare metal surface, including the head-to-penetration interfaces; and the control rod drive mechanism flanges, using VT-2 qualified personnel and procedures during the Cycle 14 midcycle outage. The results and evaluation of the inspections will be reported by letter to the Regional

Administrator, NRC Region III, prior to restart from the midcycle outage, and any evidence of reactor coolant leakage found during the inspections will be reported by telephone within 24 hours of discovery to the Regional Administrator, NRC Region III, or designee.

If the Licensee determines that submittals made in accordance with these conditions contain proprietary information as defined by 10 CFR 2.390, the Licensee shall also provide a nonproprietary version in accordance with 10 CFR 2.390(b)(1)(ii). The Regional Administrator, NRC Region III, may, in writing, relax or rescind any of the above conditions upon demonstration by the Licensee of good cause.

V.

Any person adversely affected by this Confirmatory Order, other than the Licensee, may request a hearing within 20 days of its issuance. Where good cause is shown, consideration will be given to extending the time to request a hearing. A request for extension of time in which to request a hearing must be made in writing to the Director, Office of Nuclear Reactor Regulation, U.S. Nuclear Regulatory Commission, Washington, DC 20555, and must include a statement of good cause for the extension. Any request for a hearing shall be submitted to the Secretary, U.S. Nuclear Regulatory Commission, ATTN: Chief, Rulemakings and Adjudications Staff, Washington, DC 20555. Copies of the hearing request shall also be sent to the Director, Office of Nuclear Reactor Regulation, U.S. Nuclear Regulatory Commission, Washington, DC 20555, to the Assistant General Counsel for Materials Litigation and Enforcement at the same address, to the Regional Administrator for NRC Region III, 801 Warrenville Road, Lisle, Illinois 60532-4351, and to the Licensee. If a person requests a hearing, that person shall set forth with particularity the manner in which his interest is adversely affected by this Order and shall address the criteria set forth in 10 CFR 2.309(d).

If a hearing is requested by a person whose interest is adversely affected, the Commission will issue an Order designating the time and place of any hearing. If a hearing is held, the issue to be considered at such hearing shall be whether this Confirmatory Order should be sustained. AN ANSWER OR A REQUEST FOR HEARING SHALL NOT STAY THE IMMEDIATE EFFECTIVENESS OF THIS ORDER.

FOR THE NUCLEAR REGULATORY COMMISSION

/signed/

J. E. Dyer, Director
Office of Nuclear Reactor Regulation

Dated this 8th day of March, 2004