



FirstEnergy Nuclear Operating Company

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10 CFR 2.202

Docket Number 50-346

License Number NPF-3

Serial Number 2837

March 1, 2003

Secretary, Office of the Secretary of the Commission
United States Nuclear Regulatory Commission
ATTN: Rulemakings and Adjudications Staff
Washington, DC 20555

Subject: Consent to Order Establishing Interim Inspection Requirements for Reactor
Pressure Vessel Heads at Pressurized Water Reactors

Ladies and Gentlemen:

By letter dated February 11, 2003, the Nuclear Regulatory Commission (NRC) issued an immediately effective Order establishing interim inspection requirements for reactor pressure vessel (RPV) heads at pressurized water reactors (henceforth, the Order). The Order applied to all addressees listed in the Attachment to the Order. The Davis-Besse Nuclear Power Station, Unit No. 1, (DBNPS) was included in the list of addressees. This letter is submitted in accordance with the requirements of 10 CFR 2.202, which require a written response within twenty days of the date of the Order.

As the NRC is aware, the FirstEnergy Nuclear Operating Company (FENOC) is currently replacing the DBNPS RPV head with a RPV head previously designated for the canceled Midland Plant. Information regarding this RPV head replacement was provided to the NRC in the FENOC letter to Mr. James E. Dyer, NRC Region III Administrator, dated August 9, 2002 (Letter Serial Number 1-1281).

By letter dated September 12, 2002, (Letter Serial Number 2804) FENOC provided responses for the DBNPS to NRC Bulletin 2002-02, "Reactor Pressure Vessel Head and Vessel Head Penetration Nozzle Inspection Programs," dated August 9, 2002. The responses to Bulletin 2002-02 included commitments from FENOC to perform supplemental inspections on the DBNPS replacement RPV head. This letter, submitted in response to the Order, supercedes the commitments related to supplemental inspection methods, scope, coverage, and the 30-day post-outage report discussed in the September 12, 2002, letter. Commitments related to inspection frequencies discussed in

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the September 12, 2002, letter remain in effect, providing for more frequent inspections than stipulated in the Order dated February 11, 2003 (FENOC Letter Log Number 6055). Commitments related to qualification requirements discussed in the September 12, 2002, letter remain in effect, as the Order dated February 11, 2003, did not stipulate requirements associated with this area. Commitments related to acceptance criteria discussed in the September 12, 2002, letter also remain in effect.

A public meeting was held by the NRC with the industry on February 24, 2003, to discuss the Orders dated February 11, 2003, that were issued to pressurized water reactor licensees. During this meeting, licensees were informed by the NRC that the requirement to submit a report detailing the RPV head inspection results within sixty (60) days after returning the plant to operation was intended to supercede the 30-day reports required by Bulletin 2001-01, "Circumferential Cracking of Reactor Pressure Vessel Head Penetration Nozzles," dated August 3, 2001, Bulletin 2002-01, "Reactor Pressure Vessel Head Degradation and Reactor Coolant Pressure Boundary Integrity," dated March 18, 2002, and Bulletin 2002-02. Therefore, FENOC will submit a report within 60 days after returning the DBNPS to operation detailing the RPV head inspection results in lieu of the 30-day reports required by Bulletin 2001-01, Bulletin 2002-01 and Bulletin 2002-02.

Enclosed is the signed consent to the Order. As indicated in the enclosure, pursuant to 10 CFR 2.202(a)(3), the licensees waive the right to request a hearing on all or any part of the Order. However, FENOC recognizes that this waiver of a right to a hearing is limited to the specific language of the Order and not to any future right to a hearing, or to any other legal process, that the licensees might have concerning any other order, issuance, or determination by the NRC.

If you have any questions or require further information, please contact Mr. Patrick J. McCloskey, Manager – Regulatory Affairs, at (419) 321-8450.

I declare under penalty of perjury that the foregoing is true and correct. Executed on March 1, 2003, 2003.

Very truly yours,



CWS

Attachment A. Commitment List

Enclosure

cc: Director, Office of Nuclear Reactor Regulation

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Assistant General Counsel for Materials Litigation and Enforcement
J. E. Dyer, Regional Administrator, NRC Region III
J. B. Hopkins, DB-1 NRC/NRR Senior Project Manager
C. S. Thomas, DB-1 NRC Senior Resident Inspector
USNRC Document Control Desk
Utility Radiological Safety Board

COMMITMENT LIST

The following list identifies those actions committed to by the Davis-Besse Nuclear Power Station, Unit Number 1, (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 associated regulatory commitments.

COMMITMENTS

DUE DATE

A bare metal visual examination of 100% of the RPV head surface (including 360° around each RPV head penetration nozzle) shall be performed.	Every Refueling Outage (Letter Serial Number 2804)
Ultrasonic Testing (UT) of each RPV head penetration nozzle (i.e., nozzle base material) from two (2) inches above the J-groove weld to the bottom of the nozzle and an assessment to determine if leakage has occurred into the interference fit zone shall be performed.	15 RFO, 17 RFO, 19 RFO, 20 RFO, and each refueling thereafter for the existing replacement RPV head (Letter Serial Number 2804)
Eddy current testing or dye penetrant testing of the wetted surface of each J-groove weld and RPV head penetration nozzle base material to at least two (2) inches above the J-groove weld shall be performed.	15 RFO, 17 RFO, 19 RFO, 20 RFO, and each refueling thereafter for the existing replacement RPV head (Letter Serial Number 2804)
Visual inspections shall be performed to identify potential boric acid leaks from pressure-retaining components above the RPV head. For boron deposits on the surface of the RPV head or related insulation, discovered either during the inspections required by this Order or otherwise and regardless of the source of the deposit, before returning the plant to operation perform inspections of the affected RPV head surface and penetrations appropriate to the conditions found to verify the integrity of the affected area and penetrations.	Every Refueling Outage

(continued)

COMMITMENTS

DUE DATE

(continued)

For each inspection required in Paragraph C of the Order, the Licensee shall submit a report detailing the inspection results within sixty (60) days after returning the plant to operation. For each inspection required in Paragraph D of the Order, the Licensee shall submit a report detailing the inspection results within sixty (60) days after returning the plant to operation if a leak or boron deposit was found during the inspection. This reporting requirement supercedes the 30-day reports required by NRC Bulletin 2001-01, Bulletin 2002-01, and Bulletin 2002-02.

Within sixty (60) days after returning the plant to operation following the applicable outage

Acceptance Criteria will conform to the recommendations provided in the letter from Mr. Jack Strosnider, Director, Division of Engineering, Office of Nuclear Reactor Regulation, NRC, to Mr. Alex Marion, Director Engineering, Nuclear Energy Institute, dated November 21, 2001, with the exception that flaw growth rate will be calculated in accordance with the guidance provided by MRP-55, "Materials Reliability Program (MRP) Crack Growth Rates for Evaluating Primary Water Stress Corrosion Cracking (PWSCC) of Thick-Wall Alloy 600 Material."

At the time of inspection (Letter Serial Number 2804)

Personnel and procedures will be qualified in accordance with the applicable sections of ASME Code Section V, "Nondestructive Examination," and XI, "Rules for Inservice Inspection of Nuclear Power Plant Components." The visual qualification requirements will be in accordance with the requirements of the most recent revision of EPRI Technical Report 1006899, "Visual Examination for Leakage of PWR Reactor Head Penetrations on Top of RPV Head."

Prior to inspection in 14 RFO (Letter Serial Number 2804)

Determine the susceptibility category of the reactor vessel head to PWSCC-related degradation using the methodology required by Sections A and B of the NRC Order dated February 11, 2003.

Prior to each Refueling Outage

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CONSENT

TO

ORDER

(Five (5) Pages Follow)

I, Lew W. Myers, Chief Operating Officer, FirstEnergy Nuclear Operating Company (FENOC), hereby agree on behalf of the Toledo Edison Company, Cleveland Electric Illuminating Company, and FENOC (the Licensees for Davis-Besse Nuclear Power Station, Unit No. 1) that the Licensees will comply with the following Order:

- A. To determine the required inspection(s) for each refueling outage at their facility, all Licensees shall calculate the susceptibility category of each reactor vessel head to PWSCC-related degradation, as represented by a value of EDY for the end of each operating cycle, using the following equation:

$$EDY = \sum_{j=1}^n \left\{ \Delta EFPY_j \exp \left[-\frac{Q_i}{R} \left(\frac{1}{T_{head,j}} - \frac{1}{T_{ref}} \right) \right] \right\}$$

where:

EDY	=	total effective degradation years, normalized to a reference temperature of 600°F
$\Delta EFPY_j$	=	operating time in years at $T_{head,j}$
Q_i	=	activation energy for crack initiation (50 kcal/mole)
R	=	universal gas constant (1.103×10^{-3} kcal/mole°R)
$T_{head,j}$	=	100% power head temperature during time period j ($^{\circ}R = ^{\circ}F + 459.67$)
T_{ref}	=	reference temperature (600°F = 1059.67°R)
n	=	number of different head temperatures during plant history

This calculation shall be performed with best estimate values for each parameter at the end of each operating cycle for the RPV head that will be in service during the subsequent operating cycle. The calculated value of EDY shall determine the susceptibility category and the appropriate inspection for the RPV head during each refueling outage.

- B. All Licensees shall use the following criteria to assign the RPV head at their facility to the appropriate PWSCC susceptibility category:

High	(1) Plants with a calculated value of EDY greater than 12, OR
	(2) Plants with an RPV head that has experienced cracking in a penetration nozzle or J-groove weld due to PWSCC.
Moderate	Plants with a calculated value of EDY less than or equal to 12 and greater than or equal to 8 AND no previous inspection findings requiring classification as High.

Low Plants with a calculated value of EDY less than 8 AND no previous inspection findings requiring classification as High.

- C. All Licensees shall perform inspections of the RPV head ¹ using the following techniques and frequencies²:
- (1) For those plants in the High category, RPV head and head penetration nozzle inspections shall be performed using the following techniques every refueling outage.³
 - (a) Bare metal visual examination of 100% of the RPV head surface (including 360° around each RPV head penetration nozzle), AND
 - (b) Either:
 - (i) Ultrasonic testing of each RPV head penetration nozzle (i.e., nozzle base material) from two (2) inches above the J-groove weld to the bottom of the nozzle and an assessment to determine if leakage has occurred into the interference fit zone, OR
 - (ii) Eddy current testing or dye penetrant testing of the wetted surface of each J-groove weld and RPV head penetration nozzle base material to at least two (2) inches above the J-groove weld.

¹ This Order imposes additional inspection requirements. Licensees are required to address any findings from these inspections (i.e., perform analyses and repairs) in accordance with existing requirements in the ASME Code and 10 CFR 50.55a. The NRC has issued guidance to address flaw evaluations for RPV head penetration nozzles (see letter dated November 21, 2001, from J. Strosnider, NRC, to A. Marion, Nuclear Energy Institute) and will, as necessary, issue revised guidance pending the updating of the ASME Code and related NRC regulations.

² The requirements of this Order are generally consistent with inspection plans that the NRC staff accepted in letters to some Licensees regarding their responses to Bulletin 2002-02. If the NRC staff has already accepted a specific variation from the requirements of this Order (e.g., inspections to less than two (2) inches above the J-groove weld), the Licensee may continue with the previously accepted inspection plan for the next refueling outage after issuance of this Order, provided that in its response to this Order the Licensee identifies all discrepancies between the requirements of this Order and the previously accepted inspection plan. Licensees proposing to deviate from the requirements of this Order for subsequent refueling outages shall seek relaxation of the Order pursuant to the procedure specified at the end of this Section.

³ For repaired RPV head penetration nozzles that establish a new pressure boundary, the ultrasonic testing inspection shall include the weld and at least one (1) inch above the weld in the nozzle base material. For RPV head penetration nozzles or J-groove welds repaired using a weld overlay, the overlay shall be examined by either ultrasonic, eddy current, or dye penetrant testing in addition to the examinations required by (1)(b)(i) or (1)(b)(ii).

- (2) For those plants in the Moderate category, RPV head and head penetration inspections shall be performed such that at least the requirements of 2(a) or 2(b) are performed each refueling outage. In addition the requirements of 2(a) and 2(b) shall each be performed at least once over the course of every two (2) refueling outages.
 - (a) Bare metal visual examination of 100% of the RPV head surface (including 360° around each RPV head penetration nozzle).
 - (b) Either:
 - (i) Ultrasonic testing of each RPV head penetration nozzle (i.e., nozzle base material) from two (2) inches above the J-groove weld to the bottom of the nozzle and an assessment to determine if leakage has occurred into the interference fit zone, OR
 - (ii) Eddy current testing or dye penetrant testing of the wetted surface of each J-groove weld and RPV head penetration nozzle base material to at least two (2) inches above the J-groove weld.
- (3) For those plants in the Low category, RPV head and head penetration nozzle inspections shall be performed as follows. An inspection meeting the requirements of 3(a) must be completed at least every third refueling outage or every five (5) years, whichever occurs first. If an inspection meeting the requirements of 3(a) was not performed during the refueling outage immediately preceding the issuance of this Order, the Licensee must complete an inspection meeting the requirements of 3(a) within the first two (2) refueling outages following issuance of this Order. The requirements of 3(b) must be completed at least once over the course of five (5) years after the issuance of this Order and thereafter at least every four (4) refueling outages or every seven (7) years, whichever occurs first.
 - (a) Bare metal visual examination of 100% of the RPV head surface (including 360° around each RPV head penetration nozzle).
 - (b) Either:
 - (i) Ultrasonic testing of each RPV head penetration nozzle (i.e., nozzle base material) from two (2) inches above the J-groove weld to the bottom of the nozzle and an assessment to determine if leakage has occurred into the interference fit zone, OR

- (ii) Eddy current testing or dye penetrant testing of the wetted surface of each J-groove weld and RPV head penetration nozzle base material to at least two (2) inches above the J-groove weld.
- D. During each refueling outage, visual inspections shall be performed to identify potential boric acid leaks from pressure-retaining components above the RPV head. For any plant with boron deposits on the surface of the RPV head or related insulation, discovered either during the inspections required by this Order or otherwise and regardless of the source of the deposit, before returning the plant to operation the Licensee shall perform inspections of the affected RPV head surface and penetrations appropriate to the conditions found to verify the integrity of the affected area and penetrations.
- E. For each inspection required in Paragraph C, the Licensee shall submit a report detailing the inspection results within sixty (60) days after returning the plant to operation.⁴ For each inspection required in Paragraph D, the Licensee shall submit a report detailing the inspection results within sixty (60) days after returning the plant to operation if a leak or boron deposit was found during the inspection.
- F. In the response required by Section V of this Order, all Licensees shall notify the Commission if: (1) they are unable to comply with any of the requirements of Section IV, or (2) compliance with any of the requirements of Section IV is unnecessary. Licensees proposing to deviate from the requirements of this Order shall seek relaxation of this Order pursuant to the procedure specified below.

The Director, Office of Nuclear Reactor Regulation, may, in writing, relax or rescind any of the above conditions upon demonstration by the Licensee of good cause. A request for relaxation regarding inspection of specific nozzles shall also address the following criteria:

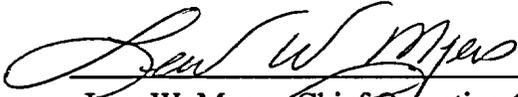
- (1) The proposed alternative(s) for inspection of specific nozzles will provide an acceptable level of quality and safety, or
- (2) Compliance with this Order for specific nozzles would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety.

Requests for relaxation associated with specific penetration nozzles will be evaluated by the NRC staff using its procedure for evaluating proposed alternatives to the ASME Code in accordance with 10 CFR 50.55a(a)(3).

⁴ This reporting requirement supercedes the 30-day reports requested by NRC Bulletin 2002-02.

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I recognize that by signing below, the Licensees consent to the issuance of this immediately effective Order and, by doing so, pursuant to 10 CFR 2.202(a)(3), the Licensees will not have a right to request a hearing on all or any part of this Order.



Lew W. Myers, Chief Operating Officer
FENOC
For the Licensees of Davis-Besse Nuclear
Power Station, Unit No. 1

3/1/03
Date