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10 CFR 2.202

Docket Number 50-346

License Number NPF-3

Serial Number 3033

March 11, 2004

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

Subject: Consent to Revised Order (EA-03-009) Establishing Interim Inspection Requirements for Reactor Pressure Vessel Heads at Pressurized Water Reactors

Ladies and Gentlemen:

Revised Order

By letter dated February 11, 2003, the Nuclear Regulatory Commission (NRC) issued an Order establishing inspection requirements for Reactor Pressure Vessel (RPV) heads at pressurized water reactors (FirstEnergy Nuclear Operating Company (FENOC) Letter Log Number 6055, henceforth, the "original Order").

By letter dated February 20, 2004, the NRC issued a revised Order (FENOC Letter Log Number 6161, henceforth, the "revised Order") superceding the requirements established in the original Order. 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 revised Order.

As the NRC is aware, FENOC has replaced 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

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responses to Bulletin 2002-02 included commitments from FENOC to perform supplemental inspections on the DBNPS replacement RPV head.

By letter dated March 1, 2003, (Letter Serial Number 2837) FENOC consented to the original Order issued on February 11, 2003. Commitments related to inspection frequencies and acceptance criteria discussed in the September 12, 2002 letter were maintained, providing for more frequent inspections than stipulated in the original Order. However, the March 1, 2003 letter did supercede the commitments related to supplemental inspection methods, scope, coverage, and the 30-day post-outage report discussed in the September 12, 2002 letter.

In response to the revised Order, this letter, now supercedes the commitments contained in the March 1, 2003 letter. Commitments related to bare metal visual inspection frequencies discussed in the September 12, 2002, letter remain in effect, providing for more frequent inspections than stipulated in the Order dated February 11, 2003 and the revised Order dated February 20, 2004. With the exception of commitments consented to in the Confirmatory Order dated February 26, 2004, commitments related to other inspection frequencies are superceded by this letter. Commitments related to qualification requirements discussed in the September 12, 2002, letter remain in effect, as the Order dated February 11, 2003, and the revised Order dated February 20, 2004 did not stipulate requirements associated with this area. Commitments related to acceptance criteria discussed in the September 12, 2002 and March 1, 2003 letters, are superceded by this letter, which incorporates the requirements of the revised Order, dated February 20, 2004.

A public meeting was held by the NRC with the industry on February 24, 2003, to discuss the Order dated February 11, 2003, that was 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. The revised Order retains this 60-day reporting requirement. 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 revised 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 revised Order.

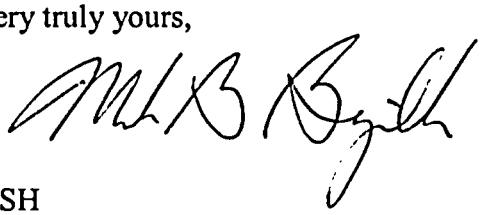
DBNPS-Specific Confirmatory Order

By letter Serial Number 1-1351 dated February 26, 2004, FENOC consented to a draft Confirmatory Order (henceforth the "Confirmatory Order") modifying License No. NPF-3, requiring a visual examination of the reactor pressure vessel upper head bare metal surface, including the head-to-penetration interfaces; the reactor vessel lower head bare metal surface, including head-to-penetration interfaces; and the control rod drive mechanism flanges, using VT-2 qualified personnel and procedures during the Cycle 14 mid-cycle outage. The results and evaluation of these inspections will be reported by letter to the Regional Administrator, NRC Region III, prior to restart from the mid-cycle 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. These requirements are in addition to those contained in the revised Order.

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

I declare under penalty of perjury that the foregoing is true and correct. Executed on March 11, 2004.

Very truly yours,



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Attachment A. Commitment List

Enclosure

cc: Director, Office of Nuclear Reactor Regulation
Assistant General Counsel for Materials Litigation and Enforcement
J. L. Caldwell, 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
Perform a bare metal visual examination of 100 percent of the RPV head surface (including 360° around each RPV head penetration nozzle).	Every refueling outage (FENOC Letter Serial 2804).
Perform a visual examination of the reactor pressure vessel upper head bare metal surface, including the head-to-penetration interfaces; the reactor vessel lower head bare metal surface, including head-to-penetration interfaces; and the control rod drive mechanism flanges, using VT-2 qualified personnel and procedures.	Cycle 14 mid-cycle outage.
The results and evaluation of the Cycle 14 mid-cycle visual inspections will be reported by letter to the Regional Administrator, NRC Region III.	Prior to restart from the Cycle 14 mid-cycle outage.
Any evidence of reactor coolant leakage found during the Cycle 14 mid-cycle visual inspections will be reported by telephone to the Regional Administrator, NRC Region III, or designee.	Within 24 hours of discovery.
For each penetration, perform a non-visual NDE in accordance with either (i), (ii), or (iii): (i) Ultrasonic testing of the RPV head penetration nozzle volume (i.e., nozzle base material) from 2 inches above the highest point of the root of the J-groove weld (on a horizontal plane perpendicular to the nozzle axis) to 2 inches below the lowest point at the toe of the J-groove weld on a horizontal plane perpendicular to the nozzle axis (or the bottom of the nozzle if less than 2 inches) OR from 2 inches above the highest point of the root of the J-groove weld (on	After the replacement head reaches 8 Effective Degradation Years, at least every 4 refueling outages or every 7 years, whichever occurs first. Thereafter, according to the schedule in EA-03-009 Section IV.C (FENOC Letter Log 6161).

COMMITMENTS	DUE DATE

a horizontal plane perpendicular to the nozzle axis) to 1.0-inch below the lowest point at the toe of the J-groove weld (on a horizontal plane perpendicular to the nozzle axis) and including all RPV head penetration nozzle surfaces below the J-groove weld that have an operating stress level (including all residual and normal operation stresses) of 20 ksi tension and greater. In addition, an assessment shall be made to determine if leakage has occurred into the annulus between the RPV head penetration nozzle and the RPV head low-alloy steel.

(ii) Eddy current testing or dye penetrant testing of the entire wetted surface of the J-groove weld and the wetted surface of the RPV head penetration nozzle base material from at least 2 inches above the highest point of the root of the J-groove weld (on a horizontal plane perpendicular to the nozzle axis) to 2 inches below the lowest point at the toe of the J-groove weld on a horizontal plane perpendicular to the nozzle axis (or the bottom of the nozzle if less than 2 inches; OR from 2 inches above the highest point of the root of the J-groove weld (on a horizontal plane perpendicular to the nozzle axis) to 1.0 inch below the lowest point at the toe of the J-groove weld (on a horizontal plane perpendicular to the nozzle axis) and including all RPV head penetration nozzle surfaces below the J-groove weld that have an operating stress level (including all residual and normal operation stresses) of 20 ksi tension and greater.

(iii) A combination of (i) and (ii) to cover equivalent volumes, surfaces and leak paths of the RPV head penetration nozzle base material and J-groove weld as described in (i) and (ii). Substitution of a portion of a volumetric exam on a nozzle with a surface examination may be performed with the following requirements:

1. On nozzle material below the J-groove weld, both the outside diameter and inside diameter

COMMITMENTS	DUE DATE
surfaces of the nozzle must be examined. 2. On nozzle material above the J-groove weld, surface examination of the inside diameter surface of the nozzle is permitted provided a surface examination of the J-groove weld is also performed.	
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 paragraph IV.C(5)(a) and paragraph IV.(C).(5)(b).	At the time of examination.
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.

COMMITMENTS	DUE DATE
For each inspection required in Paragraph C of the Order, 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. R. Barrett, Director, Division of Engineering, Office of Nuclear Reactor Regulation, NRC, to Mr. Alex Marion, Director Engineering, Nuclear Energy Institute, dated April 11, 2003.	At the time of inspection.
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 (FENOC Letter Serial Number 2804).
Determine the susceptibility category of the reactor vessel head to PWSCC-related degradation using the methodology required by Sections IV.A and IV.B of the revised Order dated February 20, 2004.	Prior to each Refueling Outage.

Docket Number 50-346
License Number NPF-3
Serial Number 3033
Enclosure

CONSENT

TO

ORDER

(Ten (10) Pages Follow)

I, Mark B. Bezilla, Vice-President-Nuclear, 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 (refer to the NRC's revised Order EA-03-009, dated February 20, 2004, section "IV"):

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 Effective Degradation Years (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* (°R=°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.

Replaced Plants with a replaced RPV head AND 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 frequencies[2] and techniques:

(1) For those plants in the High category, RPV head and head penetration nozzle inspections shall be performed using the techniques of C(5)(a) and C(5)(b) every refueling outage.[3]

(2) For those plants in the Moderate category, RPV head and head penetration inspections shall be performed such that at least the requirements of C.(5)(a) or C.(5)(b) are performed each refueling outage. In addition the requirements of C.(5)(a) and C.(5)(b) shall each be performed at least once over the course of every 2 refueling outages.

(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 C.(5)(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 C.(5)(a) was not performed during the last

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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 April 11, 2003, from R. Barrett, NRC, to A. Marion, Nuclear Energy Institute, ADAMS Accession No. ML030980322) and will, as necessary, issue revised guidance pending the updating of the 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 2 inches above the J-groove weld), the Licensee may continue with the previously accepted inspection plan for the first refueling outage after February 11, 2003, 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 C.(5)(a) or C.(5)(b).

refueling outage prior to February 11, 2003, the Licensee must complete an inspection meeting the requirements of C.(5)(a) within the first 2 refueling outages after February 11, 2003. The requirements of C.(5)(b) must be completed at least once prior to February 11, 2008 and thereafter, at least every 4 refueling outages or every 7 years, whichever occurs first.

(4) For those plants in the Replaced category, no RPV head and head penetration nozzle inspections shall be required during the outage for which the RPV head was replaced. Thereafter, until the replacement RPV head in accordance with paragraph IV.A reaches 8 EDY, RPV head and head penetration nozzle inspections shall be performed as follows. An inspection meeting the requirements of paragraph C.(5)(a) must be completed at least every third refueling outage or every 5 years, whichever occurs first. The requirements of C.(5)(b) must be completed at least every 4 refueling outages or every 7 years, whichever occurs first.

(5) Inspections of the RPV head shall be performed as directed in paragraphs C.(1), C.(2), C.(3), and C.(4) using the following techniques:

(a) Bare metal visual examination of 100 percent of the RPV surface (including 360° around each RPV head penetration nozzle). For RPV heads with the surface obscured by support structure interferences which are located at RPV head elevations downslope from the outermost RPV head penetration, a bare metal visual inspection of no less than 95 percent of the RPV head surface may be performed provided that the examination shall include those areas of the RPV head upslope and downslope from the support structure to identify any evidence of boron or corrosive product. Should any evidence of boron or corrosive product be identified, the licensee shall examine the RPV head surface under the support structure to ensure that the RPV head is not degraded.

(b) For each penetration, perform a nonvisual NDE in accordance with either (i), (ii), or (iii):

(i) Ultrasonic testing of the RPV head penetration nozzle volume (i.e., nozzle base material) from 2 inches above the highest point of the root of the J-groove weld (on a horizontal plane perpendicular to the nozzle axis) to 2 inches below the lowest point at the toe of the J-groove weld on a horizontal plane perpendicular to the nozzle axis (or the bottom of the nozzle if less than 2 inches [see Figure IV-1]) OR from 2 inches above the highest point of the root of the J-groove weld (on a horizontal plane perpendicular to the nozzle axis) to 1.0-inch below the lowest point at the toe of the J-groove weld (on a horizontal plane perpendicular to the nozzle axis) and

including all RPV head penetration nozzle surfaces below the J-groove weld that have an operating stress level (including all residual and normal operation stresses) of 20 ksi tension and greater (see Figure IV-2). In addition, an assessment shall be made to determine if leakage has occurred into the annulus between the RPV head penetration nozzle and the RPV head low-alloy steel.

(ii) Eddy current testing or dye penetrant testing of the entire wetted surface of the J-groove weld and the wetted surface of the RPV head penetration nozzle base material from at least 2 inches above the highest point of the root of the J-groove weld (on a horizontal plane perpendicular to the nozzle axis) to 2 inches below the lowest point at the toe of the J-groove weld on a horizontal plane perpendicular to the nozzle axis (or the bottom of the nozzle if less than 2 inches [see Figure IV-3]; OR from 2 inches above the highest point of the root of the J-groove weld (on a horizontal plane perpendicular to the nozzle axis) to 1.0 inch below the lowest point at the toe of the J-groove weld (on a horizontal plane perpendicular to the nozzle axis) and including all RPV head penetration nozzle surfaces below the J-groove weld that have an operating stress level (including all residual and normal operation stresses) of 20 ksi tension and greater (see Figure IV-4).

(iii) A combination of (i) and (ii) to cover equivalent volumes, surfaces and leak paths of the RPV head penetration nozzle base material and J-groove weld as described in (i) and (ii). Substitution of a portion of a volumetric exam on a nozzle with a surface examination may be performed with the following requirements:

1. On nozzle material below the J-groove weld, both the outside diameter and inside diameter surfaces of the nozzle must be examined.

2. On nozzle material above the J-groove weld, surface examination of the inside diameter surface of the nozzle is permitted provided a surface examination of the J-groove weld is also performed.

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. 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 the revised 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 the revised Order shall seek relaxation Order pursuant to the procedure specified below.

Project Directors or higher management positions in the Division of Licensing Project Management of the 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).

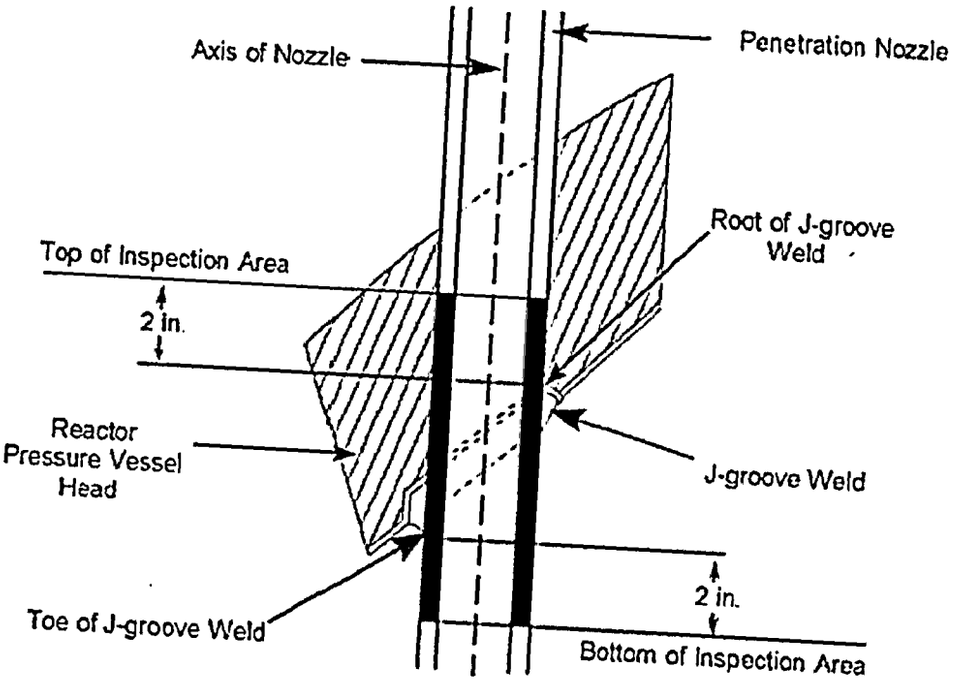

Figure IV-1: Inspection Area Using Ultrasonic Inspection Technique Without Stress Analysis (Nozzle area in black to be volumetrically inspected.)

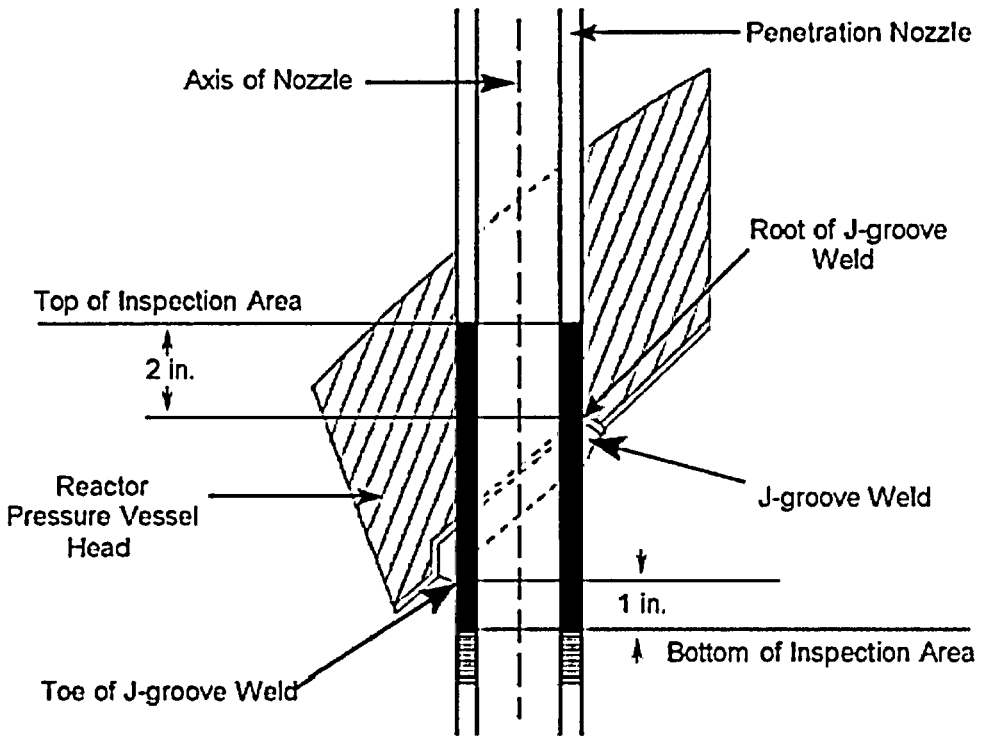

Figure IV-2: Inspection Area Using Ultrasonic Inspection Technique With Stress Analysis (Nozzle area in black to be volumetrically inspected. Nozzle area in grey requires volumetric inspection only if applied stress is ≥20 ksi in that specific area.)

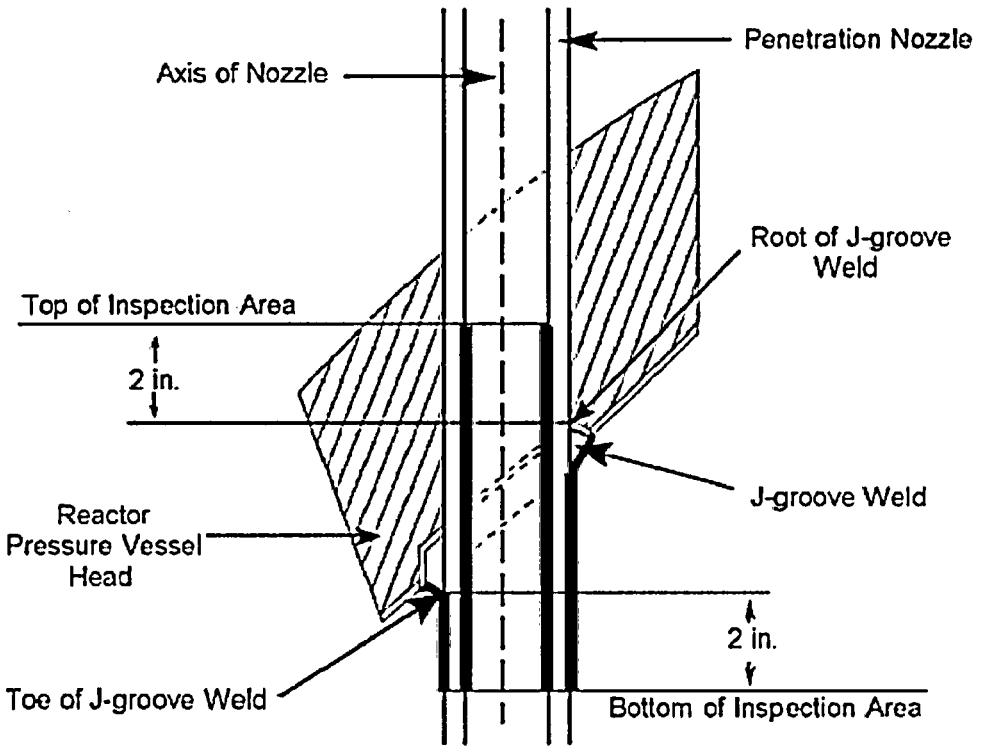

Figure IV-3: Required Wetted Surface Inspection Area Without Stress Analysis (The penetration nozzle and J-groove weld surface areas in black require surface inspection.)

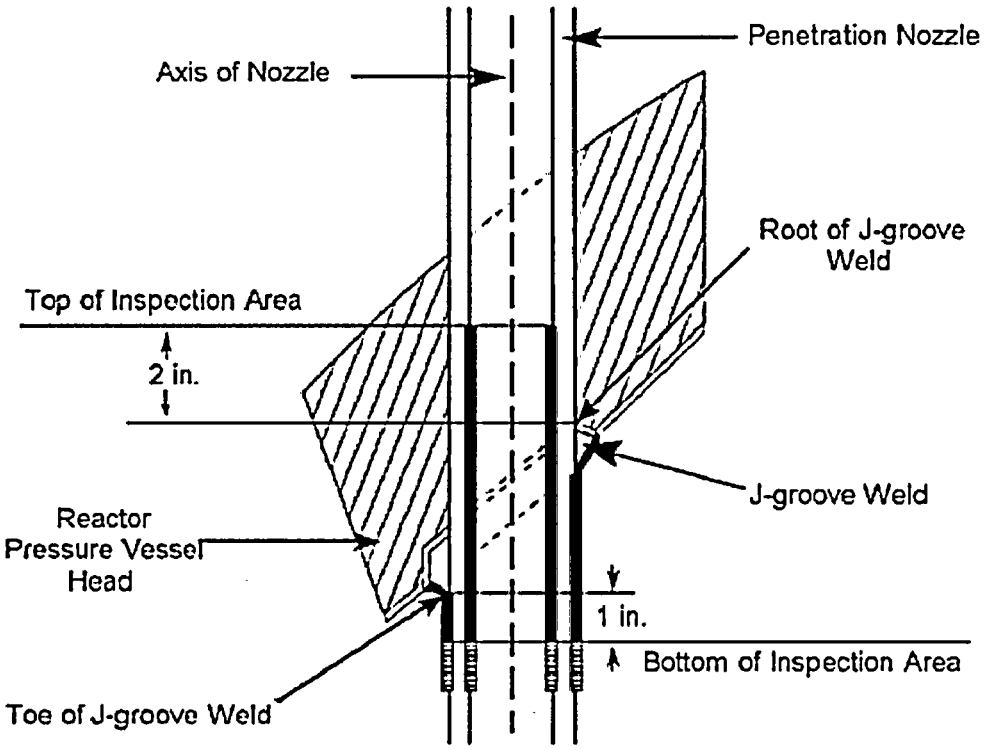

Figure IV-4: Required Wetted Surface Inspection Area With Stress Analysis (The penetration nozzle and J-groove weld surface areas in black require surface inspection. Nozzle area in grey requires surface inspection only if applied stress is ≥20 ksi in that specific area.)

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

Mark B. Bezilla, Vice President-Nuclear
FENOC
For the Licensees of Davis-Besse Nuclear
Power Station, Unit No. 1

3/11/04
Date