

Mark B. Bezilla  
Vice President - Nuclear

419-321-7676  
Fax: 419-321-7582

Docket Number 50-346

License Number NPF-3

Serial Number 3248

March 29, 2006

U.S. Nuclear Regulatory Commission  
Attention: Document Control Desk  
Washington, D.C. 20555-0001

Subject: Davis-Besse Nuclear Power Station  
10 CFR 50.55a Request Regarding Inservice Inspection Requirements  
Third Ten-Year Interval (RR-A29)

Ladies and Gentlemen:

Pursuant to 10 CFR 50.55a(a)(3)(i), the First Energy Nuclear Operating Company (FENOC) hereby requests NRC approval of Request RR-A29 (Enclosure 1) regarding American Society of Mechanical Engineers Boiler and Pressure Vessel Code (ASME Code), Section XI inservice inspection requirements for the third ten-year interval for the Davis-Besse Nuclear Power Station (DBNPS).

The DBNPS is currently in its Fourteenth Refueling Outage (14RFO). As part of the scope of 14RFO, augmented inservice inspection (ISI) ultrasonic test (UT) examinations were performed on the Reactor Coolant System (RCS) Loop 1 Cold Leg Drain Lines. This activity was scheduled based on operating experience reported at other facilities. The examinations were performed using UT procedures that met the requirements of ASME Section XI, Appendix VIII, Supplement 10, as modified by the Performance Demonstration Initiative (PDI) Program. During these examinations, an axial indication was identified in a nozzle-to-elbow weld in one of the drain lines. As there is no qualified manual depth sizing procedures for dissimilar metal welds, the axial indication was deemed unacceptable and requires repair. Since the indication is in a weld that is susceptible to primary water stress corrosion cracking (PWSCC), the proposed repair consists of a full structural overlay of the affected area to mitigate any potential PWSCC. The repair will be conducted in accordance with ASME Code Case N-504-2, with modifications as described in this request. This Code Case is conditionally endorsed in NRC Regulatory Guide 1.147 Revision 14.

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Docket Number 50-346  
License Number NPF-3  
Serial Number 3248  
Page 2

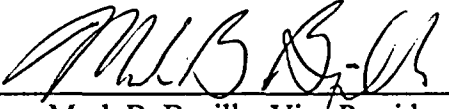
The design of the weld overlay repair is in progress. Statements in Enclosure 1 regarding the design represent the intent of the design. If the final design differs from the intent reflected in Enclosure 1, the NRC will be notified.

Confirming discussions with the NRC staff on March 28, 2006, FENOC will submit a supplemental letter regarding the analyses described in paragraph (g) of ASME Code Case N-504-2. This supplemental letter will be submitted by April 3, 2006.

FENOC requests approval of this request by April 5, 2006 to support plant heatup during return to service from 14RFO. Current projections of outage progress show plant heatup commencing on or about April 10, 2006.

Enclosure 2, Commitment List, identifies the commitments contained in this letter. If there are any questions or if additional information is required, please contact Mr. Gregory A. Dunn, Manager – FENOC Fleet Licensing, at (330) 315-7243.

Very truly yours,

  
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Mark B. Bezilla, Vice President-Nuclear

MKL

Enclosure

cc: Regional Administrator, NRC Region III  
NRC/NRR Project Manager  
NRC Senior Resident Inspector  
Utility Radiological Safety Board  
C. O'Claire, Ohio Emergency Management Agency

Docket Number 50-346  
License Number NPF-3  
Serial Number 3248  
Enclosure 1  
Page 1

**FIRSTENERGY NUCLEAR OPERATING COMPANY  
DAVIS-BESSE NUCLEAR POWER STATION  
THIRD TEN YEAR INTERVAL REQUEST RR-A29**

***PROPOSED ALTERNATIVE IN ACCORDANCE WITH 10 CFR 50.55a(a)(3)(i)***

**1. ASME Code Component Affected**

Component Number: Weld RC-40-CCA-18-1-FW2 – 2½  
Reactor Coolant Pump 1-1 Inlet Cold Leg Drain  
Nozzle-to-Elbow Weld  
Code Class: Class 1  
Examination Category: B-J  
Code Item Number: B9.21

**2. Applicable Code Edition and Addenda**

1995 Edition through the 1996 Addenda of ASME Code

**3. Applicable Code Requirements**

- 1995 Edition through the 1996 Addenda of the ASME Code, Section XI, Article IWA-4000, "Repair and Replacement"
- 1995 Edition with the 1996 Addenda of the ASME Code, Section XI, Appendix VIII, Supplement 11, "Qualification Requirements for Full Structural Overlaid Wrought Austenitic Piping Welds"
- Code Case N-504-2, "Alternative Rules for Repair of Classes 1, 2, and 3 Austenitic Stainless Steel Piping, Section XI, Division 1," with requirements of ASME Code, Section XI, Nonmandatory Appendix Q, "Weld Overlay Repair of Class 1, 2, and 3 Austenitic Stainless Steel Piping Weldments"
- Code Case 2142-2, "F-Number Grouping for Ni-Cr-Fe Filler Metals Section XI (Applicable to all Sections, including Section III, Division 1, and Section XI)"

4. **Reason For Request**

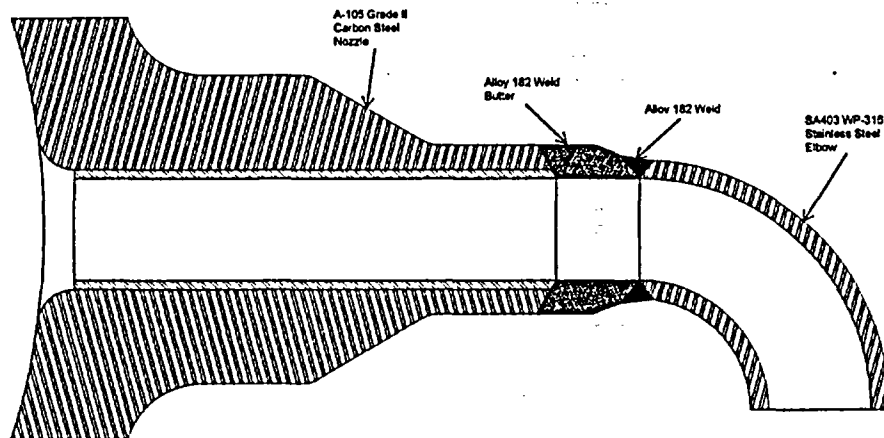
During the DBNPS Fourteenth Refueling Outage (14RFO), an augmented ultrasonic test (UT) examination of the above-referenced weld identified an axial indication within the Alloy 182 weld butter material. As there is no manual qualified procedure for sizing indications in dissimilar metal welds and the indication is in a material susceptible to primary water stress corrosion cracking (PWSCC), the area containing the indication will be repaired using a full structural overlay to mitigate any potential PWSCC.

Pursuant to 10 CFR 50.55a(a)(3)(i), an alternative is requested on the basis that the proposed alternative repair will provide an acceptable level of quality and safety.

5. **Proposed Alternatives and Basis For Use**

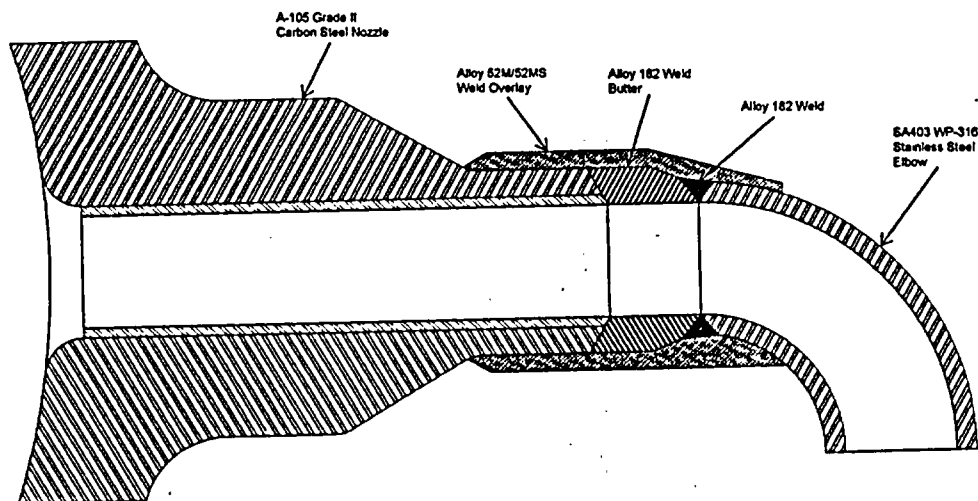
A full structural weld overlay repair is proposed for the affected weld. ASME Code Case N-504-2 and Section XI, Appendix Q, allow a flaw to be reduced to an acceptable size by deposition of weld reinforcement (weld overlay) on the outside surface of the pipe, without flaw removal. Code Case N-504-2 was conditionally approved for generic use in Regulatory Guide 1.147, Revision 14, provided that the requirements of Section XI, Appendix Q, are also met.

The affected weld is a nozzle-to-elbow weld containing Alloy 182 weld material, connecting a carbon steel nozzle to a 2-1/2-inch (nominal) austenitic stainless steel elbow. The nozzle material is A-105 Grade II carbon steel with an Alloy 182 weld butter. The elbow material is austenitic stainless steel SA403 WP-316. The weld material connecting the carbon steel nozzle butter to the austenitic stainless steel elbow is Alloy 182.



The weld overlay has been designed consistent with the requirements of ASME Code Case N-504-2 and Section XI, Nonmandatory Appendix Q, with the exceptions noted in the Tables 1 and 2 (see attached). The weld overlay will extend around the full circumference of the nozzle-to-elbow weld location. This structural weld overlay is sized to satisfy the ASME Section III requirements without crediting the existing pipe. The specific thickness and length have been computed according to the guidance provided in Code Case N-504-2 and Section XI, Nonmandatory Appendix Q. The overlay will completely cover the indication with Alloy 52M/52MS material. Alloy 52M/52MS material is highly resistant to PWSCC.

The length of the structural weld overlay was sized for inspection of an area that is 1/2-inch beyond the required repair length and the outer 25% of the original wall thickness. It should be noted that the length of the structural weld overlay will be extended and blended into the carbon steel nozzle outer diameter taper to permit UT inspection of the weld and minimize stress concentration on the nozzle outer diameter. Since the outside diameter of the nozzle is larger than that of the elbow, the structural weld overlay thickness on the elbow is increased to allow a smooth transition surface for UT inspection. Therefore, the final structural weld overlay length and thickness after taking into consideration the UT inspection requirements will exceed the length required for a structural weld overlay repair in accordance with the ASME Code Case N-504-2 and Section XI, Appendix Q.



In order to perform this repair, it is necessary to weld to the carbon steel nozzle material. The applicable ASME Code (1995 Edition through 1996 Addenda) allows welding to the carbon steel nozzle without post weld heat treatment. This exemption for post weld heat treatment is based on the cold leg drain nozzle

material (A-105 Grade II, P-No. 1 material) thickness being exempt in accordance with NB-4622.7 (b) of Section III of the applicable Code. NB-4622.7 (b) refers to Table NB-4622.7(b)-1, which shows that component welds that have a nominal thickness of  $\frac{3}{4}$ -inch or less are exempt. Since post weld heat treatment of the nozzle weld is not required, there is no need to use ASME Code Case N-638 for ambient temperature temperbead welding. Although not directly applicable, since Code Case N-638 is not being used, the total interface area of weld overlay over the carbon steel nozzle material ( $\sim 25 \text{ in}^2$ ) does not exceed  $100 \text{ in}^2$ .

Nonmandatory Appendix Q – 4000 requires ultrasonic procedures and personnel qualified in accordance with ASME Code, Section XI, Appendix VIII. Ultrasonic examination of the completed structural weld overlay will be accomplished in accordance with ASME Code, Section XI, 1995 Edition with the 1996 Addenda, Appendix VIII, Supplement 11, with alternatives to comply with the Performance Demonstration Initiative (PDI) program as shown in Table 2 (attached).

In summary, this letter requests relief from portions of ASME Code Case N-504-2 and corresponding Nonmandatory Appendix Q requirements (as detailed in Table 1), and from ASME Section XI, Appendix VIII to use the EPRI Performance Demonstration Initiative (PDI) program as an alternative to Supplement 11 (as detailed in Table 2). The application of Code Case N-504-2 and Appendix Q requirements, with modifications specified in Tables 1 and 2, when used with the ASME Code, Section XI, 1995 Edition through 1996 Addenda, Article IWA-4000, provide a comprehensive repair methodology that is standard in the industry. There are no new or different approaches in this overlay design which are considered first of a kind or inconsistent with previous approaches. The overlay has been designed as a full structural overlay in accordance with ASME Code Case N-504-2 and Section XI, Nonmandatory Appendix Q. FENOC concludes that the alternative repair approach described above, consistent with the requirements of ASME Code Case N-504-2 and Section XI, Nonmandatory Appendix Q, with the exceptions noted in the Tables 1 and 2, presents an acceptable level of quality and safety to satisfy the requirements of 10 CFR 50.55a(a)(3)(i).

## **6. Duration of Proposed Alternatives**

This alternative repair is requested for the remaining service life of the component. Once a structural weld overlay is installed it will remain in place for the design life of the repair that is defined by the evaluation required in paragraph (g)(2) of Code Case N-504-2 and corresponding requirements in Nonmandatory Appendix Q. The structural weld overlay is also subject to the satisfactory examination requirements of Code Case N-504-2 and Article Q-4000 for inservice

inspection. Those requirements include adding any installed structural weld overlay repair into the Davis-Besse ISI plan and at least one inservice examination to be completed within the next two refueling cycles.

7. **Precedents**

- 1) Three Mile Island, Unit 1  
Docket No. 50-289, TAC No. MC1201, dated July 21, 2004
- 2) Cooper Nuclear Station  
Docket No. 50-298, TAC No. MC4954, dated March 4, 2005
- 3) Susquehanna Steam Electric Station, Unit 1  
Docket No. 50-387, TAC Nos. MC2450, MC2451 and MC2594, dated June 22, 2005
- 4) Donald C. Cook Nuclear Plant, Unit 1  
Docket No. 50-315, TAC No. MC6751, dated June 27, 2005
- 5) Calvert Cliffs Nuclear Power Plant, Unit No. 2  
Docket No. 50-318, TAC Nos. MC6219 and MC6220, dated July 20, 2005
- 6) Millstone Power Station, Unit No. 3  
Docket No. 50-423, TAC No. MC8609, dated January 20, 2006
- 7) San Onofre Nuclear Generating Station, Unit 2  
Docket No. 50-361  
Submittal dated February 22, 2006; written approval pending

**TABLE 1**  
**Modifications to Code Case N-504-2 and Corresponding Nonmandatory Appendix Q Requirements**

Code Case N-504-2	Modification/Basis
<p><i>Reply:</i> It is the opinion of the Committee that, in lieu of the requirements of IWA-4120 in Editions and Addenda up to and including the 1989 Edition with the 1990 Addenda, in IWA-4170(b) in the 1989 Edition with the 1991 Addenda up to and including the 1995 Edition, and in IWA-4410 in the 1995 Edition with the 1995 Addenda and later Editions and Addenda, defect in austenitic stainless steel piping may be reduced to a flaw of acceptable size in accordance with IWB-3640 from the 1983 Edition with the Winter 1985 Addenda, or later Editions and Addenda, by deposition of weld reinforcement (weld overlay) on the outside surface of the pipe, provided the following requirements are met. [Essentially the same as the Scope of Appendix Q.]</p>	<p><b>Modification:</b> Code Case N-504-2 will be used for weld overlay repairs to the ferritic (P1) and nickel alloy (F43/P43) base material as well as the austenitic stainless steel (P8) base material.</p> <p><b>Basis:</b> Code Case N-504-2 is accepted for use along with Nonmandatory Appendix Q in the current NRC Regulatory Guide 1.147, Rev. 14. For the weld overlay of the identified weld at the DBNPS, the base material will be ferritic material (P1) with existing nickel alloy weld metal (F43/P43) to which an austenitic stainless steel (P8) elbow is welded. Industry operational experience has shown that PWSCC in Alloy 82/182 will blunt at the interface with stainless steel base metal, ferritic base metal, or Alloy 52/52M/52MS weld metal. The 360° structural weld overlay will control growth in any PWSCC crack and maintain weld integrity. The weld overlay will induce compressive stress in the weld, thus impeding growth of any reasonably shallow cracks. Furthermore, the overlay will be sized to meet all structural requirements independent of the existing weld.</p>
<p>(b) Reinforcement weld metal shall be low carbon (0.035% max.) austenitic stainless steel applied 360° around the circumference of the pipe, and shall be deposited in accordance with a qualified welding procedure specification identified in the Repair Program. [Same as Q-2000(a)]</p>	<p><b>Modification:</b> In lieu of austenitic stainless steel filler material, the reinforcement weld metal will be a nickel alloy.</p> <p><b>Basis:</b> The weld metal used may be ERNiCrFe-7A (Alloy 52M/MS, UNS N06054) or ERNiCrFe-7 (Alloy 52, UNS N06052). This weld metal is assigned F43 by ASME per Code Case 2142-2. The requirements of ASME Code, Section III, NB-2400 will be applied to all filler material. The chromium</p>



**TABLE 1**  
**Modifications to Code Case N-504-2 and Corresponding Nonmandatory Appendix Q Requirements**

Code Case N-504-2	Modification/Basis
	<p>content of Alloy 52M/MS is 28-31.5%, identical to that of Alloy 52. The main difference in Alloy 52 vs. Alloy 52M/MS is a higher Niobium content (0.5 - 1 %). The difference in chemical composition between Alloy 52 and Alloy 52M/MS improves the weld-ability of the material and pins the grain boundaries thus preventing separation between the grains and hot tearing during weld puddle solidification. These filler materials were selected for their improved resistance to PWSCC. Alloys 52 and 52M/MS contain about 30% chromium that imparts excellent corrosion resistance. The existing Alloy 82/182 weld and the Alloy 52M/52MS overlay are nickel based and have ductile properties and toughness similar to austenitic stainless steel piping welds at pressurized water reactor operating temperature. These filler materials are suitable for welding over the ferritic nozzle, Alloy 82/182 weld and the austenitic stainless steel elbow.</p>
<p>(e) The weld reinforcement shall consist of a minimum of two weld layers having as-deposited delta ferrite content of at least 7.5 FN. The first layer of weld metal with delta ferrite content of at least 7.5 FN shall constitute the first layer of the weld reinforcement design thickness. Alternatively, first layers of at least 5 FN may be acceptable based on evaluation. [Same as Q-2000(d)]</p>	<p><b>Modification:</b> Delta ferrite (FN) measurements will not be performed for weld overlay repairs made of Alloy 52/52M/52MS weld metal.</p> <p><b>Basis:</b> Welds of Alloy 52/52M/52MS are 100% austenitic and contain no delta ferrite due to the high nickel composition (approximately 60% nickel).</p>

**TABLE 2**  
**Alternatives to Appendix VIII, Supplement 11**

Appendix VIII of Section XI cannot be used for NDE of a structural weld overlay repair. Approval is requested to use the PDI program implementation of Appendix VIII. A detailed comparison of Appendix VIII and PDI requirements is summarized below.

Approval is requested to allow closer spacing of flaws provided they do not interfere with detection or discrimination. The specimens used to date for qualification to the Tri-party (NRC/BWROG/EPRI) agreement have a flaw population density greater than allowed by current Code requirements. These samples have been used successfully for all previous qualifications under the Tri-party agreement program. To facilitate their use and provide continuity from the Tri-party agreement program to Supplement 11, the PDI program has merged the Tri-party test specimens into their structural weld overlay program.

<b>SUPPLEMENT 11</b>	<b>PDI PROGRAM</b> <b>The Proposed Alternative to Supplement 11 Requirements</b>
<b>1 0 SPECIMEN REQUIREMENTS</b>	
<b>1.1 General.</b> The specimen set shall conform to the following requirements.	
(b) The specimen set shall consist of at least three specimens having different nominal pipe diameters and overlay thicknesses. They shall include the minimum and maximum nominal pipe diameters for which the examination procedure is applicable. Pipe diameters within a range of 0.9 to 1.5 times a nominal diameter shall be considered equivalent. If the procedure is applicable to pipe diameters of 24 in. or larger, the specimen set must include at least one specimen 24 in. or larger but need not include the maximum diameter. The specimen set must include at least one specimen with overlay thickness within -0.1 in. to +0.25 in. of the maximum nominal overlay thickness for which the procedure is applicable.	<b>Alternative:</b> (b) The specimen set shall include specimens with overlays not thicker than 0.1 in. more than the minimum thickness, nor thinner than 0.25 in. of the maximum nominal overlay thickness for which the examination procedure is applicable.  <b>Basis:</b> To avoid confusion, the overlay thickness tolerance contained in the last sentence was reworded and the phrase "and the remainder shall be alternative flaws" was added to the next to last sentence in paragraph 1.1 (d) (1).

**TABLE 2**  
**Alternatives to Appendix VIII, Supplement 11**

<b>SUPPLEMENT 11</b>	<b>PDI PROGRAM</b> <b>The Proposed Alternative to Supplement 11 Requirements</b>
<b>(d) Flaw Conditions</b>	
<p>(1) Base metal flaws. All flaws must be cracks in or near the ~ butt weld heat-affected zone, open to the inside surface, and extending at least 75% through the base metal wall. Flaws may extend 100% through the base metal and into the overlay material; in this case, intentional overlay fabrication flaws shall not interfere with ultrasonic detection or characterization of the cracking. Specimens containing IGSCC shall be used when available.</p>	<p><b>Alternative:</b> (1) ... must be in or... intentional overlay fabrication flaws shall not interfere with ultrasonic detection or characterization of the base metal flaws. Specimens containing intergranular stress corrosion cracking shall be used when available. At least 70% of the flaws in the detection and sizing tests shall be cracks and the remainder shall be alternative flaws. Alternative flaw mechanisms, if used, shall provide crack-like reflective characteristics and shall be limited by the following:</p> <p>(a) The use of alternative flaws shall be limited to when the implantation of cracks produces spurious reflectors that are uncharacteristic of actual flaws.</p> <p>(b) Flaws shall be semi elliptical with a tip width of less than or equal to 0.002 inches.</p> <p><b>Basis:</b> This paragraph requires that all base metal flaws be cracks. Implanting a crack requires excavation of the base material on at least one side of the flaw. While this may be satisfactory for ferritic materials, it does not produce a useable axial flaw in austenitic materials because the sound beam, which normally passes only through base material, must now travel through weld material on at least one side, producing an unrealistic flaw response. To resolve this issue, the PDI</p>

**TABLE 2**  
**Alternatives to Appendix VIII, Supplement 11**

<b>SUPPLEMENT 11</b>	<b>PDI PROGRAM</b> <b>The Proposed Alternative to Supplement 11 Requirements</b>
	<p>program revised this paragraph to allow use of alternative flaw mechanisms under controlled conditions. For example, alternative flaws shall be limited to when implantation of cracks precludes obtaining an effective ultrasonic response, flaws shall be semi elliptical with a tip width of less than or equal to 0.002 inches, and at least 70% of the flaws in the detection and sizing test shall be cracks and the remainder shall be alternative flaws. To avoid confusion, the overlay thickness tolerance contained in paragraph 1.1(b) last sentence, was reworded and the phrase “and the remainder shall be alternative flaws” was added to the next to last sentence. Paragraph 1.1(d)(1) includes the statement that intentional overlay fabrication flaws shall not interfere with ultrasonic detection or characterization of the base metal flaws.</p>
<p><b>(e) Detection Specimens</b></p> <p>(1) At least 20% but less than 40% of the flaws shall be oriented within +/-20° of the pipe axial direction. The remainder shall be oriented circumferentially. Flaws shall not be open to any surface to which the candidate has physical or visual access. The rules of IWA-3300 shall be used to determine whether closely spaced flaws should be treated as single or multiple flaws.</p>	<p><b>Alternative:</b> (1) At least 20% but less than 40% of the base metal flaws shall be oriented within +/-20° of the pipe axial direction. The remainder shall be oriented circumferentially. Flaws shall not be open to any surface to which the candidate has physical or visual access.</p> <p><b>Basis:</b> The requirement for axially oriented overlay fabrication flaws was excluded from the PDI Program as an improbable scenario. Weld overlays are typically applied using automated</p>

**TABLE 2**  
**Alternatives to Appendix VIII, Supplement 11**

<b>SUPPLEMENT 11</b>	<b>PDI PROGRAM</b> <b>The Proposed Alternative to Supplement 11 Requirements</b>
	GTAW techniques with the filler metal applied in a circumferential direction. Because resultant fabrication induced discontinuities would also be expected to have major dimensions oriented in the circumferential direction axial overlay fabrication flaws are unrealistic. The requirement for using IWA-3300 for proximity flaw evaluation was excluded, instead indications will be sized based on their individual merits.
(2) Specimens shall be divided into base and overlay grading units. Each specimen shall contain one or both types of grading units.	<b>Alternative:</b> (2) Specimens shall be divided into base metal and overlay fabrication grading units. Each specimen shall contain one or both types of grading units. Flaws shall not interfere with ultrasonic detection or characterization of other flaws.
(a)(1) A base grading unit shall include at least 3 in. of the length of the overlaid weld. The base grading unit includes the outer 25% of the overlaid weld and base metal on both sides. The base grading unit shall not include the inner 75% of the overlaid weld and base metal overlay material, or base metal to-overlay interface.	<p><b>Alternative:</b> (a)(1) A base metal grading unit includes the overlay material and the outer 25% of the original overlaid weld. The base metal grading unit shall extend circumferentially for at least 1 in. and shall start at the weld centerline and be wide enough in the axial direction to encompass one half of the original weld crown and a minimum of 0.50" of the adjacent base material.</p> <p><b>Basis:</b> The phrase "and base metal on both sides," was inadvertently included in the description of a base metal grading unit. The PDI program intentionally excludes this requirement because some of the qualification samples include flaws on both</p>

**TABLE 2**  
**Alternatives to Appendix VIII, Supplement 11**

<b>SUPPLEMENT 11</b>	<b>PDI PROGRAM</b> <b>The Proposed Alternative to Supplement 11 Requirements</b>
	sides of the weld. To avoid confusion several instances of the term "cracks" or "cracking" were changed to the term "flaws" because of the use of alternative Flaw mechanisms. Modified to require that a base metal grading unit include at least 1 in. of the length of the overlaid weld, rather than 3 inches.
(a)(2) When base metal cracking penetrates into the overlay material, the base grading unit shall include the overlay metal within 1 in. of the crack location. This portion of the overlay material shall not be used as part of any overlay grading unit.	<b>Alternative:</b> (a)(2) When base metal flaws penetrate into the overlay material, the base metal grading unit shall not be used as part of any overlay fabrication grading unit.
(a)(3) When a base grading unit is designed to be unflawed, at least 1 in. of unflawed overlaid weld and base metal shall exist on either side of the base grading unit. The segment of weld length used in one base grading unit shall not be used in another base grading unit. Base grading units need not be uniformly spaced around the specimen.	<b>Alternative:</b> (a)(3) Sufficient unflawed overlaid weld and base metal shall exist on all sides of the grading unit to preclude interfering reflections from adjacent flaws. Modified to require sufficient unflawed overlaid weld and base metal to exist on all sides of the grading unit to preclude interfering reflections from adjacent flaws, rather than the 1 inch requirement.
(b)(1) An overlay grading unit shall include the overlay material and the base metal-to-overlay interface of at least 6 in <sup>2</sup> . The overlay grading unit shall be rectangular, with minimum dimensions of 2 in.	<b>Alternative:</b> (b)(1) An overlay fabrication grading unit shall include the overlay material and the base metal-to-overlay interface for a length of at least 1 in. Modified to require sufficient unflawed overlaid weld and base metal to exist on all sides of the grading unit to preclude interfering reflections from adjacent flaws, rather than the 1 inch requirement.

**TABLE 2**  
**Alternatives to Appendix VIII, Supplement 11**

<b>SUPPLEMENT 11</b>	<b>PDI PROGRAM</b> <b>The Proposed Alternative to Supplement 11 Requirements</b>
(b)(2) An overlay grading unit designed to be unflawed shall be surrounded by unflawed overlay material and unflawed base metal-to-overlay interface for at least 1 in. around its entire perimeter. The specific area used in one overlay grading unit shall not be used in another overlay grading unit. Overlay grading units need not be spaced uniformly about the specimen.	<p><b>Alternative:</b> (b)(2) Overlay fabrication grading units designed to be unflawed shall be separated by unflawed overlay material and unflawed base metal-to-overlay interface for at least 1 in. at both ends. Sufficient unflawed overlaid weld and base metal shall exist on both sides of the overlay fabrication grading unit to preclude interfering reflections from adjacent flaws. The specific area used in one overlay fabrication grading unit shall not be used in another overlay fabrication grading unit. Overlay fabrication grading units need not be spaced uniformly about the specimen.</p> <p><b>Basis:</b> Paragraph 1.1 (e)(2)(b)(2) states that overlay fabrication grading units designed to be unflawed shall be separated by unflawed overlay material and unflawed base metal-to-overlay interface for at least 1 in. at both ends, rather than around its entire perimeter.</p>
(b)(3) Detection sets shall be selected from Table VIII-S2-1. The minimum detection sample set is five flawed base grading units, ten unflawed base grading units, five flawed overlay grading units, and ten unflawed overlay grading units. For each type of grading unit, the set shall contain at least twice as many unflawed as flawed grading units.	<b>Alternative:</b> ...base metal grading units, ten unflawed base metal grading units, five flawed overlay fabrication grading units, and ten unflawed overlay fabrication grading units. For each type of grading unit, the set shall contain at least twice as many unflawed as flawed grading units. For initial procedure qualification, detection sets shall include the equivalent of three personnel qualification sets. To qualify new values of essential variables, at least one personnel qualification set is required.

**TABLE 2**  
**Alternatives to Appendix VIII, Supplement 11**

<b>SUPPLEMENT 11</b>	<b>PDI PROGRAM</b> <b>The Proposed Alternative to Supplement 11 Requirements</b>
<b>(f) Sizing Specimen</b>	
(1) The minimum number of flaws shall be ten. At least 30% of the flaws shall be overlay fabrication flaws. At least 40% of the flaws shall be cracks open to the inside surface.	<b>Alternative:</b> (1) The...least 40% of the flaws shall be open to the inside surface. Sizing sets shall contain a distribution of flaw dimensions to assess sizing capabilities. For initial procedure qualification, sizing sets shall include the equivalent of three personnel qualification sets. To qualify new values of essential variables, at least one personnel qualification set is required.
(3) Base metal cracking used for length sizing demonstrations shall be oriented circumferentially.	<b>Alternative:</b> (3) Base metal flaws used...circumferentially.
(4) Depth sizing specimen sets shall include at least two distinct locations where cracking in the base metal extends into the overlay material by at least 0.1 in. in the through-wall direction.	<b>Alternative:</b> (4) Depth sizing specimen sets shall include at least two distinct locations where a base metal flaw extends into the overlay material by at least 0.1 in. in the through-wall direction.
<b>2.0 Conduct of Performance Demonstration</b>	
The specimen inside surface and identification shall be concealed from the candidate. All examinations shall be completed prior to grading the results and presenting the results to the candidate. Divulgence of particular specimen results or candidate viewing of unmasked specimens after the performance demonstration is prohibited.	<b>Alternative:</b> The specimen ...prohibited. The overlay fabrication flaw test and the base metal flaw test may be performed separately.
<b>2.1 Detection Test.</b>	
Flawed and unflawed grading units shall be randomly mixed. Although the boundaries of specific grading units shall not be	<b>Alternative:</b> Flawed...(base metal or overlay fabrication)...each specimen.



**TABLE 2**  
**Alternatives to Appendix VIII, Supplement 11**

<b>SUPPLEMENT 11</b>	<b>PDI PROGRAM</b> <b>The Proposed Alternative to Supplement 11 Requirements</b>
revealed to the candidate, the candidate shall be made aware of the type or types of grading units (base or overlay) that are present for each specimen.	
<b>2.2 Length Sizing Test</b>	
(d) For flaws in base grading units, the candidate shall estimate the length of that part of the flaw that is in the outer 25% of the base wall thickness.	<b>Alternative:</b> (d) For . . . base metal grading . . . base metal wall thickness.
<b>2.3 Depth Sizing Test.</b>	
For the depth sizing test, 80% of the flaws shall be sized at a specific location on the surface of the specimen identified to the candidate. For the remaining flaws, the regions of each specimen containing a flaw to be sized shall be identified to the candidate. The candidate shall determine the maximum depth of the flaw in each region.	<b>Alternative:</b> (a) The depth sizing test may be conducted separately or in conjunction with the detection test. (b) When the depth sizing test is conducted in conjunction with the detection test and the detected flaws do not satisfy the requirements of 1.1(f), additional specimens shall be provided to the candidate. The regions containing a flaw to be sized shall be identified to the candidate. The candidate shall determine the maximum depth of the flaw in each region. (c) For a separate depth sizing test, the regions of each specimen containing a flaw to be sized shall be identified to the candidate. The candidate shall determine the maximum depth of the flaw in each region.
<b>3.0 ACCEPTANCE CRITERIA</b>	
<b>3.1 Detection Acceptance Criteria</b>	
Examination procedures, equipment, and personnel are qualified for detection when the results of the performance	<b>Alternative:</b> Examination procedures are qualified for detection when:

**TABLE 2**  
**Alternatives to Appendix VIII, Supplement 11**

<b>SUPPLEMENT 11</b>	<b>PDI PROGRAM</b> <b>The Proposed Alternative to Supplement 11 Requirements</b>
demonstration satisfy the acceptance criteria of Table VIII-S2-1 for both detection and false calls. The criteria shall be satisfied separately by the demonstration results for base grading units and for overlay grading units.	(a) All flaws within the scope of the procedure are detected and the results of the performance demonstration satisfy the acceptance criteria of Table VIII-S2-1 for false calls. (b) At least one successful personnel demonstration has been performed meeting the acceptance criteria defined in (c). (c) Examination equipment and personnel are qualified for detection when the results of the performance demonstration satisfy the acceptance criteria of Table VIII-S2-1 for both detection and false calls. (d) The criteria in (b) and (c) shall be satisfied separately by the demonstration results for base metal grading units and for overlay fabrication grading units.
<b>3.2 Sizing Acceptance Criteria</b>	
(a) The RMS error of the flaw length measurements, as compared to the true flaw lengths, is less than or equal to 0.75 inch. The length of base metal cracking is measured at the 75% through-base-metal position.	<b>Alternative:</b> (a) The...base metal flaws is...position.
(b) All extensions of base metal cracking into the overlay material by at least 0.1 in. are reported as being intrusions into the overlay material.	<b>Alternative:</b> This requirement is omitted.  <b>Basis:</b> The requirement for reporting all extensions of cracking into the overlay is omitted from the PDI Program because it is redundant to the RMS calculations performed in paragraph 3.2(c) and its presence adds confusion and ambiguity to depth

Docket Number 50-346  
License Number NPF-3  
Serial Number 3248  
Enclosure 1  
Page 17

**TABLE 2**  
**Alternatives to Appendix VIII, Supplement 11**

<b>SUPPLEMENT 11</b>	<b>PDI PROGRAM</b> <b>The Proposed Alternative to Supplement 11 Requirements</b>
	sizing as required by paragraph 3.2(c). This also makes the weld overlay program consistent with the supplement 2 depth sizing criteria.

### 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 Gregory A. Dunn, Manager – FENOC Fleet Licensing (330-315-7243) of any questions regarding this document or associated regulatory commitments.

<u>COMMITMENTS</u>	<u>DUE DATE</u>
The design of the weld overlay repair is in progress. Statements in Enclosure 1 regarding the design represent the intent of the design. If the final design differs from the intent reflected in Enclosure 1, the NRC will be notified.	Prior to restart from 14RFO.
In addition, confirming discussions with the NRC staff on March 28, 2006, FENOC will submit a supplemental letter regarding the analyses described in paragraph (g) of ASME Code Case N-504-2.	April 3, 2006
Ultrasonic examination of the completed structural weld overlay will be accomplished in accordance with ASME Code, Section XI, 1995 Edition with the 1996 Addenda, Appendix VIII, Supplement 11, with alternatives to comply with the Performance Demonstration Initiative (PDI) program as shown in Table 2 (attached).	Prior to restart from 14RFO.
The structural weld overlay is also subject to the satisfactory examination requirements of Code Case N-504-2 and Article Q-4000 for inservice inspection. Those requirements include adding any installed structural weld overlay repair into the Davis-Besse ISI plan and at least one inservice examination to be completed within the next two refueling cycles.	Revise the ISI plan prior to next refueling outage to include performance of inservice exam within the next two refueling cycles.