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## **PDI Program Reconciliation with 2011 NRC Rule Making Program**

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Demonstration

**PDI/NRC Meeting**

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# Scope

- Reconcile 2011 final rule with PDI program
  - Line by line comparison of 2011 rule with program requirements
  - Reconcile differences between 2004 and 2011 Rule
  - Line by line comparison of 2008 Addenda of Appendix VIII with PDI Program
  - Reconcile differences between 2001 and 2008 Appendix VIII editions/addenda's
  - Address differences in internal quality instructions
  - Publish program document that can be referenced by utilities
    - Must address two different Code years for first time

# Example of Draft Comparison Document

Blue highlighted items are verbiage that is different from before.

Red highlighted strike through items are verbiage that has been deleted since last comparison.

Magenta highlighted items are items that may need to be added to the corresponding QPI.

Blue text items are my notes.

## Supplement 4 - Qualification Requirements for the Clad/Base Metal Interface of Reactor Vessel

2001 Edition ASME, Section XI, Appendix VIII	2007 Edition with 2008 Addendum ASME, Section XI, Appendix VIII	10CFR50.55a (from Final Rule dated Oct. 1, 2004)	10CFR50.55a (from Final Rule dated June 21, 2011)	PDI Program, PDI-QPI-305, Rev. 9; PDI-QPI-305, Appendix A, Rev. 6; & PDI-QPI-301, Rev. 9
		(2) Paragraph 1.1(c), Detection test matrix—Flaws smaller than the 50 percent of allowable flaw size, as defined in IWB-3500, need not be included as detection flaws. For procedures applied from the inside surface, use the minimum thickness specified in the scope of the procedure to calculate a/t. For procedures applied from the outside surface, the actual thickness of the test specimen is to be used to calculate a/t.”	(2) Paragraph 1.1(c), Detection test matrix—Flaws smaller than the 50 percent of allowable flaw size, as defined in IWB-3500, need not be included as detection flaws. For procedures applied from the inside surface, use the minimum thickness specified in the scope of the procedure to calculate a/t. For procedures applied from the outside surface, the actual thickness of the test specimen is to be used to calculate a/t.”	allowable flaw size, as defined in IWB-3500, need not be included as detection flaws.  6. For procedures applied from the inside surface, use the minimum thickness specified in the scope of the procedure to calculate a/t. For procedures applied from the outside surface, the actual thickness of the test specimen is to be used to calculate a/t.”
<p>(1) Flaw Type. At least 50% of the flaws shall be cracks. The balance of flaws may be cracks, fabrication defects (e.g., slag inclusions), or machined notches. Machined notches shall meet the following requirements:</p> <p>(a) notches shall be perpendicular to the surface within ±2 deg.;</p> <p>(b) notches shall have a maximum width of 0.010 in. and shall be plugged to their full depth with an insert of the parent material prior to cladding.</p>	<p>(1) Flaw Type. At least 70% of the flaws shall be cracks. The balance shall be cracks, fabrication flaws (e.g., slag, lack of fusion), or machined notches. Notches may be used only if the examination is performed from the clad surface. Machined notches shall meet the following requirements:</p> <p>(a) Notches shall have a maximum width of 0.010 in. (0.25 mm) at the tip. The width at the clad-to-base-metal interface shall not exceed 0.020 in. (0.5 mm)</p> <p>(b) Notches shall conform to the following:</p> <p>(1) Notch depth shall not exceed 0.25 in. (6 mm)</p> <p>(2) Notches shall be semi-elliptical.</p>	<p>10CFR 50.55a (b)(2)(xv)(C) states: “When applying Supplement 4 to Appendix VIII, the following provisions must be used: ...</p> <p>(3) In lieu of the flaw type requirements of Subparagraph 1.1(e)(1), a minimum of 70 percent of the flaws in the detection and sizing tests shall be cracks. Notches, if used, must be limited by the following:</p> <p>(i) Notches must be limited to the case where examinations are performed from the clad surface.</p> <p>(ii) Notches must be semi-elliptical with a tip width of less than or equal to 0.010 inches.</p> <p>(iii) Notches must be perpendicular to the surface within +/- 2 degrees.”</p>	<p>10CFR 50.55a (b)(2)(xv)(C) states: “When applying Supplement 4 to Appendix VIII, the following conditions provisions must be used: ...</p> <p>(3) In lieu of the flaw type requirements of Subparagraph 1.1(e)(1), a minimum of 70 percent of the flaws in the detection and sizing tests shall be cracks. Notches, if used, must be limited by the following:</p> <p>(i) Notches must be limited to the case where examinations are performed from the clad surface.</p> <p>(ii) Notches must be semi-elliptical with a tip width of less than or equal to 0.010 inches.</p> <p>(iii) Notches must be perpendicular to the surface within +/- 2 degrees.”</p>	<p>PDI-QPI-305, ¶ 6.2.1 E. 1. states:</p> <p>“1. Flaw Type. A minimum of 70% of the flaws shall be cracks. The balance of flaws may be cracks, fabrication defects (e.g., slag inclusions, lack of fusion), or machined notches. Machined notches, if used, must be limited by the following requirements:</p> <p>(a) Notches must be limited to the case where examinations are performed from the clad surface, i.e., no corner-trap applications.</p> <p>(b) Notches must be semielliptical with a maximum tip width of less than or equal to 0.010 inches. The width at the clad-to-base metal interface shall not exceed 0.020 inch.</p> <p>(c) Notch depth shall not exceed 0.250 inch.</p> <p>(d) Notches must be perpendicular to the surface within ± 2°.”</p>
<p>(2) All flaws shall emanate from the clad base metal interface and shall propagate predominantly into the</p>	<p>(2) Flaws shall be oriented either parallel or perpendicular to the clad direction ±10 deg. For procedure</p>	<p>10CFR 50.55a (b)(2)(xv)(C)(4) states: “In lieu of the detection matrix requirements in paragraphs 1.1(e)(2) and 1.1(e)(3),</p>	<p>10CFR 50.55a (b)(2)(xv)(C)(4) states: “In lieu of the detection matrix requirements in paragraphs 1.1(e)(2) and 1.1(e)(3),</p>	<p>PDI-QPI-305, ¶ 6.2.1 E. 2. states:</p> <p>“2. All flaws shall emanate from the clad base metal interface and shall</p>

# General Assessment of Findings

- VIII-1000 – minor verbiage changes to quality instructions may be considered.
- VIII-2000 – minor verbiage changes to quality instructions may be considered.
- VIII-3000 – minor verbiage changes; axial flaw sizing may need to be addressed.
- VIII-4000 – minor verbiage changes; equipment substitution may need further consideration.
- VIII-5000 – very minor verbiage changes to quality instructions .

# General Assessment of Findings

- **VIII-Supp 2 – complete revision of quality instructions to address changes in wording in Supplement 2, no technical issues identified**
- VIII-Supp 3 – no changes to the existing program are expected.
- VIII-Supp 4 – certain verbiage concerning single sided access flaws will need to be added to the quality instructions . No significant impact.
- **VIII-Supp 5 – Extensive changes need to be addressed due to change in scope.**

# General Assessment of Findings

- VIII-Supp 6 – Small changes will require revision of quality instructions. No significant impact is expected.
- **VIII-Supp 7 – Extensive changes need to be addressed due to change in scope.**
- VIII-Supp 8 – very minor verbiage changes. No significant impact to the present program.
- VIII-Supp 9 – In course of preparation.

# General Assessment of Findings

- VIII-Supp 10 – very minor verbiage changes. No significant impact to the present program.
- VIII-Supp 11 – **Need to reconcile with CC-653-1 once it is approved and revise quality instructions**
- VIII-Supp 12 – very minor verbiage changes. No significant impact to the present program.
- VIII-Supp 14 – very minor verbiage changes. No significant impact to the present program.



# Summary

- Extensive work is underway to reconcile the PDI program with the 2011 final rule
  - Very tedious and time consuming
- New program documentation to be issued in 2012
- Will address both 2001 and 2008 editions/agendas of Appendix VIII
- We have heard that NRC will be issuing draft revision to 10CFR.50.55a in April 2012
  - This will be right in the middle of our reconciliation process