



## ASME Code Update

**PDI/NRC Meeting**

May 2-5, 2007

**Mike Gothard**

Senior Project Manager

# What we've done

## ASME XI 2007 = 10CFR50.55a = PDI Program

ASME

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<input type="checkbox"/>	BC04-1093	BPV SC-XI	Board Approved	Section XI - Figure IWB-2500-8c	Update	Post Response
<input type="checkbox"/>	BC04-1094	BPV SC-XI	Board Approved	Appendix VIII, Supplement 11 – Qualification Requirements For Full Structural Overlaid Wrought Austenitic Piping Welds.	Update	Post Response
<input type="checkbox"/>	BC04-1560	BPV SC-XI	Board Approved	Appendix VIII, Supplements 5 and 7, - Qualification Requirements for Nozzle Examinations from the Outside and Insides Surfaces	Update	Post Response
<input type="checkbox"/>	BC04-1561	BPV SC-XI	Board Approved	Appendix I - Ultrasonic Examinations	Update	Post Response
<input type="checkbox"/>	BC04-1569	BPV SC-XI	Board Approved	IWA-2231, Radiography using phosphor imaging plates	Update	Post Response
<input type="checkbox"/>	BC05-44	BPV SC-XI	Board Approved	Section XI - Revisions to APPENDIX VIII - SUPPLEMENT 4 and 6	Update	Post Response
<input type="checkbox"/>	BC05-147	BPV SC-XI	Board Approved	Section XI - Figures IWB-2500-7(a),(b),(c) and (d)	Update	Post Response
<input type="checkbox"/>	BC05-645	BPV SC-XI	Board Approved	Section XI - Appendix VIII, Supplement 8, Bolting	Update	Post Response
<input type="checkbox"/>	BC05-646	BPV SC-XI	Board Approved	Section XI - Appendix VIII, Supplement 12	Update	Post Response
<input type="checkbox"/>	BC05-647	BPV SC-XI	Board Approved	Section XI - Appendix VIII, Supplement 13	Update	Post Response
<input type="checkbox"/>	BC05-1174	BPV SC-XI	Board Approved	Section XI, Appendix I, Supplement 9	Update	Post Response
<input type="checkbox"/>	BC05-1175	BPV SC-XI	Board Approved	Section XI, Appendix VIII qualification requirements for detection and sizing of axial flaws in selected piping components.	Update	Post Response
<input type="checkbox"/>	BC05-1176	BPV SC-XI	SC Proposal	Section XI, NDE Coverage Calculations	Update	
<input type="checkbox"/>	BC05-1542	BPV SC-XI	Board Approved	Appendix I, I-2400 qualification requirements for ultrasonic examination of threads in Flange (Item No. B6.40)	Update	Post Response
<input type="checkbox"/>	BC06-669	BPV SC-XI	Board Approved	Section XI - Appendix VIII, Supplement 7, Qualification Requirements for Nozzle Examination from the Inside Surface.	Update	Post Response
<input type="checkbox"/>	BC07-569	BPV SC-XI	SC Proposal	Section XI - Appendix VIII, VIII-4110(d) and Intent Interpretation IN07-02	Update	

# What's in the works?

## Appendix VIII-4110(d)

### VIII-4100 PROCEDURE MODIFICATIONS

#### VIII-4110 PULSERS, RECEIVERS, AND SEARCH UNITS

Components of the same manufacturer, and model or series, are substitutable without further consideration. The qualified procedure may be modified to replace pulsers, receivers, or search units without requalification when the following conditions are met.

(a) Instruments with reject, damping, or pulse tuning controls, have discrete settings specified in the procedure.

(b) Pulsers and receivers shall be evaluated using ASTM E 1324, Guide for Measuring Some Electronic Characteristics of Ultrasonic Instruments, with the following exceptions:

(1) The lower ( $F_L$ ) and upper ( $F_U$ ) limits for receivers shall be determined between frequencies that are 6 dB below the peak frequency.

(2) The receiver center frequency ( $F_C$ ) shall be determined by:

$$F_C = \frac{F_L + F_U}{2}$$

(3) The receiver band width ( $BW$ ) shall be determined by:

$$BW = \frac{F_U - F_L}{F_C} \times 100$$

(c) Search units shall be evaluated using ASTM E 1065, Evaluation of the Characteristics of Ultrasonic Search Units.

(d) Examination systems shall be evaluated using Supplement 1.

(e) Replacements of the instrument or the pulser section of the instrument system shall be within the following tolerances of the original equipment as measured into a 50 ohm, noninductive, noncapacitive, resistive load:

(1) pulse amplitude,  $\pm 10\%$ ;

(2) pulse rise time,  $\pm 10\%$ ;

(3) pulse duration,  $\pm 10\%$ ;

(f) Replacements of the instrument or the receiver section of the instrument system shall be within the following tolerances of the original equipment:

# Appendix VIII-4100(d) continued

## Appendix VIII-4110(d) and Intent Interpretation IN07-02

- Submitted by Mike Gothard – 04/09/07 IN07-02, BC07-569
- **Subject: VIII-4110(d), 1989 Edition up to and including the 2004 Edition with the 2006 Addenda.**
- **Question: Is it the intent of VIII-4110(d) to allow the use of Supplement 1 for evaluation and substitution of other components of the examination system identified as essential variables including search unit cables, pre-amplifiers, signal conversion and filtering hardware?**
- **Reply: Yes**

# IN07-02 continued

## Intent Interpretation IN07-02

### VIII-4100 PROCEDURE MODIFICATIONS

#### VIII-4110 PULSERS, RECEIVERS, AND SEARCH UNITS

Components of the same manufacturer, and model or series, are substitutable without further consideration. The qualified procedure may be modified to replace pulsers, receivers, or search units without requalification when the following conditions are met.

(a) Instruments with reject, damping, or pulse tuning controls, have discrete settings specified in the procedure.

(b) Pulsers and receivers shall be evaluated using ASTM E 1324, Guide for Measuring Some Electronic Characteristics of Ultrasonic Instruments, with the following exceptions:

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$$BW = \frac{F_U - F_L}{F_C} \times 100$$

(c) Search units shall be evaluated using ASTM E 1065, Evaluation of the Characteristics of Ultrasonic Search Units.

(d) Examination systems shall be evaluated using Supplement 1.

(e) Replacements of the instrument or the pulser section of the instrument system shall be within the following tolerances of the original equipment as measured into a 50 ohm, noninductive, noncapacitive, resistive load:

- (1) pulse amplitude,  $\pm 10\%$ ;
- (2) pulse rise time,  $\pm 10\%$ ;
- (3) pulse duration,  $\pm 10\%$ ;

(f) Replacements of the instrument or the receiver section of the instrument system shall be within the following tolerances of the original equipment:

#### VIII-4110 EXAMINATION SYSTEM COMPONENTS

(1) lower and upper frequency limits at the -6 dB point,  $\pm 0.2$  MHz;

(2) center frequency for instrument receivers with bandwidths less than 30%,  $\pm 5\%$ ;

(3) center frequency for instrument receivers with bandwidths equal to or greater than 30%,  $\pm 10\%$ .

(g) Replacement search units of the same manufacturer's model, size, and nominal frequency may be used without requalification.

(h) Replacement search units not of the same manufacturer's model, size, and nominal frequency shall be within the following tolerances of the original search units:

(1) propagation mode is the same

(2) measured angle,  $\pm 3$  deg.

(3) center frequency for search units with bandwidths less than 30%,  $\pm 5\%$

(4) center frequency for search units with bandwidths equal to or greater than 30%,  $\pm 10\%$

(5) waveform duration,  $\pm 1/2$  cycle or 20%, whichever is greater (measured at -20 dB), or bandwidth,  $\pm 10\%$

(i) As an alternative to (e) through (h) above, equipment replacement is acceptable if the examination system is within the following tolerances of the original system:

(1) system center frequency for examination systems with bandwidths less than 30%,  $\pm 5\%$

(2) system center frequency for examination systems with bandwidths equal to or greater than 30%,  $\pm 10\%$

(3) system bandwidth,  $\pm 10\%$

As an alternative to (e) through (g) above, or for substitution of other components of the examination system identified as essential variables, equipment replacement is acceptable if the examination system is within the following tolerances of the original system when evaluated in accordance with Supplement 1:

### VIII-4120 SEARCH UNIT CHARACTERIZATION

Characterization measurements of the search unit shall be made using either a sinusoidal tone burst technique or shock excitation. When using shock excitation, the characterization pulser and UT instrument/pulser shall be the same within the limits of VIII-4110(e).

### VIII-4200 COMPUTERIZED SYSTEM ALGORITHMS

When the performance demonstration uses prerecorded data, algorithms for automated decisions may be altered



## What's in the works (continued)?

**ASME 2007=10CFR50.55a=PDI Program,  
However, Qualification Issues still exist:**

**Expansion Criteria – needs definition.**

**Essential Variables – needs latitude.**

**Equipment qualification – needs simplification.**

**PDA Duties/Responsibilities – Needs definition.**

**Proposal:**

**New Supplement 1(existing to become non-mandatory  
Appendix), or VIII-5000 or ?**

# What's in the works (continued)?

## New Supplement 1 – Points to ponder:

Applicable to EPRI, Utility, and Vendor (bolting expansion, site specific mockups, mod's to hardware/software).

Defines duties and responsibilities of PDA.

Differentiates between procedure and personnel demonstrations.

Define examination modifications that require procedure, personnel, or no requalification.

Needs careful review from PDI/Regulator/Utility/Vendor perspective.

## Reference Handout – Please read/digest/discuss

# Supplement 1 continued

## New Supplement 1:

### 1.0 Scope

### 2.0 Performance Demonstration

### 3.0 Program Requirements

#### 3.1 Test Specimen Fabrication

#### 3.2 Performance Demonstration

### 4.0 Demonstration Administration

#### 4.1 Types of Procedure Performance Demonstrations

#### 4.2 Types of Personnel Performance Demonstrations

#### 4.3 Allowable Specimen Information

#### 4.4 Equipment Requirements

#### 4.5 Expansion Criteria

### 5.0 Procedure Demonstrations

### 6.0 Personnel Demonstrations

### 7.0 Grading and Documentation



## Other items:

1 - Coverage – Will go to SG NDE

2 - Figure IWC-2500-4a/c –  $\frac{1}{2}$ " on both sides of the weld



3 -  $\frac{1}{2}t$  for PSI,  $\frac{1}{2}$ " for ISI

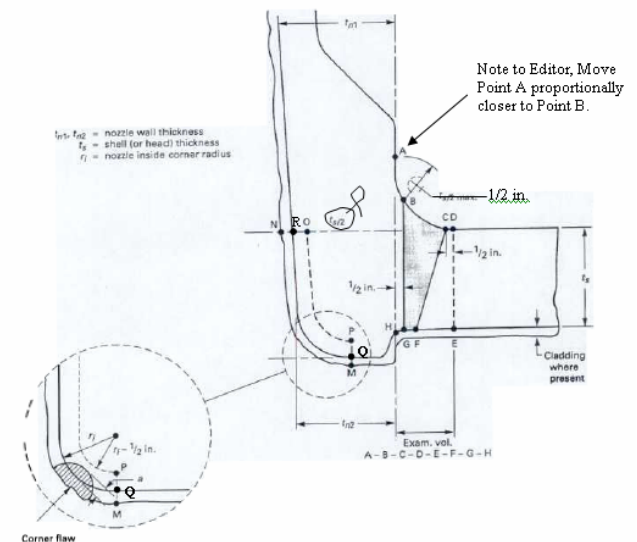
4 - I-3000 for unclad vessels

5 - N-613-2

6 – Reduce Exam volume to  $\frac{1}{3} t$  for B-B and C-A

CASE (continued)  
N-613-2

CASES OF ASME BOILER AND PRESSURE VESSEL CODE



EXAMINATION REGION [Note (1)]

Shell (or head) adjoining region  
Attachment weld region  
Nozzle cylinder region  
Nozzle inside corner region

EXAMINATION VOLUME [Note (2)]

C - D - E - F  
B - C - F - G  
A - B - G - H  
O - P - Q - R

NOTES:

(1) Examination regions are identified for the purpose of differentiating the acceptance standards in IWB-3512.  
(2) Examination volumes may be determined either by direct measurements on the component or by measurements based on design drawings.

FIG. 1 NOZZLE IN SHELL OR HEAD  
(Examination Zones in Barrel Type Nozzles Joined by Full Penetration Corner Welds)

# New Rule – Significant changes!

<http://a257.g.akamaitech.net/7/257/2422/01jan20071800/edocket.access.gpo.gov/2007/pdf/E7-6379.pdf>

[http://www.access.gpo.gov/su\\_docs/fedreg/a070405c.html](http://www.access.gpo.gov/su_docs/fedreg/a070405c.html)

*Changes - (xv) Appendix VIII Specimen Set and Qualification Requirements. The following provisions may be used to modify implementation of Appendix VIII of Section XI, 1995 Edition through the 2004 Edition. Licensees choosing to apply these provisions shall apply all of the following provisions under this paragraph except for those in Sec. 50.55a(b)(2)(xv)(F) which are optional.*

*Did not change - (xxiv) Incorporation of the Performance Demonstration Initiative and Addition of Ultrasonic Examination Criteria. The use of Appendix VIII and the supplements to Appendix VIII and Article I-3000 of Section XI of the ASME BPV Code, 2002 Addenda through the latest edition and addenda incorporated by reference in paragraph (b)(2) of this section, is prohibited.*

Implements Code Case N-722 and N-729 with modifications

Comments regarding the proposed amendment must be submitted by June 19, 2007.

## Other items (continued):

**If requirements are UNCLEAR instead of NUCLEAR**

**Let me know and we'll fix it**