CSI – Ohio
The Common Sense Initiative
Business Regulation Impact Analysis

Ohio Board of Building Standards

Rule Numbers: 4101:4-1-01, 4101:4-2-01, 4101:4-2-02, 4101:4-3-01, 4101:4-4-04, 4101:4-4-01, 4101:4-4-02, 4101:4-4-03, 4101:4-4-05, 4101:4-5-01, 4101:4-6-01, 4101:4-7-01, 4101:4-8-01, 4101:4-9-01, 4101:4-10-01

Introduction

In compliance with Executive Order 2011-01K and Senate Bill 2 of the 129th General Assembly, the Ohio Board of Building Standards (Board) has conducted a Business Regulation Impact Analysis (Analysis) of proposed amendments to Ohio Administrative Code (OAC) 4101:4-1-01, 4101:4-2-01, 4101:4-2-02, 4101:4-3-01, 4101:4-4-03, 4101:4-4-04, 4101:4-7-01, and 4101:4-9-01 and the determination to make no change to 4101:4-4-01, 4101:4-4-02, 4101:4-4-05, 4101:4-5-01, 4101:4-6-01, 4101:4-8-01, and 4101:4-10-01.

Background

The Board is charged with the duty to formulate rules for the construction, installation, repair, conservation of energy, and operation of boilers and the construction and repair of pressure vessels, for ascertaining the safe working pressures to be carried on such boilers and pressure vessels, and the qualification of inspectors of boilers and pressure vessels. The Division of Industrial Compliance (DIC) in the Ohio Department of Commerce enforces these rules.

Regulatory Intent

1. *Please briefly describe the draft regulation in plain language.*
   Please include the key provisions of the regulation as well as any proposed amendments.

As a result of a five year rule review, the Board proposes to amend:
4101:4-1-01 to clarify the National Board Inspection Code references and to delete the definition of “F”;
4101:4-2-01 to update the Residential Code of Ohio reference;
4101:4-2-02 to clarify National Board publication NB-263 reference and provide an optional method of taking the boiler inspector examination;
4101:4-3-01 to update ASME BPVC from the 2004 to the 2010 edition and to clarify the National Board publications NB-371, NB-263, NB-27 and the National Board Inspection Code references;
4101:4-4-03 to make correction to by removing “hour” from kilowatt input;
4101:4-4-04 to correct the reference to publication NB-27;

4101:4-7-01 to correct references to the “NBIC” part numbers;
4101:4-9-01 to add a provision regarding the maintenance of boilers and pressure vessels and to correct references to the “NBIC” part numbers.

As a result of the five year rule review, the Board further proposes to make no change to Rules 4101:4-4-01, 4101:4-4-02, , 4101:4-4-05, 4101:4-5-01, 4101:4-6-01, 4101:4-8-01, 4101:4-10-01.

2. *Please list the Ohio statute authorizing the Agency to adopt this regulation.*

Ohio Revised Code § 4104.02: http://codes.ohio.gov/orc/4104.02

3. *Does the regulation implement a federal requirement?*

No.

Is the proposed regulation being adopted or amended to enable the state to obtain or maintain approval to administer and enforce a federal environmental law or to participate in a federal environmental program?

No.

If yes, please briefly explain the source and substance of the federal requirement.

Not applicable.

4. *If the regulation includes provisions not specifically required by the federal government, please explain the rationale for not incorporating the federal counterpart.*

Not applicable.

5. *What is the public purpose for this regulation (i.e., why does the Agency feel that there needs to be any regulation in this area at all)?*

The Board is charged with the duty to formulate rules for the construction, installation, repair, conservation of energy, and operation of boilers and the construction and repair of pressure vessels, for ascertaining the safe working pressures to be carried on such boilers, and pressure vessels and the qualification of inspectors of boilers and pressure vessels. The Division of Industrial Compliance in the Ohio Department of Commerce enforces these rules. This program is intended to protect the health and safety of Ohio citizens by ensuring the safe construction, installation and operation of boilers in Ohio.

6. *How will the Agency measure the success of this regulation in terms of outputs and/or outcomes?*

The major substantive change in the proposed rules is the update of the American Society of Mechanical Engineer's (ASME) Boiler and Pressure Vessel Code (BPVC) from the 2004 to the 2010 edition. The BPVC standard regulates the manufacture of boilers and pressure vessels. It is expected these proposed amendments will bring the Board's rules more in line with current industry practice.

Development of Regulation

7. *Please list the stakeholders included by the Agency in the development or initial review of the draft regulation.*

On June 29, 2012, the Board sent an email to all agency stakeholders informing them of a scheduled stakeholder meeting on July 13, 2012 to hear comments and respond to questions on the proposed amendments to these rules. The email and stakeholder distribution list are attached as Exhibit A. The notice summarized the proposed amendments and also informed stakeholders that if they could not attend the stakeholder meeting, they could submit questions or comments via email or regular mail. On July 9, 2012, the Board sent a follow-up email to stakeholders updating the proposed amendment list. The follow-up email and stakeholder list are attached as Exhibit B. On July 13, 2012, the Board conducted a stakeholder meeting on the proposed rules between 12:00 PM and 1:00 PM and the following individuals attended: Dave Lockhorn, City of Cincinnati; Rocco Fana, ACCA/PHCC; Don Phillips, City of Worthington, Dean Jagger, Boiler Division, Division of Industrial Compliance.

If applicable, please include the date and medium by which the stakeholders were initially contacted.

See above.

8. *What input was provided by the stakeholders, and how did that input affect the draft regulation being proposed by the Agency?*

A copy of the correspondence the Board received in response to June 29, 2012 and July 13, 2012 emails are attached as Exhibit C. There were no additional comments provided during the Stakeholder Meeting.

Mr. Moore submitted comments regarding several provisions of the proposed Boiler rulers:
Adoption of ASME CSD-1-2012. Board Staff reviewed this comment and consulted with Dean Jagger, DIC Boiler Division Chief. Due to the conflicts between this standard and ASME BPVC, the comment has not been incorporated in the proposed rules.
Adoption of ASME Boiler and Pressure Vessel 2011 addenda. Board Staff reviewed this comment, and determined that the 2010 edition is the latest edition and that rule 4101:4-3-01(B) automatically adopts any subsequent addenda. Therefore this change is not necessary.

Eliminate definition for "F" in 4101:4-1-01. This comment has been incorporated into the proposed rules and this definition has been deleted.
Deletion of "hour" in "kilowatt hour" in 4101:4-4-03(D). This comment has been incorporated into the proposed rules and "hour" has been deleted from this provision.
Correction of the revision date of the Rules for National Board Inservice and New Construction Commissioned Inspectors in Table 4-3-01. This comment has been incorporated into the proposed and the revision date has been updated.
Correction to NB-263 References. Board Staff reviewed these comments and determined that the organization of NB-263 had been changed and now organized into parts not sections. These comments have been incorporated into the proposed rules and the specific references to this standard refer to parts, not sections.

9. *What scientific data was used to develop the rule or the measurable outcomes of the rule? How does this data support the regulation being proposed?*

The major substantive change in the proposed rules is the update to the ASME BPVC from the 2004 to the 2010 edition. The BPVC standard regulates the manufacture of boilers. The Board consulted with DIC Boiler Section and sought information related to the changes incorporated in the 2010 ASME BPVC. DIC Boiler Chief obtained a synopsis of 2010 edition developed by Hartford Steam Boiler Codes and Standards Group. The Executive Summary of this report is attached as Exhibit D. The Executive Summary provides an overview the major revisions included in the edition as well as their intent. The entire report is available upon the request.

10. *What alternative regulations (or specific provisions within the regulation) did the Agency consider, and why did it determine that these alternatives were not appropriate? If none, why didn't the Agency consider regulatory alternatives?*

As this rule package was prepared as a result of a five-year rule review, all the Board's rules related to boilers were reviewed to ensure that they coordinated with other Board and DIC rules, were up-to-date, and were based on the most recent applicable technical standards. As part of this evaluation, the Board determined that no amendment was necessary to Rules 4101:4-4-01, 4101:4-4-02, 4101:4-4-05, 4101:4-5-01, 4101:4-6-01, 4101:4-8-01, 4101:4-10-01. The major substantive change in the proposed rules is the update of the ASME BPVC from the 2004 to the 2010 edition. The Board considered but did not adopt the 2007 edition and instead adopted the 2010 edition as it is more in line with current industry practice.

11. *Did the Agency specifically consider a performance-based regulation? Please explain.*

OAC 4101:4-5-01 sets forth the procedure to have a boiler or pressure vessel approved for use in Ohio that does not meet the BPVC. A registered design professional may submit drawings, calculations and analysis to the Board for review and approval. This process permits the approval of "Ohio Special" boilers or pressure vessels by the Board that may not comply with the prescriptive requirements for the BPVC by

demonstration through calculation that the boiler or pressure vessel is safe for installation and operation in Ohio. Upon approval by the Board for use in Ohio, an Ohio Special boiler or pressure vessel must still be inspected to confirm that it has been constructed in accordance with the design and is safe for operation. While this alternative approval process exists, the Board receives very few applications for Ohio Special boilers or pressure vessels because the ASME BPVC has broadened its scope in recent editions recognizing many more boiler designs and technologies than it had in the past making ASME certification more accessible.

12. *What measures did the Agency take to ensure that this regulation does not duplicate an existing regulation?*

The Board coordinated the proposed updates with the DIC Boiler Section. The Board and DIC are the only Ohio entities that regulate boilers and their inspection and therefore there should be no duplication in rules. Additionally, the major substantive change in the proposed rules is the update the ASME BPVC from the 2004 to the 2010 edition. This change is to coordinate with current industry practice. Also, the National Board of Boiler and Pressure Vessel Inspectors is located in Columbus, Ohio. Its role is to coordinate laws, rules, and regulations relating to boilers and pressure vessels in North America. The National Board Members are the chief boiler inspectors representing most states and all provinces of North America, as well as many major cities in the United States. DIC Boiler Chief Dean Jagger represents Ohio on the Board.

13. *Please describe the Agency's plan for implementation of the regulation including any measures that the regulation is applied consistently and predictably for the regulated community.*

The Board does not enforce the boiler standards. The DIC Boiler Section is charged with enforcing the standards. The Board and the DIC Boiler Section work closely together to ensure that rules are consistently applied. Additionally, the National Board of Boiler and Pressure Vessel Inspectors oversees the credentialing of authorized boiler inspectors recognized by most states. This process ensures the consistent inspection standards are applied not only in Ohio, but throughout North America by National Board participating states.

<u>Adverse Impact to Business</u>

14. *Provide a summary of the estimated cost of compliance with the rule.*

The major substantive change in the proposed rules is the update the ASME BPVC from the 2004 to the 2010 edition. The BPVC standard regulates the manufacture of boilers. The Board does not estimate an increased cost to the business community to comply with the substantive changes in the rules because more than half of States already require boilers to be manufactured to either the 2007 or 2010 standards. To install a boiler or pressure vessel in Ohio and most other states, the boiler/pressure vessel must be constructed to ASME standard, inspected by an authorized inspector, and then stamped

with an ASME stamp. ASME permits its stamp to be placed on boilers only if the manufacturer is certified by ASME. The certification must be renewed every three years. As part of the recertification process, a manufacturer must be able to demonstrate that it is cable of manufacturing to the most recent edition of the BPVC. Therefore, by the time these rules are effective in 2013 almost all ASME-certified manufacturers will have been required to demonstrate they are capable of manufacturing to the 2010 edition as part of their certifications renewal with ASME.

Specifically, please do the following:

a. Identify the scope of the impacted business community;

See above.

b. *Identify the nature of the adverse impact (e.g., license fees, fines, employer time for compliance); and*

Not applicable. See above.

c. *Quantify the expected adverse impact from the regulation.*
The adverse impact can be quantified in terms of dollars, hours to comply, or other factors; and may be estimated for the entire regulated population or for a "representative business." Please include the source for your information/estimated impact.

Not applicable. See above.

15. *Why did the Agency determine that the regulatory intent justifies the adverse impact to the regulated business community?*

The major substantive change in the proposed rules is the update of ASME BPVC from the 2004 to the 2010 edition. The BPVC standard regulates the manufacture of boilers and pressure vessels. It is the intent of the proposed these amendments to bring the Board's rules in line with current industry practice.

Regulatory Flexibility

16. *Does the regulation provide any exemptions or alternative means of compliance for small business? Please explain.*

The Board does not enforce the boiler standards. The DIC Boiler Section is charged with enforcing the standards. As these rules are intended to ensure the safe construction, installation, and operation of boilers and pressure vessels, it is critical that the Section actively seek compliance from all entities. However, OAC 4101:4-5-01 sets forth the procedure to have a boiler or pressure vessel approved for use in Ohio that does not meet the BPVC. A registered design professional may submit drawings, calculations

and analysis to the Board for review and approval. This process permits the approval of "Ohio Special" boilers and pressure vessels by the Board that may not comply with the prescriptive requirements of the BPVC by demonstration through calculation that the boiler/pressure vessel is safe for installation and operation in Ohio. Upon approval by the Board for use in Ohio, an Ohio Special boiler or pressure vessel must still be inspected to confirm that it has been constructed in accordance with the design and is safe for operation. While this alternative approval process exists, the Board receives very few applications for Ohio Special boilers or pressure vessels because the ASME BPVC has broadened its scope in recent editions recognizing many more boiler/pressure vessel designs and technologies than it had in the past making ASME certification more accessible.

17. *How will the agency apply Ohio Revised Code section 119.14 (waiver of fines and penalties for paperwork violations and first-time offenders) into implementation of the regulation?*

The Board does not enforce the boiler standards. The DIC Boiler Section is charged with enforcing the standards. As these rules are intended to ensure the safe construction, installation, and operation of boilers, it is critical that the Section actively seek compliance. However, the Board and DIC regularly communicate to ensure the fair and reasonable implementation of the Board's rules for the entire regulated community.

18. *What resources are available to assist small businesses with compliance of the regulation?*

The Board's technical staff spends approximately 25% of their time responding to questions on its rules and educating design professionals, contractors, the public, and code officials of the intent and rules assisting all parties in compliance. Additionally, DIC Boiler Section is responsive to questions from regulated community to assist them in compliance. The Board and DIC coordinate its assistance and regularly communicate to ensure the fair and reasonable implementation of the Board's rules. Also, the National Board of Boiler and Pressure Vessel Inspectors is located in Columbus, Ohio with a state-of-the-art testing facility located in Worthington, Ohio. This organization provides resources and education to manufacturers, inspectors, and operators throughout North America. DIC Boiler Chief Dean Jagger represents Ohio on the Board. Also, ASME responds to requests for interpretations of their standards and provides formal interpretation of their intent and application.

Lane, Michael

From: Lane, Michael
Sent: Friday, June 29, 2012 3:51 PM
To: Lane, Michael
Subject: Board of Building Standards Proposed Rule/Stakeholder Meeting Notification

Board of Building Standards Stakeholder:

You are receiving this message pursuant to the requirements of Executive Order 2011-01K and Senate Bill 2 of the 129th General Assembly, which require state agencies, including the Ohio Board of Building Standards (Board), to draft rules in collaboration with stakeholders, assess and justify any adverse impact on the business community, and provide opportunity for the affected public to provide input on the rules.

Stakeholder Meeting

The Board will conduct a Stakeholder Meeting to hear comments and respond to questions on the proposed amendments summarized below on July 13, 2012 from 10:00 AM to 1:00 PM in Training Room 1, 6606 Tussing Road, Reynoldsburg, Ohio 43068. All interested stakeholders are invited to attend. The Agenda for the Meeting is as follows:

10:00 AM – 11:00 AM	Proposed Ohio Building Code Rules Proposed Mechanical Code Rules
11:00 AM – 12:00 PM	Proposed Certification Rules Miscellaneous Rules Proposed To Be Rescinded
12:00 PM – 1:00 PM	Proposed Boiler Rules

Overview of Proposed Rules

Proposed Ohio Building Code Rules

The Board proposes to amend Ohio Administrative Code (OAC) as follows: 4101:1-1-01 to make corrections and delete provisions related to building departments, personnel, boards of building appeals, and fire protection system designers which are being moved in their entirety to OAC Division 4101:7; 4101:1-4-01 to correct references to ICC 117.1 and to amend provisions related to health care facilities in coordination with the Ohio Department of Aging and Ohio Department of Health to safely enhance the quality of life for elders; 4101:1-9-01 to correct references to the Ohio Fire Code, to make corrections to accessibility provisions, and to add a reference to manually activated smoke exhaust system to coordinate with section 910.5; 4101:1-10-01 to make corrections, to amend provisions related to health care facilities in coordination with the Ohio Department of Aging and Ohio Department of Health to safely enhance the quality of life for elders, and to readopt language included in Petition 11-01 approved by the Board related to Group F-1 and S-1 exit access travel distances; 4101:1-11-01 to amend several sections to further coordinate Ohio's accessibility provisions with federal requirements; 4101:1-30-01 to make corrections in references to ICC A117.1, NFPA 72, and the Ohio Elevator Code. The Board further proposes to rescind and adopt new OAC Rule 4101:1-31-01 to delete sections 3102.1.1 and 3101.1.2 and move to section 3103, incorporate clarifying model code language related to tents and membrane structures, clarify existing language related to gates as a required means of egress, add reference to Ohio Manufactured Homes Commission rules for parks, and adds a new section for refuse containers previously in OAC Chapter 4101:2-88 which are to be rescinded.

EXHIBIT
A

These proposed rules can be viewed here:
http://www.com.ohio.gov/dico/docs/dico_ProposedOhioBuildingCodeRules.pdf

Ohio Mechanical Code Rules
The Board proposes to amend OAC Rules 4101:2-4-01 and 4101:2-5-01 to amend provisions related to health care facilities in coordination with the Ohio Department of Aging and Ohio Department of Health to safely enhance the quality of life for elders and 4101:2-15-01 to add standard ASHRAE 170 for ventilation of health care facilities, update ASME BPVC from the 2004 to the 2010 edition to coordinate with the Boiler and Pressure Vessel Rule five year rule review, and make corrections in reference to NFPA 30 and 72 Standards.
These proposed rules can be viewed here:
http://www.com.ohio.gov/dico/docs/dico_ProposedOhioMechanicalCodeRules.pdf

Proposed Certification Rules
The Board proposes to adopt new OAC Rules 4101:7-1-01, 4101:7-1-02, 4101:7-2-01, 4101:7-3-01, 4101:7-4-01, 4101:7-5-01 to add clarity by moving provisions related to building departments, personnel, boards of building appeals, and fire protection system designer certification requirements out of the building code and miscellaneous Board rules and consolidate into new rules specific to certification requirements.
These proposed rules can be viewed here:
http://www.com.ohio.gov/dico/docs/dico_ProposedCertificationRules.pdf

Miscellaneous Rules Proposed To Be Rescinded
The Board proposes to rescind OAC Rules 4101:2-87-01, 4101:2-87-02, 4101:2-87-03, 4101:2-87-04, 4101:2-87-05, 4101:2-87-06, 4101:2-88-01, 4101:2-88-02, 4101:2-88-03, 4101:2-88-04, 4101:2-89-01, 4101:2-89-02, 4101:2-89-03, 4101:2-89-04, 4101:2-89-05, 4101:2-90-01, 4101-2-90-02, 4101:2-90-03, 4101:2-90-04, 4101:2-90-06, 4101:2-90-07, 4101:2-90-08, 4101:2-90-09, 4101:2-90-10, 4101:2-90-11, 4101:2-90-12, 4101:2-90-13, 4101:2-90-13, 4101:2-90-14, 4101:2-90-15, 4101:2-90-16, 4101:2-90-17, 4101:2-90-18, 4101:2-90-19, 4101:2-90-20, 4101:2-90-21, 4101:2-90-22, 4101:2-90-23, 4101:2-90-24, 4101:2-90-25, 4101:2-90-26, 4101:2-92-01, 4101:2-92-02, 4101:2-93-01, 4101:2-93-02, 4101:2-93-03, 4101:2-93-04, 4101:2-93-05, 4101:2-93-06, 4101:2-93-07, 4101:2-93-08, 4101:2-93-09, 4101:2-93-10, 4101:2-93-11, 4101:2-93-12, 4101:2-93-13 because these rules are either obsolete, duplicate provisions addressed by other Board rules, or have been moved into to proposed new certification rules.
These rules proposed to be rescinded can be viewed here:
http://www.com.ohio.gov/dico/docs/dico_MiscellaneousRulesProposedToBeRescinded.pdf

Proposed Boiler Rules
As a result of a five year rule review, the Board proposes to amend OAC Rules 4101:4-1-01, 4101:4-2-01, 4101:4-2-02, 4101:4-3-01, 4101:4-4-04, 4101:4-9-01 to make corrections, to update ASME BPVC from the 2004 to the 2010 edition, to add clarification to National Board publications NB-371, NB-263, NB-27 and the National Board Inspection Code, and to add a provision regarding the maintenance of boilers and pressure vessels. As a result of the five year rule review, the Board further proposes to make no change to OAC Rules 4101:4-4-01, 4101:4-4-02, 4101:4-4-03, 4101:4-4-05, 4101:4-5-01, 4101:4-6-01, 4101:4-7-01, 4101:4-8-01, 4101:4-10-01.
These proposed rules can be viewed here: http://www.com.ohio.gov/dico/docs/dico_ProposedBoilerRules.pdf

Contact Information for Comments or Questions

If you cannot attend the above Stakeholder Meeting, you can submit written comments or questions on the proposed amendments to the Board. You may submit your comments via email at BBS@com.state.oh.us or U.S. Mail at Ohio Board of Building Standards, 6606 Tussing Rd, Reynoldsburg, Ohio 43068, Attn: Regina Hanshaw.

Sincerely,

Regina S. Hanshaw
Executive Secretary

Alliance
Amherst
Amherst Township
Anna
Ashtabula County
Ashville
Aurora
Avon
Avon Lake
Baltimore
Baltimore
Barberton
Barberton
Bay Village
Beachwood
Bedford
Bedford Heights
Berea
Bexley
Bloom Township
Bratenahl
Brecksville
Broadview Heights
Brook Park
Brooklyn
Brooklyn Heights
Brown County
Brunswick
Butler County
Canal Winchester
Canal Winchester
Canton
Carroll
Centerville
Champaign County
Cheviot
Chillicothe
Cincinnati
Circleville
Clark County
Clermont County
Cleveland
Cleveland Heights
Cleves
Clinton County
Columbus
Commercial Point

Commercial point
Crestline
Cuyahoga Heights
Cuyahoga Heights
Deer Park
Defiance
Delaware
Delaware County
Doylestown
Dublin
East Cleveland
Eastlake
Eaton
Elyria
Englewood
Euclid
Fairborn
Fairfax
Fairfield
Fairlawn
Fairview Park
Fairview Park
Fayette County
Forest Park
Franklin County
Gahanna
Galion
Garfield Heights
Gates Mills
Geauga County
Georgetown
Girard
Grafton
Grandview Heights
Greenhills
Grove City
Groveport
Hamilton
Hamilton County
Hamilton County
Harrison
Hartville
Harveysburg
Highland Heights
Highland Hills
Hilliard
Holland

Huron
Independence
Kent
Kent
Kent
Kettering
Lake County
Lakewood
Lakewood
Lancaster
Lebanon
Licking County
Licking County
Lima
Lincoln Heights
Logan County
London
Lorain
Lorain County
Louisville
Louisville
Loveland
Lucas County
Lyndhurst
Macedonia
Madison County
Mahoning County
Mansfield
Mansfield
Mariemont
Marietta
Mason
Massillon
Mayfield
Mayfield
Mayfield Heights
Medina
Medina County
Mentor
Miami County
Miamisburg
Middletown
Milford
Montgomery County
Moraine
Mount Healthy
Munroe Falls

Napoleon
New Albany
Newburgh Heights
Newtown
Niles
North Olmsted
North Randall
North Ridgeville
Norton
Norwood
Oakwood Village
Oberlin
Olmsted Falls
Olmsted Township
Orange
Oregon
Oregon
Ottawa County
Painesville
Parma
Parma Heights
Pepper Pike
Pickerington
Portage County
Powell
Powell
Preble County
Ravenna
Ravenna
Reminderville
Reynoldsburg
Richland County
Richmond Heights
Rocky River
Ross County
Ross County
Saint Bernard
Sandusky
Sebring
Seven Hills
Shaker Heights
Sharonville
Sheffield Lake
Sheffield Village
Sidney
Solon
South Euclid

South Russell
Springdale
Springfield
Stark County
Steubenville
Stow
Streetsboro
Streetsboro
Strongsville
Summit County
Terrace Park
Toledo
Trenton
Trotwood
Trumbull County
Tuscarawas County
Twinsburg
Union
Union County
University Heights
Upper Arlington
Valley View
Vandalia
Vermilion
Vermilion
Wadsworth
Walton Hills
Walton Hills
Warren
Warrensville Heights
Washington County
Washington Court Hou
Wauseon
Wauseon
Wayne County
West Carrollton
West Jefferson
Westerville
Westerville
Westlake
Whitehall
Whitehouse
Wickliffe
Willoughby
Willoughby Hills
Willowick
Wilmington

Wood County
Woodmere
Wooster
Worthington
Youngstown
Zanesville

American Council of Engineering Companies of Ohio
Midwest Energy Alliance
Herman Gibans Fodor Architects
US Department of Justice
Ohio Home Builders Association
Ohio Township Association
Federal Emergency Management Agency
Associated Builders and Contractors
Ohio Association of Consulting Engineers
Building Owners and Managers Association
Insurance Services Offices
National Fire Sprinkler Association
Ohio Fire Chiefs Association
Ohio Hotel and Lodging Association
Ohio Petroleum Marketers and Convenience Store Association
Ohio Manufactured Homes Association
American Institute of Architects
Pacific Northwest National Laboratories
National Institute of Standards and Technology
Ohio Statewide Independent Living Council
Mechanical Contractors Association of Central Ohio
National Institute of Building Sciences
Ohio Society of Professional Engineers
Ohio Building Officials Association
Ohio Association of Plumbing Inspectors
National Fire Protection Association
International Association of Electrical Inspectors
Ohio Chapters
International Code Council
International Brotherhood of Electrical Workers
Ohio State Building Trades (Dennis Duffey)
Village of South Amherst (Kim Green)
CR Architecture and Design
Building Code Compliance
Building Code Compliance
National Council of Architectural Registration Boards
Ohio Department of Aging
Ohio Department of Health
Oak Group
Washington Township Fire Department
Boiler Section
Plumbing-Heating-Cooling Contractors of Ohio
Mechanical Contractors Association of Northwestern Ohio
Toledo Heating & Air Conditioning Contractors Association
National Board of Boiler & Pressure Vessel Inspectors
National Board of Boiler & Pressure Vessel Inspectors

National Board of Boiler & Pressure Vessel Inspectors
American Society of Mechanical Engineers
Information Handling Services
National Insitute for the Uniform Licensing of Power Engineers
Buckeye Association of School Administrators
Ohio Manufacturer's Association
Ohio Hospital Association
Arise Boiler Inspection and Insurance Company
Chubb and Son
Cincinnati Insurance Companies
CNA Insurance Companies
Factory Mutual Insurance Company
Hartford Steam Boiler Inspection and Insurance Company
Liberty Mutual Insurance Company
OneCIS America Insurance Company
Travelers Risk
XL Insurance America
Zurich Services Corporation

Residential Code Advisory Board

Lane, Michael

From: Lane, Michael
Sent: Monday, July 09, 2012 1:13 PM
To: Lane, Michael
Cc: Hanshaw, Regina
Subject: **Update** Board of Building Standards Proposed Rule/Stakeholder Meeting Notification

** UPDATE **

The Board has added two additional rules to the list of proposed amendments: Ohio Building Code (OBC) Chapter 35 Referenced Standards (OAC 4101:1-35-01) and Ohio Plumbing Code (OPC) Chapter 13 Referenced Standards (OAC 4101:3-13-01). Additionally, the Board has revised the proposed amendments to Ohio Mechanical Code (OMC) Chapter 15 (OAC 4101:2-15-01). These additions are summarized below and have also been added to the July 13, 2012 Stakeholder Meeting Agenda.

Board of Building Standards Stakeholder:

You are receiving this message pursuant to the requirements of Executive Order 2011-01K and Senate Bill 2 of the 129th General Assembly, which require state agencies, including the Ohio Board of Building Standards (Board), to draft rules in collaboration with stakeholders, assess and justify any adverse impact on the business community, and provide opportunity for the affected public to provide input on the rules.

Stakeholder Meeting

The Board will conduct a Stakeholder Meeting to hear comments and respond to questions on the proposed amendments summarized below on July 13, 2012 from 10:00 AM to 1:00 PM in Training Room 1, 6606 Tussing Road, Reynoldsburg, Ohio 43068. All interested stakeholders are invited to attend. The Agenda for the Meeting is as follows:

10:00 AM – 11:00 AM	Proposed Ohio Building Code Rules Proposed Ohio Mechanical Code Rules Proposed Ohio Plumbing Code Rule
11:00 AM – 12:00 PM	Proposed Certification Rules Miscellaneous Rules Proposed To Be Rescinded
12:00 PM – 1:00 PM	Proposed Boiler Rules

Overview of Proposed Rules

<u>** Updated ** Proposed Ohio Building Code Rules</u>
The Board proposes to amend Ohio Administrative Code (OAC) as follows: 4101:1-1-01 to make corrections and delete provisions related to building departments, personnel, boards of building appeals, and fire protection system designers which are being moved in their entirety to OAC Division 4101:7; 4101:1-4-01 to correct references to ICC 117.1 and to amend provisions related to health care facilities in coordination with the Ohio D[illegible] of Aging and Ohio Department of Health to safely enhance the quality of life for elders; 4101:1-9-01

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references to the Ohio Fire Code, to make corrections to accessibility provisions, and to add a reference to manually activated smoke exhaust system to coordinate with section 910.5; 4101:1-10-01 to make corrections, to amend provisions related to health care facilities in coordination with the Ohio Department of Aging and Ohio Department of Health to safely enhance the quality of life for elders, and to readopt language included in Petition 11-01 approved by the Board related to Group F-1 and S-1 exit access travel distances; 4101:1-11-01 to amend several sections to further coordinate Ohio's accessibility provisions with federal requirements; 4101:1-30-01 to make corrections in references to ICC A117.1, NFPA 72, and the Ohio Elevator Code. The Board further proposes to rescind and adopt new OAC Rule 4101:1-31-01 to delete sections 3102.1.1 and 3101.1.2 and move to section 3103, incorporate clarifying model code language related to tents and membrane structures, clarify existing language related to gates as a required means of egress, add reference to Ohio Manufactured Homes Commission rules for parks, and adds a new section for refuse containers previously in OAC Chapter 4101:2-88 which are to be rescinded. *Update:* The Board also proposes to amend 4101:1-35-01 to edit Table 3501.2 to remove the references to the 2007 Ohio Plumbing Code and the NFPA 70-08 for 1-, 2-, 3- Family Dwellings to coordinate with the updates to the Residential Code of Ohio effective January 1, 2013, to add CPSC Standard 16 CFR 1301, to delete the reference to the International Fire Code, and to edit the title of NFPA 72.
These proposed rules can be viewed here:
http://www.com.ohio.gov/dico/docs/dico_ProposedOhioBuildingCodeRules.pdf

** Updated ** Ohio Mechanical Code Rules
The Board proposes to amend OAC Rules 4101:2-4-01 and 4101:2-5-01 to amend provisions related to health care facilities in coordination with the Ohio Department of Aging and Ohio Department of Health to safely enhance the quality of life for elders and 4101:2-15-01 to add standard ASHRAE 170 for ventilation of health care facilities, update ASME BPVC from the 2004 to the 2010 edition to coordinate with the Boiler and Pressure Vessel Rule five year rule review, and make corrections in reference to NFPA 70 and 72 Standards. *Update:* The Board also proposes to add additional amendments to 4101:2-15-01 to edit the reference ASME B16.9 standard to the 2007 edition, and to edit the AWWA C110/A21.10 standard to the 2008 edition.
These proposed rules can be viewed here:
http://www.com.ohio.gov/dico/docs/dico_ProposedOhioMechanicalCodeRules.pdf

** Added ** Proposed Ohio Plumbing Code Rule
The Board proposes to amend 4101:3-13-01 to update the ASME BPVC Standard to the 2010 edition.
This proposed rule can be viewed here:
http://www.com.ohio.gov/dico/docs/dico_ProposedOhioPlumbingCodeRule.pdf

Proposed Certification Rules
The Board proposes to adopt new OAC Rules 4101:7-1-01, 4101:7-1-02, 4101:7-2-01, 4101:7-3-01, 4101:7-4-01, 4101:7-5-01 to add clarity by moving provisions related to building departments, personnel, boards of building appeals, and fire protection system designer certification requirements out of the building code and miscellaneous Board rules and consolidate into new rules specific to certification requirements.
These proposed rules can be viewed here:
http://www.com.ohio.gov/dico/docs/dico_ProposedCertificationRules.pdf

Miscellaneous Rules Proposed To Be Rescinded
The Board proposes to rescind OAC Rules 4101:2-87-01, 4101:2-87-02, 4101:2-87-03, 4101:2-87-04, 4101:2-87-05, 4101:2-87-06, 4101:2-88-01, 4101:2-88-02, 4101:2-88-03, 4101:2-88-04, 4101:2-89-01, 4101:2-89-02, 4101:2-89-03, 4101:2-89-04, 4101:2-89-05, 4101:2-90-01, 4101-2-90-02, 4101:2-90-03, 4101:2-90-04, 4101:2-90-06, 4101:2-90-07, 4101:2-90-08, 4101:2-90-09, 4101:2-90-10, 4101:2-90-11, 4101:2-90-12, 4101:2-90-13, 4101:2-90-13, 4101:2-90-14, 4101:2-90-15, 4101:2-90-16, 4101:2-90-17, 4101:2-90-18, 4101:2-90-19, 4101:2-90-20, 4101:2-90-21, 4101:2-90-22, 4101:2-90-23, 4101:2-90-24, 4101:2-90-25, 4101:2-90-26, 4101:2-92-01, 4101:2-92-02, 4101:2-93-01, 4101:2-93-02, 4101:2-93-03, 4101:2-93-04, 4101:2-93-05, 4101:2-93-06, 4101:2-93-07, 4101:2-93-08, 4101:2-93-09, 4101:2-93-10, 4101:2-93-11, 4101:2-93-12, 4101:2-93-13 because these rules are either obsolete, duplicate provisions addressed by other Board rules, or have been moved into to proposed new certification rules.

These rules proposed to be rescinded can be viewed here:
http://www.com.ohio.gov/dico/docs/dico_MiscellaneousRulesProposedToBeRescinded.pdf

Proposed Boiler Rules
As a result of a five year rule review, the Board proposes to amend OAC Rules 4101:4-1-01, 4101:4-2-01, 4101:4-2-02, 4101:4-3-01, 4101:4-4-04, 4101:4-9-01 to make corrections, to update ASME BPVC from the 2004 to the 2010 edition, to add clarification to National Board publications NB-371, NB-263, NB-27 and the National Board Inspection Code, and to add a provision regarding the maintenance of boilers and pressure vessels. As a result of the five year rule review, the Board further proposes to make no change to OAC Rules 4101:4-4-01, 4101:4-4-02, 4101:4-4-03, 4101:4-4-05, 4101:4-5-01, 4101:4-6-01, 4101:4-7-01, 4101:4-8-01, 4101:4-10-01.
These proposed rules can be viewed here: http://www.com.ohio.gov/dico/docs/dico_ProposedBoilerRules.pdf

Contact Information for Comments or Questions

If you cannot attend the above Stakeholder Meeting, you can submit written comments or questions on the proposed amendments to the Board. You may submit your comments via email at BBS@com.state.oh.us or U.S. Mail at Ohio Board of Building Standards, 6606 Tussing Rd, Reynoldsburg, Ohio 43068, Attn: Regina Hanshaw.

Sincerely,

Regina S. Hanshaw
Executive Secretary
Ohio Board of Building Standards

Alliance
Amherst
Amherst Township
Anna
Ashtabula County
Ashville
Aurora
Avon
Avon Lake
Baltimore
Baltimore
Barberton
Barberton
Bay Village
Beachwood
Bedford
Bedford Heights
Berea
Bexley
Bloom Township
Bratenahl
Brecksville
Broadview Heights
Brook Park
Brooklyn
Brooklyn Heights
Brown County
Brunswick
Butler County
Canal Winchester
Canal Winchester
Canton
Carroll
Centerville
Champaign County
Cheviot
Chillicothe
Cincinnati
Circleville
Clark County
Clermont County
Cleveland
Cleveland Heights
Cleves
Clinton County
Columbus
Commercial Point

Commercial point
Crestline
Cuyahoga Heights
Cuyahoga Heights
Deer Park
Defiance
Delaware
Delaware County
Doylestown
Dublin
East Cleveland
Eastlake
Eaton
Elyria
Englewood
Euclid
Fairborn
Fairfax
Fairfield
Fairlawn
Fairview Park
Fairview Park
Fayette County
Forest Park
Franklin County
Gahanna
Galion
Garfield Heights
Gates Mills
Geauga County
Georgetown
Girard
Grafton
Grandview Heights
Greenhills
Grove City
Groveport
Hamilton
Hamilton County
Hamilton County
Harrison
Hartville
Harveysburg
Highland Heights
Highland Hills
Hilliard
Holland

Huron
Independence
Kent
Kent
Kent
Kettering
Lake County
Lakewood
Lakewood
Lancaster
Lebanon
Licking County
Licking County
Lima
Lincoln Heights
Logan County
London
Lorain
Lorain County
Louisville
Louisville
Loveland
Lucas County
Lyndhurst
Macedonia
Madison County
Mahoning County
Mansfield
Mansfield
Mariemont
Marietta
Mason
Massillon
Mayfield
Mayfield
Mayfield Heights
Medina
Medina County
Mentor
Miami County
Miamisburg
Middletown
Milford
Montgomery County
Moraine
Mount Healthy
Munroe Falls

Napoleon
New Albany
Newburgh Heights
Newtown
Niles
North Olmsted
North Randall
North Ridgeville
Norton
Norwood
Oakwood Village
Oberlin
Olmsted Falls
Olmsted Township
Orange
Oregon
Oregon
Ottawa County
Painesville
Parma
Parma Heights
Pepper Pike
Pickerington
Portage County
Powell
Powell
Preble County
Ravenna
Ravenna
Reminderville
Reynoldsburg
Richland County
Richmond Heights
Rocky River
Ross County
Ross County
Saint Bernard
Sandusky
Sebring
Seven Hills
Shaker Heights
Sharonville
Sheffield Lake
Sheffield Village
Sidney
Solon
South Euclid

South Russell
Springdale
Springfield
Stark County
Steubenville
Stow
Streetsboro
Streetsboro
Strongsville
Summit County
Terrace Park
Toledo
Trenton
Trotwood
Trumbull County
Tuscarawas County
Twinsburg
Union
Union County
University Heights
Upper Arlington
Valley View
Vandalia
Vermilion
Vermilion
Wadsworth
Walton Hills
Walton Hills
Warren
Warrensville Heights
Washington County
Washington Court House
Wauseon
Wauseon
Wayne County
West Carrollton
West Jefferson
Westerville
Westerville
Westlake
Whitehall
Whitehouse
Wickliffe
Willoughby
Willoughby Hills
Willowick
Wilmington

Wood County
Woodmere
Wooster
Worthington
Youngstown
Zanesville

American Council of Engineering Companies of Ohio
Midwest Energy Alliance
Herman Gibans Fodor Architects
US Department of Justice
Ohio Home Builders Association
Ohio Township Association
Federal Emergency Management Agency
Associated Builders and Contractors
Ohio Association of Consulting Engineers
Building Owners and Managers Association
Insurance Services Offices
National Fire Sprinkler Association
Ohio Fire Chiefs Association
Ohio Hotel and Lodging Association
Ohio Petroleum Marketers and Convenience Store Association
Ohio Manufactured Homes Association
American Institute of Architects
Pacific Northwest National Laboratories
National Institute of Standards and Technology
Ohio Statewide Independent Living Council
Mechanical Contractors Association of Central Ohio
National Institute of Building Sciences
Ohio Society of Professional Engineers
Ohio Building Officials Association
Ohio Association of Plumbing Inspectors
National Fire Protection Association
International Association of Electrical Inspectors
Ohio Chapters
International Code Council
International Brotherhood of Electrical Workers
Ohio State Building Trades (Dennis Duffey)
Village of South Amherst (Kim Green)
CR Architecture and Design
Building Code Compliance
Building Code Compliance
National Council of Architectural Registration Boards
Ohio Department of Aging
Ohio Department of Health
Oak Group
Washington Township Fire Department
Boiler Section
Plumbing-Heating-Cooling Contractors of Ohio
Mechanical Contractors Association of Northwestern Ohio
Toledo Heating & Air Conditioning Contractors Association
National Board of Boiler & Pressure Vessel Inspectors
National Board of Boiler & Pressure Vessel Inspectors

National Board of Boiler & Pressure Vessel Inspectors
American Society of Mechanical Engineers
Information Handling Services
National Insitute for the Uniform Licensing of Power Engineers
Buckeye Association of School Administrators
Ohio Manufacturer's Association
Ohio Hospital Association
Arise Boiler Inspection and Insurance Company
Chubb and Son
Cincinnati Insurance Companies
CNA Insurance Companies
Factory Mutual Insurance Company
Hartford Steam Boiler Inspection and Insurance Company
Liberty Mutual Insurance Company
OneCIS America Insurance Company
Travelers Risk
XL Insurance America
Zurich Services Corporation

Residential Code Advisory Board

Hanshaw, Regina

From: Moore Brian [brian_moore@hsb.com]
Sent: Monday, July 09, 2012 4:05 PM
To: Lane, Michael; Jagger, Dean
Cc: Hanshaw, Regina
Subject: **Update** Board of Building Standards Proposed Rule/Stakeholder Meeting Notification

Comments for consideration by the Board.

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I suggest that the Board consider adopting ASME CSD-1-2012.

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The ASME Boiler and Pressure Vessel Code current edition is the 2011 addenda. I suggest the board adopt the latest edition.

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Why is this definition needed? A word search of the rule shows that neither °F nor deg F are used. Fahrenheit is spelled out in all cases.
4101:4-1-01 (U) "F" means the Fahrenheit temperature scale.

==========

I think there is an error in 4101:4-2-02(C) which states "An applicant for examination as an inspector of boilers and pressure vessels shall be qualified as prescribed in **section** 3 of the "National Board" publication "NB-263, Rules for National Board Inservice and New Construction Commissioned Inspectors" as referenced in rule 4101:4-3-01 of the Administrative Code."

In NB-263 Part 2 is for Inservice and Part 3 is for New Construction. Instead of "section 3", I suggest "Parts 2 and 3" in its place.

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There is an error in 4101:4-4-03(D). "kilowatt ~~hour~~" should be changed to just "kilowatt". Btu/hr converts to kW which are units of power. In energy units, Btu converts to kWh. Note, too, that electric boilers are rated in kW.

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The NBIC edition proposed for adoption is the 2011 addenda. Note, however, that parts of the old version are referenced in the rest of the rule. For example, 4101:4-7-01(D) states "Unless the contractor or owner obtains a "National Board "R" Certificate of Authorization" as prescribed in "**Part RA**" of the "NBIC" referenced in rule 4101:4-3-01 of the Administrative Code".

4101:4-7-01(E) states "Every contractor or owner performing boiler alterations shall obtain a "National Board "R" Certificate of Authorization" as prescribed in "**Part RA**" of the "NBIC" referenced in rule 4101:4-3-01 of the Administrative Code "

There may be several others as well.
4101:4-1-01 (NN)
4101:4-9-01(D)

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Table 4-3-01
NB-263 – The final approved document has been posted to the National Board

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Webpages. I suggest referencing "**Rules for National Board *Inservice and New Construction* Commissioned Inspectors**" revision 5 dated May 12, 2012.
http://www.nationalboard.org/SiteDocuments/Commissioned%20Inspectors/NB-263.pdf

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HSB Code Services
ASME Boiler and Pressure Vessel Code
2010 Edition Synopsis – Executive Summary

General Code Revisions

2010 Edition

2010 Edition changes are noted with a "(10)" in the margin of the Code Book.

List of Sections
The second paragraph below "Interpretations " was revised to state that Interpretations are now posted in January and July on the ASME website. The sentence describing annual distribution in July with the issuance of the Code edition and subsequent Addenda has been removed.

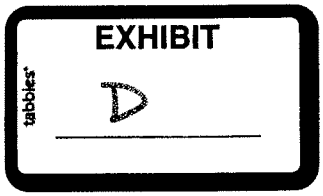
Foreword
In the 9th paragraph, the last sentence was revised by removing the words "annually in Addenda to the Code" and replacing them with "in updates to the Code". The next Addenda for the Boiler and Pressure Vessel Code Sections will be issued in July 2011. The Addenda will "look" like a new Edition as it will be printed in a white-paged book format. The 2011 Addenda will also be the last one published.
In 2013 the next new Edition of the Code will be issued. Subsequent Code Editions will be published every two (2) years thereafter without intervening Addenda.

Statement of Policy on the Use of Code Symbols and Code Authorization in Advertising
(1) Added 3rd paragraph, new last sentence: "An ASME corporate logo shall not be used by any organization other than ASME." (2) Deleted previous 5th paragraph: "The ASME logo, which is the cloverleaf with the letters ASME within, shall not be used by any organization other than ASME."

Code Revisions by Sections

Section I

UT in lieu of RT
With the incorporation of Case 2235-7, PW-11 and Table PW-11 were revised to allow either radiographic or ultrasonic testing methods unless Table PW-11 restricts the volumetric examination to one method. Several paragraphs are also revised throughout the book to change reference from radiographic examination to volumetric examination. The new Mandatory Appendix (VII) adopted by Section V Article 4 specifically to cover the techniques for "workmanship-based acceptance criteria" is also referenced in PW-52.1 with the existing acceptance/rejection standards specified in Section I being retained.



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2010 Edition Synopsis – Executive Summary

MTR for Pressure Parts
Section I never clearly addressed the subject of material test reports (MTR) for pressure parts. The Code changes (PG-5.1 & A-302.4) along with the Intent Interpretation (I-10-04) clarifies that Material Test Reports for pressure parts are required to be obtained when so stated in the individual material specifications in Section II.

Cold Forming of CSEF Steels
A new paragraph PG-20 has been introduced to Section I establishing rules on post-forming heat treatment of creep strength enhanced ferritic (CSEF) steels if certain cold-forming strain limits are exceeded. Grade 91 and 92 are included in this action.

Carbon Steel Materials and Table PG-26
The previous Note 3 of Table PG-26, read "Carbon steel pipes and tubes are exempt from the requirements of PG-26 and Table PG-26." This potentially misled some Code users to conclude that longitudinal welds in other carbon steel product forms required application of weld strength reduction factors (WSRFs), even though none were provided in Table PG-26. Note 3 is now revised to make it consistent with the original intent of exempting all carbon steel materials from weld strength reduction factors.

Section II, Parts A, B & C

Twelve (12) SA-, sixteen (16) SB-, and three (3) SFA-specifications were updated.

Section II, Part A
On page xxxvi, as has been the practice for a few years, ASME is providing notification of pending specification removals. The 2010 Edition is listing SA-557 and SA-731 as candidates for removal since they were discontinued by ASTM in 1995. If a Manufacturer still has a current need for these material specifications, they should contact HSB CT and ASME as soon as possible.

Five (5) new base materials were added: Ti alloy R56323, Grade 28 for Section VIII, Division 1 (Code Case 2425-2); SA-213-310HCbN/S31042 for Section I (Code Case 2115); SA-299 Grades A and B for Sections I, VIII, Division 1 and XII (Code Case 2364); UNS S17400 for Section VIII, Division 2 (Code Case 2277); and S32550 for Section VIII, Division 2 (Code Case 2068-3).

Section II, Part D

Table 5B
The following materials' allowable stress lines for Section VIII, Division 2 were revised as noted:

- SB-171-C71500: For 500-700°F, increased up to 1.7 ksi.
- Titanium alloys R50400, R52400, R52402 and R53400: **REDUCED** by up to a maximum of 66%.

Subpart 3
External Pressure Chart NFN-9 was extended to 1650°F (900°C) for Alloy 800H (UNS N08810).

Section III

"Accreditation" vs. "Authorization"
A change in terminology has taken place throughout Section III eliminating the term "Accreditation" in reference to ASME Certificates. All ASME N-Type Certificates will now be issued as "Authorizations" (with or without stamps) with the exception of the new Quality Assurance Program Certificate which replaces the current Certificate of Accreditation (Corporate). ASME began issuing the new certificates in August 2010 after the Code was published.

Table NCA-7200-1 - Incorporation of NQA-1 2008, 2009(a) Addenda
Table NCA-7000-2 was revised to adopt the ASME NQA-1 2008, 2009(a) addenda. This change does not appear to make significant changes to the current requirements; however, the 2008 Edition of NQA-1 has been reformatted to incorporate all of the previous Supplements into the body of the Requirements. One area that should be looked at for possible revision to QA Programs is the Design Software Verification in Requirement 3, Paragraph 800.

NCA-3900 - Addition of Polyethylene Piping Requirement
Section III incorporated Code Case N-755 into NCA-3900 which provides the rules for the qualification of nonmetallic manufacturers, constituent suppliers and material organizations (MOs) in the supply chain for polyethylene source material and piping material. Previously, the Committee on Nuclear Certification ruled that fabricators welding polyethylene piping could be accredited under the current rules of NCA. **THIS IS A SIGNIFICANT CHANGE IN THE CURRENT RULES FOR MATERIAL ORGANIZATIONS.**

Section IV

Aluminum Boiler Revisions
When Part HA was developed for Section IV for Cast Aluminum Boilers, it was the intent to mirror many of the cast iron boiler requirements or include "cast aluminum" where "cast iron" was referenced in such places as nameplate, marking, data reports, etc. These changes were accidentally omitted when aluminum boilers were incorporated. Several items were opened to make these changes where needed. In most cases it was just an addition of "cast aluminum" to the existing text but several areas were revised in order to separate cast iron and cast aluminum from the previously worded "cast boilers". Affected text includes HG-100(a), HG-530, HG-540.2, HG-540.4, HG-540.5 and Nonmandatory Appendix K.

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New Mandatory Appendix 7

This **major revision** updates the rules governing mass production of Section IV boilers, water heaters, and storage tanks specified in HG-515.4(b) and HLW-600.3(d) respectively. It is recognized that in a high-volume manufacturing environment it is impracticable for the Authorized Inspector (AI) to fulfill each of his/her required duties. In these situations, and under the purview of ASME, the Manufacturer then takes on some of the inspection responsibilities that would normally be carried out by the AI. The previous rules for multiple duplicate construction in HG-515.4(b) and HLW-600.3(d) were very thin on detail, and over the years several Interpretations were published to clarify the intent of these rules. The primary goal of this revision was to bring into Section IV those clarifications and also to expand the level of detail on how to address mass production of boilers, water heaters, and/or storage tanks. These expanded rules are found in a new Mandatory Appendix 7. Below is a summary of the major changes and clarifications:

1. The term "multiple duplicate vessels" was replaced by "mass produced vessels". This simple change eliminates much of the confusion concerning when the rules of HG-515.4(b) and HLW-600.3(d) are applicable, since some people thought that the construction of two or more duplicate or identical vessels qualified for HG-515.4(b) and HLW-600.3(d) construction. The intent of the Code is that the rules of HG-515.4(b) and HLW-600.3(d) only apply in a construction environment where the volume or pace of fabrication is so large that it is impracticable for the AI to perform all of his or her required duties.

2. Boilers and HLW-stamped vessels constructed under the provisions of HG-515.4(b) and HLW-600.3(d) shall be identical, except for differences in fitting sizes and locations, shell lengths, and the location and configuration of non-pressure attachments.

3. There is no size limitation on mass-produced items.

4. The most significant clarification concerns the amount of inspection time required by the Authorized Inspection Agency (AIA) during mass production. A minimum of one full-time (40 hours per week) Inspector shall be present during mass production operations. For production less than 40 hours per week, the AI shall be present at all times. When mass production during multiple shifts takes place, the required AI presence beyond the full-time requirement shall be a matter of agreement between the AIA of Record and the Manufacturer. **THESE REVISIONS SHOULD BE CAREFULLY REVIEWED BY HG-515.4(b) and HLW-600.3(d) MANUFACTURERS AND THEIR AUTHORIZED INSPECTION AGENCIES.**

5. Appendix 7 now contains a list of responsibilities for both the AI as well as the Manufacturer, as provided in his Inspection and Quality Control Procedure.

6. The inspection and quality control procedures governing mass produced vessels and any revisions thereto shall be accepted by the AIA, legal jurisdiction, and ASME Designee.

Section V

T-434.1.7 and T-434.3.
The requirements for piping weld calibration block curvature and thickness tolerances, where none were previously provided for, were revised to more closely align with those for non-piping (vessel) weld calibration blocks. An aligning Code Case 2638 - "Alternative Piping Calibration Blocks" - was also adopted for implementation.

Article 4, Mandatory Appendix Fig. III-434.2.1(a)
On thin material, or thick material broken down into multiple examination zones, the indication from one reflector may affect indication of another if all of the holes are machined on the same face (side) of the calibration block. Article 4, Mandatory Appendix III, Figure III-434.2.1(a) - General Note (c) was revised to allow side drilled holes to be machined on opposite faces (sides) of the block when the indication from one hole affects the indication from another.

Article 4 Mandatory Appendices VII and VIII
Mandatory Appendix VII for workmanship-based acceptance criteria and Mandatory Appendix VIII for fracture mechanics-based acceptance criteria for ultrasonic examination (UT) procedural requirements when UT is allowed in lieu of radiography were adopted. Workmanship-based acceptance criteria are standards for acceptance of a weld based on the characterization of imperfections by type (i.e - crack, incomplete fusion, incomplete penetration or inclusion) and size (i.e.- length). Fracture mechanics-based acceptance criteria are standards for acceptance of a weld based on the characterization of imperfections by location (i.e - surface or subsurface) and size (i.e. - length or through wall height).

Article 4 Mandatory Appendix IX
Widespread, successful usage of Code Case 2235 to permit ultrasonic examination in lieu of radiography resulted in its incorporation into Section I and Section VIII, Divisions 1 and 2. The ultrasonic procedure qualification requirements of Code Case 2235 have been added to Section V Article 4 as new Mandatory Appendix IX.

T-675.3, T-676.1 & Table T-662 Liquid Penetrant Interpretation Times
Previous Code wording could have been interpreted as establishing total minimum liquid penetrant development time of 20 min rather than 10 min, (the 10 min from T-675.3 and the table plus the 10 min from T-676.1). T-676.1 was revised to clearly indicate a 10 minute interpretation time and it was removed from Table T-662. The maximum interpretation time was clarified as 60 min. In Table T-662 the "Developer Dwell" column was deleted.

Article 7 and Added Mandatory Appendix IV
Changes were made to Article 7 to implement "blue light" examinations. "Fluorescent excitation" was added as a term to include methods other than "black light" (ultraviolet). Mandatory Appendix IV was added to Article 7 for allowing an alternate method of obtaining fluorescent magnetic particle indications using methods other than "black light".

Section VIII, Division 1

UG-19(a)(2) - Mean Metal Temperature Design-
Section VIII, Division 1 permits the design of common elements of vessels made up of two or more chambers to be based on differential pressure acting on the common element, as well as an mean wall temperature. Detailed rules addressing differential pressure design as well as mean metal temperature design were added to the Code in the 2006 Addenda. The version of paragraph UG-19(a)(2) addressing mean metal temperature design resulted from some final "wordsmithing" that took place during the balloting of this item. Upon later review of this paragraph, as well as the Intent interpretation that was published, it was determined that the previous words could use some clarity. In UG-19(a)(2) it previously stated: "When mean metal temperature design is used, the maximum design temperature of one of its adjacent chambers shall not exceed the maximum common element design temperature determined in accordance with UG-20(a)." This is wrong, because it suggests that the mean wall temperature of the common element can never be less than the maximum design temperature of one of the chambers. The only way this could be true is if the maximum design temperature of both chambers is identical. The paragraph was revised to read: "When mean metal temperature design is used, the maximum common element design temperature determined in accordance with UG-20(a) may be less than the greater of the maximum design temperatures of its adjacent chambers; however, it shall not be less than the lower of the maximum design temperatures of its adjacent chambers."

Interpretation: VIII-1-04-68
Subject: Section VIII, Division 1 (2001 Edition, 2003 Addenda); Appendix 23
Date Issued: July 26, 2005

Question (1): A shell-and-tube heat exchanger utilizes tubes that fall under the scope and other provisions of Appendix 23 of Section VIII, Division 1. As permitted by UG-20(a), the tubes in the heat exchanger are designed based on the maximum mean metal temperature (taken through the tube wall at any point in the bundle and not along the tube length) that is expected under operating conditions. Is it the intent of the Code that the Appendix 23 rules can be applied if the heat exchanger is operated such that the tube design temperature so determined is within the maximum limits of the Appendix, but is less than the greater of the design temperatures of the shell side and tube side?

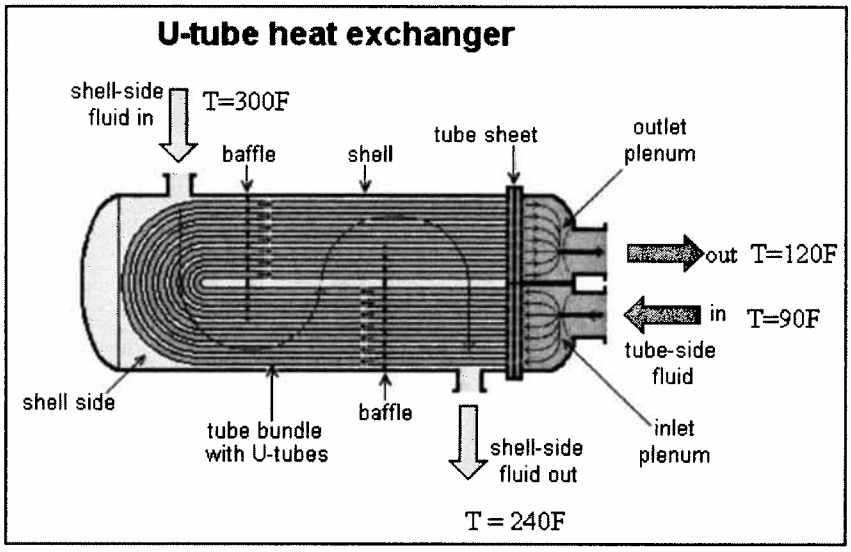
Reply (1): Yes, provided either the shell side or tube side maximum design temperature does not exceed the tube design temperature.

Question (2): If the reply to Question (1) is yes, shall the tube design temperature as described above be shown separately on the Manufacturer's Data Report and vessel nameplate?

Reply (2): Yes.

UG-19(a)(3) Example

Here is an example of a U-tube heat exchanger whereby heat transfer takes place between the shell side and tube side fluids. The shell side fluid enters the heat exchanger at 300°F and exits at 240°F. The tube side fluid enters at 90°F and exits at 120°F. If one were designing this heat exchanger based on the maximum design temperatures from either chamber, then the tubes would be designed based on a maximum temperature of 300°F. However UG-20(a) permits the design temperature to be based on mean metal temperature (through the thickness) expected under operating conditions. The mean metal temperature shall be determined by computation or by measurement from equipment in service under equivalent operating conditions. Note: Nonmandatory Appendix C provides guidance on obtaining the operating temperature of vessel walls in service.



- Tubes – SB-359 Mean wall design temperature = 145°F, based on heat transfer calculations
- Therefore, Appendix 23 may be used to establish maximum allowable external working pressure

If the designer of this heat exchanger wishes, he can reduce the maximum design temperature for the common elements (tubes and tubesheet) based on a mean wall temperature calculated from a heat transfer analysis, or perhaps based on previous operational experience. Depending upon the fluid flow in each of the chambers, it is possible that the mean wall temperature of the tubes would be significantly less than the actual temperature on the shell side of 300°F. In this example the SB-359 tubes can be designed for 145°F. One reason he may want to take advantage of a mean wall design temperature, would be to make use of Appendix 23 which provides an alternative

procedure for establishing the maximum allowable external working pressure for heat exchanger tubes. Appendix 23 rules are based on an actual external proof test, and often result in a much higher external pressure rating than one would achieve by direct calculations per UG-28. However Appendix 23 limits copper tubes to a maximum design temperature of 150°F. So unless one takes advantage of establishing the actual mean wall temperature in operation for this heat exchanger, the designer would not be able to make use of Appendix 23 rules.

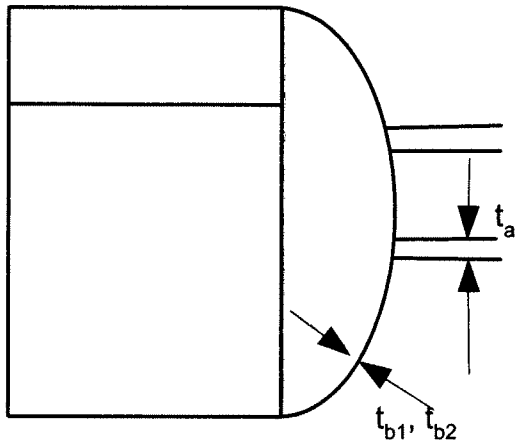
UG-45 Nozzle Neck Sizing Rules

Paragraph UG-45 is often considered one of the more difficult code paragraphs to understand. UG-45 establishes the minimum required thickness for nozzle necks and inspection openings, and what often challenges code users is the fact that the thickness of a nozzle neck is not only a function of pressure and other loads acting on it, but also consideration of the thickness of the shell or head into which the nozzle is installed, as well as the minimum thickness of standard wall pipe. Paragraph UG-45 has been presented in a couple of different formats over the years, but in the 2007 Edition of Section VIII, Division 2 the nozzle neck sizing rules were presented in a simpler form making use of mathematical min/max expressions instead of excessive text.

t_a = nozzle required thickness
t_{b1} = shell/head required thickness for internal pressure
t_{b2} = shell/head required thickness for external pressure
t_{b3} = min wall thickness of pipe from Table UG-45

UG-45 Example:

P = 500 psi
T = 200F
Material
Shell SA-516-70 S = 20 ksi
Shell OD = 60 in
Shell Nominal Thickness = 0.875 in
Nozzle SA-106 B S = 17.1 ksi
Nozzle NPS 8
No Corrosion Allowance



t_a = 500 (8.625/2)/(17,100 + 0.4(500)) = 0.125 in.
Nozzle
t_{b1} = 500(29.125)/(20000-0.6(500)) = .739 in Shell
t_{b2} = 0.0
t_{b3} = 0.282 in Min thickness of standard wall pipe

t_b = min[t_{b3} , max(t_{b1} , t_{b2})] = min [0.282, max (0.739, 0.0)] = 0.282 in
t_{UG-45}= max (ta, tb) = max (0.125, 0.282) = 0.282 in
If using pipe, nom. Thickness $\geq$ 0.282 / 0.875 = 0.322 in
Select Schedule 40

UW-2(c) – Use of Electric Resistance Welded (ERW) Pipe as the Shell in an Unfired Steam Boiler

If a Manufacturer wishes to use ERW pipe as the shell of an unfired steam boiler under the rules of Section VIII, Division 1 UW-2(c), there are no prohibitions against such use. However, a reasonably strong case can be made against such use by carefully assembling selected Interpretations, on the basis of the ERW weld seam being classified as a Category A weld joint, and the premise that radiography of ERW weld seams is not acceptable. After much debate, it was decided to align Section VIII rules for use of ERW pipe in an unfired steam boiler with the limitations specified in Section I, PG-9.5. This revision removes an inconsistency that has existed between Section I and Section VIII when a Section VIII vessel is used on a Section I ("E" stamped) electric boiler. Prior to this revision, a Section VIII Manufacturer could not use ERW pipe for the shell of a Section I electric boiler, even though it would be permitted under Section I rules.

Revised UW-2(c) Paragraph

(c) Unfired steam boilers with design pressures exceeding 50 psi (343 kPa) shall satisfy all of the following requirements:

(1) All joints of Category A (see UW- 3) shall be in accordance with Type No. (1) of Table UW-12, and all joints in Category B shall be in accordance with Type No. (1) or No. (2) of Table UW-12.

(2) All butt welded joints shall be fully radiographed except under the provisions of UW-11(a)(4) and except for ERW pipe weld seams. When using ERW pipe as the shell of an unfired steam boiler, its thickness shall not exceed ½ inch (13 mm), its diameter shall not exceed 24 inches (DN 600), and the ERW weld shall be completed using high frequency (HFI) welding.

(3) When fabricated of carbon or low alloy steel, such vessels shall be postweld heat treated.

(4) See also U-1(g), UG-16(b), and UG-125(b) for additional requirements.

UHA-44(d), UNF-79 – Postfabrication Heat Treatment Due to Straining

In this revision post fabrication heat treatment is now mandatory for cold formed swages, flares and upsets in pipe and tube for the alloys and design temperatures listed in Table UHA-44 and Table UNF-79. The equations to estimate the strain for pipe swages, flares and upsets have been deleted. Similar changes were made to the rules in Part 6 of Section VIII, Division 2. The following is background material behind this rule change.

Background[1]**-** In the metallurgical context, cold forming is the language used for forming below the recrystallization temperature. In the context of austenitic materials, it generally means forming at temperatures below about 1000°F (540°C).

Prior to the adoption of the PG-19 rules for cold formed austenitic material in 1998, there were two competing approaches. The first approach was to require forming trials on representative heats of material from the lots being used for fabrication and to base the decision on whether to perform post-forming heat treatment on an increase in hardness. An increase of 10 points on the Rockwell B scale, or an as-formed hardness in excess of 95 Rockwell B, were considered as appropriate criteria. The second approach was to use simple equations to estimate the forming strains and require post-forming heat treatment when the calculated strains exceeded certain critical values for simple tube or pipe bends, cylinders formed from plate, or spherical or dished heads (15 or 20% at design temperatures below 1250°F (650°C) or 10% at higher design temperatures -see Table PG-19). For swages, flares, and upsets, the strain limits were arbitrarily set at one-half those for the "simply calculated" configurations previously enumerated, with the belief that this was sufficiently conservative. The second approach was ultimately the one adopted for PG-19 because of the appeal of determining the need for heat treatment based on calculation without the need for forming trials on production material.

In estimating forming strains, swages, flares, and upsets represent a particular challenge because there are strains in multiple directions and the sequence of forming and equipment applied actually determines the strain history at each point in the formed fitting. Thus, objects having the same initial and final shape might, in truth, follow different strain histories and have different degrees of cold work. Nevertheless, the equations to estimate strains were adopted based on "before" and "after" dimensions using the assumption of constant volume commonly applied for plastic deformation. The limit of one-half strain versus simply bent configurations was thought to compensate for these simplifications.

A recent failure after only 100 hours in service has occurred in a cold worked swage for a superheater made with SA-213 TP321H austenitic stainless steel tubing. One swage severed completely and many suffered extensive cracking. While not heat treated after forming, the swage apparently does modestly violate the strain limits established in PG-19 that should have triggered heat treatment, but the amount of the violation wasn't "horrendous" and the question arises as to whether a similar swage which "just meets" the PG-19 rules might fail similarly. In recent memory, a similar failure occurred in three days in a swage of TP310HCbN and another example has been cited for short time failure in a TP347H swage that received inadequate solution treatment temperature.

The experience stated by the four major US boiler companies and two major offshore boiler companies who participated in the meeting of the Subgroup on Materials (SC I) on December 15, 2004 was that their practice predating the PG-19 rules was to perform post-forming heat treatments on all swages, flares, and upsets, and that mostly they had continued to do so regardless of the potential relief offered in PG-19. The one exception was the recent failure after 100 hours previously cited by an offshore boiler company in which the intent was to follow PG-19, albeit it appears it wasn't followed to the "letter of the law." The affected offshore boiler company viewed this issue as an urgent matter and

sent a representative to the Subgroup on Materials meeting on December 15, 2004 to present their perspective on a need for Code revision.

Two considerations mainly support the proposed Code revision. First, it appears that making heat treatment mandatory for swages, flares, and upsets will not pose an economic hardship or be a barrier to existing industry practices. Second, the calculational approach to strain estimation does not appear to work well for these "redundantly formed" configurations and it would take substantial experimentation to establish truly safe limits. Reversion to hardness testing was considered as an alternative but was not supported by the Subgroup on Materials (SC I).

[1]*Background material taken from ASME Section I Record 04-1670 Explanation.*

Appendix 2 – Bolt Spacing Correction Factor

It is a well known fact that if too few bolts are used on a flange it is possible to develop secondary bending stresses in between the bolts that would lead to non-uniform compression on the gasket. Excessive bolt spacing can result in a flange that is more prone to leakage. The well-known Taylor Forge Bulletin 502 "Modern Flange Design" contained an equation to calculate maximum bolt spacing as well as an equation to adjust the design moment when the bolt spacing exceeded a certain limit. Many companies invoke these rules as part of their internal specifications, but there has always been resistance within ASME Section VIII to add these rules to Appendix 2. Many committee members argued that "if it's not broke, don't fix it", meaning that the Appendix 2 flange design rules have been in the book now for over 45 years without this bolt spacing correction factor, so they fail to see the need to add it at this time. However from an engineering point of view, it is hard to ignore the presence of this additional stress on the flange and potential for leakage of the joint. With the current provision in UG-99(g), leakage is a Code issue for flanged joints, and the spacing limitation is appropriate. The compromise that was reached during the balloting of this item was that the bolt spacing and correction factor rules would be introduced into Appendix 2, but they would only become mandatory when the vessel is designated for lethal service, or when the user or his designated agent specifies the use of these rules.

Case 2651 - Rules for the Design of Electric Immersion Heater Element Support Plates

The current rules for reinforcement of multiple openings in flat covers used to support electric element heaters result in greater thicknesses than rules consistent with those in Part UHX. Flanged electric immersion heaters consist of tubular electric heating elements typically mounted in multiple penetrations in ASME B16.5 blind flanges. Under the current Code rules and interpretations, a flanged electric immersion heater element support plate is not considered a tubesheet but rather an unstayed flat head or cover. Therefore, the rules in Part UHX are not applicable and the cover thickness requirements are calculated using the formulas and rules in UG-34 and UG-39. For multiple penetrations, the rules in UG-39(d)(2) require the value under the square root sign in formula UG-34 (c)(2), Formula (2) to be doubled for both operating and bolting

calculations. This causes the thickness to be unnecessarily greater than that computed using the Part UHX methodology.

Typically blind flanges are used for the electric immersion heater element support plate. However it is not uncommon for a manufacturer to be forced to use the next higher class of blind flange in order to achieve the minimum thickness requirements for both operating and bolting as calculated by UG-34 and UG-39. Moreover the required thicknesses as determined by these rules are typically 20% to 30% thicker than similar calculations for heat exchanger tubesheets subjected to the same pressure and temperature. The Subgroup on Heat Transfer Equipment of Section VIII developed special rules for the design of immersion heater element support plates, based upon the rules in UHX-12 for U-tube tubesheets. These new rules will be published in a Mandatory Appendix in VIII-1 in the 2011 Addenda. An early implementation Code Case, Case 2651, has been approved for use, effective June 25, 2010. Note that some minor revisions were made to this Case, and Revision 1 (Case 2651-1) was approved for use on September 8, 2010.

Section VIII, Division 3

Composite Reinforced Pressure Vessels (CRPV)

Section VIII, Division 3 has adopted two Code Cases (2390 and 2579) which allowed for the use of Composite Reinforced Pressure Vessels (CRPV) in high pressure hydrogen service. Several new Articles and paragraphs have been added to address the special requirements for design, testing, marking, etc. for these types of vessels. There was one technical change during the incorporation. The prohibition of truck transport from Case 2579 was eliminated. The Committee felt that if the transport loads were properly addressed then there was no reason to prohibit these vessels from over-the-road transport.

Section IX

Introduction – Volumetric NDE

Qualification of Welders and Welding Operators using ultrasonic examination (UT) has been added to Section IX. The third paragraph of the Introduction, "Performance Qualifications", was revised to include "volumetric NDE" of a test coupon or initial production weld to permit qualification of welders and welding operators by ultrasonic (UT) examinations on test welds in material 1/2 inch (13 mm) thick or greater in lieu of radiography or mechanical testing. This change incorporates the requirements of Code Case 2326 and is reflected in revised paragraphs in Section IX Articles I and III.

QW-191 and QW-191.2 – Volumetric NDE
QW-191 has been retitled "Volumetric NDE". Ultrasonic Examination requirements were added to QW-191.2. These changes incorporate the requirements of Code Case 2326 as explained in the "Introduction".

Article 4 – Addition of P-No. 10H Duplex Stainless Steels
Duplex (austenitic/ferritic) stainless steels solution annealed after welding were not specifically mentioned in Section IX. From a metallurgical standpoint, it would seem logical that they would be handled in the same manner as austenitic stainless steels that are solution annealed after welding, based upon the fact that the detrimental metallurgical characteristics in the heat affected zone (HAZ) would be eliminated by the solution heat treatment. As a result of an Interpretation, "P-No. 10H" materials were added to paragraphs QW-403.6, QW-406.3, QW-407.4, QW-409.1 & QW-410.9.

QW-409.1 (c) - Heat Input Determination
Waveform controlled power source technology (**See item below on Nonmandatory Appendix H**) allows infinite adjustment of the output waveform characteristics to control features such as droplet shape, penetration, wetting, and bead shape. When using these new power sources the previously existing heat input formula does not take into account waveform shape, phase shifts or other synergistic changes. Supplementary essential variable QW-409.1 was therefore revised with the addition of "(c)" to address heat input determination using instantaneous energy or power measurements.

QW/QB-422 - ISO 15608 Group Numbers
A column was added to QW/QB-422 to identify the corresponding material group numbers according to ISO/TR 15608:2005 - "Welding - Guidelines for a metallic materials grouping system" and is consistent with the assignments found in ISO/TR 20173:2008 - "Grouping systems for materials — American materials". This ISO 15608 Group listing is provided as a convenience and is for information only. Section IX does not refer to the ISO 15608 groupings as a basis for establishing the range of base metals qualified for either procedure or performance qualification. **NOTE: This addition does not appear in either the "Summary of Changes" or "List of Changes in Record Number Order" printed in the 2010 Edition.**

QW/QB-492 – Machine Welding
As a result of Interpretation IX-07-11, the following phrase was added to the definition of machine welding: "or adjusted under the welding operator's direction". A person who makes adjustments to the welding equipment settings, under the supervision and control of the welder or welding operator performing the weld, need not be a qualified welder or welding operator under QW-301.2.

QB-452.1 – Sectioning Test Specimens
QB-141.1 states in part: "Sectioning tests are also a substitute for the peel test when the peel test is impractical to perform..." Although QB-452.1 stated two (2) peel tests are required, it did not clearly indicate that an equal number of sectioning tests may be substituted. The addition of references to Section(ing) test specimens in the rightmost

column of QB-452.1 and a modification to NOTE (1) clarified these requirements and reinforced the applicability of QB-141.4.

Nonmandatory Appendix B Suggested Forms QW-484A/B (WPQR / WOPQR)
The welder and welding operator performance qualification suggested forms were revised to include a block to indicate "or UT". The change was made to reflect Section IX allowance of "volumetric NDE" (either radiography (RT) or UT) of a test coupon or initial production weld to permit qualification of welders and welding operators.

New Nonmandatory Appendix H - Waveform Controlled Welding
Advances in microprocessor controls and welding power source technology have resulted in the ability to develop waveforms that improve control of arc characteristics for pulsed welding. The characteristics selected by the welder or welding operator are no longer limited to amperage, voltage or wire feed speed, as in traditional welding power sources. Widespread use of waveform controlled power sources has resulted in the need to review traditional methods of measuring heat input and specifying welding variables for applicability to this new technology. Work performed by several equipment manufacturers and research organizations has shown significant error in the actual power (current, voltage) produced by a waveform controlled power source in measurements obtained using conventional DC or RMS amperage and voltage meters compared to that measured by high frequency sampling methods that account for changes in the wave shape. The error can be on the order of 20% and be in a non-conservative direction.

When qualifying a new welding procedure using waveform controlled welding, the instantaneous energy or power range is used in lieu of the amperage and voltage ranges to determine the heat input per QW-409.1(c). When qualifying a new procedure using nonwaveform controlled welding, either the current (amperage) and voltage is recorded and heat input determined using the methods of QW-409.1(a) or QW-409.1(b), or the instantaneous energy or power is recorded and the heat input determined by the method in QW-409.1(c).

Welding procedures previously qualified by nonwaveform controlled welding and heat input determined by QW-409.1(a) may continue to be used for waveform controlled welding provided they are amended to require heat input determination for production welds using the methods of QW-409.1(c). Welding procedures previously qualified using nonwaveform controlled welding and heat input determined by QW-401.9(b) continue to be applicable for waveform controlled welding without changes to the heat input determination method.

Methods are described in Nonmandatory Appendix H to: (1) determine if the heat input of a waveform controlled production weld meets the heat input range of a welding procedure qualified with nonwaveform controlled welding with heat input determined using QW-409.1(a); and (2) determine if the heat input of a nonwaveform controlled production weld meets the heat input range of a welding procedure qualified with waveform controlled welding with heat input determined using QW-409.1(c).

Separate performance qualifications are not required for waveform controlled welding; however, it is recognized that a welder or welding operator may require instruction on the proper use of the equipment. The extent of such instruction is left to the discretion of the Manufacturer.

Section X

Appendix 8 - Class III Vessel Added
A Class III vessel for filament wound vessels with polar boss openings for up to 15000 psi [103.4 MPa] has been added. This addition is an incorporation of a Code Case (as Appendix 8) in order to meet the needs for the future storage of hydrogen gas for motor vehicle use. Most of these high pressure cases have been adopted by Section VIII, Div. 3 but because Division 3 does not have rules for all composite construction, it was necessary for Section X to adopt the case. With the inclusion of the new Appendix, the scope of Section X was increased to the maximum pressure of 15000 psi [103.4 MPa] There were also several paragraphs that were revised to accommodate the new vessel class (e.g. hydrostatic test pressure ratio, hold time for the hydrostatic test and the addition of acoustic emission examination for all vessels.

RT-330 - Deletion of 5% Limit for Volumetric Expansion
The original requirement was for the volumetric expansion of production vessels to be within 5% of the value recorded in the Qualification Test Report and the Procedure Specification. In 2007, RT-330.2 was added which deleted the lower limit for vessels with less than 120 gallons capacity. The reasoning then was that for small vessels the accuracy of the measurements was often insufficient to determine if a vessel was rejected or accepted. A lower volumetric expansion indicates the production vessel is stronger than the prototype used for qualification testing. Therefore, the deletion of the volumetric expansion lower limit does not affect the integrity of the vessel. This revision to RT-330 makes the volumetric expansion requirements the same for all production vessels.

"Assembler" and "UV Stamp"
Since safety relief devices for Section X vessels are required to comply with Section IV or Section VIII, Division 1, it was decided that references to "Assembler", "UV Stamp" and a Certificate of Authorization for the UV stamp were not necessary and thus were deleted.

Section XI

IWA-1400(n)(2)
Table IWA-1600-1 was previously changed to refer to NQA-1, 1994 Edition. With the introduction of this edition, NQA-1 was reorganized such that "Part I" contains the Basic and Supplementary Requirements. Previous references to Part II and Part III have been deleted.

HSB Code Services
ASME Boiler and Pressure Vessel Code
2010 Edition Synopsis – Executive Summary

IWA-2410
IWA-2410 was revised to address Preservice Inspection (PSI), initial and successive Inservice Inspection (ISI) for a new nuclear power plant receiving a Combined Operating License (COL) under US 10CFR52 by removing the reference to US 10CFR50,Section 50.55a. This change should also benefit Owners using Section XI outside the USA.

IWA-4411(h)
Reference to stress corrosion cracking (SCC) was deleted to make wording consistent with prior changes to Nonmandatory Appendix Q, and to clarify that when Appendix Q is used, all of its requirements become mandatory and the provisions of IWA-4520 and IWA-4530 do not apply. Nonmandatory Appendix Q previously only addressed weld overlays for SCC. Code Case N 504-2 and Appendix Q were determined to be appropriate for addressing defects for fatigue cracking as well as SCC.

IWB-1220
Listed components are exempt from volumetric and surface examinations. Visual examinations VT-1 and VT-3 are now exempted as well based upon IWF-1230 and intent Interpretation XI-1-86-45.

IWB/C/D/F-2430
The criteria of Code Case N-586-1 and Interpretation XI-1-98-41 have been added. Code Case N-586-1 allowed additional examinations to be limited to those welds, areas, parts or supports that are subject to the same apparent or root cause and degradation mechanism as the flaws or relevant conditions originally detected. Application of the Code Case required the performance of an engineering evaluation to determine these factors. Interpretation XI-1-98-41 stated that additional examinations may be limited to the method that originally detected the subject flaws or relevant conditions.

Nonmandatory Appendix B
Nonmandatory Appendix B - "Forms" contained Forms NIS-BA "Record of Welding Operator Qualification Test for Tube Welding by Explosives" and NIS-BB "Example of Tube Examination Report" (dated 10/06). There was no reference to either Form in Section XI or that they were being used in Section XI applications; therefore, this Appendix was deleted in its entirety.

Code Case N-778 Approved
Code Case N-778 for Alternative Requirements for Preparation and Submittal of Plans, Schedules, and Preservice and Inservice Inspection Summary Reports. (Applicability: Section XI 1989 Edition through the 2007 Edition with the 2009 Addenda.) was developed to eliminate the Section XI requirement that licensees submit ISI plans, schedules, and preservice and inservice inspection summary reports to the regulatory and enforcement authorities having jurisdiction at the plant site. This was essentially a regulatory requirement and intended to be removed from the Code. Owners were required by ASME to submit these documents to the regulatory and enforcement authorities, regardless of whether these authorities needed or even wanted this documentation. Should the regulatory and enforcement authorities wish to continue receiving these

documents, these authorities should specify this in the applicable regulations governing the Owner's plant site. In parallel to this Code Case, complementary revisions were made to IWA-1400(c) and IWA-6240.

Section XII

Modal Appendix 1 - Fatigue Evaluation Exemptions
Current design requirements in Section XII for MC331 cargo tanks require consideration of cyclic loads due to both dynamic loads during highway transit and full pressure cycles during the tank vessel service life due to filling and emptying of lading. This revision provides some exemptions of certain MC331 cargo tanks from fatigue analysis requirements based on construction material, size and lading restrictions. These revisions will now exempt a large proportion of tank vessels in this category.

New Mandatory Appendix XVI – Local Thin Areas (LTA) in Cylindrical Shells and in Spherical Segments of Shells
This new Appendix is an adoption of Appendix 32 from Section VIII, Division 1. The Appendix contains rules that permit a local thin area (LTA) in a shell or head with no reduction in MAWP. LTA's in pressure vessels are small local areas in the shell or head that have a thickness less than the nominal thickness, and in some cases, less than the required thickness. The transport industry felt that a similar rule as Appendix 32 in Section VIII, Div. 1 was needed.